

main frame

IBM

Information Management

**IBM Inter-University Programming Contest 2011 Training**

Chapter 1a: Contest Briefing

Software Group, IBM

IBM Asia - University Programming Contest 2011

January 29, 2011 (Saturday)

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## Agenda

- Contest Rundown
- Overview of the contest technical scope
- Description on the contest PC setup and contest workflow
- Overview of the contest questions
- How to answer the questions

IBM Programming Contest

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## Contest Rundown

Date : Jan 29, 2011 (Saturday)

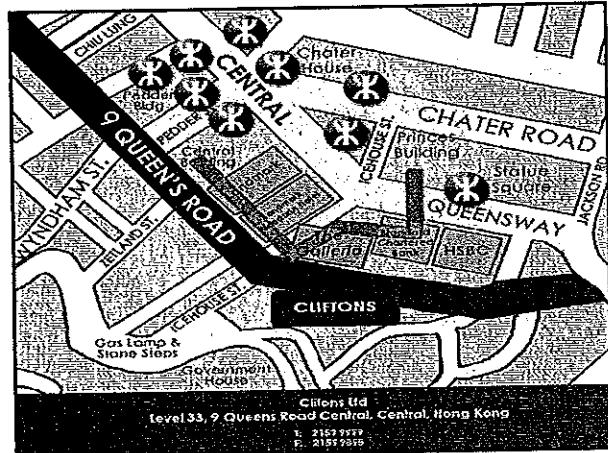
Time : 2:00 p.m. - 5:30 p.m.  
(registration starts at 1:30 p.m.)

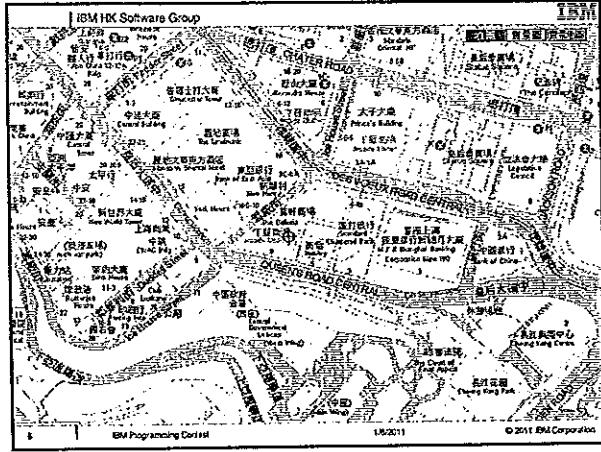
Venue : Cliftons Central Training Centre, Level 33, 9 Queen's Road Central, Hong Kong

IBM Programming Contest

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<b>Contest Rundown</b>											
<table border="1"> <tr> <td>1:30 - 2:00pm</td><td>Registration</td></tr> <tr> <td>2:00 - 2:15pm</td><td>Welcome Speech</td></tr> <tr> <td>2:15 - 4:15pm</td><td>Competition takes place</td></tr> <tr> <td>4:15 - 4:45pm</td><td>Marking</td></tr> <tr> <td>4:45 - 5:30pm</td><td>Award Presentation</td></tr> </table>		1:30 - 2:00pm	Registration	2:00 - 2:15pm	Welcome Speech	2:15 - 4:15pm	Competition takes place	4:15 - 4:45pm	Marking	4:45 - 5:30pm	Award Presentation
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4:15 - 4:45pm	Marking										
4:45 - 5:30pm	Award Presentation										

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<b>Prize</b>	
<b>Champions</b>	<ul style="list-style-type: none"> <li>▪ HK\$30,000<sup>a</sup> Cash Award</li> <li>▪ Champion Trophy</li> <li>▪ Three-month Summer Internship Program at IBM<sup>b</sup></li> </ul>
<b>First runner ups</b>	<ul style="list-style-type: none"> <li>▪ HK\$15,000<sup>a</sup> Cash Award</li> <li>▪ 1st runner up Trophy</li> </ul>
<b>Second runner ups</b>	<ul style="list-style-type: none"> <li>▪ HK\$ 9,000<sup>a</sup> Cash Award</li> <li>▪ 2nd runner up Trophy</li> </ul>
<b>All Contestants</b>	<ul style="list-style-type: none"> <li>▪ IBM Trendy Backpack</li> <li>▪ IBM Participation Certificate</li> </ul>
<b>The Champion University*</b>	<b>▪ Champion Trophy</b>

\*The Cash Award is for the whole team.  
<sup>a</sup>The award will be the most points of all their team.  
<sup>b</sup>Winners must be Hong Kong residents or have a "Visa Definition Letter" (VDL) issued by Immigration Department.

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<b>Contest Rules (1)</b>	
<ul style="list-style-type: none"> <li>▪ The contest has a duration of 2 hours.</li> <li>▪ One PC and one terminal will be provided for each team.</li> <li>▪ A set of questions will be given to each team to be completed within 2 hours.</li> <li>▪ The contest is an open book contest. Contestants could bring in their reference books for the contest.</li> <li>▪ Internet Access NOT allowed.</li> <li>▪ Inter-Team Communication NOT allowed.</li> <li>▪ ONLY Intra-Team Communication allowed.</li> <li>▪ All the questions and related schema are provided to the students at the beginning of the contest. Question sheet is provided in hardcopy form.</li> <li>▪ Once a team completes a question, the result is submitted to the judge. A time is recorded as the submission time. Then the judge will evaluate the submitted answer. In case the validation fails, the team will be notified and feedback will be provided to the team.</li> </ul>	

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## Contest Rules (2)

- Each team can have THREE chances to submit the answer of each question: (For programming questions only)
  - Each time the team submits an answer, the judge records the submission time and runs a stored procedure to check the answer. If the answer is correct, they will be awarded points for the question. If the answer is incorrect, the contest system will send the answer back to the team and the team can then re-submit again up to three times.
  - Full points will be provided if the answer is correct.
  - Partial points might be given on programming questions.
  - For each question, the highest point obtained will be recorded as its final point.
- After the contest is over, the team which gets the most points wins. If several teams get the same number of points, the one with the earliest last submission time wins.
- The decisions of the judges will be final.
- IBM reserves the right to publish the photographs and/or names of all or any prize winners in any of its promotional materials and/or advertisements as it sees fit.

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## Technical Scope

- Overview on IBM middleware
- DB2 basic operations on distributed platform and mainframe platform. For example:
  - How to submit DDL and DML commands
  - How to interpret error messages
  - How to save results
- Overview on graphical Interfaces
- Overview on web programming using Java, DB2, WebSphere Application Server, Rational Application Developer and WebSphere Portal Server
- Overview on Tivoli Netcool Omnibus

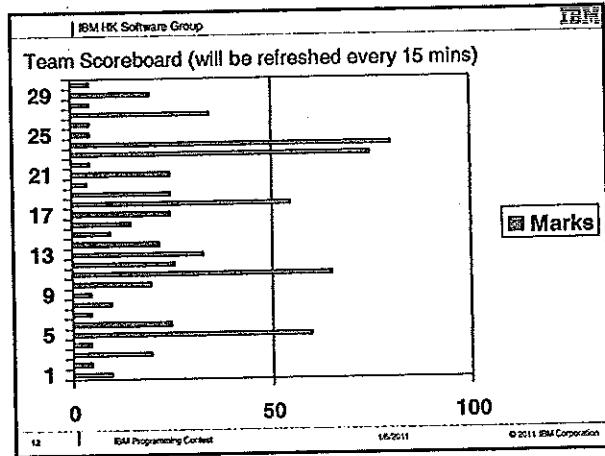
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## Contest PC Setup

- Networked student PC and Instructor PC
- CPU : Intel Core 2 Quad Q9400 2.66GHz
- Ram : 4GB (2GB effective in VMware)
- Hard disk : 500GB HD
- One set of keyboard, mouse and a 17" TFT flat screen

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## Announcement

- Announcement will be published to the projector and by voice.

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### Question Overview

IBM Inter-University Programming Contest 2011

January 29, 2011 (Saturday) 09:00 Central 15/2011 © 2011 IBM Corporation

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## Two Types of Questions

- Section 1 : Multiple Choices**
  - Choices of A, B, C and D
  - Can only submit all the answers ONCE
- Section 2 : Programming Questions**
  - Need to perform programming work
  - Provide URL as the answer
  - Judge will check the correctness of the answer by running your program
  - Can submit answers up to three times

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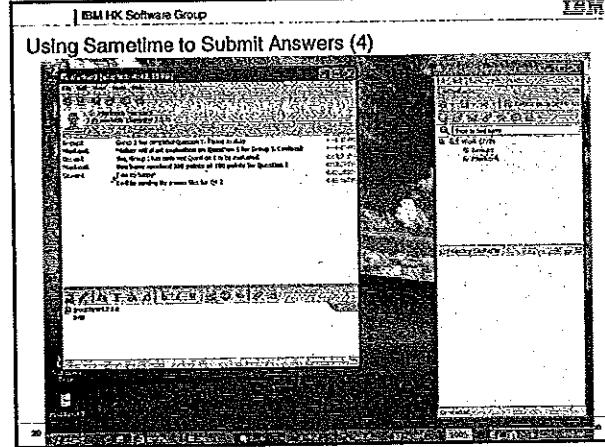
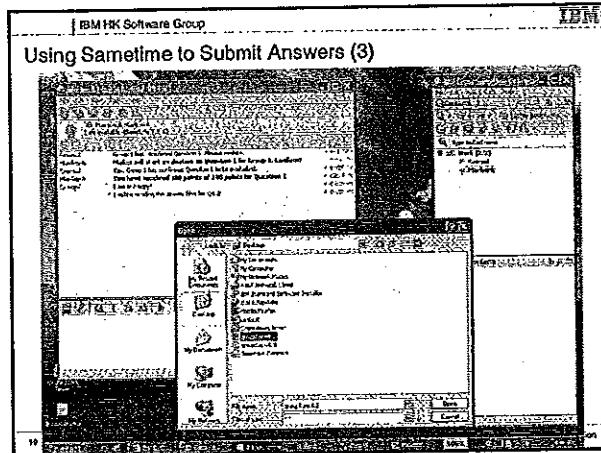
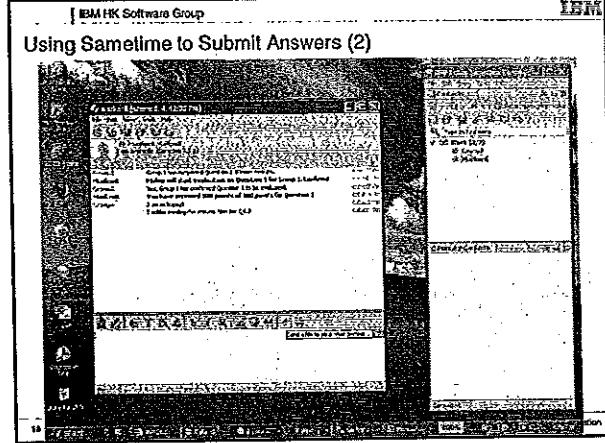
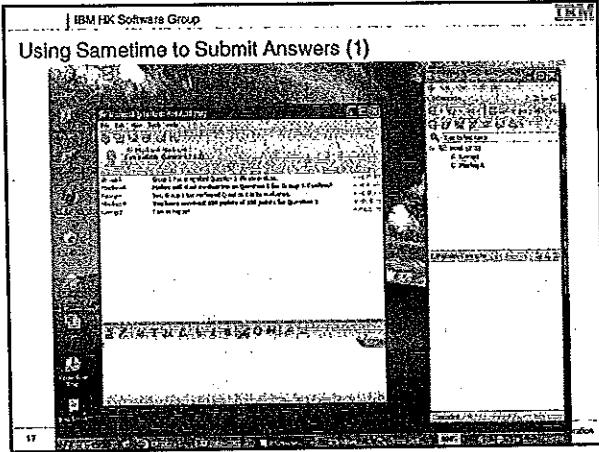
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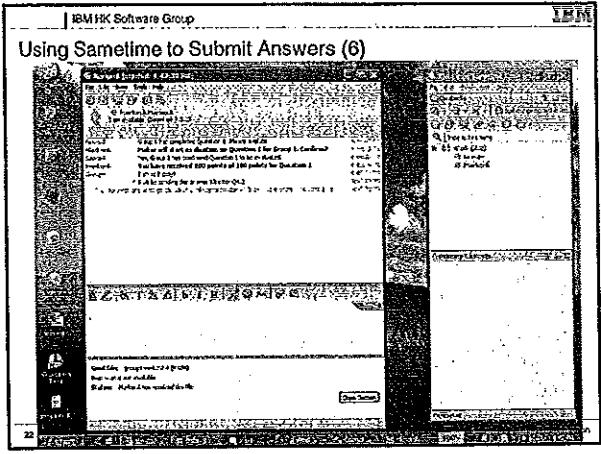
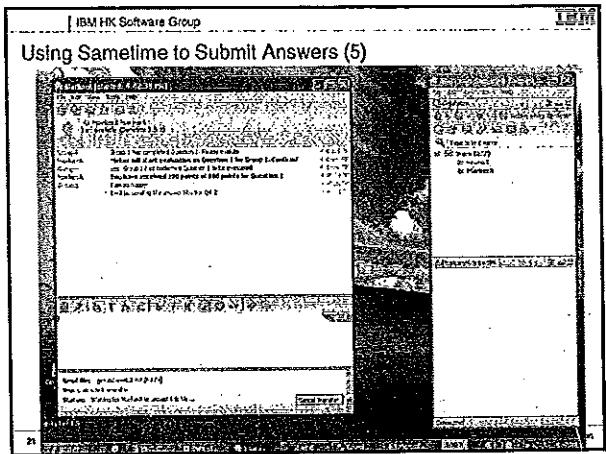
## Distribution of Points

Question Number	Difficulty (* to *****)	Point
1.1	*	10
1.2	**	10
1.3	***	10
1.4	****	10
1.5	*****	10
1.6	***	20
1.7	****	20
1.8	*****	20
1.9	*****	20
1.10	*****	20
<b>Section 1 Total</b>		<b>150</b>
2.1	*****	50
2.2	*****	200
2.3	*****	60
2.4	*****	120
2.5	*****	60
2.6	*****	50
2.7	*****	200
<b>Section 2 Total</b>		<b>850</b>
<b>Grand Total</b>		<b>1000</b>

Sample Points

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### Agenda

- 9:15am - 10:30am: Introduction, contest environment walkthrough and DB2 with LAB
- 10:30am - 11:30am: Tivoli with LAB
- 11:30am - 12:30pm: WAS with LAB
- 12:30pm - 1:30pm: Lunch
- 1:30pm - 2:30pm: Portal with LAB
- 2:30pm - 3:30pm: Mainframe with LAB
- 3:30pm - 4:30pm: RAD with LAB
- 4:30pm - 5:30pm: Cognos with LAB

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### Contest PC Environment

- You have a chance to walk through the PC environment by running the lab today

Ready to Go?

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### IBM Inter-University Programming Contest 2011 Training

#### Chapter 1b: DB2 Operation Overview

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### Chapter Outline

- Tools to Access DB2
- DB2 Instances and Databases
- Bufferpool
- Tablespace
- Schema
- Data Type
- Table
- Insert Statement
- Update Statement
- Delete Statement
- Select Statement
- Select Statement Options

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### Tools to Access DB2

Tool	Description
DB2 Command Line Processor	Database Command Line Processor
DB2 Command Window	DB2 Command Window
DB2 Connect	DB2 Connect
DB2 Control Center	DB2 Control Center
DB2 Data搬移	DB2 Data搬移
DB2 Express	DB2 Express
DB2 Load	DB2 Load
DB2 Optimizer	DB2 Optimizer
DB2 Parallel Load	DB2 Parallel Load
DB2 Parallel Server	DB2 Parallel Server
DB2 Performance Tuner	DB2 Performance Tuner
DB2 Profiler	DB2 Profiler
DB2 Statistics	DB2 Statistics
DB2 Utilities	DB2 Utilities
DB2 WebSphere Business Intelligence	DB2 WebSphere Business Intelligence

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### Command Line Access

- DB2 Command Line Processor (CLP)
  - click on the DB2 Command Line Processor icon or enter db2 at a command prompt
  - an interactive input prompt appears:
    - db2 =>
    - no need to prefix commands with 'db2'
    - e.g. db2 => connect to sample
    - to end the interactive mode, enter quit
    - to disconnect from the database and terminate the DB2 backend process (db2bp), enter terminate
    - to execute OS commands, enter !<OS command>
- DB2 Command Line Window
  - click on the DB2 Command Window icon or from MS-DOS prompt, enter db2cmd
  - The command db2cmd is valid for Windows only
  - invoke the interpreter by prefacing commands and SQL with 'db2'
    - e.g. db2 connect to sample
    - e.g. db2 "select \* from employee"
    - e.g. db2 -tvf createtab.db2
  - to end command line mode and terminate the DB2 backend process (db2bp), enter db2 terminate
  - all OS commands can be issued from the DB2 Command Window

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*R1/r2/cde*

**Getting Help**

- Obtain syntax and information for DB2 commands from the command line
  - db2 "?" list of all DB2 commands
  - db2 "? <db2-command>" get syntax help for a specific command
  - db2 -? sqlmhfn get message and brief description of a specific SQLCODE
  - db2 -? db2nnnn get message and brief description of a DB2 error code
- For example:

```
db2 "? catalog tcpip"
CATALOG [ADMIN]TCPIP NODE node-name REMOTE hostname
[SERVER service-name] [SECURITY [SOCKS]]
[REMOTE_INSTANCE instance-name] [SYSTEM system-name]
[OSTYPE os-type] [WITH "comment string"]
```

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*DB2 rollback  
DB2 commit*

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**Command Line Options**

- To list default command options
- LIST COMMAND OPTIONS

Default Setting	Description
ON	Set all variables to connect to local
OFF	Ignore options with the exception of those specified in the command line
OFF	Display command line
OFF	Display command file
OFF	Get command in listing file
OFF	Unknown how this option is used
ON	Display command line
ON	Display interactive help screen
OFF	Do not report to report file
OFF	Stop execution on command error
OFF	Set parameter resolution directed
OFF	Set parameter override
ON	Display response/return warning messages
OFF	Report listing of active handles
OFF	Save all output to output file

- To change default command options:
  - For example, to turn auto-commit off: set db2options=-c
- To change command option for the current session:
  - For example, to save output to file: UPDATE COMMAND OPTIONS USING z ON output.txt

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*Connect to DB2*

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**Control Center**

Control Center

- All Objects
- Applications
- Tables
- Tablespaces
- Indexes
- Views
- Materialized
- Code Objects
- Procedures
- Triggers
- Event Monitors
- Application Objects
- User and Group Objects
- Partitioned Database Objects
- SMS Schema Processing (SMS)

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**Information Management**

**Command Center**

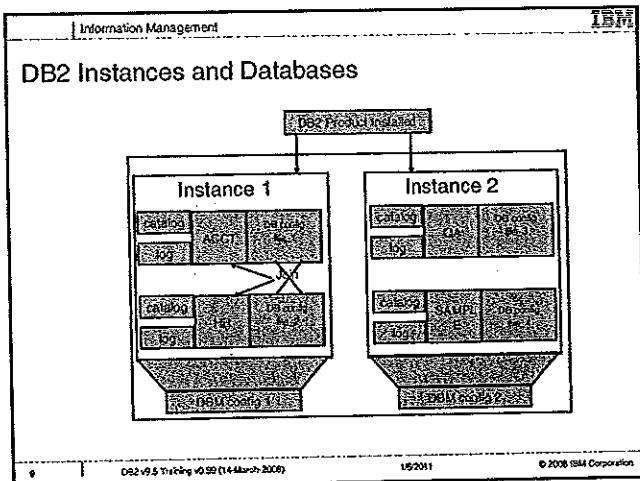
Command Center

Database Connection Information

- Database server = DB2LUX 9.5.0
- DB authorization ID = CCRCS
- Local database alias = SAMPLE

A JDBC connection to the sample DB proceeded.

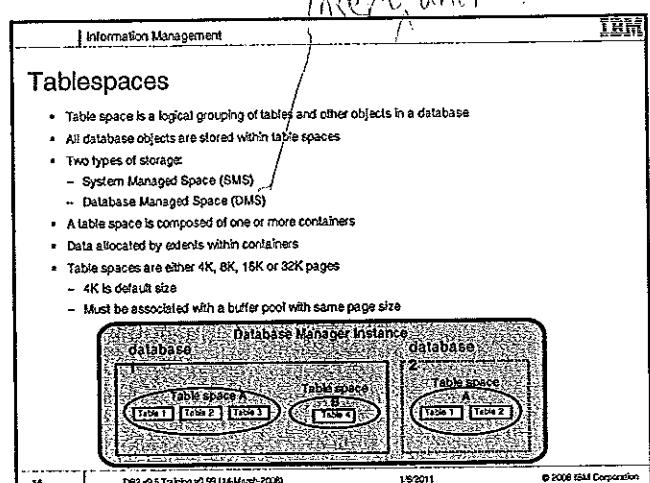
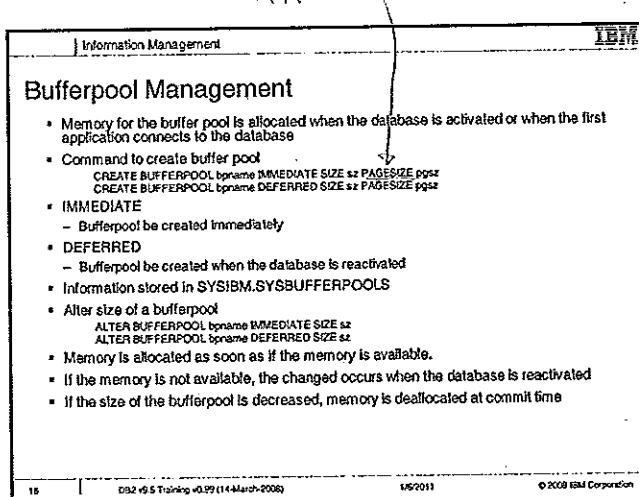
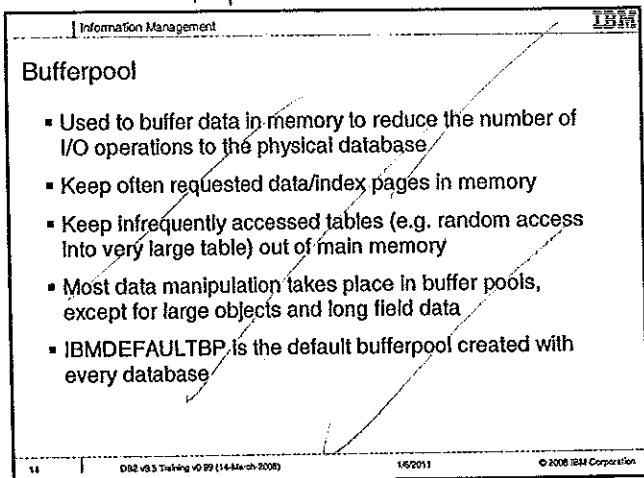
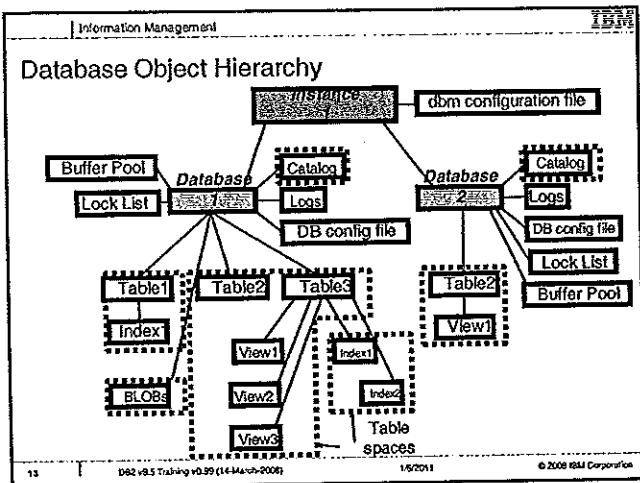
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- ## DB2 Instances
- A DB2 instance is a logical context in which DB2 commands and functions are executed
  - An instance manages access to database files
  - More than one instance can be defined on a server machine
  - Each instance is independent of the others
  - An instance is created on install by default
    - db2inst1 (UNIX)
    - DB2 (Windows)
  - To start an instance
    - db2start
  - Starts a remote instance
    - db2start REMOTE <instance name>
  - Start the instance in quiesced mode for administration purposes
    - db2start ADMIN MODE
  - Terminates all database connections and stop an instance
    - db2stop force
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- ## Managing DB2 Instances
- To create additional instances
    - db2crt -u <fenced user ID> <instance name>
      - \* must specify fenced user ID for UNIX platforms
    - db2crt <instance name>
      - \* for Windows platforms
  - To terminate all database connections and drop an instance
    - db2drop <instance name>
  - To list existing instances defined in a server
    - db2inst
  - To update a DB2 instance for access to functions associated with installation or removal of certain product options or fix patches
    - db2upd <instance name>
  - To migrates an existing instance, for UNIX platforms only
    - db2migr <instance name>
  - To create, drop, update, or migrate an instance, root or administrative access is required
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- ## Create a Database
- Simplest format
- ```
CREATE DATABASE database-name
```
- More options:
- ```
CREATE DATABASE database-name
[AUTOMATIC STORAGE {NO | YES}]
[ON drive{,drive}...|[DBPATH ON drive]]
[ALIAS database-alias]
[USING CODESET codeset TERRITORY territory]
[PAGESIZE integer [Ki]]
[CATALOG TABLESPACE tbspace-defn]
[USER TABLESPACE tbspace-defn]
[TIMESTAMP TABLESPACE tbspace-defn]
[AUTOCONFIGURE {USING config-keyword value [,config-keyword value]...}]
```
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*WIP account*

## Information Management

### Default Tablespaces in a Database

- With a simple CREATE DATABASE command:
  - CREATE DATABASE sample
- Three SMS table spaces are created automatically in default locations:
  - SYSCATSPACE - system catalog tables
  - USERSPACE1 - default user data
  - TEMPSPACE1 - temporary data
- Can change table space storage type and explicitly specify the locations of the containers:

```

CREATE DATABASE sample
  CATALOG TABLESPACE
    MANAGED BY SYSTEM
    USING ('c:\catalog1');
  USER TABLESPACE
    MANAGED BY DATABASE
    USING ('FILE:c:\db2\res\user\bsp1 100, FILE:c:\db2\res\user\bsp2 100');
  TEMP TABLESPACE
    MANAGED BY SYSTEM
    USING ('c:\temp\space1');
  
```

*using space1*

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*database & names  
a.t.*

*database & names  
a.t.*

## Information Management

### Schema

- A schema is a collection of database objects such as tables, views, indexes, or triggers. It provides a logical classification of database objects
- How is a Schema name used?
  - Fully-qualified object name: "schemaname.tablename"
  - Can have multiple tables with the same name, but different schema names
    - eyerman.staff != jones.staff
- Reserved schema names
  - SYSCAT, SYSIBM, SYSSTAT, SYSFUN
  - Avoid schema names beginning with SYS
- If database object does not specify a schema name, table qualified with current authorization ID
- Alternate schema names can be specified using
  - SET CURRENT SCHEMA or SET CURRENT SQLID command
  - CREATE ALIAS <aliasname> FOR <tab/view name>
  - CREATE VIEW

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## Information Management

### System Schemas

- Created with every database and placed into the SYSCATSPACE table space
- SYSIBM**
  - Base catalogs
  - Access not recommended
- SYSCAT**
  - SELECT authority GRANTED to PUBLIC
  - Catalog Read-only Views
  - Recommended way to obtain catalog information
- SYSTAT**
  - Updateable Catalog Views - Influence the Optimizer
- SYSFUN**
  - User-Defined Functions

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## Information Management

### System Catalog Tables and Views

Schema: Table = SYSIBM View = SYSCAT

TABLE	VIEW	DESCRIPTION
SYSBAUTH	DBAUTH	Authorities on database
SYSCHECKS	CHECKS	Check constraints
SYSCOLUMNS	COLUMNS	Column definitions
SYSCTCHECKS	COLCHECKS	Columns referenced by check constraints
SYSCOLDIST	COLDIST	Detailed column statistics
SYSKEYCOLUSE	KEYCOLUSE	Columns used in keys
SYSCONSTDEF	CONSTDEF	Constraint dependencies
SYSDATATYPES	DATATYPES	Data type definitions (built-in & JDT)
SYSDEVENTMONITOR	EVENTMONITOR	Event Monitor Definitions
SYSINDEXES	INDEXES	Index definitions
SYSFUNCTIONS	FUNCTIONS	UDF definitions
SYSINDEXAUTH	INDEXAUTH	Index privileges
SYSINDEXES	INDEXES	Index definitions

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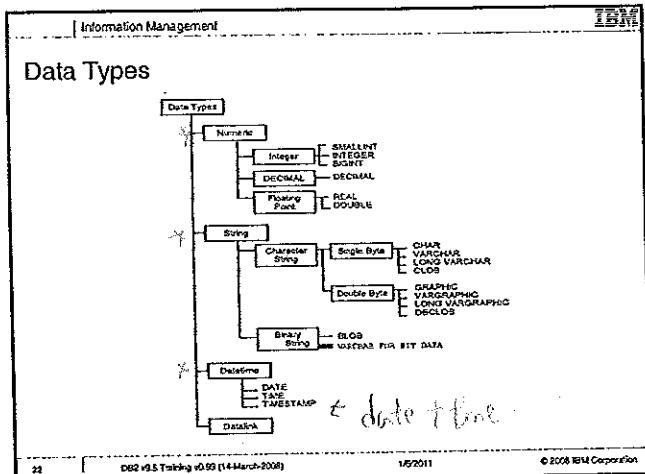
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### System Catalog Tables and Views

Schema: Table = SYSIBM View = SYSCAT

TABLE	VIEW	DESCRIPTION
SYSPACKAGEAUT	PACKAGEAUTH	Authorizes on packages
SYSPACKAGEDEP	PACKAGEDEP	Package dependencies
SYSPACKAGES	PACKAGES	Package definitions
SYSPREFERENCES	REFERENCES	Referential constraints definitions
SYSTSTATEMENTS	STATEMENTS	Details of package SQL statements
SYSTABAUTH	TABAUTH	Table Authorities
SYSTABCONST	TABCONST	Table constraint definitions
SYSTABLES	TABLES	Table definitions
SYSTABLESPACES	TABLESPACES	Table Space Definitions
SYSTRIGDEP	TRIGDEPEVENT	Trigger dependencies
SYSTRIGGERS	TRIGGERS	Definitions of triggers
SYSVIEWDER	VIEWDEP	View dependencies
SYSVIEWS	VIEWS	View definitions

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### CREATE TABLE Command

- You must have SYSADM or DBADM authority or CREATETAB privilege on the database
- Example:

```
create table t1
  (name      SMALLINT NOT NULL,
   classification CHAR(1) NOT NULL,
   id        CLOB(100) LOGGED,
   datafile  DATAFILE LUNTYPE URL FILE,
   link      LINK CONTROL MODE DECODEPTION,
   picture   BLOB(2M) NOT LOGGED POLPAT)
   INDEX IN Index1
   LONG PLongIndex
   IN Database;
```

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### Table

- If a table is created without the IN clause, it will be placed:
  - In the IBMDEFAULTGROUP table space (if it exists and if the page size is sufficient)
  - In a user created table space which is of the smallest pagesize that is sufficient for the table
  - Then it will go in USERSPACE1 (if it exists and has a sufficient page size)
- Use IN, INDEX IN, and LONG IN clauses to specify the tablespaces to stored related information
- To duplicate a table:
  - CREATE TABLE tabnew LIKE tab;
  - No constraints, triggers, or indexes copied, and data not copied
  - May specify table or view
- To define a table using SQL statement
  - CREATE TABLE t1new
 

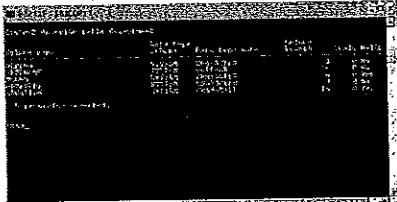
```
AS (SELECT c1,c8,c10 FROM t1)
          DEFINITION ONLY;
```
  - Column attributes of defined table based upon referenced table
  - Data not populated

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## Other Useful Table Commands

- LIST TABLES
  - List tables for the current user
- LIST TABLES FOR ALL
  - List all tables defined in the database
- LIST TABLES FOR SCHEMA <schema>
  - List tables for the specified schema
- DESCRIBE TABLE <tablename>
  - Show the structure of the specified table



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## Insert Statement

- You need to have appropriate table or view privilege
- Can insert one or more rows at a time
 

```
INSERT INTO department (deptno, deptname, admndept)
VALUES ('E31', 'ARCHITECTURE', 'E01'),
       ('E32', 'INFRASTRUCTURE', 'E02')
```
- You can use subselect to determine values
 

```
INSERT INTO department (deptno, deptname)
SELECT deptno, deptname FROM sales_depts
```
- May also be done to a subset of columns provided:
  - A column not specified accepts NULLS or
  - Columns defined WITH DEFAULT
- Large amounts of data? Look at using LOAD instead

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## Update Statement

- UPDATES come in 3 main varieties :
  - Full table
 

```
UPDATE employee SET salary = NULL
UPDATE employee SET (dept) = (
  SELECT deptname FROM department WHERE deptno = 1)
```
  - Searched with a WHERE clause
 

```
UPDATE employee SET salary = salary * 1.10 WHERE title = 'DBA'
```
  - Positioned using a CURSOR in a program
 

```
EXEC SQL DECLARE C1 CURSOR FOR
  SELECT * FROM EMPLOYEE FOR UPDATE OF JOB;
EXEC SQL OPEN C1;
EXEC SQL FETCH C1 INTO ... ;
if (strcmp (change, "YES") == 0)
  EXEC SQL UPDATE EMPLOYEE
    SET JOB = :newjob
    WHERE CURRENT OF C1;
EXEC SQL CLOSE C1;
end if;
```

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Information Management

## Delete Statement

- DELETES can apply to single or multiple rows
  - You can also use subselect to determine values
- Two forms of statement :
  - Searched DELETE form is used to delete one or more rows
    - Optionally determined by a search condition
  - Positioned DELETE form is used to delete exactly one row
    - Determined by the current position of a cursor
- Deleted rows not removed from table
  - Space is marked as unused
  - Reclaim space using the REORG command
- Example:
 

```
DELETE FROM DEPARTMENT WHERE DEPTNO = 'D11'
```

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Information Management

## Select Statement

- SELECT Is the QUERY element of the language
- Queries come in many styles:
  - Retrieving all table data
  - Limiting Columns or Rows retrieved
  - Cartesian Product
  - Inner Join
  - Set operators
  - Common table expressions
  - Other options:
    - derived columns
    - sub-query etc.
    - sorting
    - using functions
    - grouping values

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Information Management

## ORDER BY Clauses

- ORDER BY clause
  - The ORDER BY clause specifies an ordering of the rows of the result table
  - If a single sort specification (one sort-key with associated direction) is identified, the rows are ordered by the values of that sort specification
  - If more than one sort specification is identified, the rows are ordered by the values of the first identified sort specification, then by the values of the second identified sort specification, and so on
  - Example:  
`SELECT c1, c2 FROM t1 ORDER BY c1;`

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Information Management

## GROUP BY, HAVING Clauses

- GROUP BY ... <grouping expression>
  - A GROUP BY clause contains a grouping expression, it specifies an intermediate result table that consists of a grouping of the rows of R. It is the result of the previous clause of the subselect.  
`SELECT workdept, MAX(salary) FROM employee GROUP BY workdept;`
- HAVING clause
  - The HAVING clause specifies an intermediate result table that consists of the groups of R for which the search-condition is true. R is the result of the previous clause of the subselect.  
`SELECT workdept, MAX(salary) FROM employee GROUP BY workdept  
HAVING MAX(salary) < (SELECT avg(salary) FROM employee);`
- Obtain distinct value from a table  
`SELECT DISTINCT (position) FROM employee;`
- Use of LIKE  
`SELECT DISTINCT WORKDEPT FROM employee WHERE WORKDEPT LIKE 'A%';`
- Use of EXISTS  
`SELECT empno, salary FROM employee  
WHERE NOT EXISTS (SELECT empno FROM manager);`
- Use of IN, NOT IN clauses  
`SELECT empno, salary FROM employee  
WHERE department IN ('AD0', 'BD0', 'CD0');`

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# **Chapter 1: Contest Environment Walkthrough**

## **Objectives**

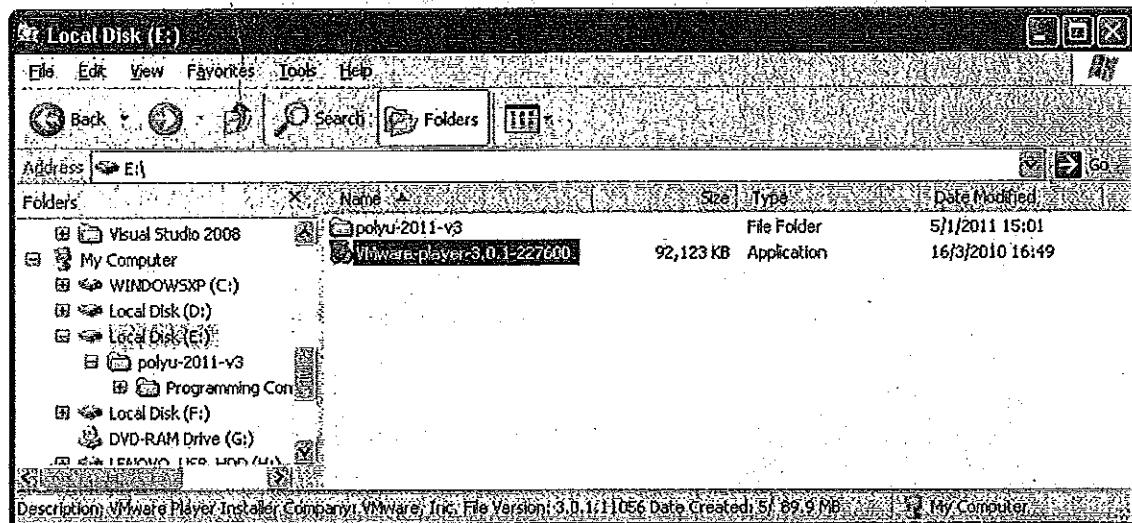
In this exercise, we will learn:

- How to configure your environment
- How to boot up the programming environment using VMware
- How to log in and start up necessary services and system software
- Examine the sample application which will be used in the programming contest
- How to perform programming using the GUI environment
- How to use DB2 in command line mode and GUI mode

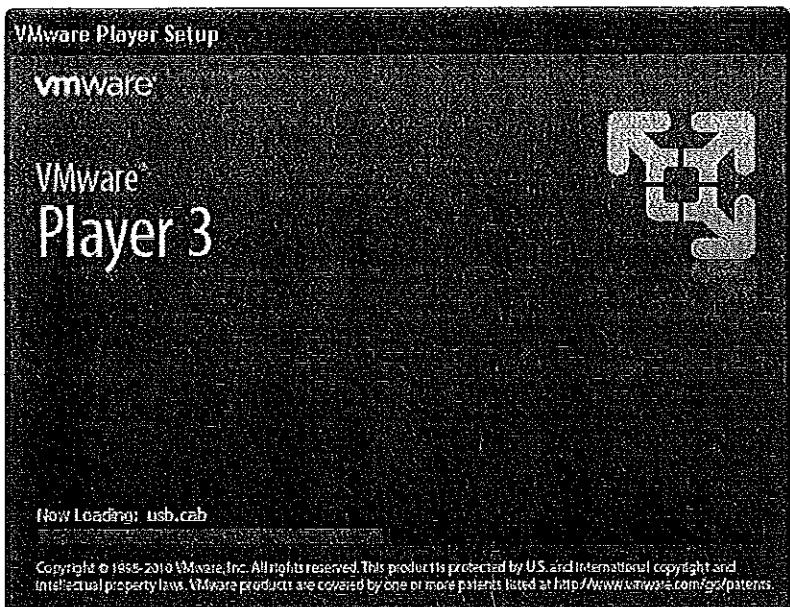
## **Exercises**

1. Log into the PC using the username and password provided by instructor.

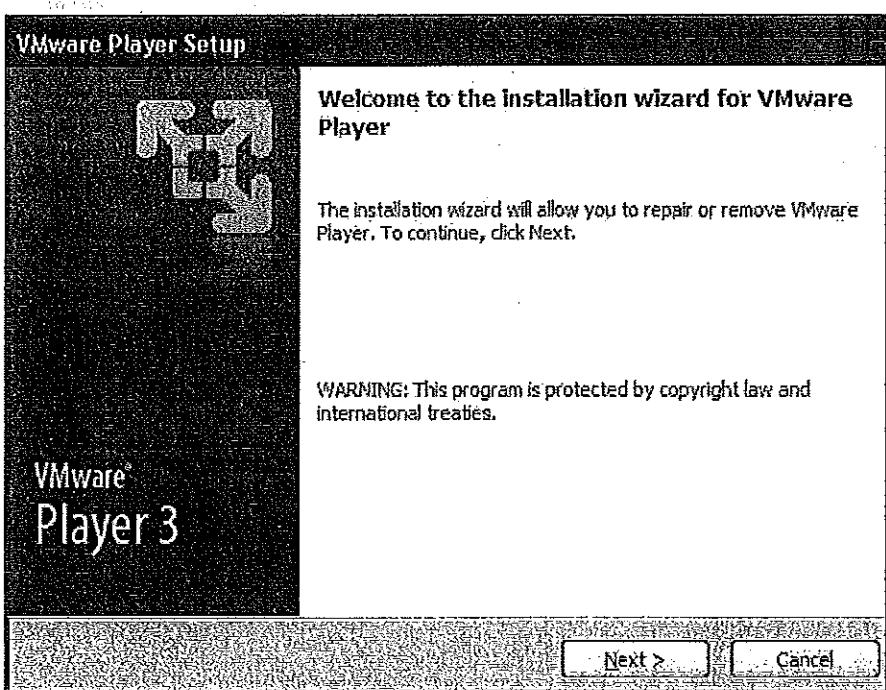
2. Open an Explorer and then navigate to E:\



3. Select and double click the program VMware-player-3.0.1-227600 to install the VMware player. The following screen is displayed:

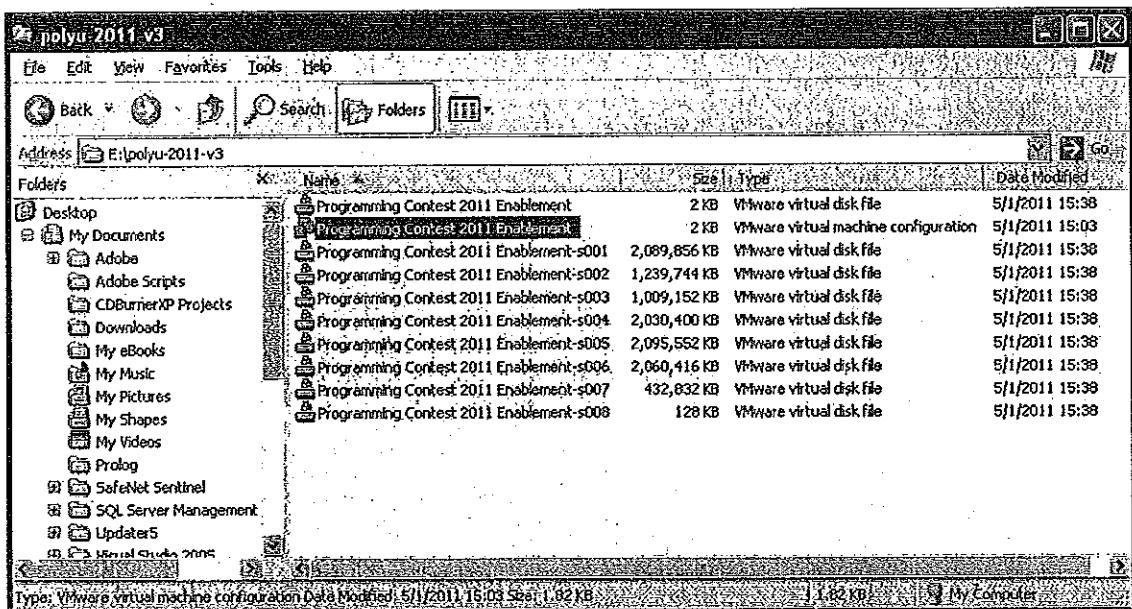


4. After a while the following screen is displayed:

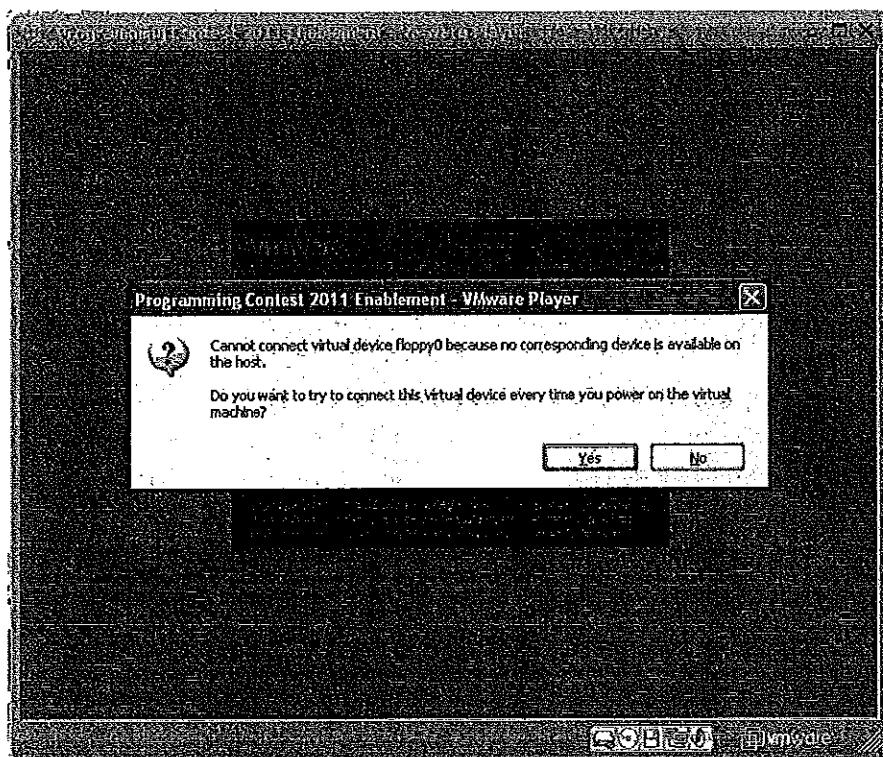


Keep pressing Next and adopting the default choice until VMware player is installed successfully.

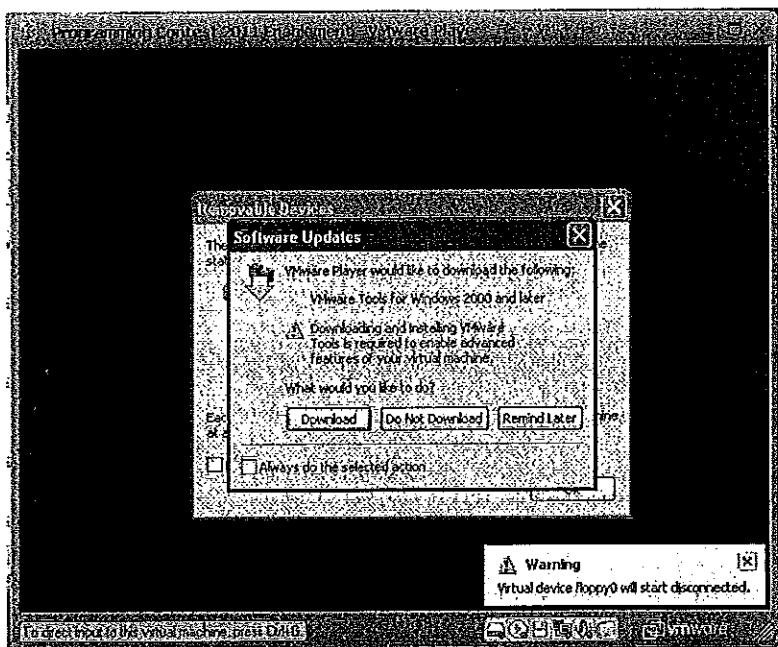
5. Using the Explorer, navigate to the folder E:\polyu-2011-v3 and the double click the VMware virtual machine configuration file with name "Programming Contest 2011 Enablement" and then boot up the VMware.



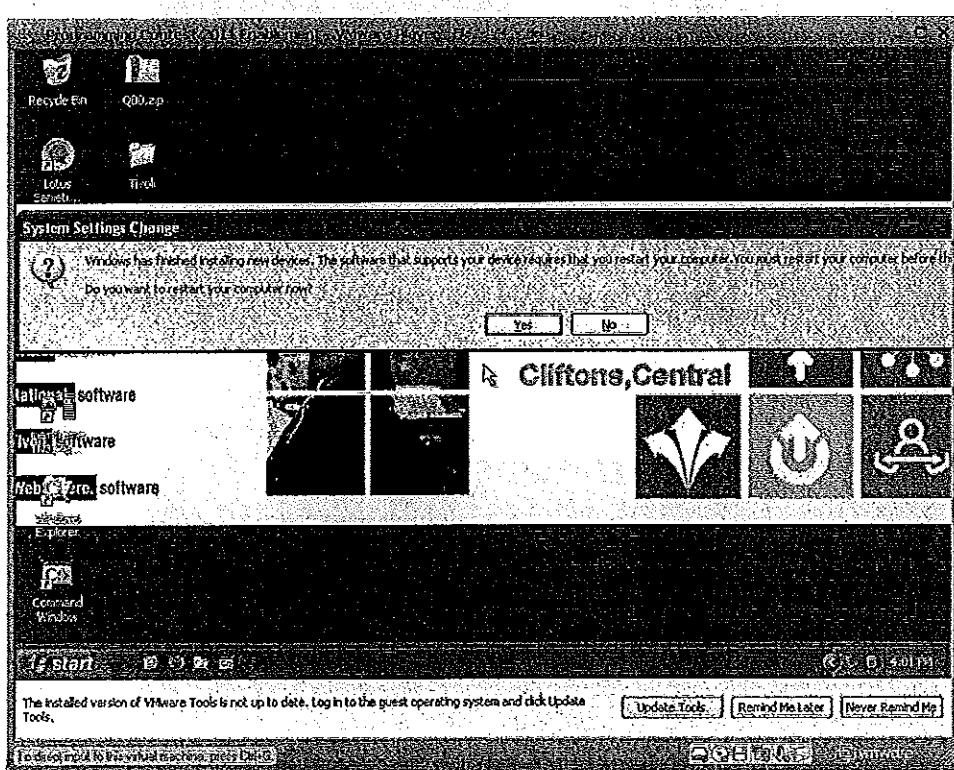
6. The VMware is now being booted up. You might see a pop up window telling you floppy0 is not available. Please "No" and then proceed:



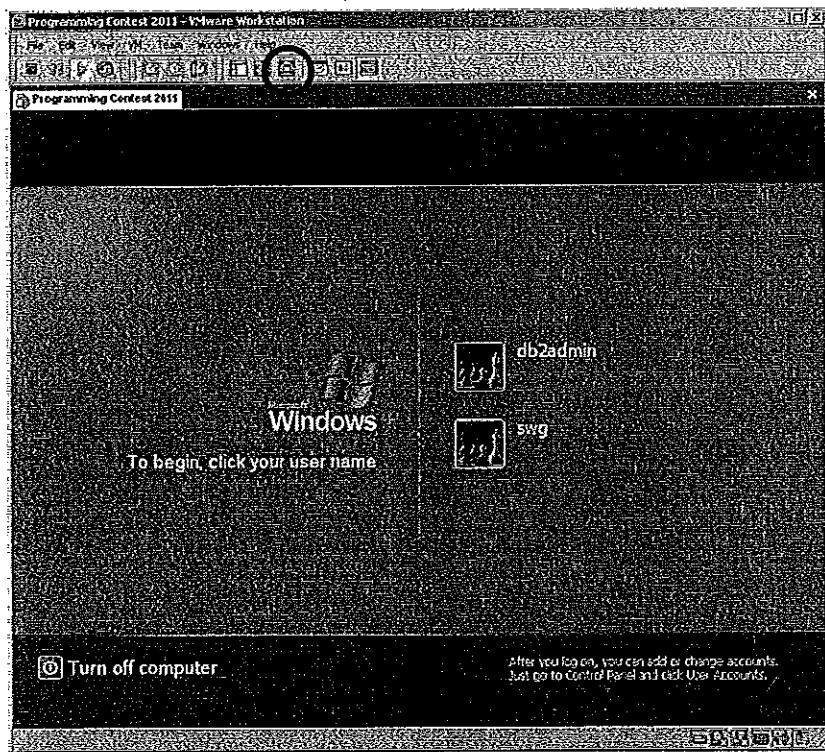
7. During boot up, you might see the following screen asking you whether you want to download the VMware Tools update. Press the button "Do Not Download" and proceed:



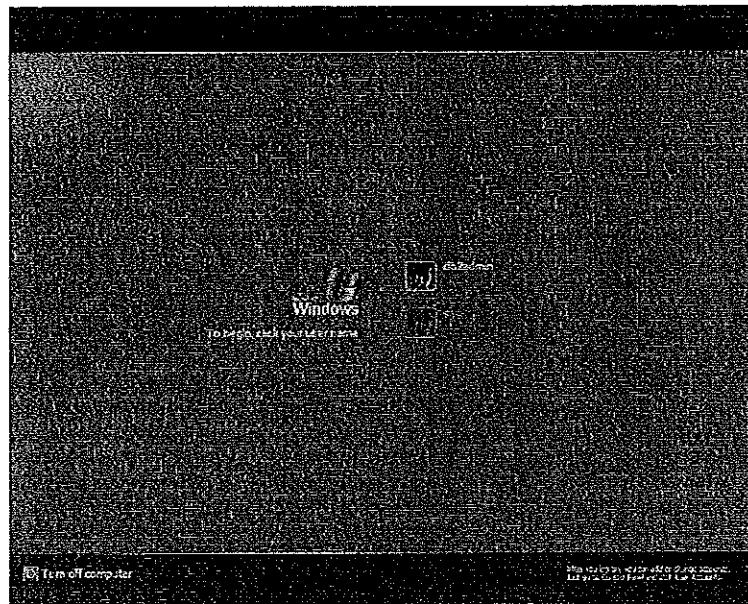
8. Lastly, you might see a pop up window asking you to restart the VMware, press the button "No" and then proceed:



9. When the Windows XP is booted up, the following login screen appears:

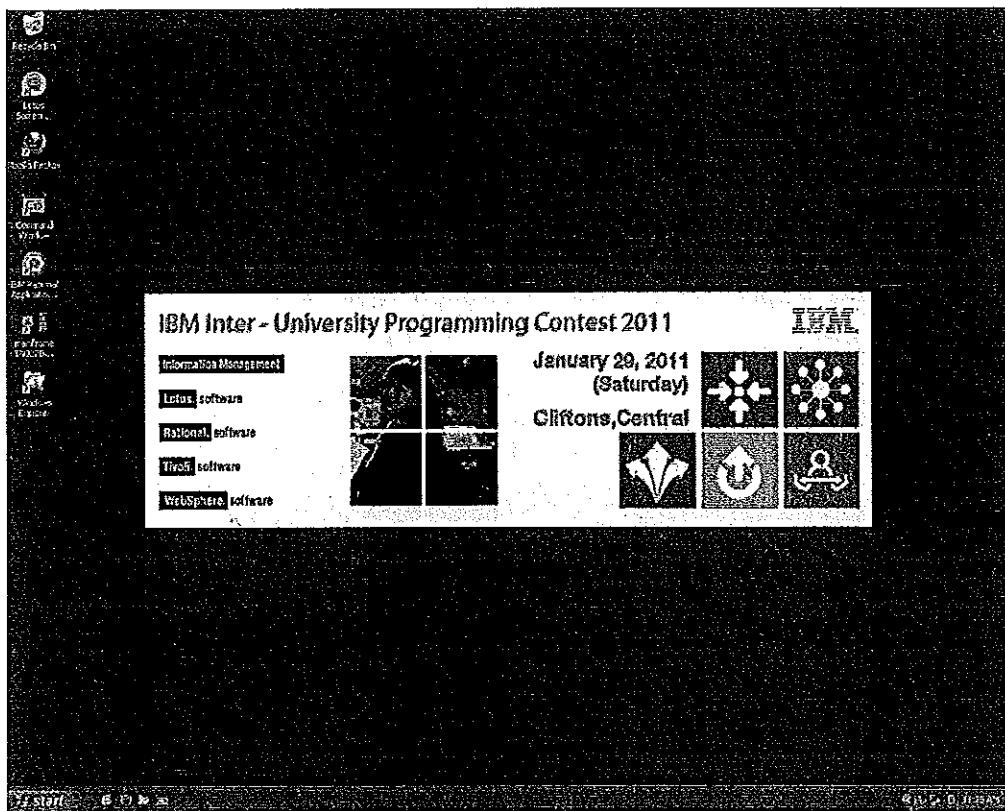


It is possible to click the full screen button (the icon within the black circle) to switch the booted system to full screen. This is shown as the following screen:

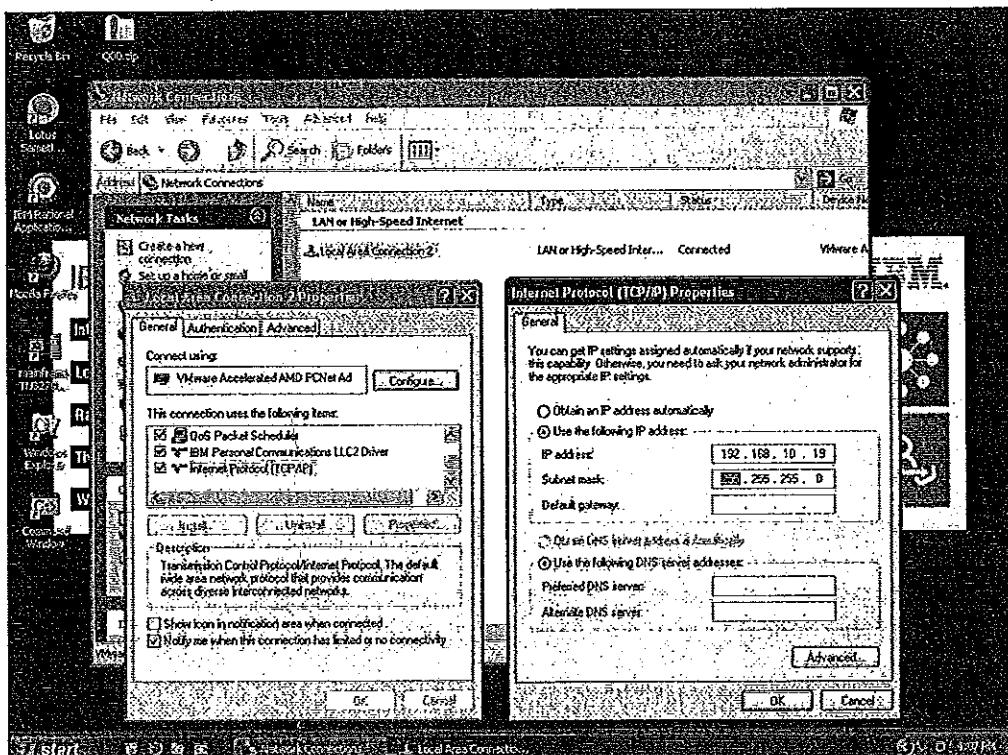


Under the full screen, you can put the mouse button to the top of the screen to activate the VMware manual bar, and then you can go back to windowed mode by pressing the corresponding buttons in the manual bar.

10. Click "db2admin" and enter the password "password" to log into the programming contest environment. The following screen is displayed:



11. Open Control Panel, select Network Connections, and then bring up the LAN properties window. Then select "Internet Protocol (TCP/IP)" then press the button "Properties". The window "Internet Protocol (TCP/IP) Properties" is displayed. Select "Use the following IP address" and then enter the IP address provided when you were enrolled into the class. Use the Subnet mask "255.255.255.0".



Press the button "OK" in both windows such that the new IP address is set up effectively.

12. You can bring up a command window and the run the command "ping 192.168.10.4" to verify the IP address is set up properly.

A screenshot of a Windows Command Prompt window. The title bar says 'Select DB2 CLP - DB2COPY1'. The command entered is 'ping 192.168.10.4'. The output shows the ping results:

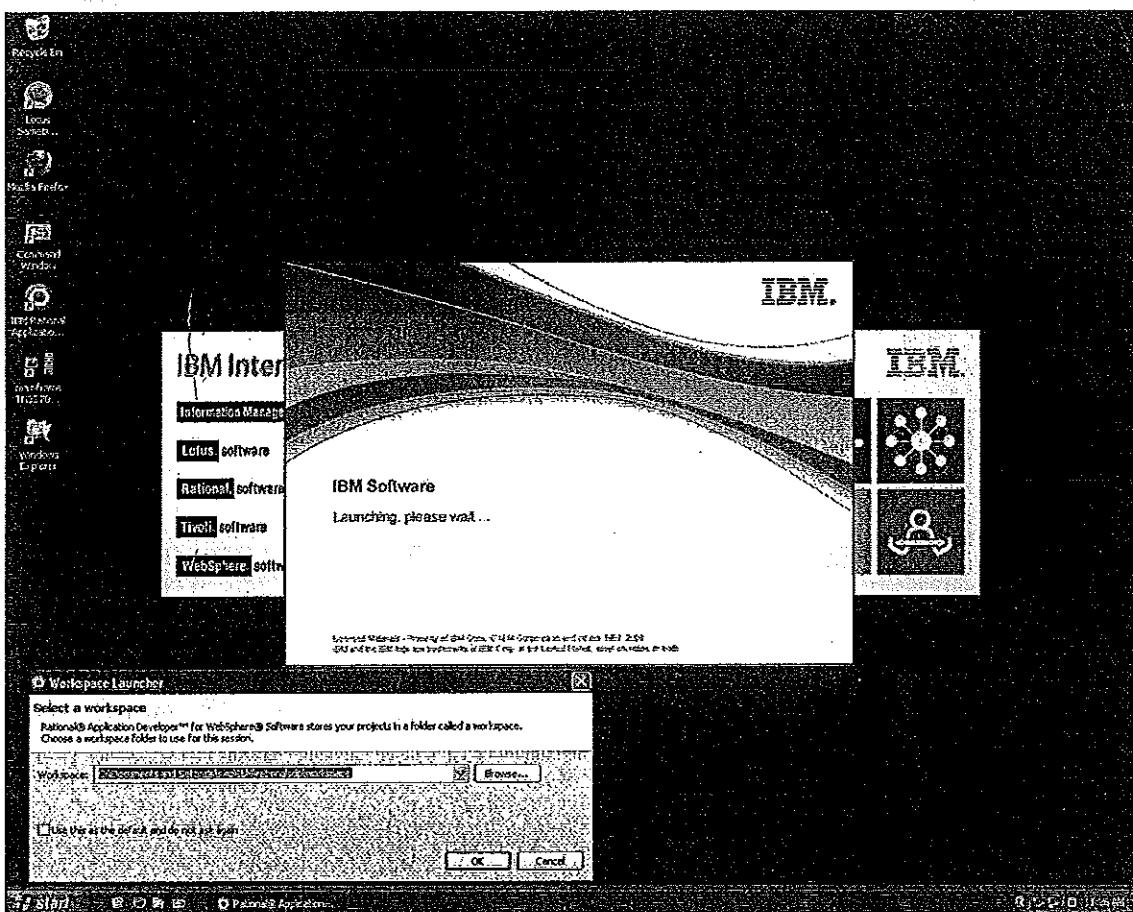
```
C:\>Documents and Settings\db2admin>ping 192.168.10.4
Pinging 192.168.10.4 with 32 bytes of data:
Reply from 192.168.10.4: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.10.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>Documents and Settings\db2admin>
```

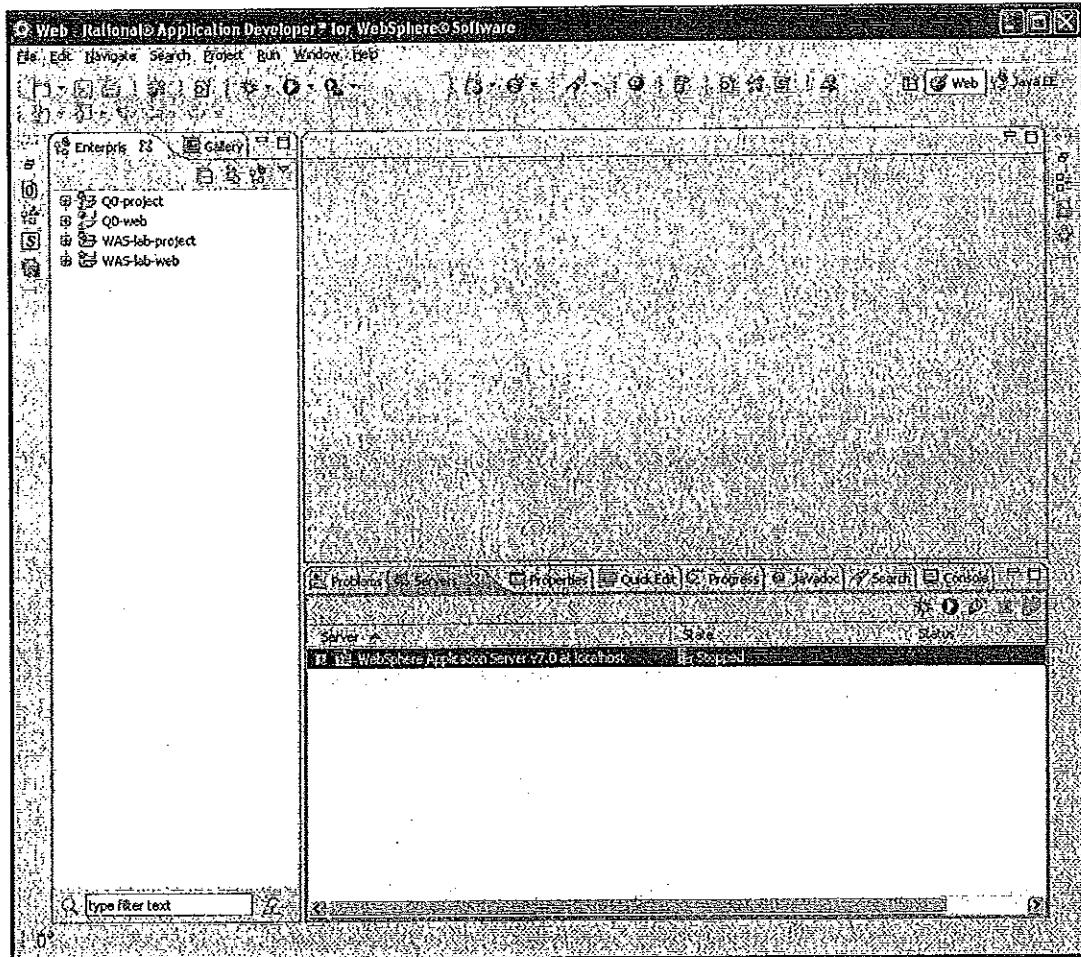
13. The next task we should perform is to can start the RAD (i.e., Rational Application Developer) to look at a J2EE application which will be used during the programming contest. RAD is a GUI development environment which is used to perform J2EE programming. The resultant programs will be published to WAS (WebSphere Application Server) so that it can be executed in the web environment.

Double clicked the icon "IBM Rational Application Developer" to start RAD. A banner will appear and a Workspace Launcher window will appear which allows you to choose the base location of the workspace:



Click the "OK" button to adopt the default value which is "C:\Documents and Settings\swg\IBM\rationalsdp\workspace".

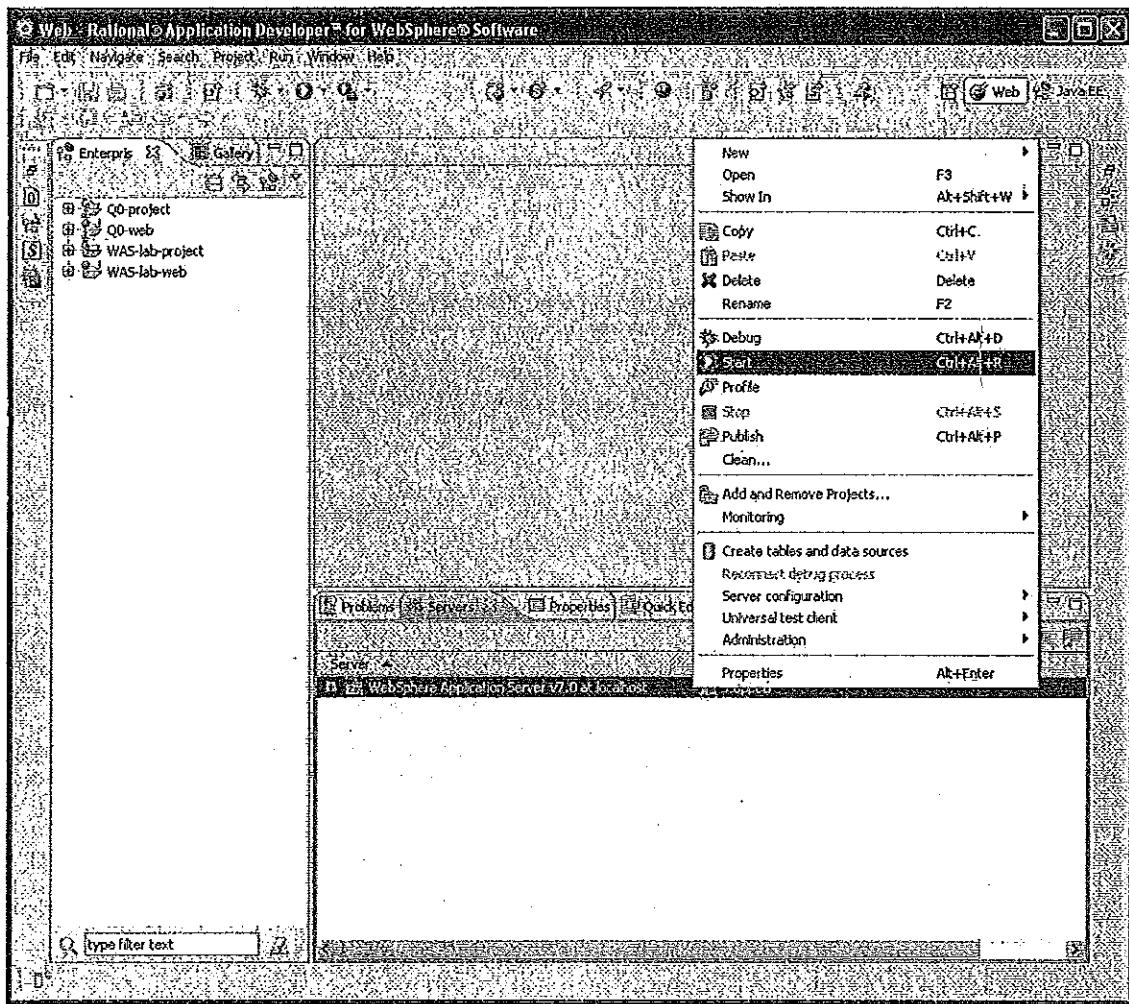
14. After the workspace is loaded, the following window appears:



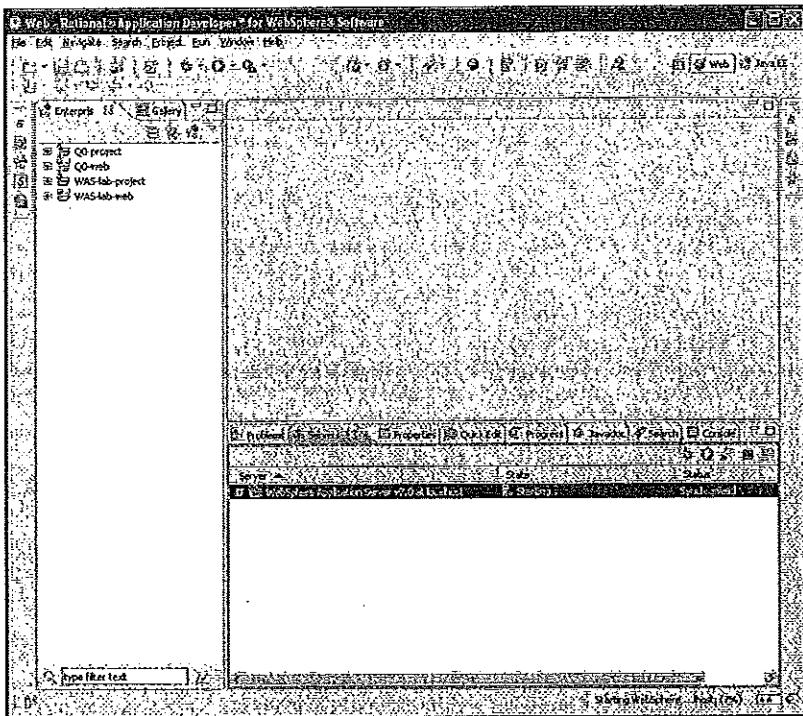
On the left side is the "Project Explorer" folder which contains a list of all available projects. In the above window, there are four available projects (i.e., Q0-project, Q0-web, WAS-lab-project and WAS-lab-web). Q0-project is an application which produces a course report, and its program codes are embedded in the project Q0-web. WAS-lab-project is an application which performs a distributed transaction, and its program codes are embedded in the project WAS-lab-web.

15. Before we start to review the program, we should start WAS (i.e., WebSphere Application Server) such that the program can be run via a web browser (i.e., Internet Explorer in our case).

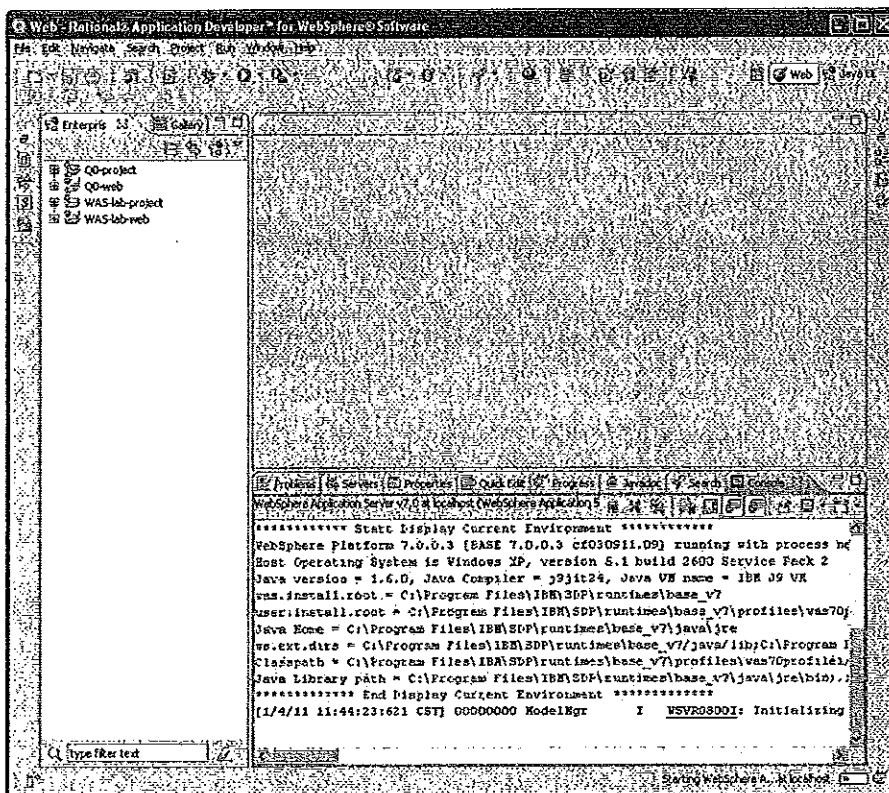
Click on the 'Server' tab in the middle-bottom view. You see the 'WebSphere Application Server v7.0 at localhost' is stopped at the moment. First click on the server, then right click to show the command manual, then choose 'Start' to start WAS:



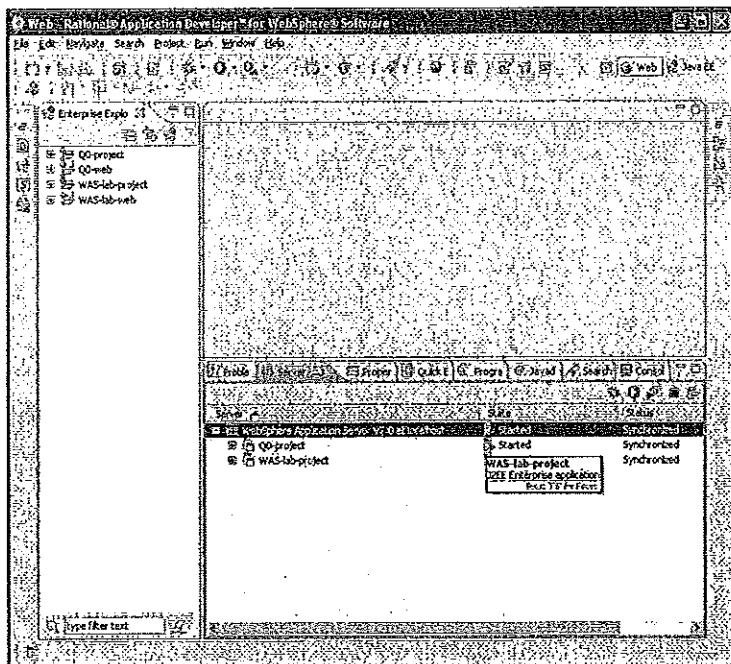
Then you will see the state of the server changing from 'Stopped' to 'Starting':



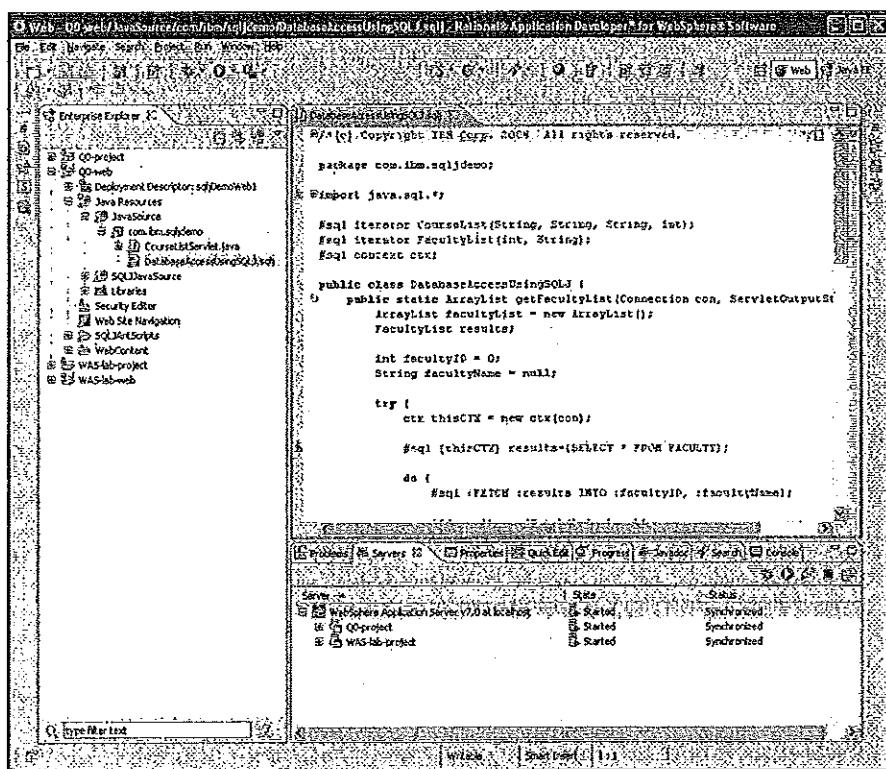
If you click on the tab 'Console', you might be able to see the system messages generated during startup:



After a while, WAS is booted up and the state of the server is changed to 'Started':



16. Now, we can continue to explore the project. Click the "+" signs of Q0-project and Q0-web to view the content of the projects:



Further expand Q0-web by clicking the "+" signs of "Java Resources", "JavaSource", and "com.ibm.sqljdemo" until you see the 2 programs of the application (i.e., CourseListServlet.java and DatabaseAccessUsingSQLJ.sqlj). Double click "DatabaseAccessUsingSQLJ.sqlj" to edit this program. A new sub-window is displayed on the top-right portion of the window. Please refer to the above screen.

- Now, let's see the output of this program. Open a Mozilla Firefox browser, and then select 'Bookmarks -> Q0 – Course Selection' to run the program Q0. The following screen is generated:

Course Code	Title	Offering Faculty	Unit
ENG0104	Engineering mathematics	Engineering	3
ENG0106	Digital logic	Engineering	6
ENG0107	Foundations of computer science	Engineering	6
CSE0120	Computer programming I	Engineering	6
CSE0122	Computer programming II	Engineering	6
CSE0119	Introduction to data structures & algorithms	Engineering	6
CHI0102	Putonghua course for Engineering students	Arts	3
SOC0118	Japanese society	Social Sciences	3
ECO0213	Microeconomic analysis	Business	6
BUS0102	Introduction to accounting	Business	6
PHY0017	Renewable energy	Science	3
STA0102	Linear statistical analysis	Science	6
AMR0002	Issues in American business: Wall Street	Arts	3
MUS0210	Music of China	Arts	6
POI0020	Hong Kong politics	Social Sciences	6
SOC0008	Culture and society	Social Sciences	6
FIN0101	Financial markets and institutions	Business	6
CHE0013	Chemistry and daily life	Science	3
ELE0115	Electronic circuits	Engineering	3
ELE0112	Computer microprocessors	Engineering	6

**COURSE CODE**    
**Offering Faculty**

[List of Faculty](#)

[Done](#)

18. Now, we modify the program Q0 to reduce the lines of output. Scroll down the edit window until you reach line 107:

The screenshot shows the Rational Application Developer interface. The left panel displays the 'Enterprise Explorer' with a tree view of project files, including 'Q0-project', 'Q0-web', 'Deployment Descriptor: sajDemoWeb1', 'Java Resources', 'com.ibm.sajdemo', 'CourseListServlet.java', 'DatabaseAccessUsingSQLJ.sqlj', 'SQLDataSource', 'Libraries', 'Security Editor', 'Web Site Navigation', 'SQLAnnotate', 'WebContent', 'WAS-lab-project', and 'WAS-lab-web'. The right panel shows the code editor with Java code for 'DatabaseAccessUsingSQLJ.sqlj'. The code includes SQL queries for selecting courses based on course code, title, faculty name, and unit. The bottom panel shows a 'Servers' list with two entries: 'WebSphere Application Server v7.0 (localhost)' and 'Q0-project', both marked as 'Started' and 'Synchronized'. A status bar at the bottom indicates 'The local version is 7.0.0.20130703-1000'.

```
ArrayList courseList = new ArrayList();
CourseList results;

String courseCode = null;
String courseName = null;
String offeringFaculty = null;
int numCredits = 0;

try {
    ctx thisCTX = new ctx(con);

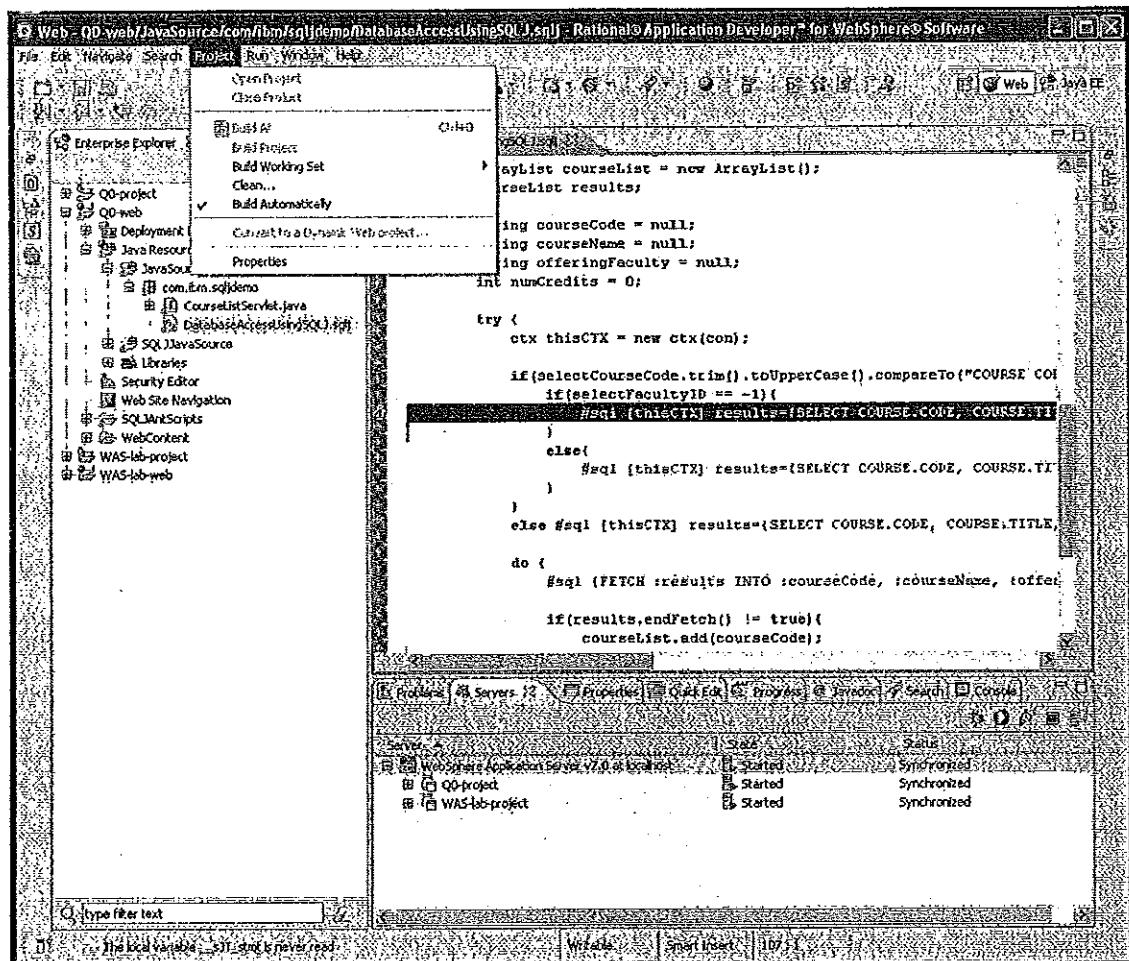
    if(selectCourseCode.trim().toUpperCase().compareTo("COURSE CODE") == 0) {
        if(selectFacultyID == -1) {
            #sql {thisCTX} results=(SELECT COURSE.CODE, COURSE.TITLE,
                FACULTY.NAME, COURSE.UNIT FROM COURSE, FACULTY WHERE COURSE.FACULTY_ID =
                FACULTY.ID);
        }
        else{
            #sql {thisCTX} results=(SELECT COURSE.CODE, COURSE.TITLE,
                FACULTY.NAME, COURSE.UNIT FROM COURSE, FACULTY WHERE COURSE.FACULTY_ID =
                :facultyID);
        }
    }
    else #sql {thisCTX} results=(SELECT COURSE.CODE, COURSE.TITLE,
        FACULTY.NAME, COURSE.UNIT FROM COURSE, FACULTY WHERE COURSE.FACULTY_ID =
        :facultyID);

    do {
        #sql {FETCH results INTO :courseCode, :courseName, :offeringFaculty,
            :numCredits};

        if(results.endFetch() != true){
            courseList.add(courseCode);
        }
    } while(results.next());
}
```

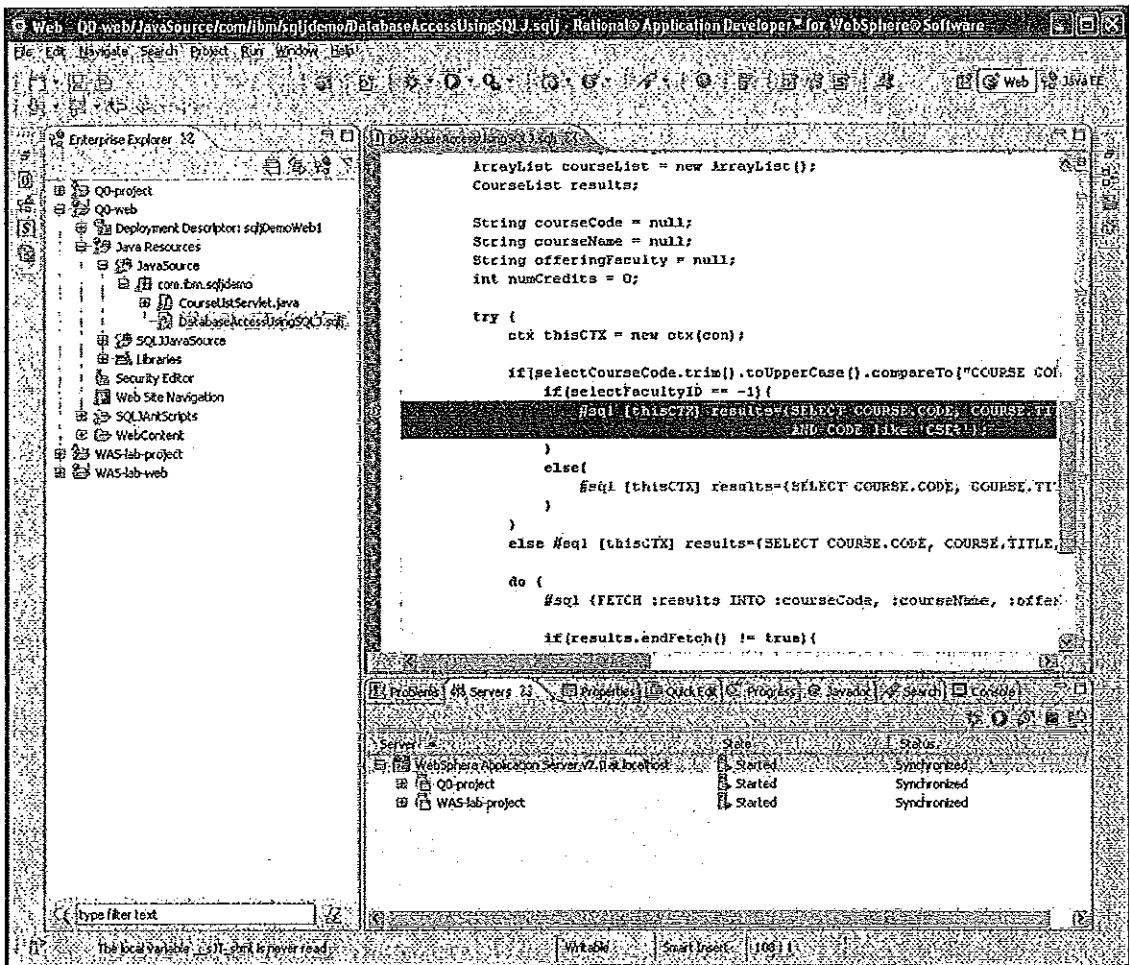
The above window shows the SQL statement "SELECT course.code, course.title, faculty.name, course.unit FROM COURSE, FACULTY where course.faculty\_id = faculty.id" which obtains the list of available courses. This statement generates the list of courses and the results are displayed in the Internet Explorer.

19. Let's make some changes to the application. First of all, click the "Project" item under the manual. It can be seen that there is a tick beside the item "Build Automatically":



This means that after you modify something in the program and issue the save command, the project will be rebuilt automatically and the change will be deployed to WAS automatically.

20. Go to line 107 of the edit screen for the program "DatabaseAccessUsingSQLJ.sqlj".  
 Modify the SQL statement by adding a where-clause "where code like 'CSE%'" at the end of the SQL statement:



The screenshot shows the Rational Application Developer interface. On the left, the Enterprise Explorer view displays a project structure for 'QD-web' containing Java Resources, SQL Sources, and a Deployment Descriptor. In the center, the code editor shows Java code for a SQLJ program. A specific line of code is highlighted in red, which contains a SQL query with a WHERE clause: 'END-CODE like 'CSE%''. Below the code editor is the Servers view, showing two servers: 'WebSphere Application Server 7.0 (localhost)' and 'WAS-lab-project', both in 'Started' and 'Synchronized' states.

```

ArrayList courseList = new ArrayList();
CourseList results;

String courseCode = null;
String courseName = null;
String offeringFaculty = null;
int numCredits = 0;

try {
    ctx thisCTX = new ctx(con);

    if(selectCourseCode.trim().toUpperCase().compareTo("COURSE CODE") == 0) {
        if(selectFacultyID == -1) {
            #sql {thisCTX} results=(SELECT COURSE.CODE, COURSE.TITLE,
                FROM COURSE WHERE COURSE.CODE like :CODE)
        }
        else{
            #sql {thisCTX} results=(SELECT COURSE.CODE, COURSE.TITLE,
                FROM COURSE WHERE COURSE.CODE like :CODE AND COURSE.FACULTY_ID = :FACULTY_ID)
        }
    }
    else #sql {thisCTX} results=(SELECT COURSE.CODE, COURSE.TITLE,
        FROM COURSE WHERE COURSE.FACULTY_ID = :FACULTY_ID)

    do {
        #sql {FETCH :results INTO :courseCode, :courseName, :offer
        if(results.endFetch() != true){
            courseList.add(new Course(courseCode, courseName, offeringFaculty, numCredits));
        }
    }
    while(results.next());
}
catch (Exception e) {
    System.out.println("Exception: " + e);
}
}

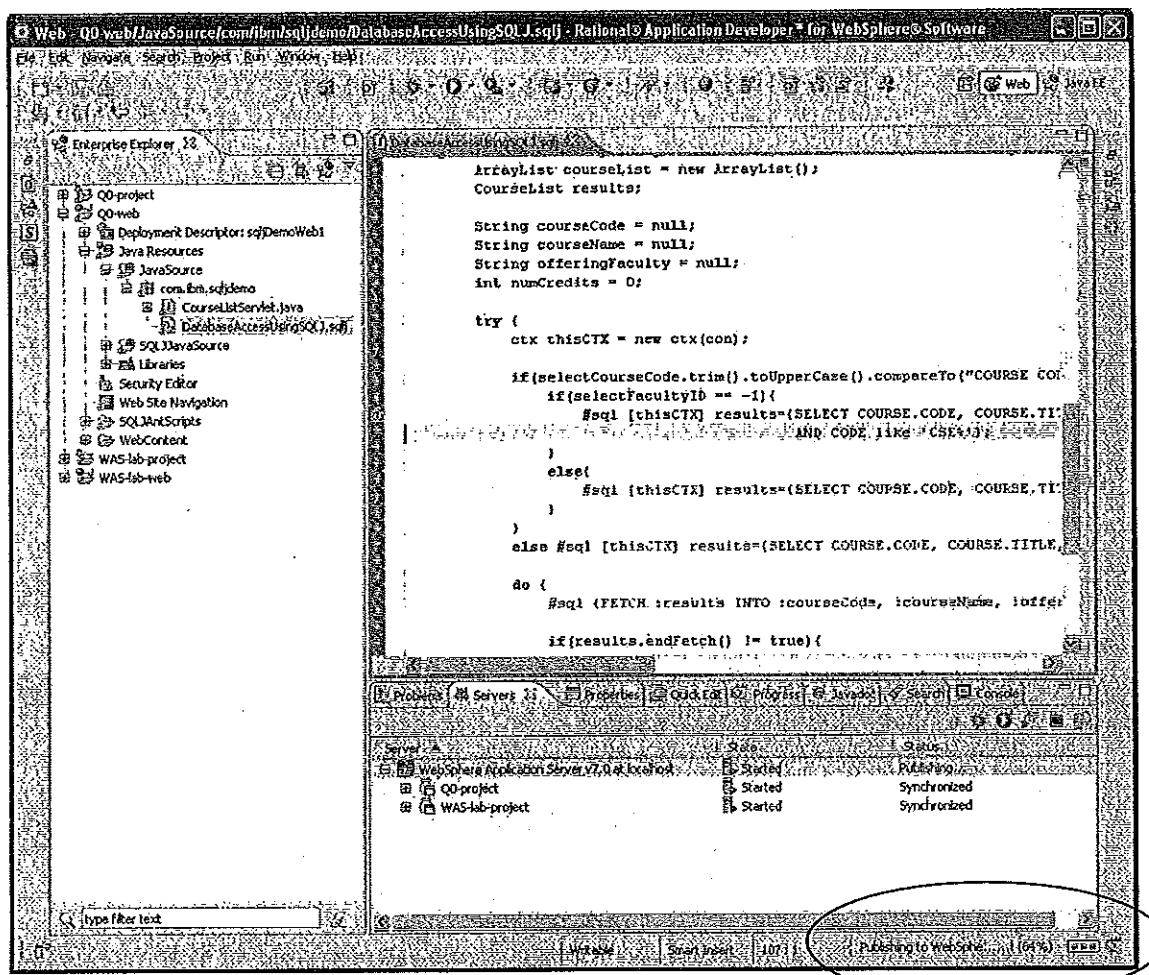
```

This will restrict the result of the SQL statement by only returning the department names starting with 'A' only. The character '%' is the wildcard character which matches any strings.

21. Press "Control-S" to save the edited content. At the same time, please note that in the bottom-right corner of the screen the following message is displayed

Building workspace (0%)

Please refer to the following window for an illustration. Please take attention to the circle on the bottom-right corner which shows the message:



After a while, the project rebuilding process is completed and the message will disappear.

22. Open the Internet Explorer window, and run the application again (or you can reuse the originally opened Internet Explorer and press the reload button). The following screen appears:

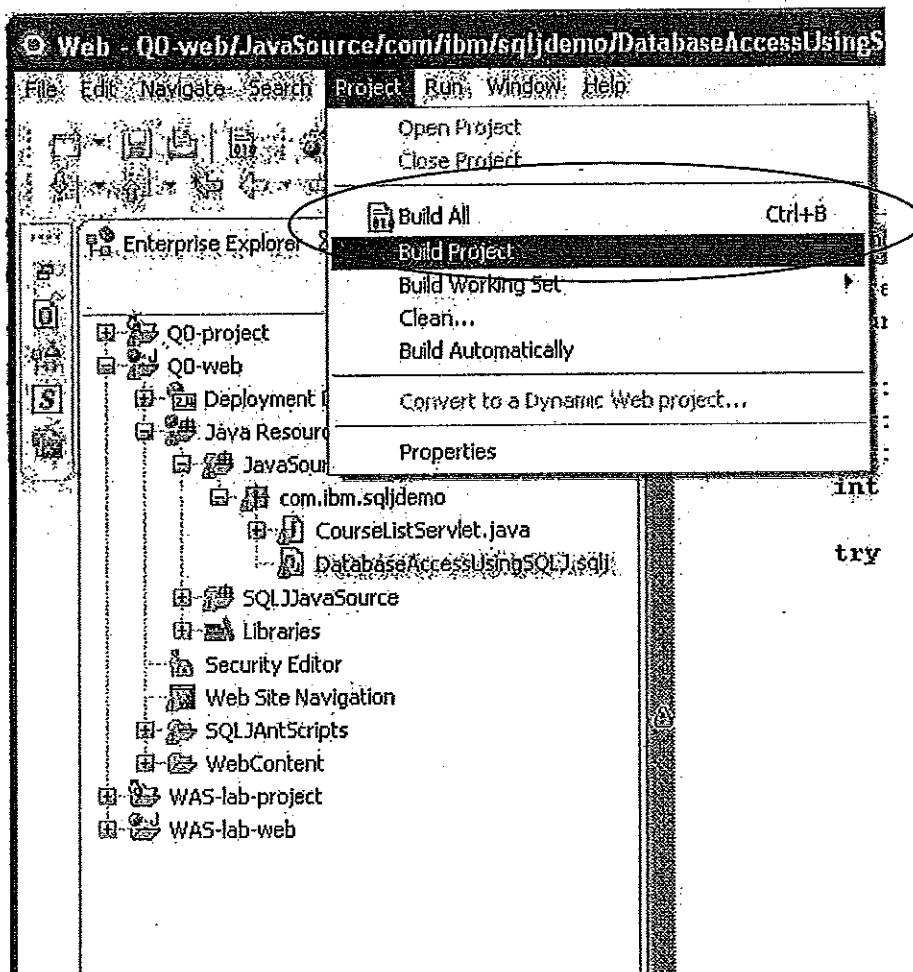
The screenshot shows a Mozilla Firefox browser window with the title "Q0 - Course Selection - Mozilla Firefox". The address bar displays "http://localhost:9080/Q0-web/CourseListServlet". The main content area is titled "Optional Courses" and contains a table with three rows of course information. Below the table are two search input fields: "COURSE CODE" and "Offering Faculty", each with a "Select" or "Filter" button. At the bottom left is a "List of Faculty" link, and at the bottom right is a "Show border" link. A "Done" button is located at the very bottom.

Course Code	Title	Offering Faculty	Unit
CSE0120	Computer programming I	Engineering	6
CSE0122	Computer programming II	Engineering	6
CSE0119	Introduction to data structures & algorithms	Engineering	6

Please note that only the course name with prefix "CSE" is displayed. This indicates the new SQL statement is effective.

23. Since there is a tick beside the menu item "Build Automatically", the project will be rebuilt and redeployed automatically for every change to the project. If you want to perform multiple changes to the project before you rebuild the project. You can turn off the tick of the menu item "Build Automatically". In this case, you have to select either "Build All" or "Build Project" to manually start the project rebuild process.

This is shown in the black circle in the following diagram:



Please also note that when you change a program, there will be a symbol "!" beside the affected objects under the project explorer in the left side of RAD. Please refer to the blue circle in the above diagram for an illustration.

24. To review the DB2 database environment, open a DB2 Command Window by clicking the following Windows menu button: Start -> Programs -> IBM DB2 -> DB2COPY1 (default) -> Command Line Tools -> Command Window.
25. The following DB2 command window appears:



Please note that all DB2 SQL statements and commands must be entered to the DB2 command windows before they can be interpreted by DB2 properly (i.e., normal Windows command window does not work).

26. Execute the command "db2 list db directory" in the DB2 command window and you will see there are three databases (i.e., SAMPLE, MF and REALMF) defined in the system:

```
DB2 CLP - DB2COPY1
C:\Program Files\IBM\SQLLIB\BIN>db2 list db directory
System Database Directory
Number of entries in the directory = 3

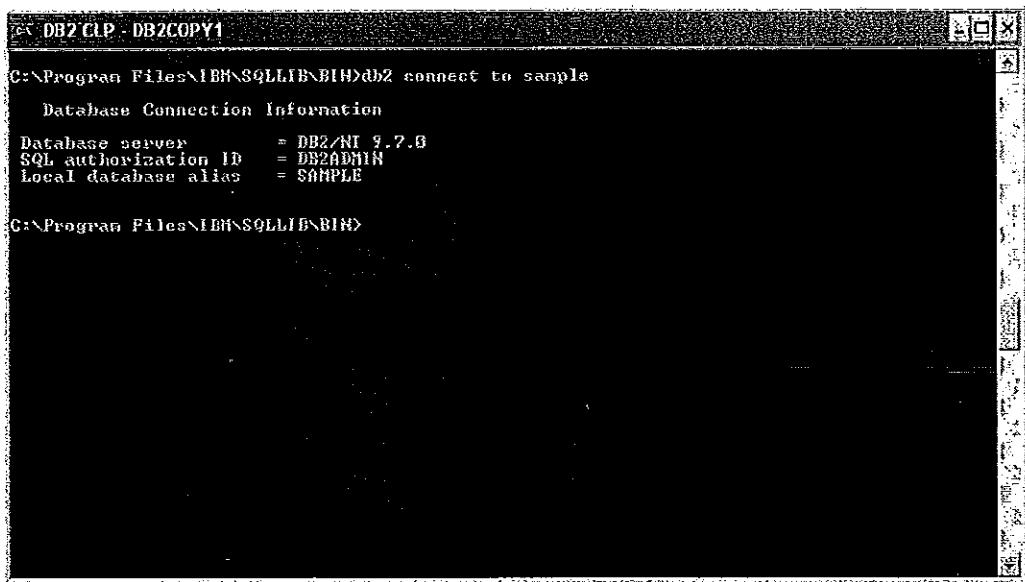
Database 1 entry:
Database alias = REALMF
Database name = REALMF
Node name = DB9
Database release level = d.00
Comment =
Directory entry type = Remote
Authentication = SERVER
Catalog database partition number = -1
Alternate server hostname =
Alternate server port number =

Database 2 entry:
Database alias = MF
Database name = MF
Node name = DB3
Database release level = d.00
Comment =
Directory entry type = Remote
Catalog database partition number = -1
Alternate server hostname =
Alternate server port number =

Database 3 entry:
Database alias = SAMPLE
Database name = SAMPLE
Local database directory = C:
Database release level = d.00
Comment =
Directory entry type = Indirect
Catalog database partition number = 0
Alternate server hostname =
Alternate server port number =
```

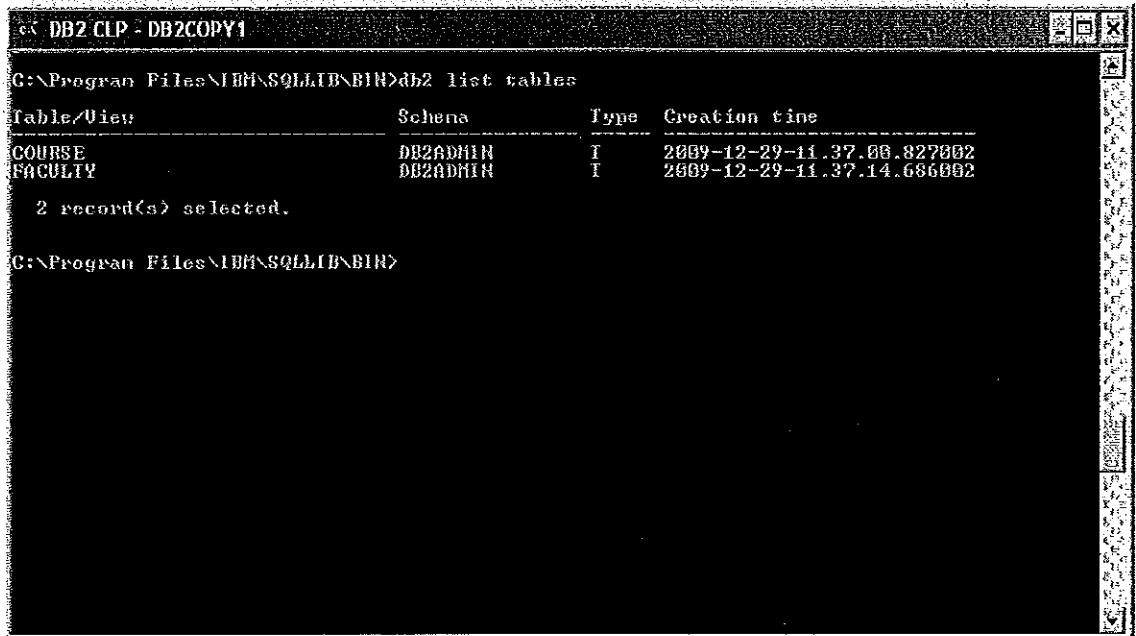
The database SAMPLE is a database defined in the primary instance (DB2) in the local PC. The database MF is a database defined in the secondary instance (DB3) in the local PC. The database REALMF is a database defined in a mainframe server in a remote server. We will access MF and REALMF in the later chapters.

27. Enter the command "db2 connect to sample" to connect to the SAMPLE database.  
The Q0-project application is configured to query the SAMPLE database:



```
DB2 CLP - DB2COPY1  
C:\Program Files\IBM\SQLLIB\BIN>db2 connect to sample  
Database Connection Information  
Database server      = DB2/NT 9.7.0  
SQL authorization ID = DB2ADMIN  
Local database alias = SAMPLE  
C:\Program Files\IBM\SQLLIB\BIN>
```

28. Enter the command "db2 list tables" to display the list of major database objects created by the user "db2admin":



```
DB2 CLP - DB2COPY1  
C:\Program Files\IBM\SQLLIB\BIN>db2 list tables  
Table/View          Schema    Type  Creation time  
COURSE             DB2ADMIN  T     2009-12-29-11.37.00.827002  
FACULTY            DB2ADMIN  T     2009-12-29-11.37.14.686002  
2 record(s) selected.  
C:\Program Files\IBM\SQLLIB\BIN>
```

29. Enter the command db2 "SELECT code, substr(title, 1, 50) as title, unit from course" which is a slightly modified version of that in the program "DatabaseAccessUsingSQLJ.sql". The only change is the addition of the substring function which trims the TITLE column to fit in the window. Refer to the following screen for the results:

```
DB2 CLP - DB2COPY1
C:\Documents and Settings\db2admin>db2 "select code, substr(title, 1, 50) as title, unit from course"
CODE      TITLE                               UNIT
ENG0104  Engineering mathematics            3
ENG0106  Digital logic                   6
ENG0107  Foundations of computer science   5
CSE0128  Computer programming I           6
CSE0122  Computer programming II          6
CSE0119  Introduction to data structures & algorithms 6
CHI0102  Putonghua course for Engineering students 3
SOC0118  Japanese society                 3
ECO0213  Microeconomic analysis            6
BUS0102  Introduction to accounting       6
PHY0017  Renewable energy                  3
STA0102  Linear statistical analysis       6
MHR0002  Issues in American business: Wall Street 3
MUS0210  Music of China                   6
POL0020  Hong Kong politics                6
SOC0008  Culture and society               6
FIN0101  Financial markets and institutions 6
CHE0013  Chemistry and daily life          3
ELE0015  Electronic circuits               3
ELE0112  Computer microprocessors         6
20 record(s) selected.

C:\Documents and Settings\db2admin>
```

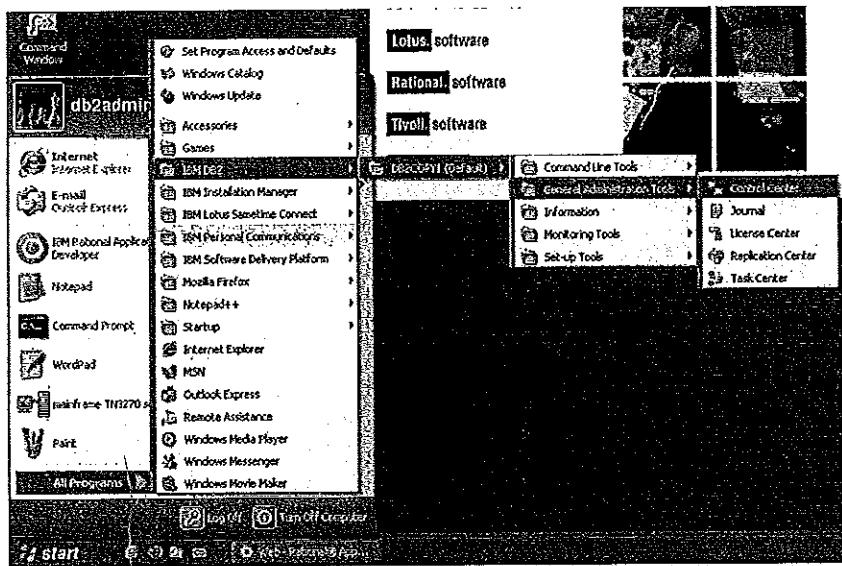
30. Finally, enter the following command "db2 describe table course" to display the column definition of the table COURSE:

```
DB2 CLP - DB2COPY1
C:\Documents and Settings\db2admin>db2 describe table course
Column name          Data type schema  Data type name  Column Length  Scale Nulls
CODE                SYSIBM             CHARACTER        8          0 Yes
TITLE               SYSIBM             VARCHAR        100         0 Yes
UNIT                SYSIBM             INTEGER        4          0 Yes
TYPE                SYSIBM             INTEGER        4          0 Yes
FACULTY_ID          SYSIBM             INTEGER        4          0 Yes
5 record(s) selected.

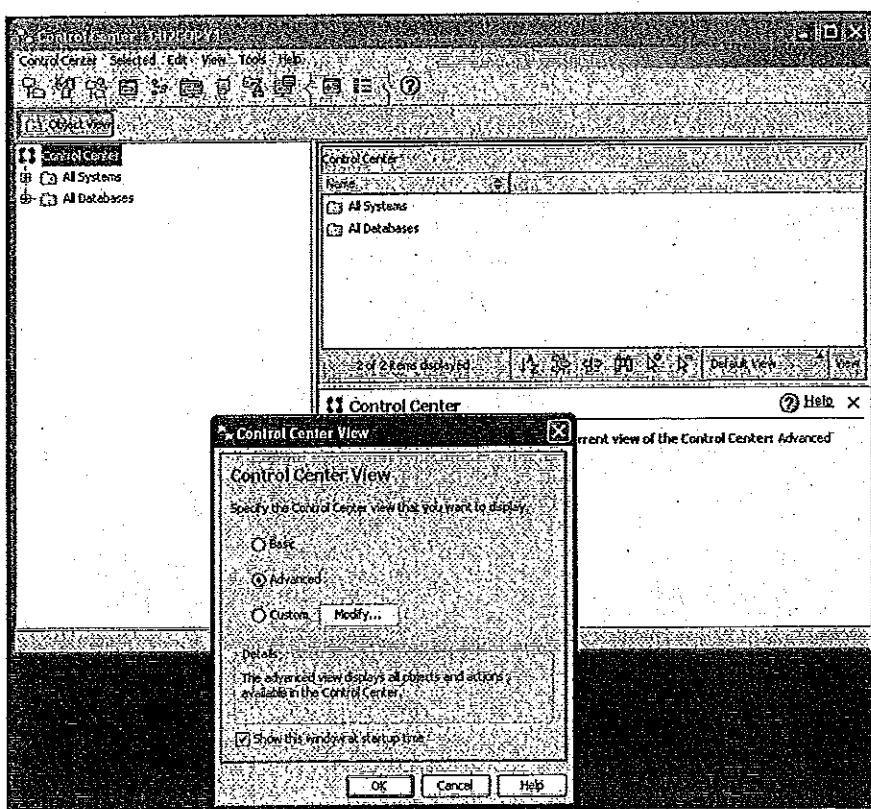
C:\Documents and Settings\db2admin>
```

31. In general you can run SQL statements by putting each statement after the command "db2". You need to double quote the command in case it contains wildcard characters.

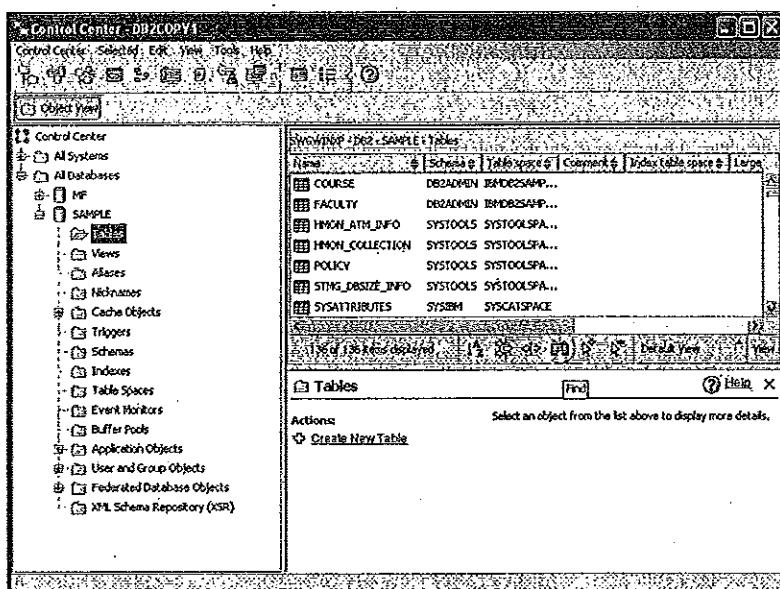
32. Now we will try to use the graphical interface of DB2. Run the DB2 control center from "Start"->"All Programs"->"IBM DB2"->"DB2COPY1 (Default)"->"General Administration Tools"->"Control Center":



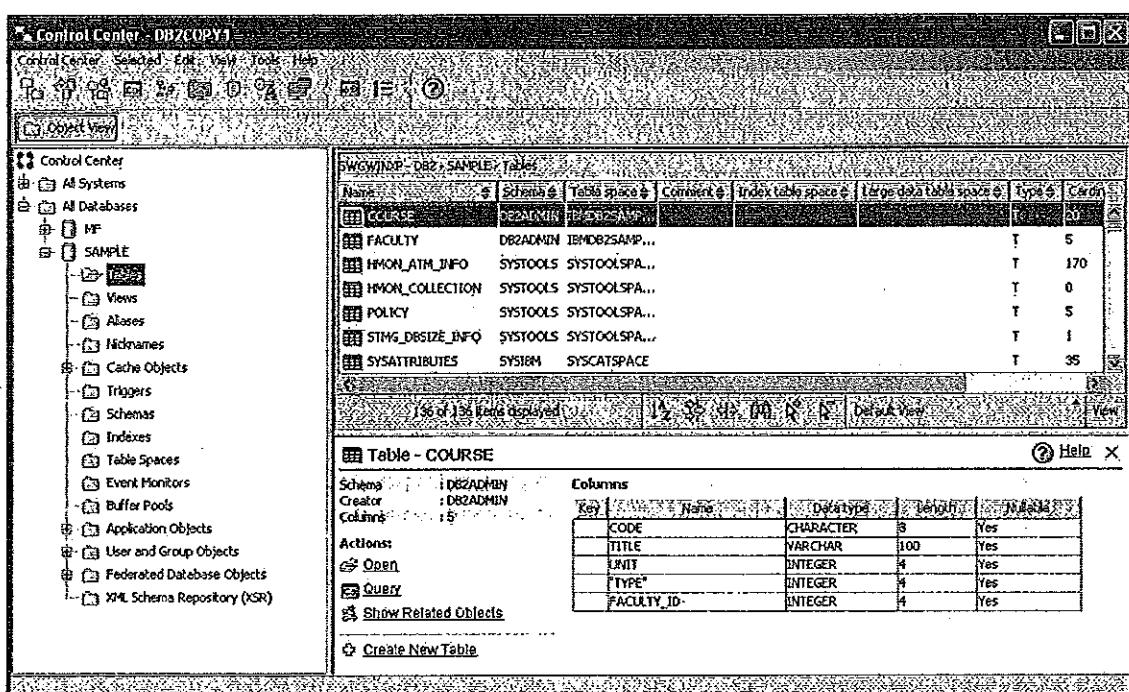
33. The DB2 control center is displayed. Press "OK" on the Control Center View to accept the default view:



34. In the Control Center screen, navigate to "All Databases" > "SAMPLE" > "Tables" on the left pane and then the list of tables will be displayed on the top right pane:



35. Click on the table COURSE and the field definition of the table will be displayed on the lower right pane:



36. Double click on the table COURSE and then a new window is popped up to display the content of the table:

\* Open Table - COURSE

SWGWINXP - DB2 - SAMPLE - DB2ADMIN.COURSE

Edits to these results are performed as positioned UPDATES and DELETES. Use the Tools Settings notebook to change the form of editing.

CODE	TITLE	UNIT	TYPE	FACULTY_ID
ENG0104	Engineering mathema...	3	0	3
ENG0106	Digital logic	6	0	3
ENG0107	Foundations of comp...	6	0	3
CSE0120	Computer programmi...	6	0	3
CSE0122	Computer programmi...	6	0	3
CSE0119	Introduction to data ...	6	0	3
CHI0102	Putonghua course for...	3	1	1
SOC0118	Japanese society	3	1	5
ECO0213	Microeconomic analysis	6	1	2
BUS0102	Introduction to accou...	6	1	2
PHY0017	Renewable energy	3	1	4
STA0102	Linear statistical anal...	6	1	4
AMR0002	Issues in American bu...	3	1	1
MUS0210	Music of China	6	1	1
POL0020	Hong Kong politics	6	1	5
SOC0008	Culture and society	6	1	5
FIN0101	Financial markets and...	6	1	2
CHE0013	Chemistry and daily life	3	1	4
ELE0115	Electronic circuits	3	1	3
ELE0112	Computer microproce...	6	1	3

Commit    Roll Back    Filter    Fetch More Rows

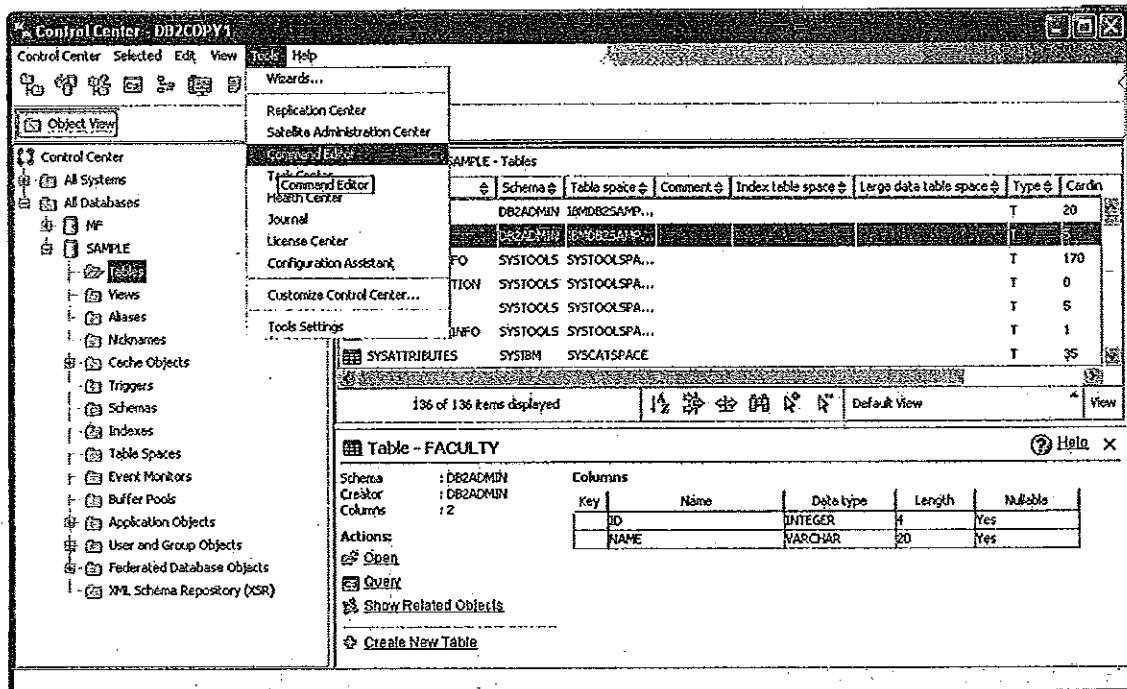
Automatically commit updates    20 row(s) in memory

Close    Help

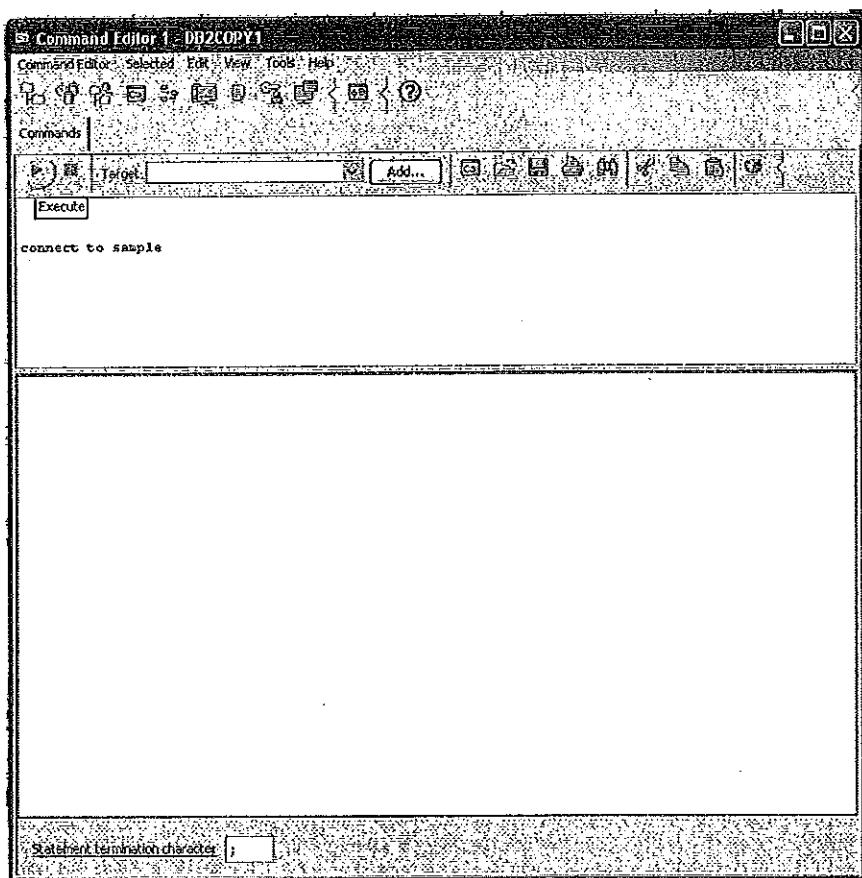
Spend some time on reviewing the functions of this window. Press the button "Close" to close the window.

37. Spend some more time to understand the other objects (e.g., indexes) in the database and functions of Control Center.

38. Then we will review the DB2 Command Editor. Execute the Command Editor through "Tools"->"Command Editor" from the manual bar of the Control Center:



39. The Command Editor screen is displayed. You can type the commands in the top pane and then the result will be displayed in the bottom pane. Type the command "connect to sample" in the top pane and then press the run button (i.e., the green triangle button) just above the top pane:



40. The Command Editor will then log into the database SAMPLE:

The screenshot shows the DB2COPY1 Command Editor window. The title bar reads "Command Editor 1 - DB2COPY1". The menu bar includes "Command Editor", "Selected", "Edit", "View", "Tools", and "Help". The toolbar contains various icons for file operations like Open, Save, Print, and Copy. Below the toolbar is a tab bar with "Commands" (selected), "Query Results", and "Access Plan". A toolbar below the tabs includes icons for "New", "Open", "Save", "Print", "Copy", "Paste", "Find", and "Help". The main pane shows the command "connect to sample" entered. Below this, a "Commands Entered" section displays the same command twice. A "Database Connection Information" section follows, listing the database server as DB2/NT 9.7.0, SQL authorization ID as DB2ADMIN, and local database alias as SAMPLE. At the bottom, a message states "A JDBC connection to the target has succeeded." A "Statement termination character:" input field is at the bottom right.

```
connect to sample

----- Commands Entered -----
connect to sample;
-----
connect to sample

Database Connection Information

Database server      = DB2/NT 9.7.0
SQL authorization.ID = DB2ADMIN
Local database alias = SAMPLE

A JDBC connection to the target has succeeded.

Statement termination character: ;
```

You can run SQL statements just like what you did in the command window. But you don't need to prefix each command by "db2".

Now please try the Command Editor out by entering more commands and see how it responds.

41. This is the end of this exercise.

**IBM Inter-University  
Programming Contest 2011 Training**

Chapter 2: Tivoli Netcool/OMNibus Overview

Software Group, IBM

**Tivoli software**

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**ISM - Overcoming the Barriers**  
*'Operations'-specific focal points based on real-world pains*

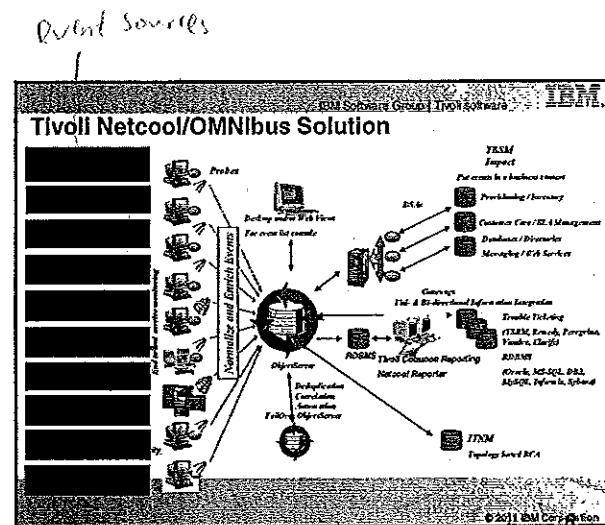
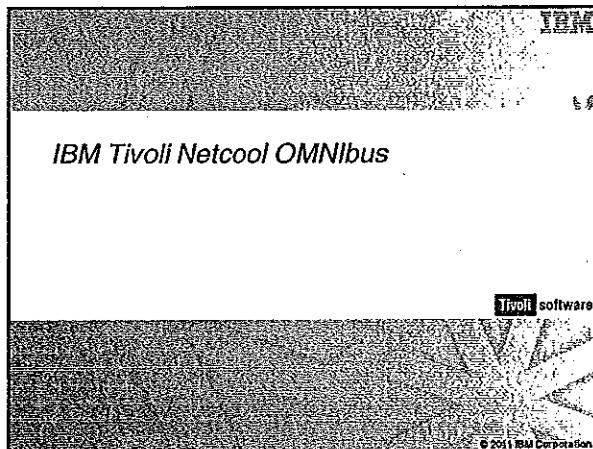
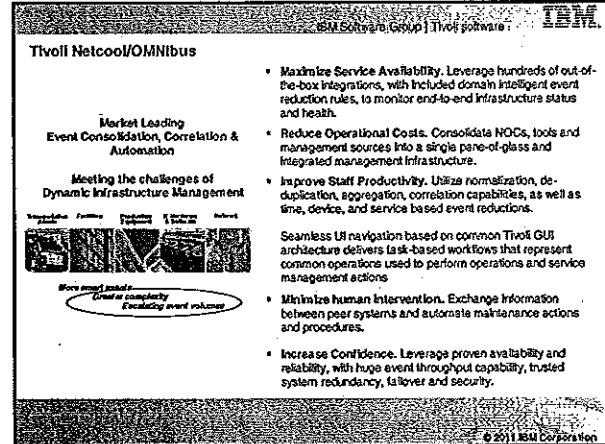
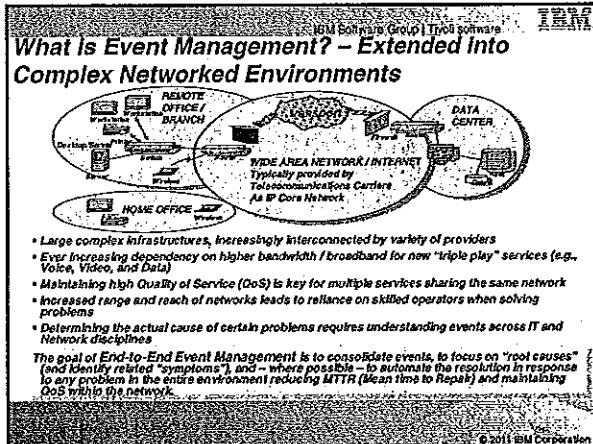
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**Analyst Accolades**

Gartner	Forrester	IDC
<b>LEADER in Gartner's Magic Quadrants for Event Correlation &amp; Analysis, Security Information, SOA Governance &amp; J2EE Application Management.</b>	<b>"IBM is a LEADER in the business service management (BSM) space, based on IBM's wealth of experience in delivering effective system management solutions." – Forrester Wave</b>	<b>"IBM is #1 in the Performance &amp; Availability Management Market in 2006, with a 19.3% market share."</b>
<b>IBM is a LEADER in the IT Application Management Software Market – Successful application management solutions must include an end-to-end view of all components, consolidate reports in a single pane of glass and must support a form of process improvement.</b>		

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## Netcool Omnibus Probes

- **Collection**
  - **Source-specific code for integrating with 3<sup>d</sup> party systems and event synchronisation**
    - Standard protocols: SNMP, Syslog, ODBC, 3GPP...
    - Custom message formats: Socket, Logfile
    - Proprietary/API: Many Vendors
- **Normalisation**
  - **Common code for rules-based event processing:**
    - Normalisation
    - Enrichment
    - Human Readability
    - Pre-classification for ObjectServer Correlation and Netcool processing

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## Types of Probes

- Device
- Log file
- Database
- API
- CORBA
- Miscellaneous
- Security

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## Netcool Omnibus Probes – Rules File Example

```

// netcool:ruleset:ProbeRules
probe("Tivoli Probe")
{
    // ...
}

// Manager
Manager("Tivoli Probe")
{
    // ...
}

// Alert
Alert("Tivoli Probe")
{
    // ...
}

// AlertGroup
AlertGroup("Tivoli Probe")
{
    // ...
}

// Severity
Severity("Tivoli Probe")
{
    // ...
}

// Type
Type("Tivoli Probe")
{
    // ...
}

// Agent
Agent("Tivoli Probe")
{
    // ...
}

// Summary
Summary("Tivoli Probe")
{
    // ...
}

```

**▪ Base Fields**

- **Identifier**
- **Severity**
- **Node**
- **AlertGroup**
- **AlertKey**
- **Summary**
- **Agent**
- **Type**

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**IBM Tivoli Netcool/OMNIbus Web GUI**

**Tivoli software**

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**AEL Features**

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Active Event List - 'Tivoli Enterprise Console' Style Look and Feel

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**Active Event List - 'Tivoli Enterprise Console' Style Look and Feel**

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Active Event List - 'Tivoli Enterprise Console' Style Look and Feel

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**Event Dashboard**

Tivoli software

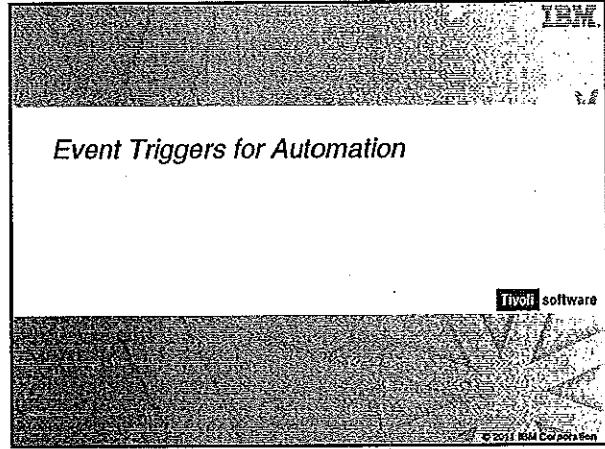
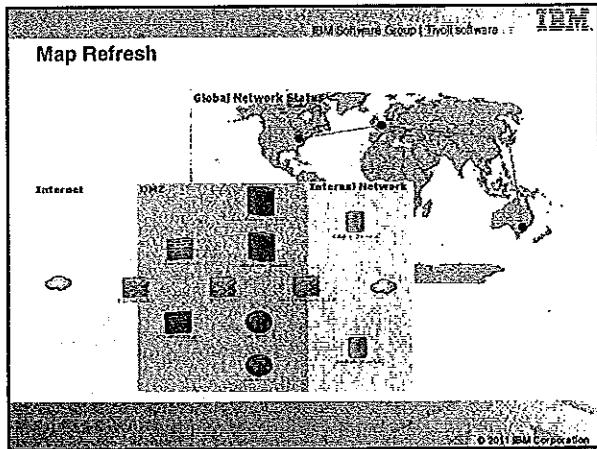
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**Event Dashboard**

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Event Dashboard

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**Clear Event Trigger**

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event stored in here

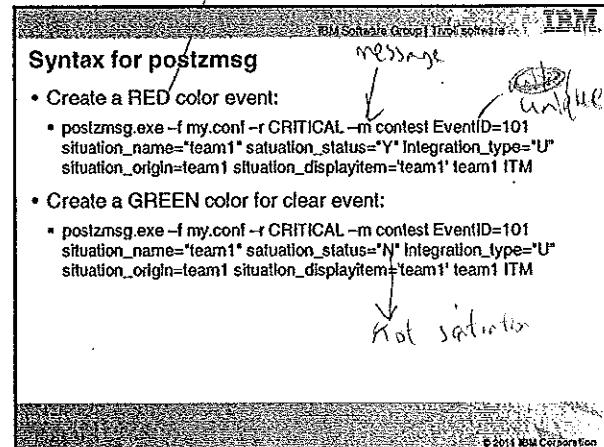
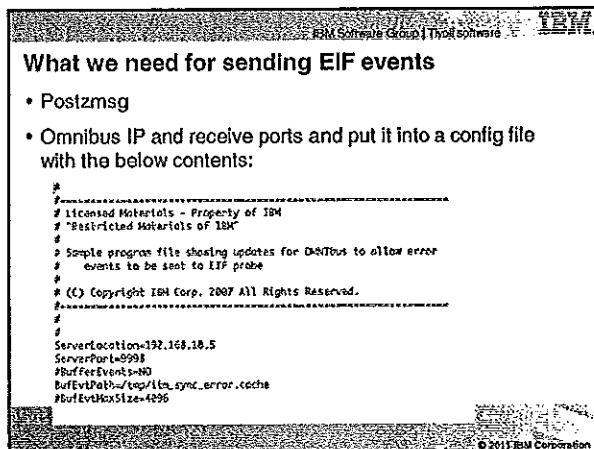
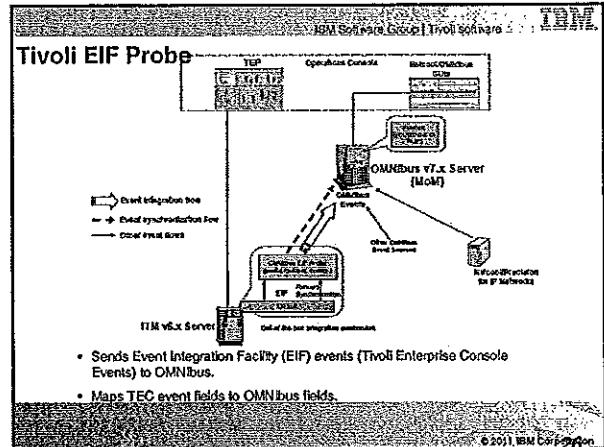
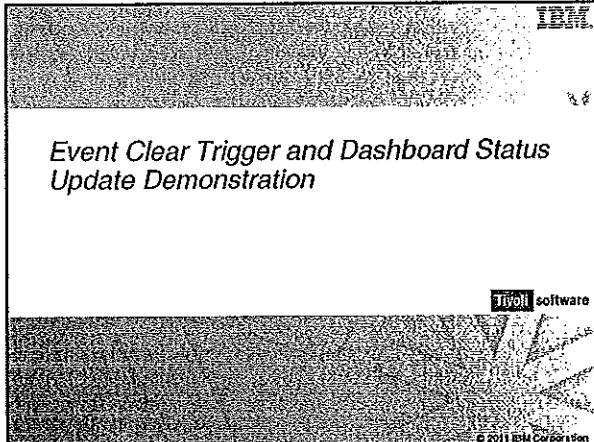
```

begin
    -- Populate a table with ITM Type 20 events corresponding to any
    -- undesired Type 21 events
    for each row problem in alerts.status where
        problem.ITMStatus = '' and problem.Type = 20 and
        problem.Severity > 0 and
        (problem.Manager) in
            (select Manager from alerts.status where Severity >
            0 and Type = 21)
    begin
        Insert Into alerts.itm,problem,events values (
            problem.Identifier, problem.LastOccurrence,
            problem.ITMHostname, problem.ITMStatus, problem.ITMTime,
            problem.ITMEventData, problem.ITNResetFlag, problem.ITMThruNode,
            problem.ITMApplLabel,
            ...
        )
    end
end

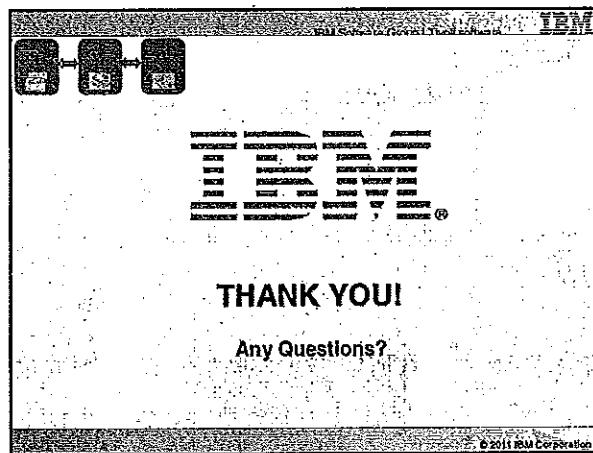
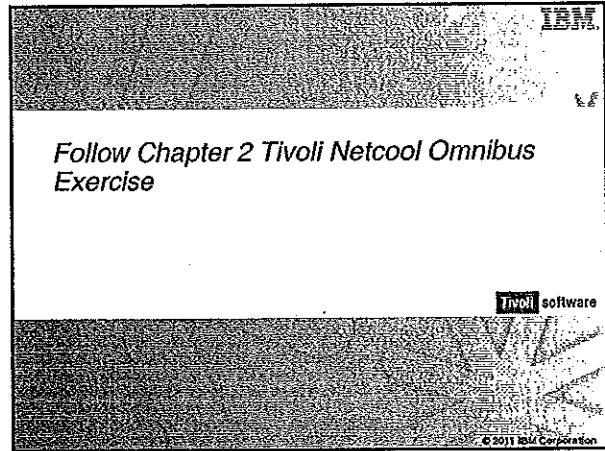
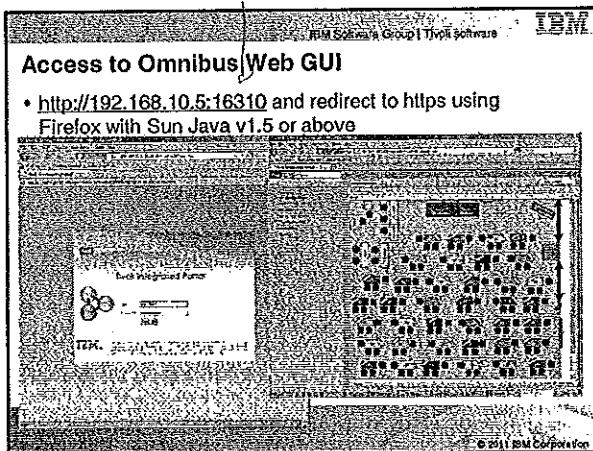
```

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pvt or b fuit.



## **Chapter 2: Tivoli Netcool Omnibus**

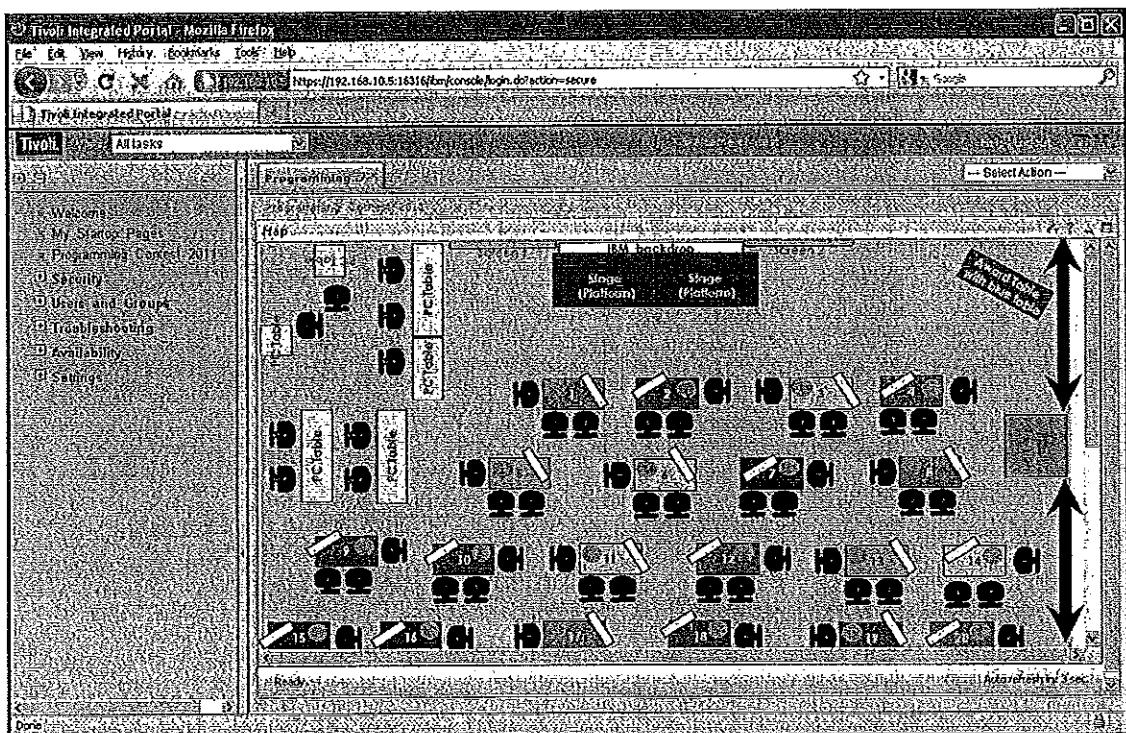
### **Objectives**

In this exercise, we will learn:

- Review server interface of Omnibus
- Review and change Omnibus client scripts
- Observe the reaction of the Omnibus based on client request

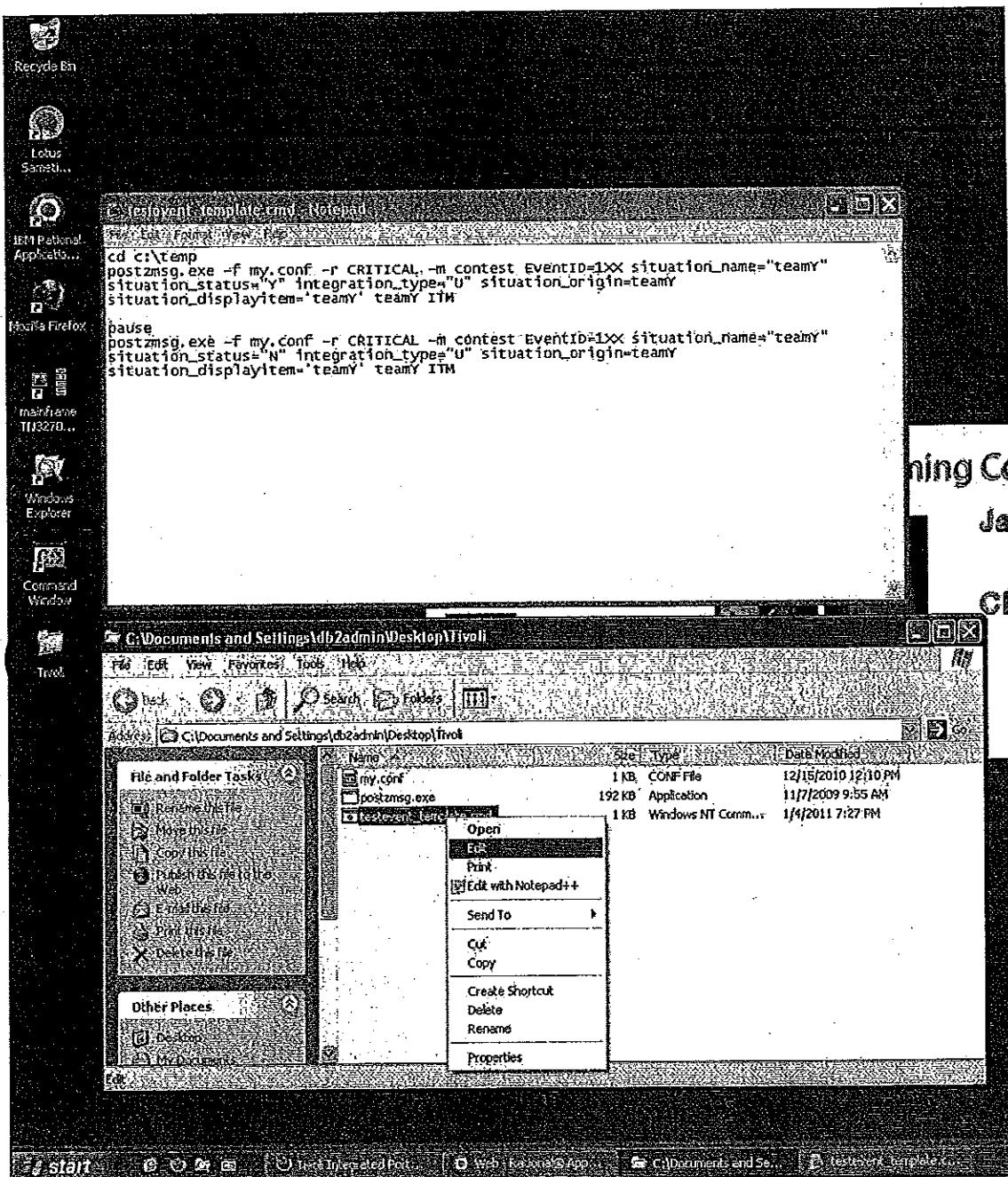
### **Exercises**

1. Review the server interface of the Omnibus server as provided by the instructor



All the traffic lights in the tables are green in color. Now you will write a script to change the color of your table to red and then back to green.

- Double click the folder "Tivoli" on the desktop, then select the file "testevent\_template.cmd" then right clicked it and then press "Edit":



then an editor pops up with the content of the script file displayed in the editor.

- You can see there are two commands in the script file. The first command is to change the traffic light of team<Y> to red, and the second command is to change the traffic light of team<Y> back to green.

4. Modify the two commands by change Y to your team number, and XX = Y with a prefix 0 if Y is single digit. For example, if Y = 2, then XX = 02. Then the two commands will become:

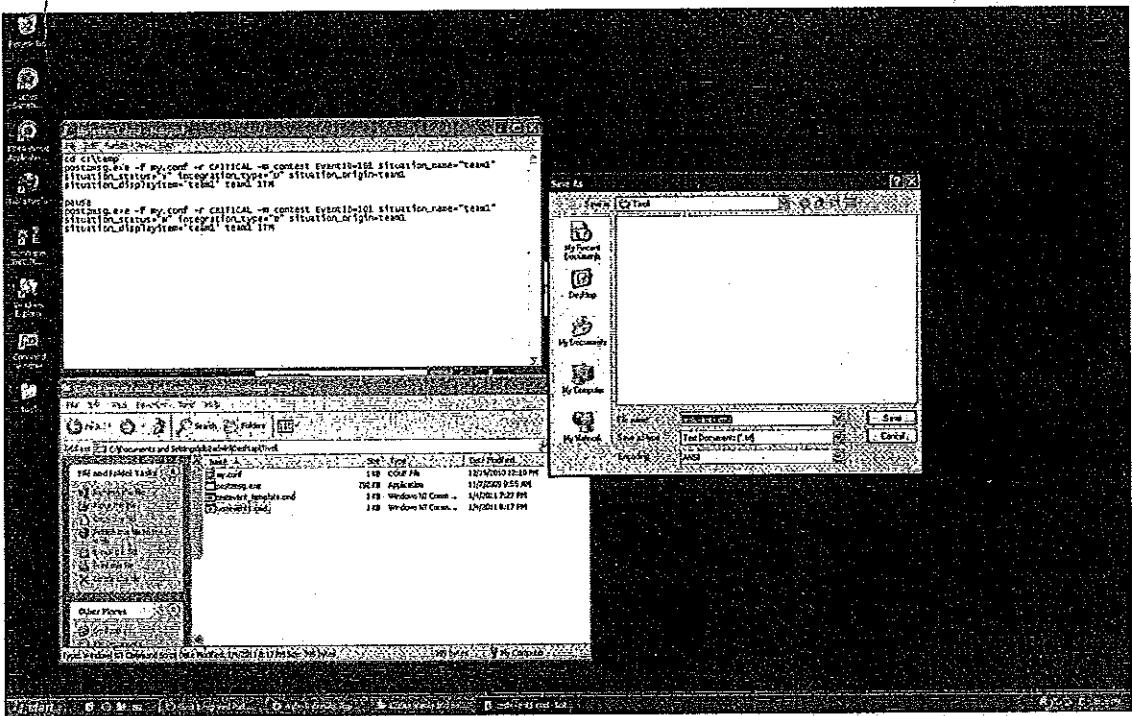
```
postzmsg.exe -f my.conf -r CRITICAL -m contest EventID=101  
situation_name="team1" satuation_status="Y" integration_type="U"  
situation_origin=team1 situation_displayitem='team1' team1 ITM
```

and

```
postzmsg.exe -f my.conf -r CRITICAL -m contest EventID=101  
situation_name="team1" satuation_status="N" integration_type="U"  
situation_origin=team1 situation_displayitem='team1' team1 ITM
```

respectively.

5. After the two commands are changed, run the command "File"->"Save As" from the editor and give a new name (e.g., testevent1.cmd)::



6. Double click the file "testevent1.cmd" to run the script file. You will see the following window:

The screenshot shows a Windows Command Prompt window titled 'C:\WINDOWS\system32\cmd.exe'. The command entered is 'C:\Documents and Settings\db2admin\Desktop\Tivoli>cd c:\temp'. The system responds with 'The system cannot find the path specified.' The next command entered is 'C:\Documents and Settings\db2admin\Desktop\Tivoli>postzmsg.exe -f my.conf -r CRITICAL -m contest EventID=101 situation\_name="team1" situation\_status="Y" integration\_type="U" situation\_origin=team1 situation\_displayitem='team1' team1 ITM'. The system responds with 'C:\Documents and Settings\db2admin\Desktop\Tivoli>pause'. The prompt 'Press any key to continue . . .' is visible at the bottom.

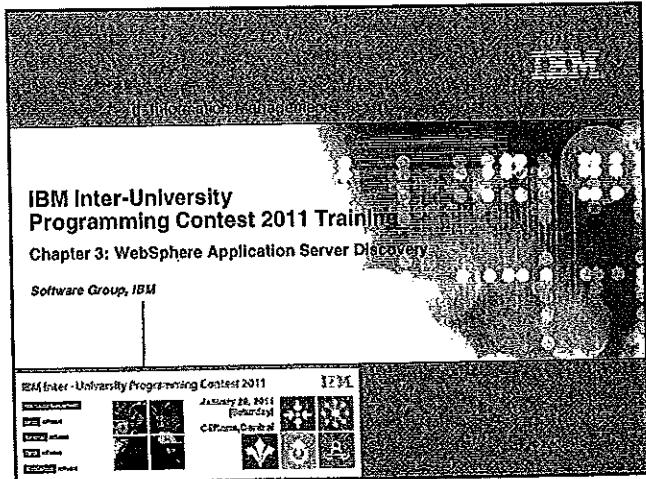
The first command is run and then it will pause and wait for your input. Don't press any key right now.

7. Look at the Omnibus server screen. Wait until the traffic light of your team changes to red. The screen will be refreshed every 5 seconds.
8. Press enter on the script window. The second command is run now and you will see the following output:

The screenshot shows a Windows Command Prompt window titled 'C:\WINDOWS\system32\cmd.exe'. The command entered is 'C:\Documents and Settings\db2admin\Desktop\Tivoli>cd c:\temp'. The system responds with 'The system cannot find the path specified.' The next command entered is 'C:\Documents and Settings\db2admin\Desktop\Tivoli>postzmsg.exe -f my.conf -r CRITICAL -m contest EventID=101 situation\_name="team1" situation\_status="Y" integration\_type="U" situation\_origin=team1 situation\_displayitem='team1' team1 ITM'. The system responds with 'C:\Documents and Settings\db2admin\Desktop\Tivoli>pause'. The prompt 'Press any key to continue . . .' is visible at the bottom. The command 'C:\Documents and Settings\db2admin\Desktop\Tivoli>postzmsg.exe -f my.conf -r CRITICAL -m contest EventID=101 situation\_name="team1" situation\_status="N" integration\_type="U" situation\_origin=team1 situation\_displayitem='team1' team1 ITM' is partially visible below the pause command.

9. Look at the Omnibus server screen. Wait until the traffic light of your team changes back to green. The screen will be refreshed every 5 seconds.
10. This is the end of this exercise.

## IV Proof of Technology

A presentation slide titled "Agenda" for "WebSphere Application Server Discovery". The agenda items listed are:

- What is an Application Server?
- Application Server Architectural Overview
- JEE Packaging Overview
- Application Server Administration
  - Integrated Solutions Console
  - Application Install
  - Problem Determination
- JDBC Provider and DataSource
- Distributed Transaction
- Lab (Review WAS-lab application)

A presentation slide titled "Agenda" for the entire session. The agenda items listed are:

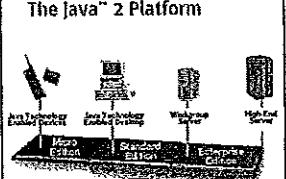
- What is an Application Server?
- Application Server Architectural Overview
- JEE Packaging Overview
- Application Server Administration
  - Integrated Solutions Console
  - Application Install
  - Problem Determination
- JDBC Provider and DataSource
- Distributed Transaction
- Lab (Review WAS-lab application)

A diagram titled "What is an Application Server?". It shows a layered system architecture. At the top is a box labeled "Application". Below it is a layer labeled "Business Logic". The bottom layer is labeled "Platform Services". Arrows point from the "Application" box down through the layers to the "Platform Services" layer, indicating that the application runs on the platform services.

## BM Proof of Technology

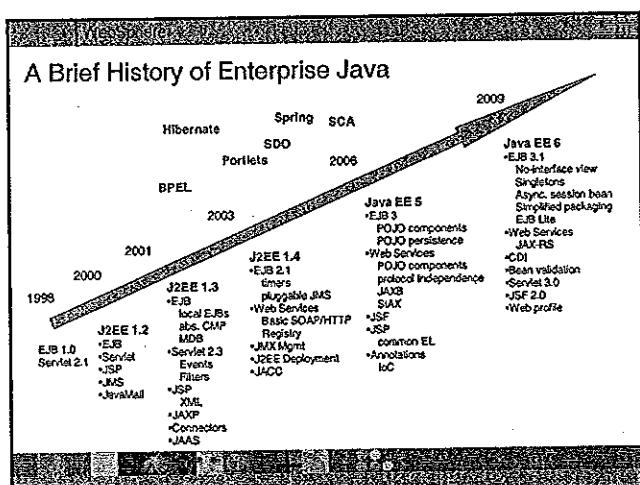
### The Java Platforms

- Java 2 Micro Edition (J2ME)  
An optimized Java runtime environment for the consumer space. It covers the range of extremely tiny devices such as smart cards or a pager all the way up to the set-top box.
- Java 2 Standard Edition (J2SE)  
A complete environment for applications development on desktops & servers.
  - Java Runtime Environment, Standard Edition (JRE) - provides the Java APIs, Java virtual machine, and other components necessary to run applets and applications written in the Java programming language
  - Java Software Development Kit, Standard Edition (SDK) - A superset of the JRE that includes tools such as the compilers and debuggers necessary for developing applets and applications.
- Java Enterprise Edition (JEE) – formerly J2EE



### Java Enterprise Edition (JEE)

- Built upon J2SE, JEE provides the specifications for developing multi-tier enterprise applications with Java
- Accelerates and simplifies enterprise application development
  - With applications based on standardized, modular components
  - Providing a complete set of services to those components
    - Standard APIs for common services such as database access, transaction management, messaging, etc.
    - Handling many details of application behavior automatically, without complex programming (e.g. transaction management, security)
    - Providing a foundation for the third party component market (e.g. JCA, JMS, JDBC)
- Improves systems and operations management by providing:
  - Packaging, deployment, and management standards for enterprise applications
- Fulfils the promise of true portability
  - Hardware, operating system and vendor



### JEE and WebSphere Application Server

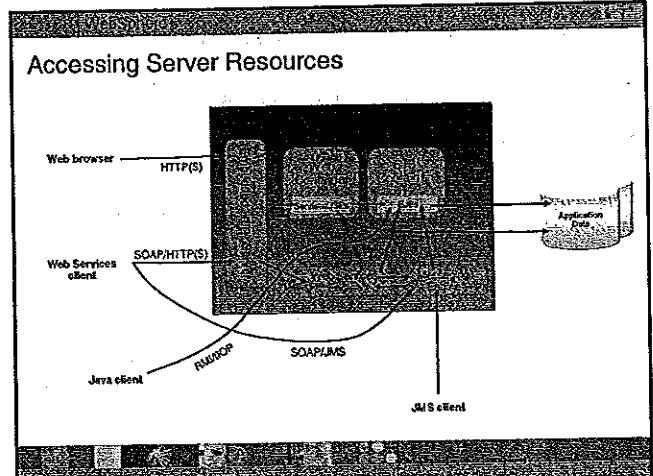
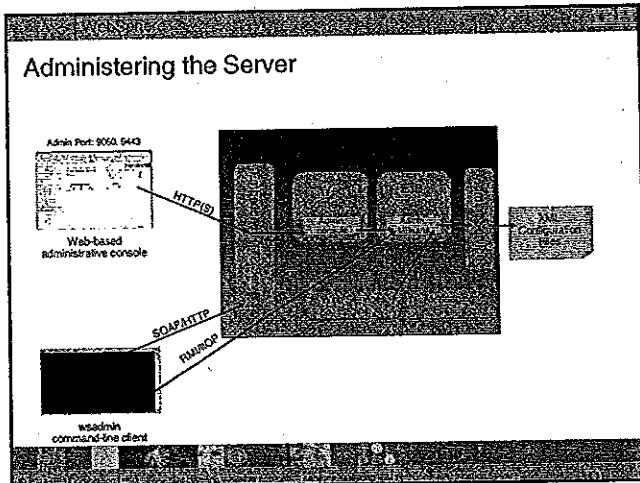
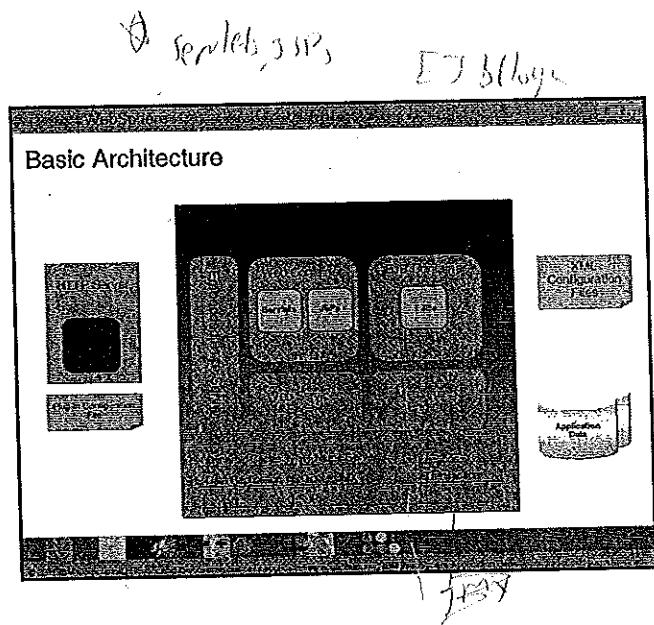
- Application servers, based on standards, can be perceived as commodities
- WebSphere Application Server (WAS) delivers more value to customers than just standards compliance
  - Quality of service, such as
    - Workload management
    - High availability and failover
    - Performance
  - Tooling support
    - Runtime embedded in Application Developer products
  - Programming model extensions
    - Future standards
    - Customer identified critical functions
  - Foundation for evolving WebSphere Software Platform

## IV Proof of Technology

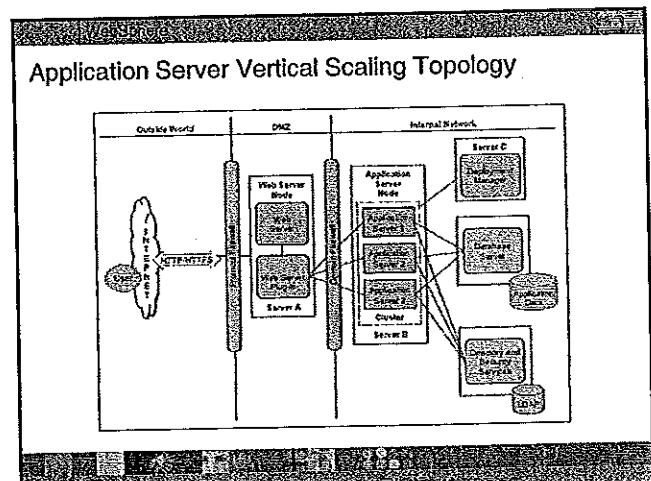
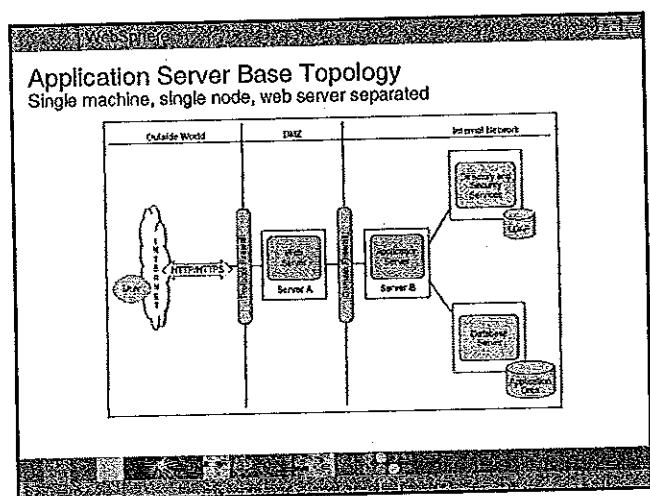
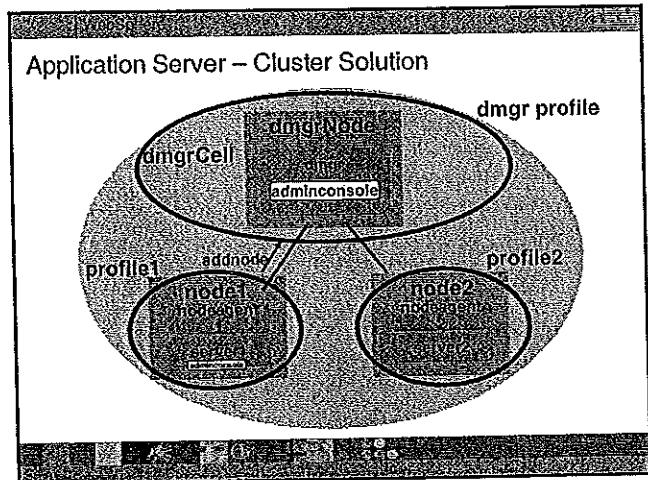
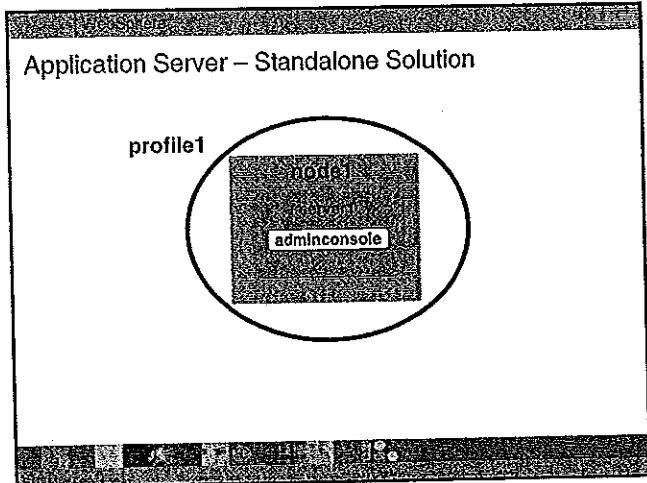
WAS-Slide 1

### Agenda

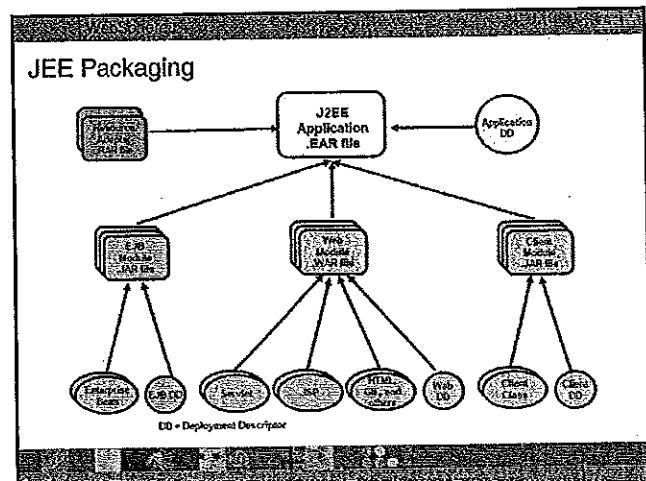
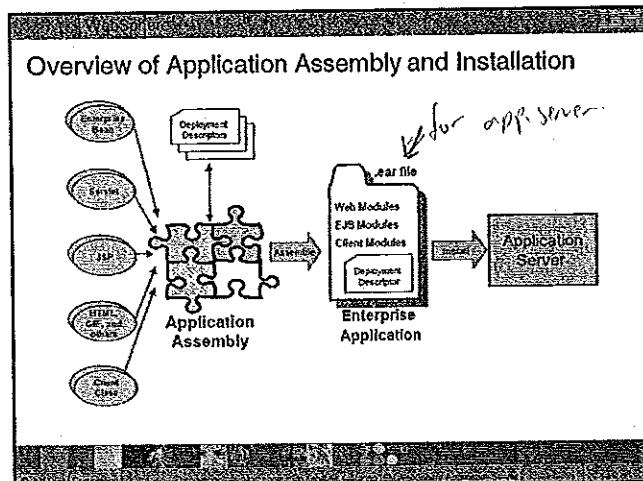
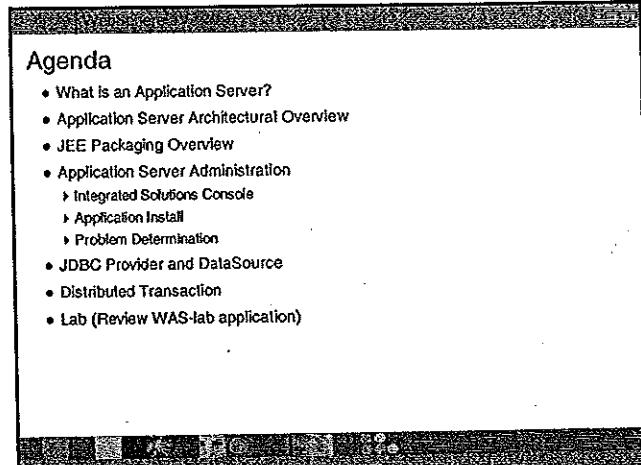
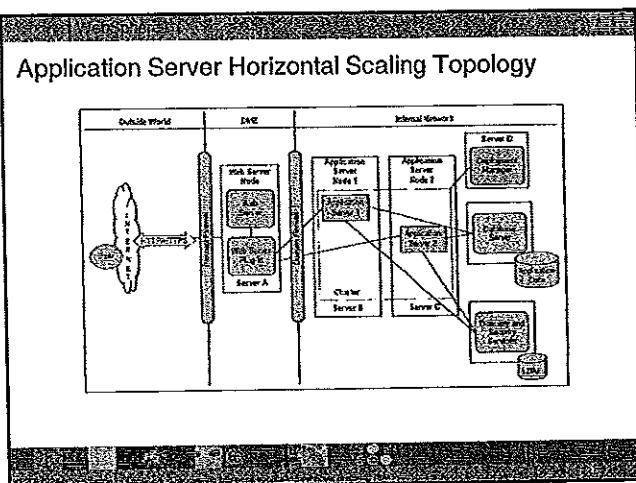
- What is an Application Server?
- Application Server Architectural Overview
- JEE Packaging Overview
- Application Server Administration
  - Integrated Solutions Console
  - Application Install
  - Problem Determination
- JDBC Provider and DataSource
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- Lab (Review WAS-lab application)



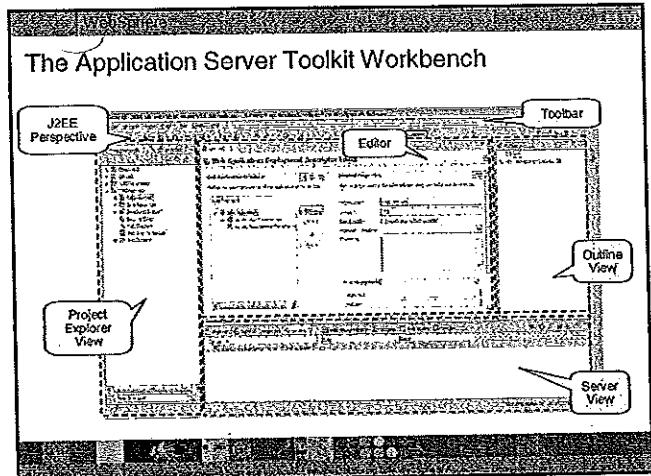
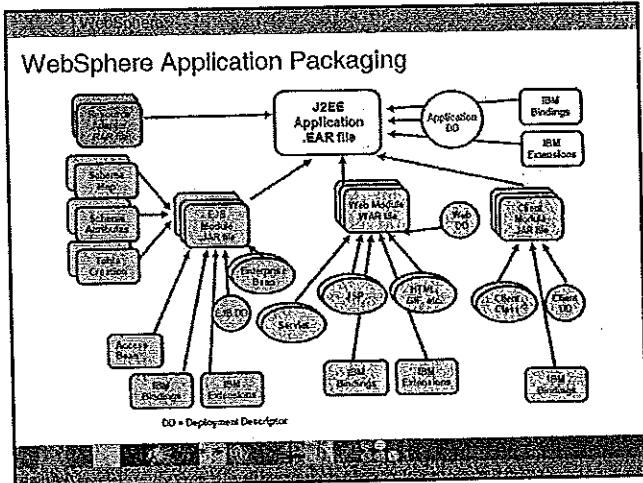
## 3M Proof of Technology



## 1.1 Proof of Technology



## 3M Proof of Technology



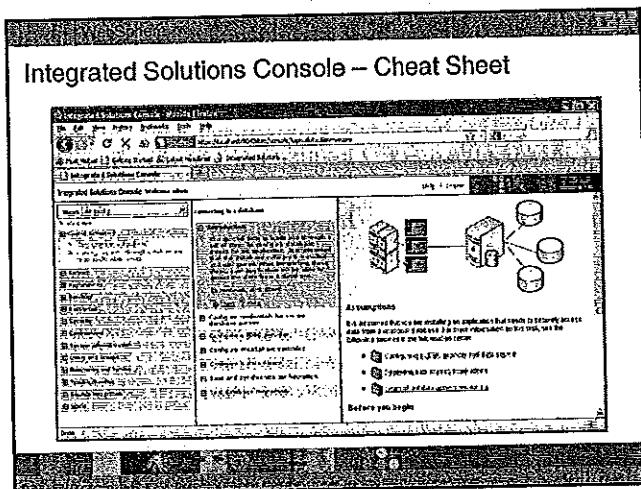
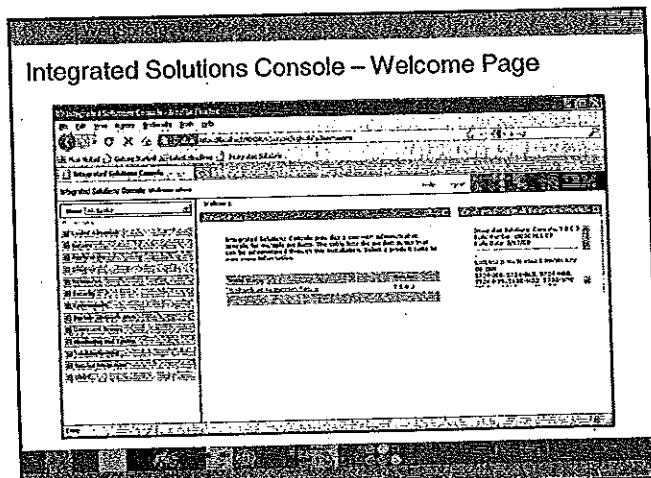
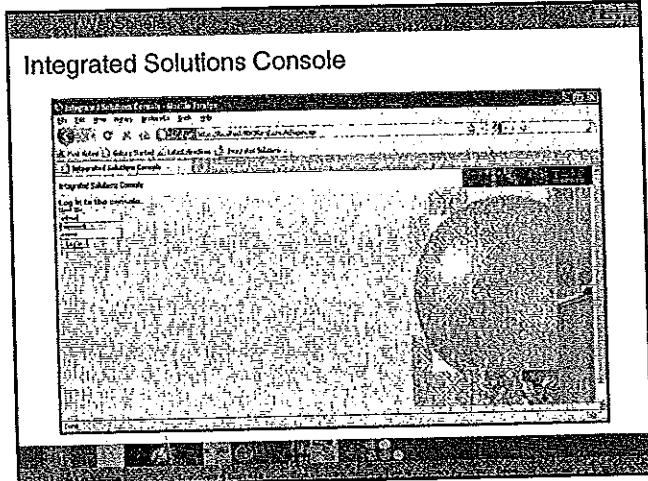
**Agenda**

- What Is an Application Server?
- Application Server Architectural Overview
- JEE Packaging Overview
- Application Server Administration
  - Integrated Solutions Console
  - Application Install
  - Problem Determination
- JDBC Provider and DataSource
- Distributed Transaction
- Lab (Review WAS-lab application)

**System Administration Tools**

- WebSphere Integrated Solutions Console
  - Browser-based interface
- Command-line operation tools
  - Available in the bin directory
- wsadmin scripting
  - Interactive and batch modes
  - Supports JACL or Jython scripts
- Ant
  - Java-based build and automation tool
- Java-based JMX APIs
  - Programming interface for custom Java applications

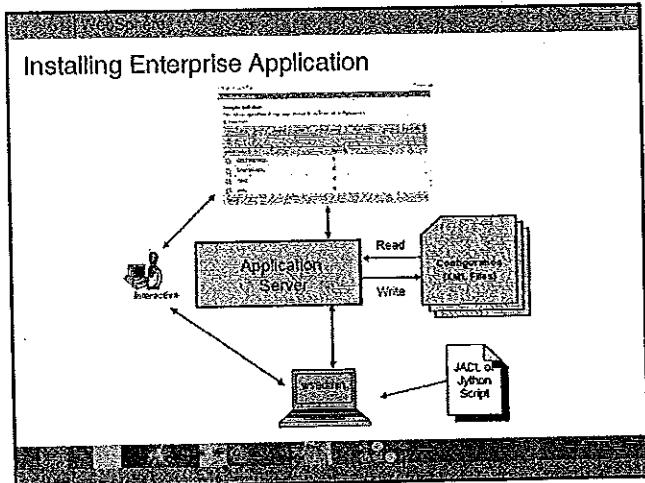
## IV Proof of Technology



### Agenda

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## 3M Proof of Technology



### Installation Tasks

- Configure the application environment as required
  - Variables, virtual hosts, classpath, security, and so forth
- Configure application resources
  - JDBC provider, DataSources
- Install application

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**Logging and Tracing**

- Message logging (messages) and diagnostic trace (trace) are conceptually similar since they are using the same Java logging API
- They have important differences:
  - A message entry is an informational record that is intended for end users, systems administrators, and support personnel to view. The text of the message must be clear, concise, and interpretable by an end user.
  - A trace entry is an information record that is intended for service engineers or developers to use. As such, a trace record might be considerably more complex, verbose and detailed than a message entry.

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### Log Files and Locations

- The destination and names for the log files are configurable.  
The default location is:  
<was\_root>\profiles\<profile\_name>\Logs\<server\_name>
- Log Files:
  - SystemOut.log and SystemErr.log - Standard JVM output and error log
  - startServer.log and stopServer.log
    - Startup and shutdown of the Application Servers
  - activity.log - Events that show a history of installation activities
    - Use Log Analyzer to read output from this file
  - trace.log - Output from diagnostic trace
    - Destination and name are configurable
  - http\_plugin.log - Not in <was\_root>
    - Location: <plugin\_root>\Logs\<webserver\_name>

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### JDBC Drivers and DataSource

- DataSource represents a real-world data source, e.g. DB2 for z/OS, in the Java programming language
- DataSource is registered with JNDI naming service for use in a JEE environment, e.g. WebSphere Application Server

### Types of JDBC Driver

Type-1	Type-2	Type-3	Type-4
<ul style="list-style-type: none"><li>Oldest type</li><li>JDBC API calls ODBC</li><li>No good performance</li><li>Not commonly used</li><li>Partially written in Java</li></ul>	<ul style="list-style-type: none"><li>Platform- and Database-specific</li><li>Best performance</li><li>Partially written in Java</li><li>Platform-specific</li><li>written in C</li></ul>	<ul style="list-style-type: none"><li>Middleware translates JDBC API to database-specific call thru TCP/IP</li><li>No driver for DB2 for z/OS</li></ul>	<ul style="list-style-type: none"><li>Full written by Java</li><li>Portable</li><li>DB2 Universal Driver for Java Common Connectivity (JCC)</li></ul> <p>Pure Java run through TCP/IP</p>

Only Type-2 and Type-4 drivers are supported by DB2 for z/OS.

# 3M Proof of Technology

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## What is a Transaction?

- A financial program might transfer money from a savings account to a trading account by using the pseudocode below:
  - begin transaction
  - debit savings account
  - credit trading account
  - commit transaction
- Either all or none of the two steps must complete. Otherwise, data integrity is lost. Because the steps within a transaction are a unified whole, a transaction is often defined as an indivisible *unit of work*.
- A transaction can end in two ways:
  - with a commit for a successful transaction
  - with a rollback for a failed transaction
- As shown, the begin and commit statements mark the boundaries of the transaction, which is declared by application developer.

## Code Pattern

- javax.transaction.UserTransaction interface is used to mark the boundaries of a JTA transaction.

- Code pattern of a distributed transaction under an application server:

```
    // Obtain UserTransaction object from the application server
    InitialContext ctx = new InitialContext();
    javax.transaction.UserTransaction utx = (UserTransaction) ctx.lookup("java:comp/UserTransaction");
    // Use the begin method on a UserTransaction object to indicate
    // the beginning of a distributed transaction.
    utx.begin();
    ...
    // Execute some SQL statements with one Connection object.
    // Do not call Connection methods commit or rollback.
    ...
    // Use the commit method on the UserTransaction object to
    // drive all transaction branches to commit and indicate
    // the end of the distributed transaction.
    utx.commit();
```

• To rollback a transaction, use `utx.rollback()` instead.

## Distributed Transaction in JEE

- Distributed transactions typically involve multiple connections to the same data source or different data sources from the same or different manufacturers.
- J2EE supports distributed transactions through Java Transaction API (JTA) and Java Transaction Service (JTS) specifications.
- JTS is seldom manipulated directly by application developers.
- JTA specifies standard Java interfaces between a *transaction manager* and the parties involved in a distributed transaction system: the *resource manager*, the application server, and the transactional applications. For example:
  - DB2 acts as a resource manager.
  - WAS assumes the role of a *transaction manager*. *(A)*
- JDBC drivers with distributed transaction capability are required. For example:
  - com.ibm.db2.jcc.DB2XADataSource class should be used when defining DB2 data sources involved in a distributed transaction within the WAS.

## I Proof of Technology

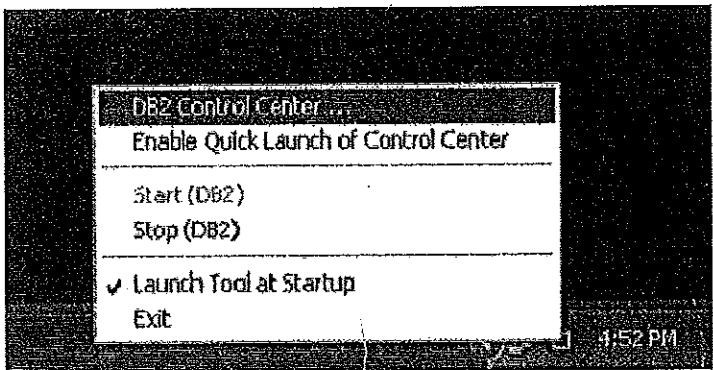
The image shows a presentation slide with a dark header and footer. The main content area has a light gray background. The title 'Agenda' is at the top in bold. Below it is a bulleted list of topics:

- What is an Application Server?
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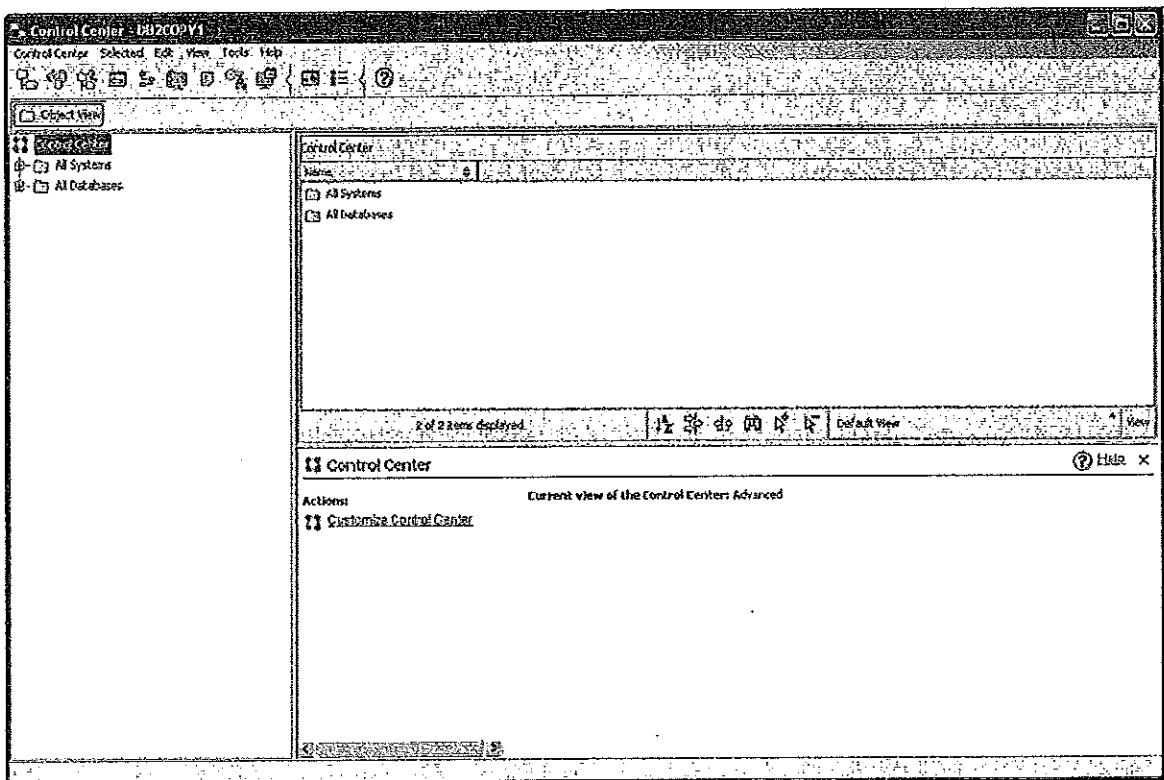
## Chapter 3: Step by Step Lab Instructions for WAS-lab

### Task A – Setup DB2 Database Tables

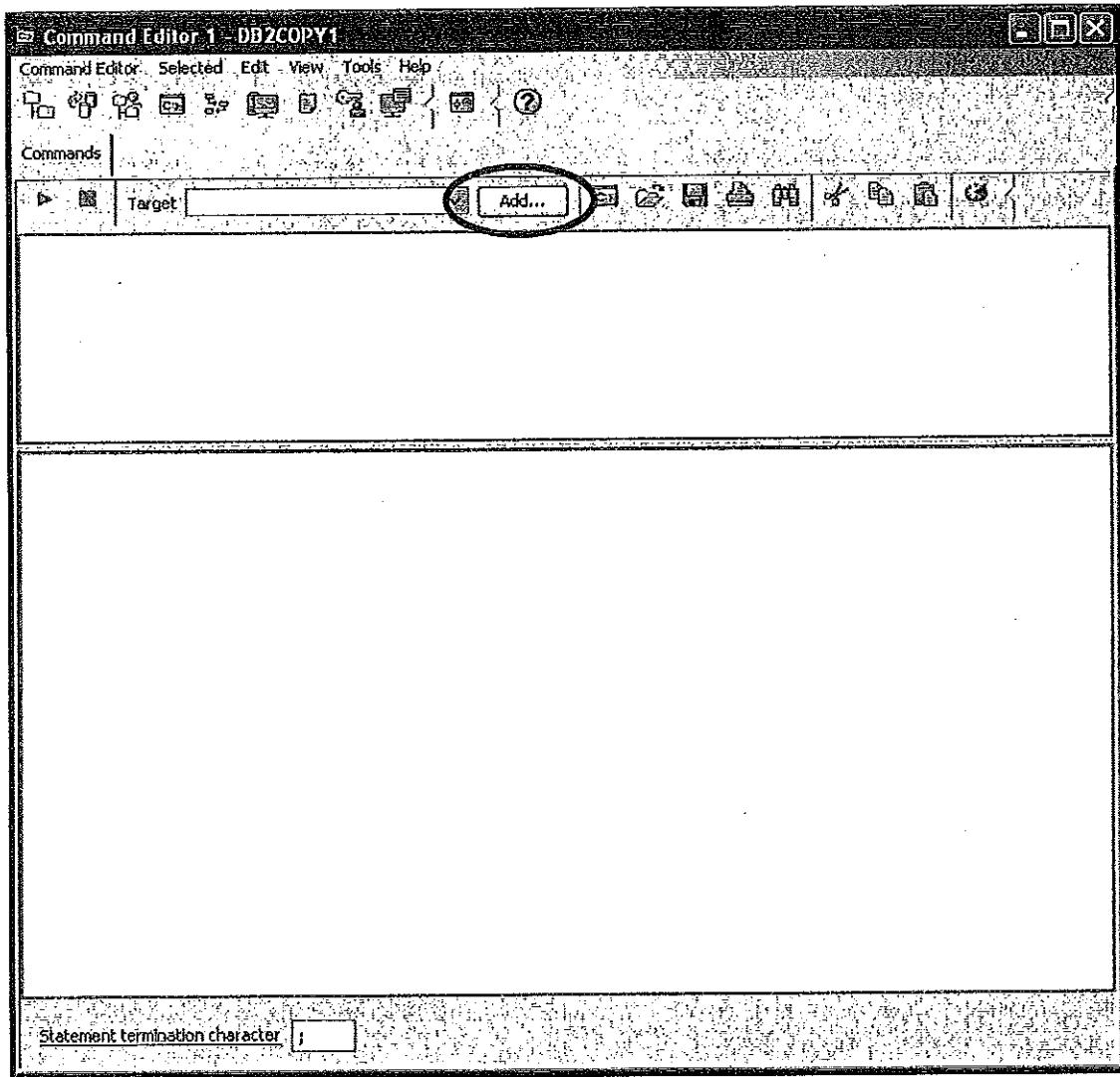
1. Right click on the DB2 tray icon on the taskbar and select “DB2 Control Center” .



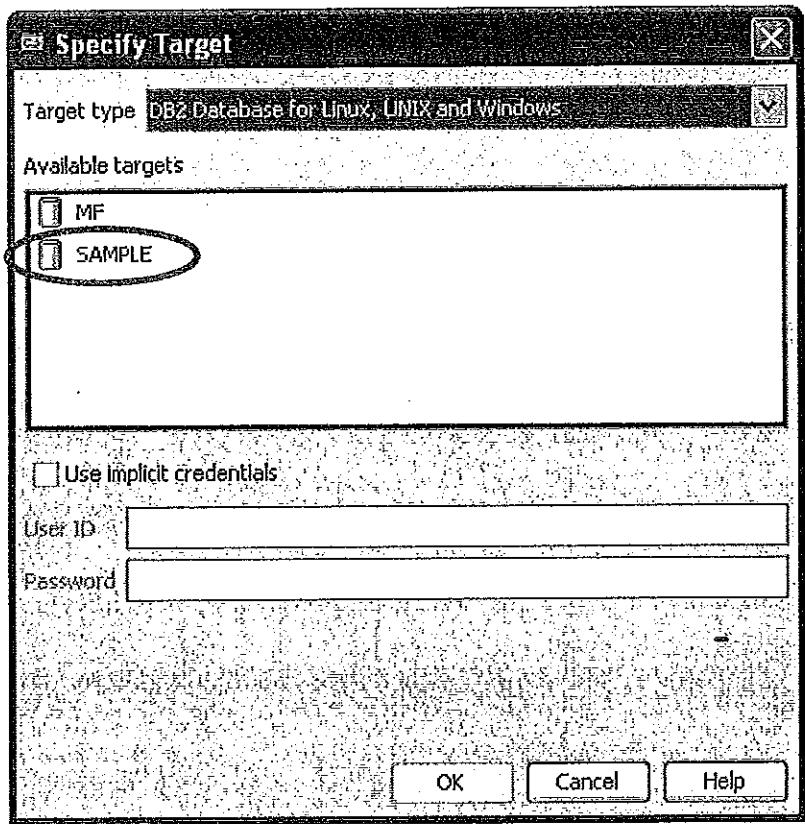
2. A dialogue called “Control Center View” is shown, click “OK” . Then the Control Center shows.



3. On the menu bar, click “Tools → Command Editor” and another Command Editor window will be shown. Click “Add” button.



4. Select "SAMPLE" from the "Specify Target" dialogue box.



5. Enter the following SQL statement in the Command Editor and click the "Run" button. Check to see if "The SQL command completed successfully." appears on the status window.

```
CREATE TABLE A (
    NAME VARCHAR(20) NOT NULL,
    VALUE INTEGER,
    PRIMARY KEY (NAME)
);
```

The screenshot shows the 'Command Editor 1 - DB2COPY1' window. The title bar has 'Command Editor' and 'Selected'. The menu bar includes 'Edit', 'View', 'Tools', and 'Help'. The toolbar contains various icons for database management tasks. The tabs at the top are 'Commands', 'Query Results', and 'Access Plan', with 'Commands' selected. The main pane displays the SQL command:

```
CREATE TABLE A (
    NAME VARCHAR(20),
    VALUE INTEGER
);
```

Below the command, the status window shows the following output:

```
-- Commands Entered --
connect to SAMPLE ;
-----
connect to SAMPLE

Database Connection Information

Database server      = DB2/NT 9.7.0
SQL authorization ID = DB2ADMIN
Local database alias = SAMPLE

A JDBC connection to the target has succeeded.
-- Commands Entered --
CREATE TABLE A (
    NAME VARCHAR(20),
    VALUE INTEGER
);
-----
```

A large oval highlights the message:

```
CREATE TABLE A ( NAME VARCHAR(20), VALUE INTEGER )
DB20000I The SQL command completed successfully.
```

At the bottom, there is a 'Statement termination character' input field containing a semicolon.

6. Enter the following SQL statement in the Command Editor and click the "Run" button. Check to see if "The SQL command completed successfully." appears on the status window.

*INSERT INTO A VALUES ('SAMPLE', 10);*

The screenshot shows the DB2COPY1 Command Editor interface. The title bar reads "Command Editor 1 - DB2COPY1". The menu bar includes "Command Editor", "Selected", "Edit", "View", "Tools", and "Help". The toolbar contains various icons for database management tasks. The main window has tabs for "Commands", "Query Results", and "Access Plan", with "Commands" selected. The command input field contains the SQL statement:

```
INSERT INTO A VALUES ('SAMPLE', 10);
```

Below the input field, the "Database connection information" section displays:

```
Database server      = DB2/NT 9.7.0
SQL authorization ID = DB2ADMIN
Local database alias = SAMPLX
```

The status window at the bottom shows the execution results:

```
A JDBC connection to the target has succeeded.
----- Commands Entered -----
CREATE TABLE A (
    NAME    VARCHAR(20),
    VALUE   INTEGER
);
----- Commands Entered -----
CREATE TABLE A ( NAME  VARCHAR(20), VALUE      INTEGER )
DB20000I  The SQL command completed successfully.

----- Commands Entered -----
INSERT INTO A VALUES ('SAMPLE', 10);
----- Commands Entered -----
INSERT INTO A VALUES ('SAMPLE', 10)
DB20000I  The SQL command completed successfully.
```

A red oval highlights the last line of the status window, "DB20000I The SQL command completed successfully.", which corresponds to the executed SQL statement.

7. Close Command Editor by clicking **Command Editor** → **Exit** on the menu bar.  
 In Control Center, expand **All Databases** → **SAMPLE** → **Tables** by clicking the (+) icon in the **Object View**. On the right panel, the created table A should be there. Click to select table A and then click **Query** link on the bottom.

Name	Schema	Table space	Compressed	Index table space	Target data table space	Type	Cardinality	Statistics last
ACCOUNT	DEZADMIN	DEZDB2SAMPLE				T	3	12/2/10 2:57 ..
COURSE	DEZADMIN	DEZDB2SAMPLE				T	20	12/2/10 6:48 194
CUSTOMER	DEZADMIN	DEZDB2SAMPLE				T	2	12/2/10 3:58 ..
FACILITY	DEZADMIN	DEZDB2SAMPLE				T	5	12/2/10 5:58 99
HINN_ATMINFO	SYSTOOLS	SYSTOOLSPA				I	170	12/1/10 6:30 ..
HINN_COLLECTION	SYSTOOLS	SYSTOOLSPA				T	0	12/1/10 5:39 ..
HOLIDAY	DEZADMIN	DEZDB2SAMPLE				T	17	12/22/10 3:53 ..
ORDER	DEZADMIN	DEZDB2SAMPLE				T	29	12/22/10 9:25 ..
PASTQUOTE	DEZADMIN	DEZDB2SAMPLE				I	62932	12/1/10 6:09 ..
POLICY	SYSTOOLS	SYSTOOLSPA				I	5	10/2/10 2:12 ..

1 of 145 items displayed | View | Default View | Help | X

**Table - A**

Schema: DEZADMIN Columns: 2

Key	Name	Data type	Length	Nullable
	NAME	VARCHAR	20	Yes
	VALUE	NUMBER	4	Yes

**Actions:**

- Query**
- Show Related Objects
- Create New Table

8. A Command Editor will be shown again with a SQL statement already there.  
 Click the **Run** button.

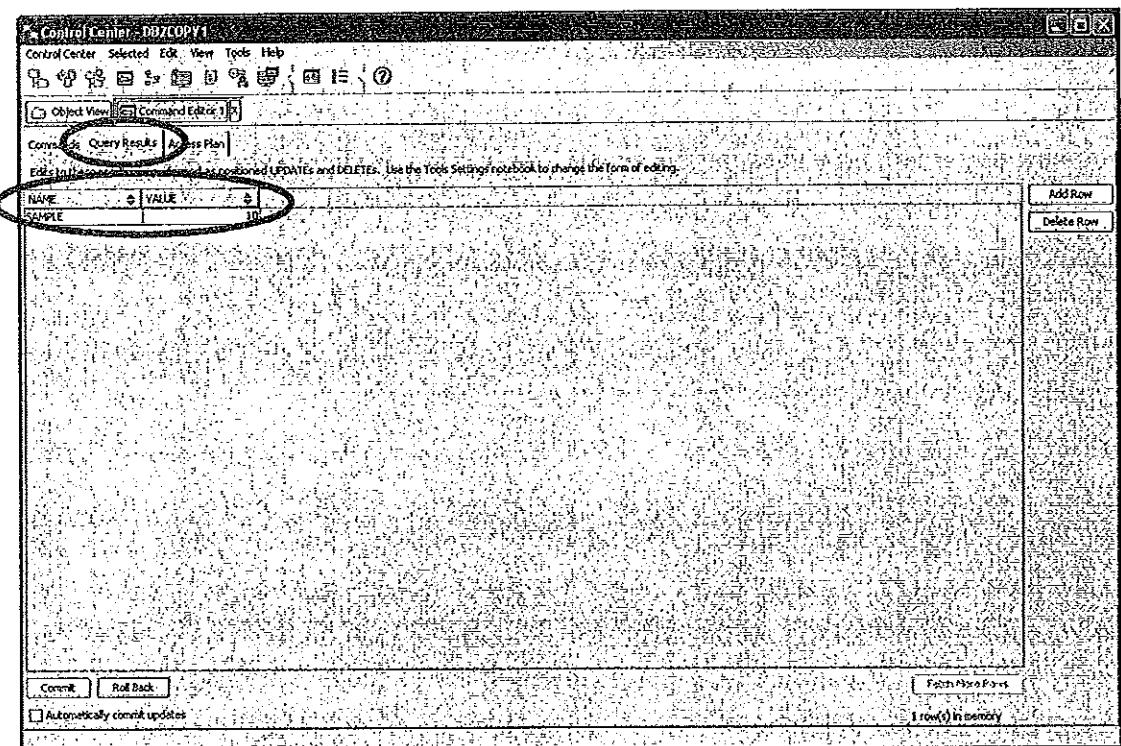
```

Control Center - DO2COPY1
Control Center > File > Exit
Control Center > Object View > Command Editor
Query
SELECT * FROM DEZADMIN.'A'

----- Commands Entered -----
connect to SAMPLE /
connect to SAMPLE
Database Connection Information
Database server      = DB2/ST 9.7.0
SQL authorization ID = DEZADMIN
Local database alias  = SAMPLE
A JDBC connection to the target has succeeded.

```

9. The **Query Results** tab will be shown with the records of table A displayed in a table. The field values should be consistent with the previous insert SQL statement. Close Command Editor by clicking **Command Editor** → **Exit** on the menu bar.



10. Using similar steps from 3 to 9 above to prepare another table, called **B**, in the database MF with reference to the following SQL statements.

```
CREATE TABLE B (
    NAME VARCHAR(20) NOT NULL,
    VALUE INTEGER,
    PRIMARY KEY (NAME)
);
INSERT INTO B VALUES ('MF', 20);
```

Congratulations, you have finished Task A of this lab. Go ahead to Task B.

## Task B – Configure Data Sources in WebSphere Application Server

1. Open FireFox and enter the link (<http://localhost:9060/ibm/console>). Log in to the Integrated Solutions Console. Enter admin as username and admin as password, click Log in. The Welcome page shows.
2. Click Resources → JDBC → Data sources. Click the New button on the right panel.

The screenshot shows the IBM Integrated Solutions Console interface. On the left, there is a navigation tree with the following structure:

- Resources
- JDBC
- Data sources

The 'Data sources' node is highlighted with a red oval. On the right, a detailed configuration page for a new data source is displayed. The title of this page is 'Data sources'. The main content area contains the following information:

**Data sources**  
Use this page to add the settings of a datasource that is associated with your selected JDBC provider. The datasource object supplies your application with connections for accessing the database. Learn more about this task in a [guided activity](#). A guided activity provides a list of task steps and more general information about the topic.

**Scope**: Cell=>vgvnxpNode01, Node=>vgvnxpNode01, Server=server1

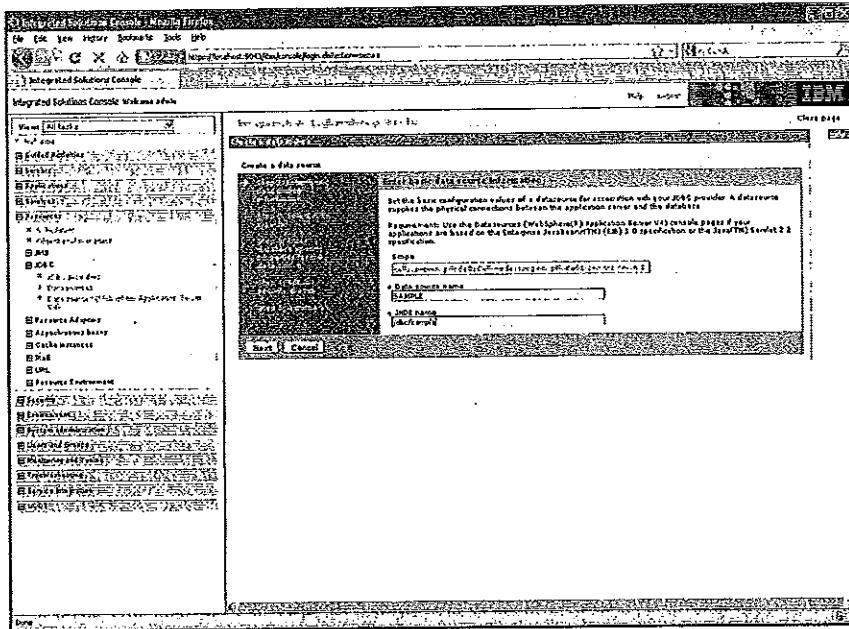
**Scope**: Cell=>vgvnxpNode01, Node=>vgvnxpNode01, Server=server1

**New** [New] [Select] [Testconnection] [Manage state]

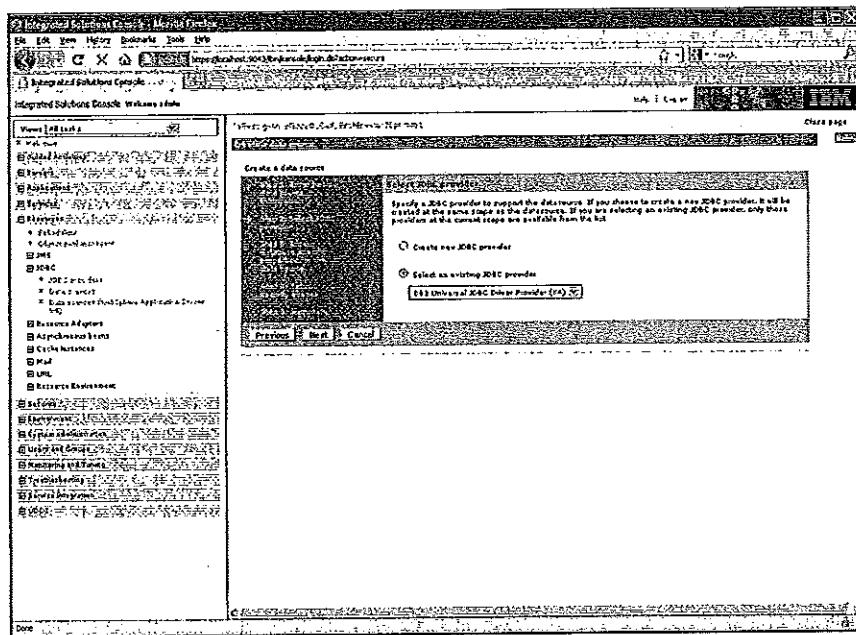
Name	Type	Provider	Description	Comments
Default Database	DefaultDataSource	Node=>vgvnxpNode01,Server=server1	Darby JDBC Provider	Datasource for the WebSphere Default Application

3. Enter the following details and click Next.

Data source name: **SAMPLE**  
JNDI name: **jdbc/sample**

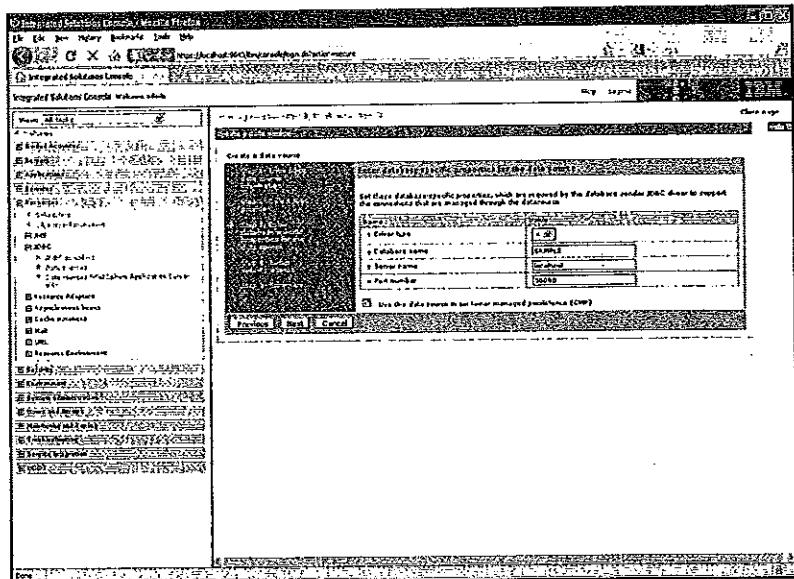


4. Select DB2 Universal JDBC Driver Provider (XA) in Select an existing JDBC provider. Click Next..



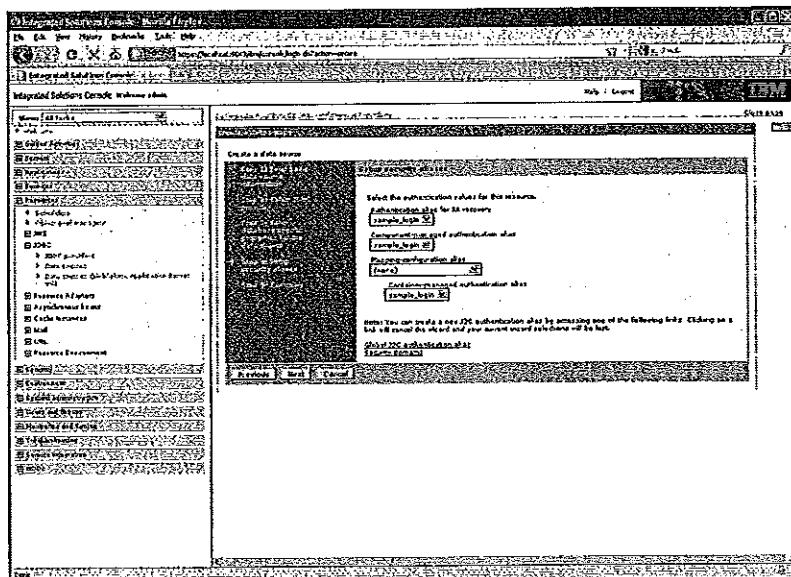
5. Enter the following details and click **Next**.

Driver type: 4  
Database name: **SAMPLE**  
Server name: **localhost**  
Port number: **50000**

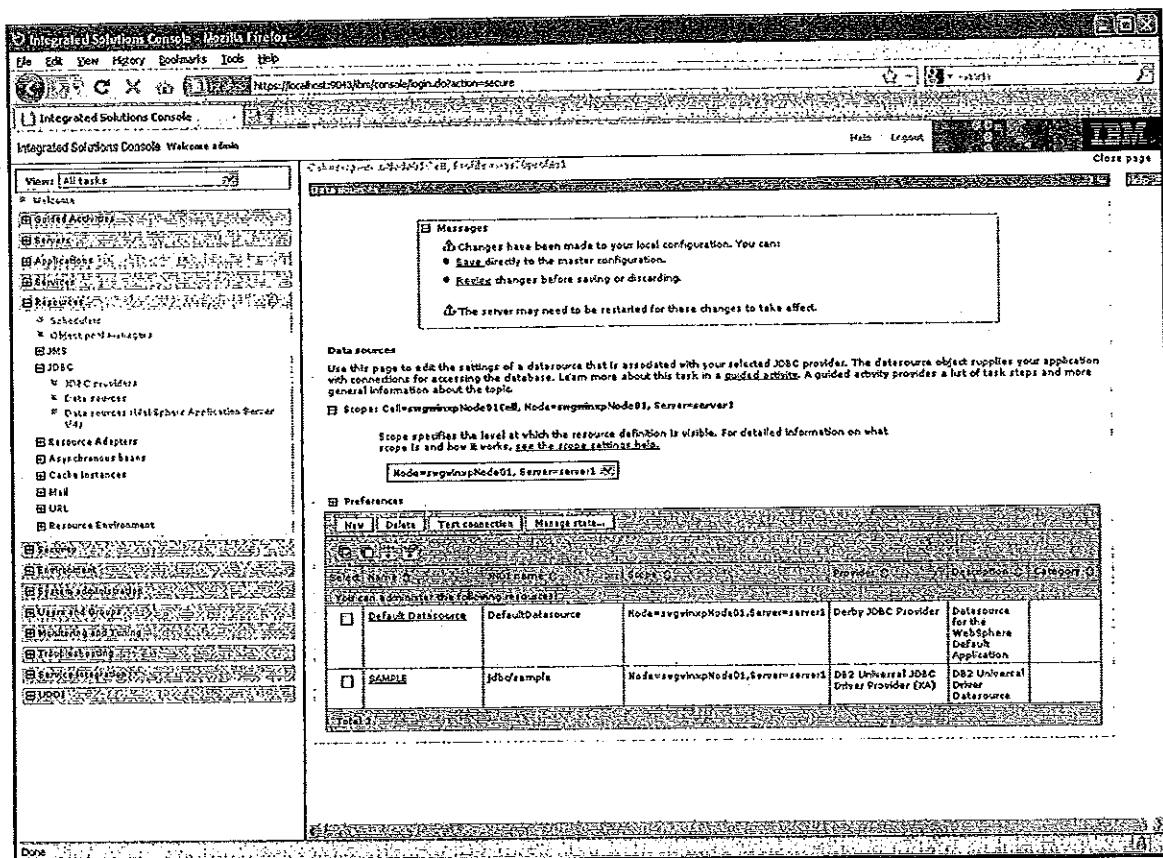


6. Select the following details and click “**Next**”.

Authentication alias for XA recovery: **sample\_login**  
Component-managed authentication alias: **sample\_login**  
Mapping-configuration alias: **(none)**  
Container-managed authentication alias: **sample\_login**



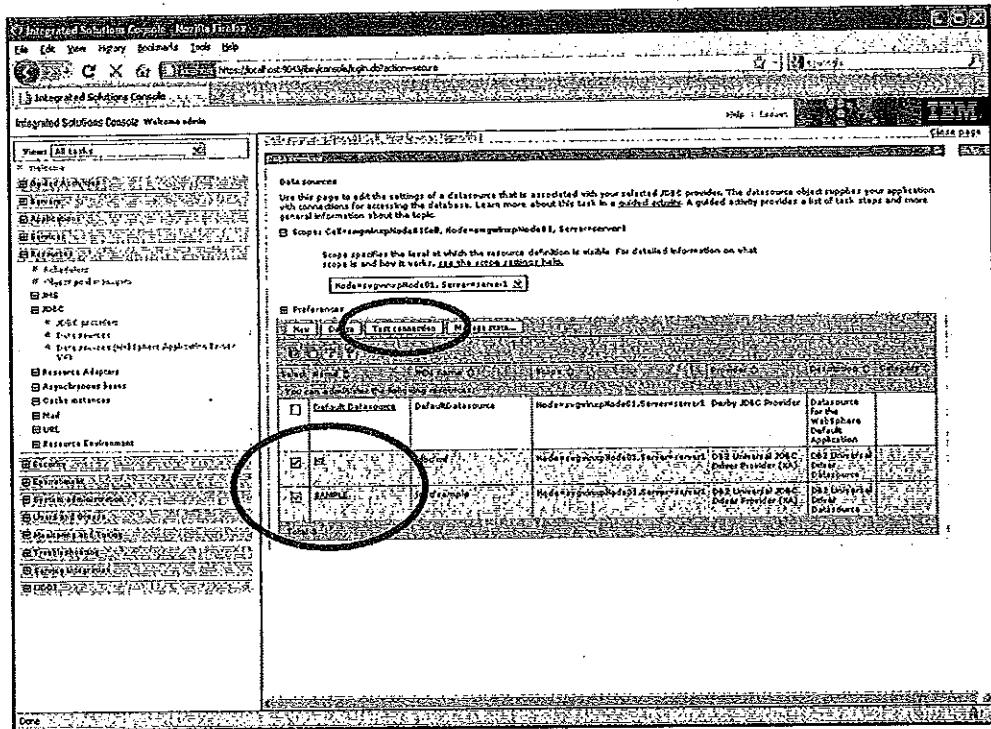
7. In Step 5: Summary, click Finish. Then click Save on the top of the screen to make the setting effective.



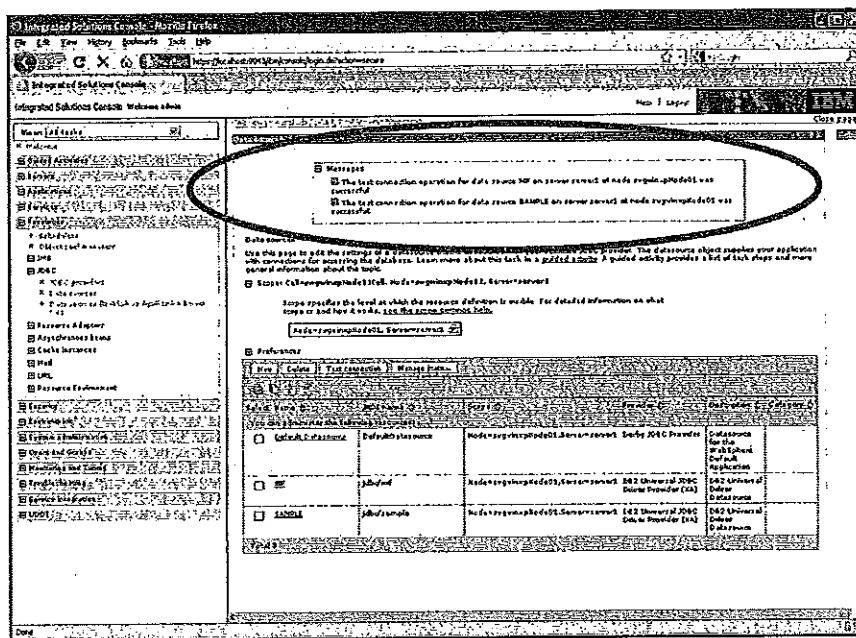
8. Using similar steps from 2 to 6 above to prepare another data source, called **MF**, with reference to the following details.

**Data source name:** MF  
**JNDI name:** jdbc/mf  
**Driver type:** 4  
**Database name:** MF  
**Server name:** localhost  
**Port number:** 50010  
**Authentication alias for XA recovery:** mf\_login  
**Component-managed authentication alias:** mf\_login  
**Mapping-configuration alias:** (none)  
**Container-managed authentication alias:** mf\_login

9. Go back to Data sources page, select MF and SAMPLE and then click the Test connection button.



10. The following screen should be shown to inform you test connections successful.



Congratulations, you have finished Task B of this lab. Go ahead to Task C.

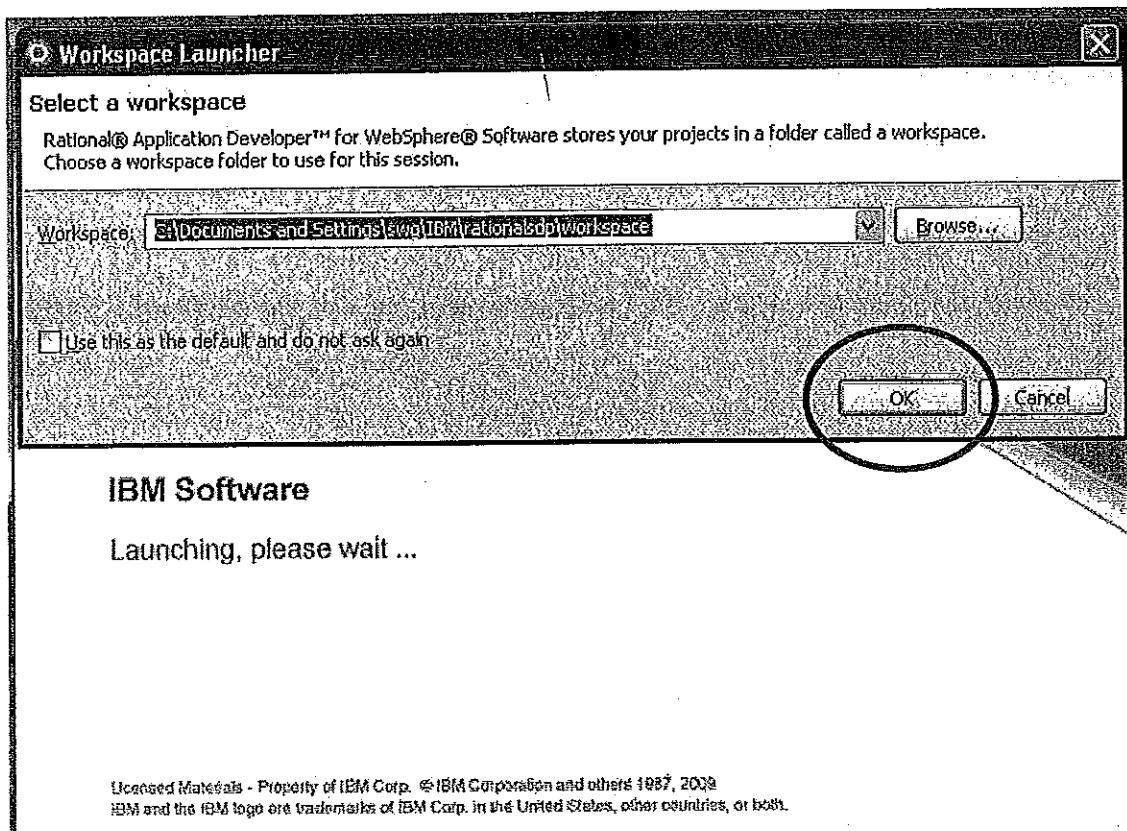
### **Task C – Test and Modify Servlet Involving a Distributed Transaction**

Use db2admin as username and password as password account log in the Windows VMware image.

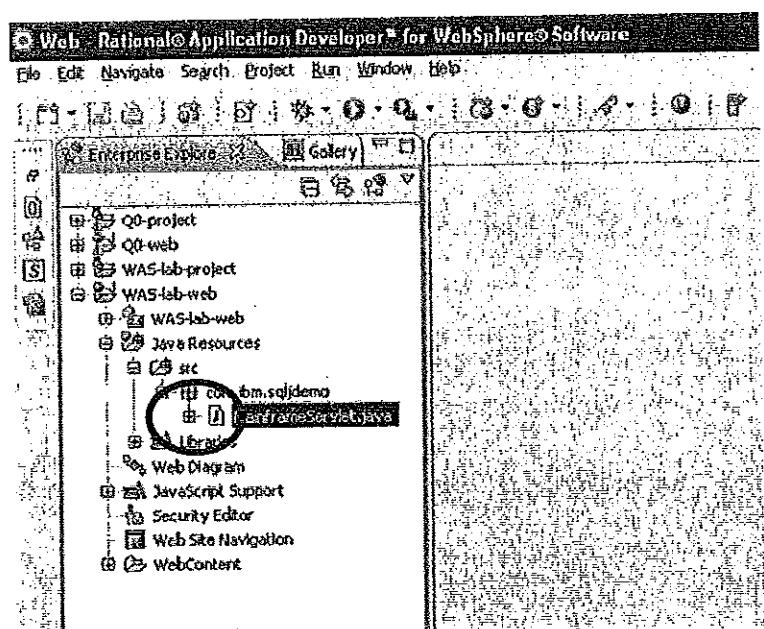
1. Double click on the **IBM Rational Application Developer** icon (RAD) which is located on desktop



2. Click OK to accept the default workspace location



3. Expand the WAS-lab-web project -> Java Resources -> src -> com.ibm.sqljdemo by clicking (+) in the Enterprise Explorer.

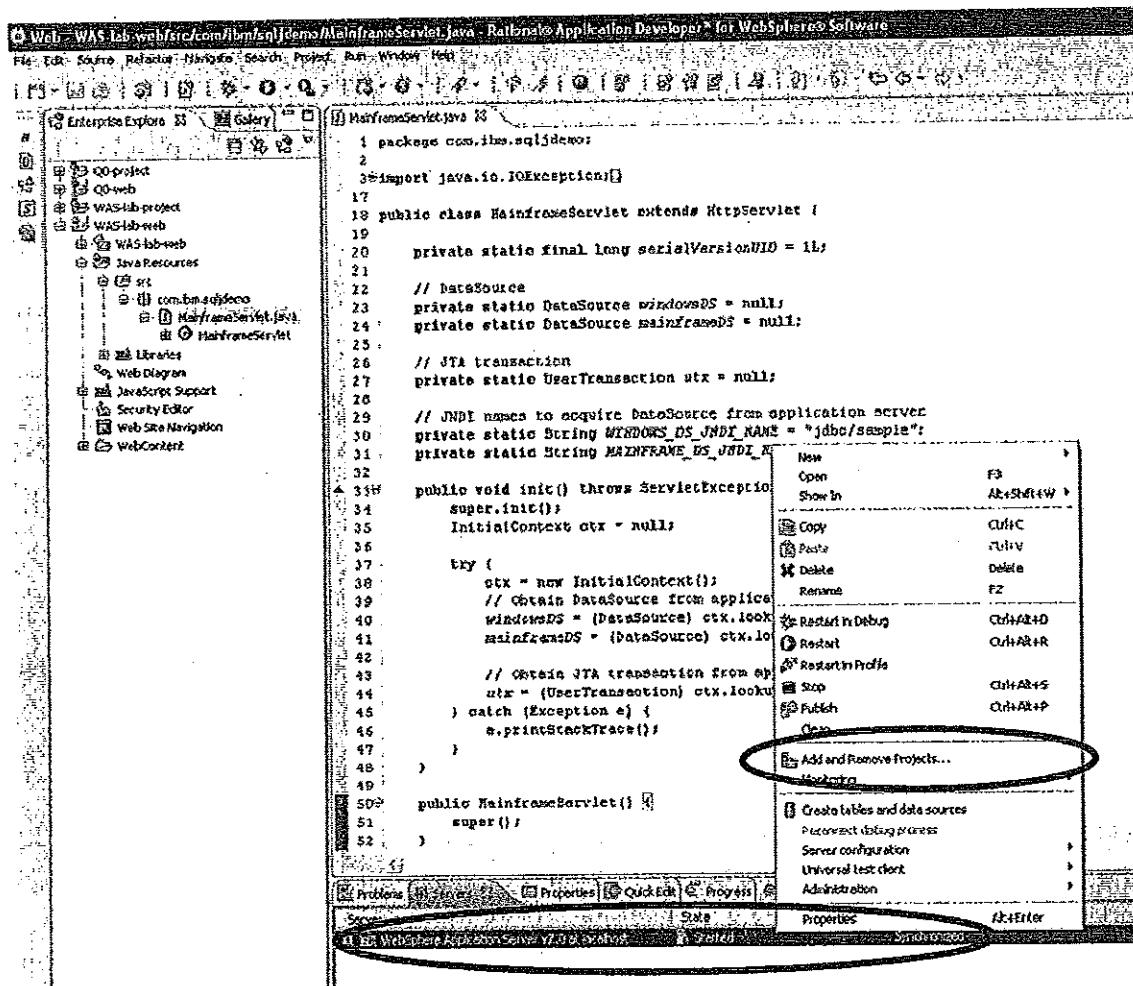


4. Double click MainframeServlet.java, modification of codes will be done here.

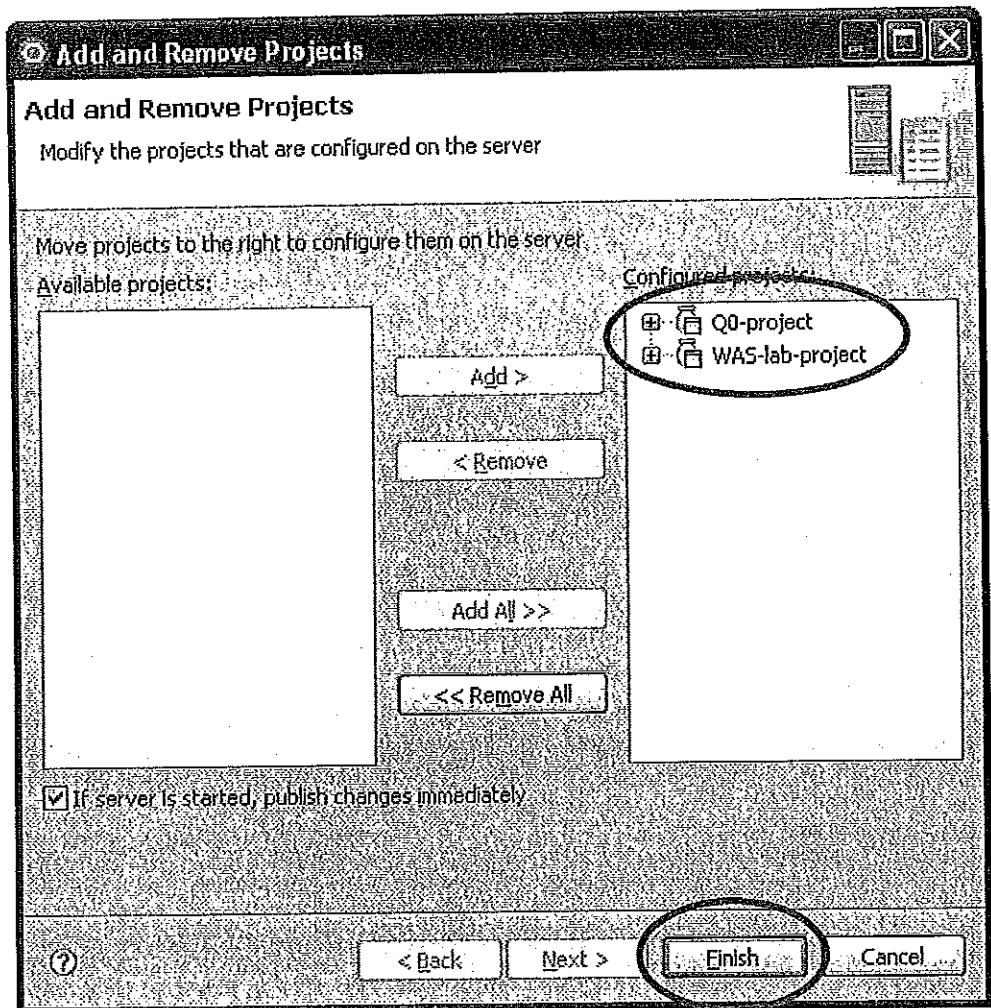
The screenshot shows the Rational Application Developer interface for WebSphere Software. On the left, the 'Enterprise Explorer' panel displays a project structure with several nodes, including 'com.ibm.sqljdemo' and 'MainframeServlet.java'. The 'MainframeServlet.java' node is highlighted with a red oval. The main workspace shows the Java code for 'MainframeServlet.java'. The code imports java.io.IOException and defines a class MainframeServlet extending HttpServlet. It includes static fields for DataSources (WindowsDS and mainframeDS), a JTA transaction (utx), and JNDI names for the DataSources. The init() method initializes the context and looks up the DataSources. The constructor calls super(). At the bottom of the code editor, there is a toolbar with various icons for file operations like Open, Save, and Cut/Paste.

```
1 package com.ibm.sqljdemo;
2
3 import java.io.IOException;
4
5 public class MainframeServlet extends HttpServlet {
6
7     private static final long serialVersionUID = 1L;
8
9     // DataSource
10    private static DataSource windowsDS = null;
11    private static DataSource mainframeDS = null;
12
13    // JTA transaction
14    private static UserTransaction utx = null;
15
16    // JNDI names to acquire DataSource from application server
17    private static String WINDOWS_DS_JNDI_NAME = "jdbc/sample";
18    private static String MAINFRAME_DS_JNDI_NAME = "jdbc/mf";
19
20    public void init() throws ServletException {
21        super.init();
22        InitialContext ctx = null;
23
24        try {
25            ctx = new InitialContext();
26            // Obtain DataSource from application server
27            windowsDS = (DataSource) ctx.lookup(WINDOWS_DS_JNDI_NAME);
28            mainframeDS = (DataSource) ctx.lookup(MAINFRAME_DS_JNDI_NAME);
29
30            // Obtain JTA transaction from application server
31            utx = (UserTransaction) ctx.lookup("java:comp/UserTransaction");
32        } catch (Exception e) {
33            e.printStackTrace();
34        }
35    }
36
37    public MainframeServlet() {
38        super();
39    }
40}
```

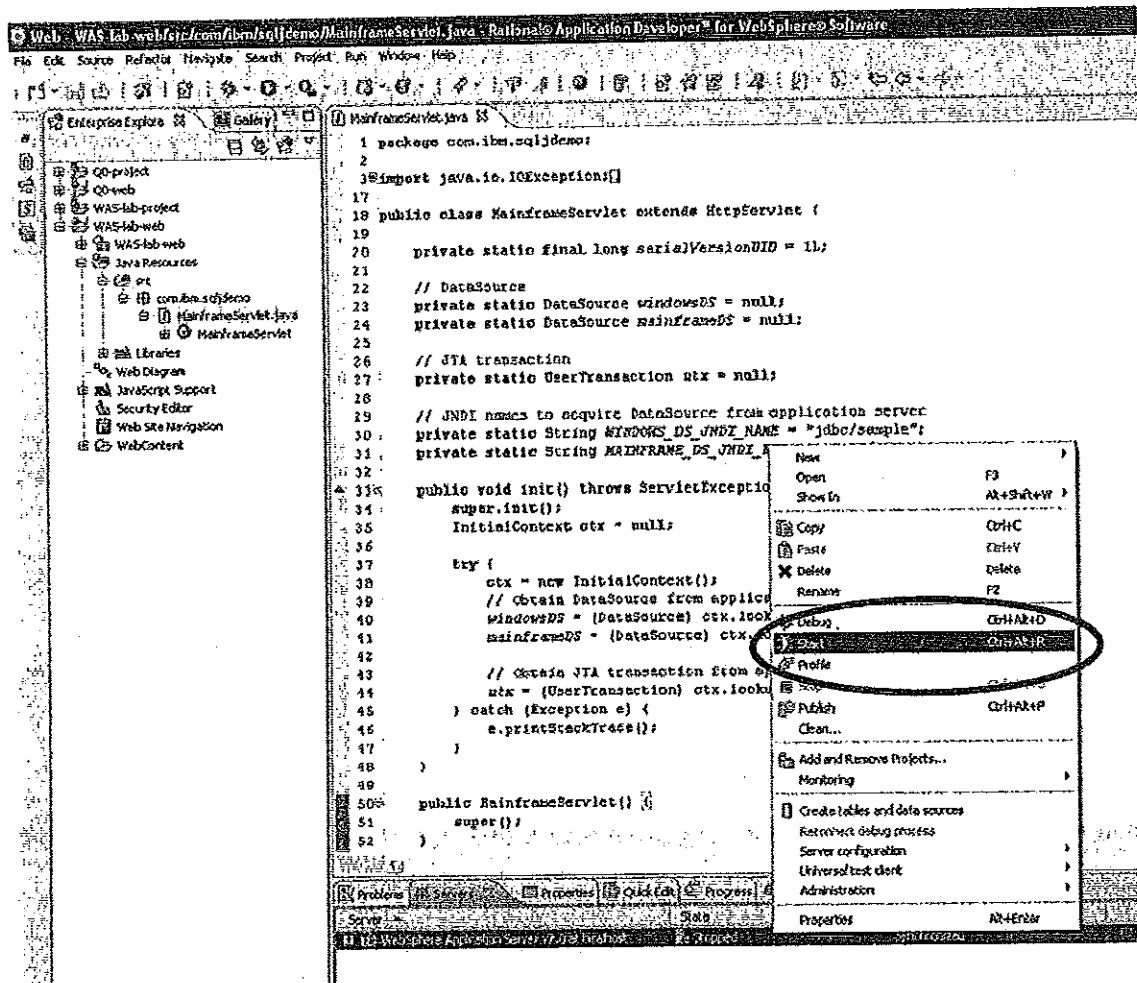
5. Right click on the WebSphere Application Server v7.0 at localhost in the server perspective, select Add and Remove Projects in order to test the project.



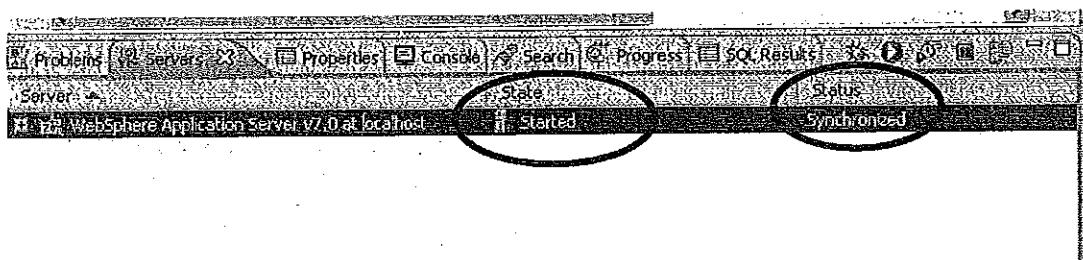
6. Make sure the project **WAS-lab-project** is in the Configured projects, otherwise, click **Add All** to add the project and click **Finish**



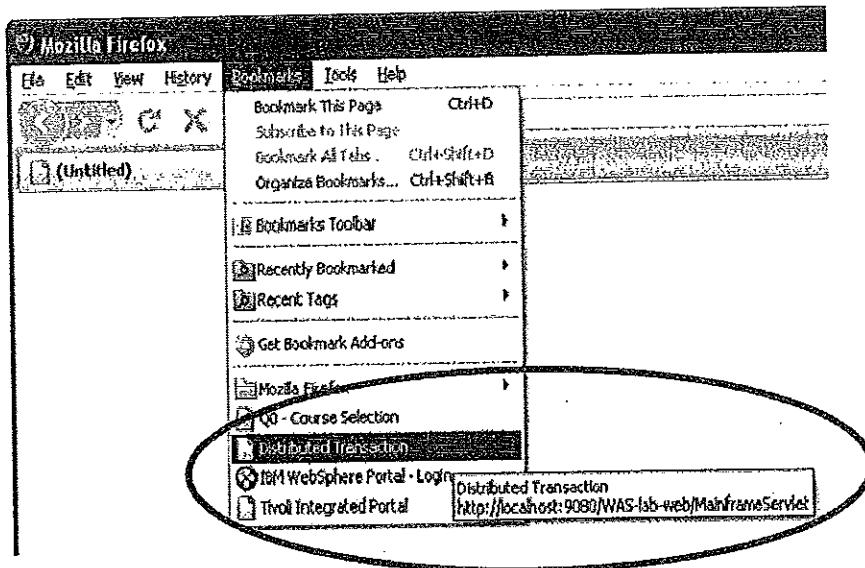
- Start the WebSphere Application Server instance by right clicking WebSphere Application Server v7.0 at localhost and selecting Start.



- Check the server status, which should be “State = Started” and “Status = Synchronized” (server start-up time highly depends on the machine power, which should be within 1-5 minutes)



9. Open FireFox and navigate for the link (<http://localhost:9080/WAS-lab-web/MainframeServlet>) in Bookmarks.



10. The following screen should appear, it shows a record of table A in SAMPLE database and another record of table B in MF database respectively.

A screenshot of a Mozilla Firefox window displaying the 'Distributed Transaction - Display' page. The title bar says 'Distributed Transaction - Display - Mozilla Firefox'. The address bar shows the URL <http://localhost:9080/WAS-lab-web/MainframeServlet>. The page content starts with 'Running SQL on SAMPLE database: SELECT NAME, VALUE FROM A'. Below this is a table:

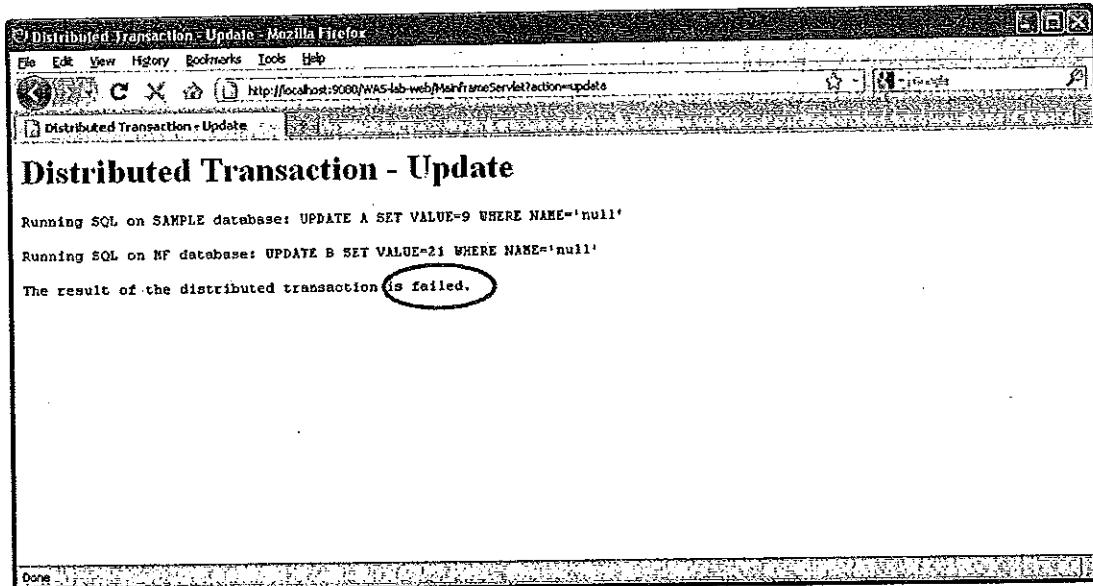
NAME	VALUE
SAMPLE	10

Below the table, it says 'Running SQL on MF database: SELECT NAME, VALUE FROM B'. Below this is another table:

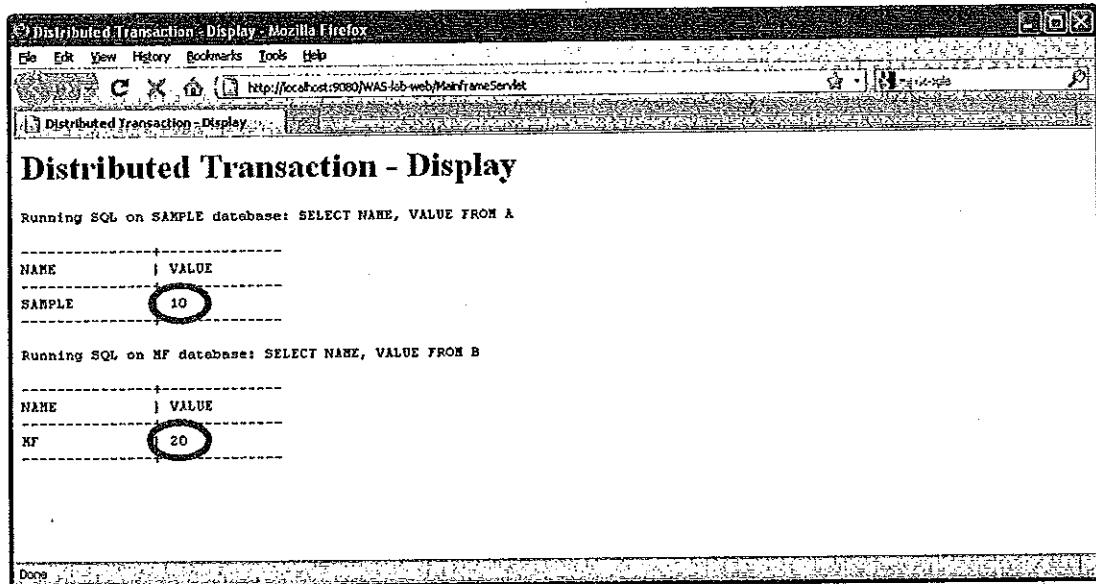
NAME	VALUE
MF	20

At the bottom left, there is a 'Done' button.

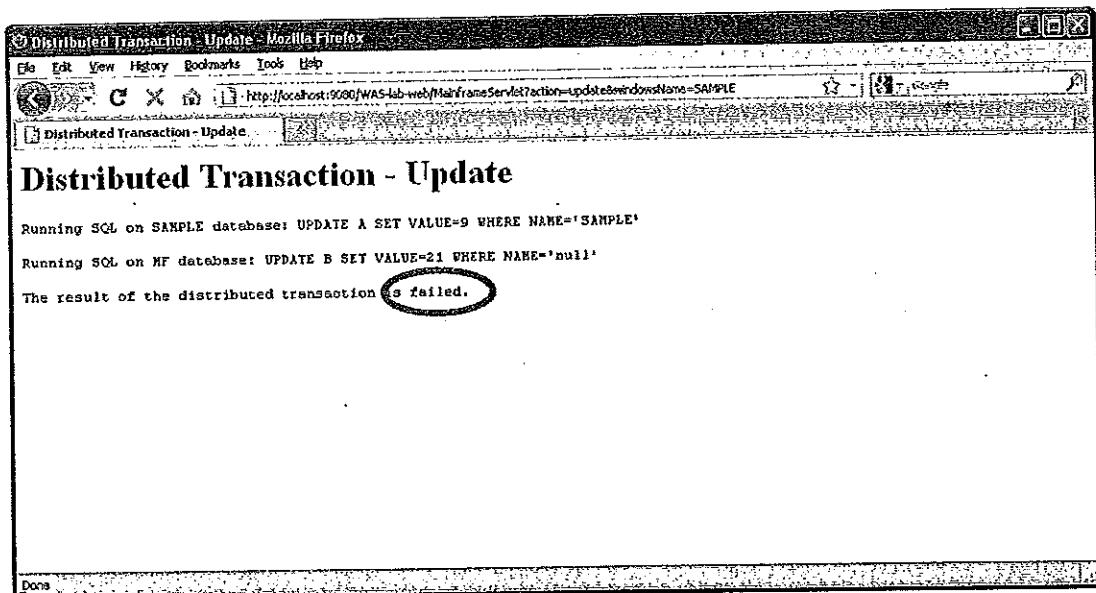
11. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=update>). It shows the distributed transaction failed.



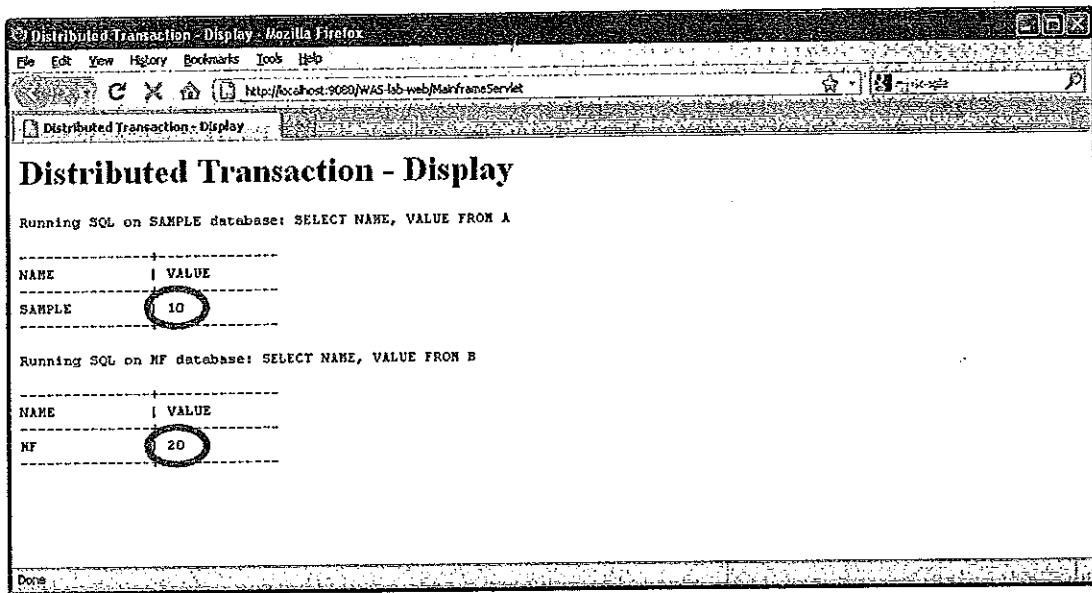
12. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=display>). It shows the records in tables A and B and their values are not changed.



13. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=update&windowsName=SAMPLE>). It shows the distributed transaction failed again.



14. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=display>). It shows the records in tables A and B and, again, their values are not changed.



15. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=update&mainframeName=MF>). It shows the distributed transaction failed again.

Distributed Transaction - Update - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:9080/WAS-lab-web/MainframeServlet?action=update&mainframeName=MF

Distributed Transaction - Update

**Distributed Transaction - Update**

Running SQL on SAMPLE database: UPDATE A SET VALUE=9 WHERE NAME='null'

Running SQL on MF database: UPDATE B SET VALUE=21 WHERE NAME='MF'

The result of the distributed transaction **is failed.**

Done

16. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=display>). It shows the records in tables A and B and, again, their values are not changed.

Distributed Transaction - Display - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:9080/WAS-lab-web/MainframeServlet

Distributed Transaction - Display

**Distributed Transaction - Display**

Running SQL on SAMPLE database: SELECT NAME, VALUE FROM A

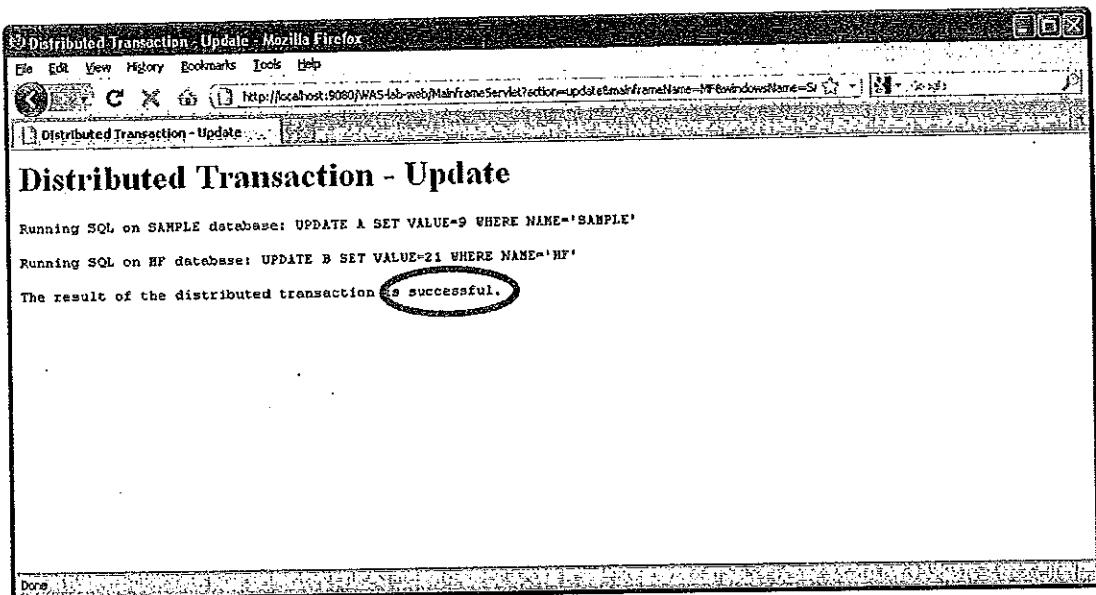
NAME	VALUE
SAMPLE	10

Running SQL on MF database: SELECT NAME, VALUE FROM B

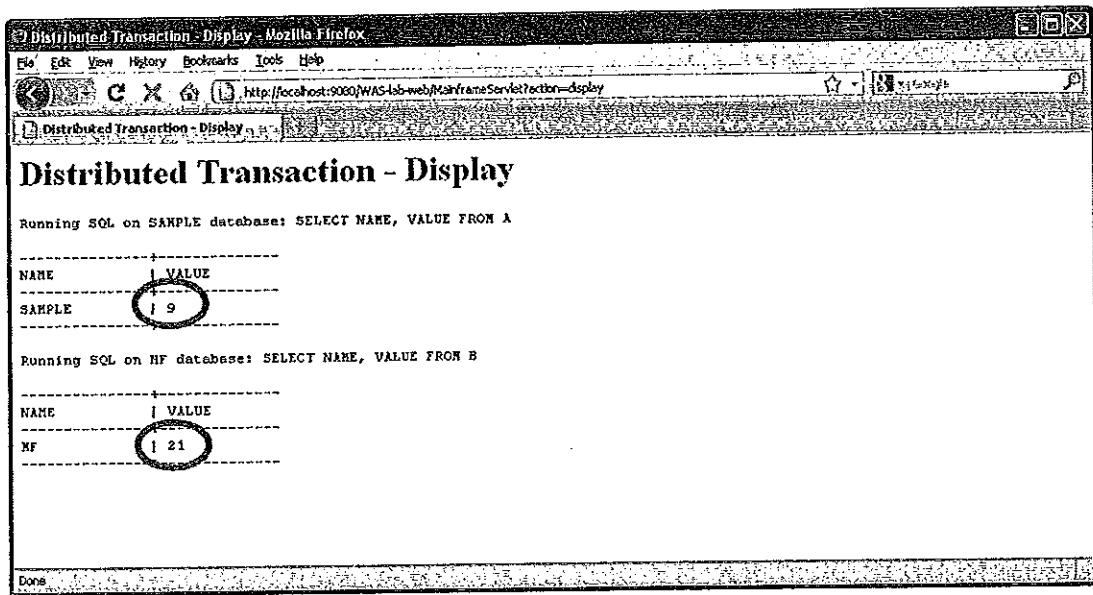
NAME	VALUE
MF	20

Done

17. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=update&mainframeName=MF&windowsName=SAMPLE>). It shows the distributed transaction successful.



18. On the address bar, enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=display>). It shows the records in tables A and B and their values are changed according to the SQL statements.



## Source code explanation

The servlet *MainframeServlet.java* generates an html page. Take a look on the source code in the RAD, the method *request.getParameter("action")* [line 66] get the value of variable "action" from the URL.

```
64G public void doService(HttpServletRequest request,
65     HttpServletResponse response) throws ServletException, IOException {
66     String action = request.getParameter("action");
67
68     if ("display".equals(action)) {
69         doDisplayInfo(request, response);
70     } else if ("update".equals(action)) {
71         doUpdateInfo(request, response);
72     } else
73         doDisplayInfo(request, response);
74
75 }
```

If the value of "action" is equal to "display", it calls the method *doDisplayInfo*. If the value of "action" is equal to "update", it calls *doUpdateInfo*.

```
1 package com.ibm.sqljdemo;
2
3 @import java.io.IOException;
4
5 public class MainframeServlet extends HttpServlet {
6
7     private static final long serialVersionUID = 1L;
8
9
10    // DataSource
11    private static DataSource windowsDS = null;
12    private static DataSource mainframeDS = null;
13
14    // JTA transaction
15    private static UserTransaction utx = null;
16
17    // JNDI names to acquire DataSource from application server
18    private static String WINDOWS_DS_JNDI_NAME = "jdbc/sample";
19    private static String MAINFRAME_DS_JNDI_NAME = "jdbc/mf";
20
21
22    public void init() throws ServletException {
23        super.init();
24        InitialContext ctx = null;
25
26        try {
27            ctx = new InitialContext();
28            // Obtain DataSource from application server
29            windowsDS = (DataSource) ctx.lookup(WINDOWS_DS_JNDI_NAME);
30            mainframeDS = (DataSource) ctx.lookup(MAINFRAME_DS_JNDI_NAME);
31
32            // Obtain JTA transaction from application server
33            utx = (UserTransaction) ctx.lookup("java:comp/UserTransaction");
34        } catch (Exception e) {
35            e.printStackTrace();
36        }
37    }
38 }
```

Lines 23 to 24 declare the DataSource objects.

Line 27 declare the JTA transaction object that is used to manipulate the transaction programmatically.

Lines 30 and 31 are the JNDI names configured in the WAS data sources.

Lines 40 to 44 is the program code to obtain DataSource objects and JTA transaction object from the application server.

Line 76 shows the method *doDisplayInfo* that is to generate the html page to display the records of tables A and B respectively.

```
76 public void doDisplayInfo(HttpServletRequest request,
77     HttpServletResponse response) throws ServletException, IOException {
78     ServletOutputStream os = response.getOutputStream();
79
80     // SQL statement to be executed on SAMPLE database to return records
81     String windowsSQL = "SELECT NAME, VALUE FROM A";
82
83     // SQL statement to be executed on MF database to return records
84     String mainframeSQL = "SELECT NAME, VALUE FROM B";
85
86     try {
87         // Get connections from application server
88         Connection windowsConn = windowsDS.getConnection();
89         Connection mainframeConn = mainframeDS.getConnection();
90
91         os.print("<html><head><title>Distributed Transaction - Display</title></head>");
92         os.print("<body>");
93         os.println("<h1>Distributed Transaction - Display</h1>");
94
95         // Create statements in connections
96         Statement windowsStmt = windowsConn.createStatement();
97         Statement mainframeStmt = mainframeConn.createStatement();
98
99         // Execute SQL statements and get records
100        ResultSet windowsRs = windowsStmt.executeQuery(windowsSQL);
101        ResultSet mainframeRs = mainframeStmt.executeQuery(mainframeSQL);
102
103        os.println("<pre>");
104        os.println("Running SQL on SAMPLE database: " + windowsSQL);
105        os.println();
106        os.println("-----+-----");
107        os.println("NAME      | VALUE      ");
108        os.println("-----+-----");
109        os.println("-----+-----");
110    }
```

Lines 81 to 84 define the select SQL statements to be execute to get the records from tables A and B respectively.

Lines 88 and 89 are to get DataSource Connection objects from the application server.

Lines 96 and 97 create the JDBC Statement objects to be executed.

Lines 100 and 101 are to execute the SQL statements and return the records to the ResultSet objects.

```

102
103     os.println("<pre>");
104     os.println("Running SQL on SAMPLE database: " + windowsSQL);
105     os.println();
106     os.println("-----+-----");
107     os.println("NAME      | VALUE      ");
108     os.println("-----+-----");
109     while (windowsRs.next()) {
110         os.print(windowsRs.getString("NAME"));
111         os.print("      | ");
112         os.println(windowsRs.getInt("VALUE"));
113     }
114     os.println("-----+-----");
115     os.println();
116     os.println("Running SQL on MF database: " + mainframeSQL);
117     os.println();
118     os.println("-----+-----");
119     os.println("NAME      | VALUE      ");
120     os.println("-----+-----");
121     while (mainframeRs.next()) {
122         os.print(mainframeRs.getString("NAME"));
123         os.print("      | ");
124         os.println(mainframeRs.getInt("VALUE"));
125     }
126     os.println("-----+-----");
127     os.println("</pre>");
128     os.print("</body></html>");
129     os.close();
130
131     // Release resources
132     mainframeStmt.close();
133     windowsStmt.close();
134     mainframeConn.close();
135     windowsConn.close();

```

Lines 109 to 113 are a loop body to iterate the ResultSet returned from the SAMPLE database to display the record values on the HTML page. Lines 121 to 125 function the same but for the MF database.

Lines 132 to 135 release the resources back to the application server.

Line 143 is the method *doUpdateInfo* that is to perform a distributed transaction involving databases SAMPLE and MF.

```

143S public void doUpdateInfo(HttpServletRequest request,
144     HttpServletResponse response) throws ServletException, IOException {
145     ServletOutputStream os = response.getOutputStream();
146
147     // Request parameters from URL
148     String windowsName = request.getParameter("windowsName");
149     String mainframeName = request.getParameter("mainframeName");
150
151     // Flag indicating the result of distributed transaction
152     boolean success = false;
153
154     // SQL statements to update the respective table in SAMPLE and MF databases
155     String windowsSQL = "UPDATE A SET VALUE=9 WHERE NAME='" + windowsName + "'";
156     String mainframeSQL = "UPDATE B SET VALUE=21 WHERE NAME='" + mainframeName + "'";
157
158     try {
159         // Mark distributed transaction begin
160         utx.begin();
161
162         // Get connections from application server
163         Connection windowsConn = windowsDS.getConnection();
164         Connection mainframeConn = mainframeDS.getConnection();
165
166         // Create statements in connections
167         Statement windowsStmt = windowsConn.createStatement();
168         Statement mainframeStmt = mainframeConn.createStatement();
169
170         // Execute SQL statements and get updated count
171         int windowsCount = windowsStmt.executeUpdate(windowsSQL);
172         int mainframeCount = mainframeStmt.executeUpdate(mainframeSQL);
173
174         // Business logic to determine transaction successful or not
175         //    windowsCount == 1 means updating SAMPLE database successfully
176         //    mainframeCount == 1 means updating MF database successfully

```

Lines 148 and 149 are to get the parameters from the URL which will be passed to the SQL statements for execution.

Lines 155 and 156 are the update SQL statements to modify record value of table A in the SAMPLE database and that of table B in the MF database.

Line 160 is to mark the start of the distributed transaction boundary.

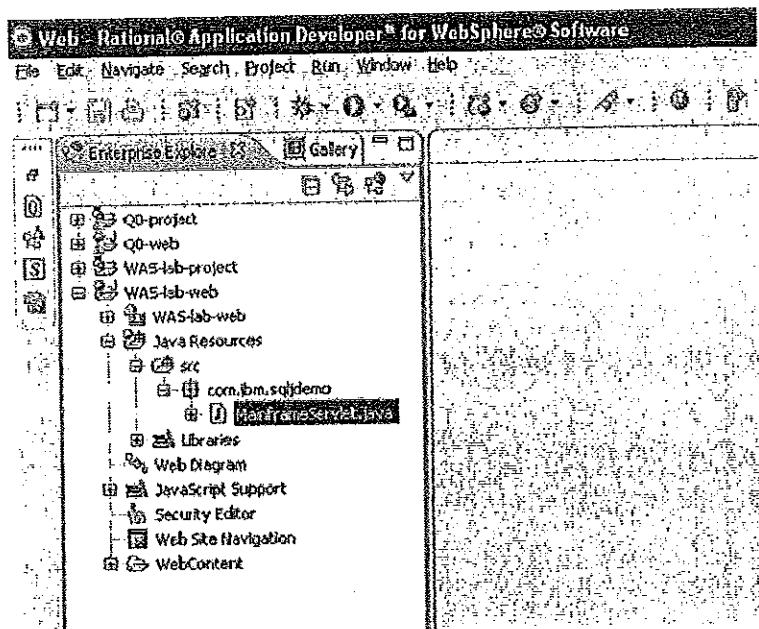
Lines 171 and 172 are the actual execution of the update SQL statements. The method *executeUpdate* returns the number of records affected after the SQL statement is executed. In our sample tables, each should have only one record and therefore the number of records affected in a successful case is one.

```

177         //      if updating both databases successfully, commit the transaction;
178         //      otherwise rollback the transaction
179         if ((windowsCount == 1) && (mainframeCount == 1)) {
180             utx.commit();
181             success = true;
182         } else {
183             utx.rollback();
184             success = false;
185         }
186
187         // Release resources
188         mainframeStmt.close();
189         windowsStmt.close();
190         mainframeConn.close();
191         windowsConn.close();
192     } catch (SQLException se) {
193         System.out.println("SQLException:" + se.toString());
194     } catch (Exception e) {
195         System.out.println("Exception:" + e.toString());
196     }
197
198     os.print("<html><head><title>Distributed Transaction - Update</title></head>");
199     os.print("<body>");
200     os.println("<h1>Distributed Transaction - Update</h1>");
201     os.println("<pre>");
202     os.println("Running SQL on SAMPLE database: " + windowsSQL);
203     os.println();
204     os.println("Running SQL on MF database: " + mainframeSQL);
205     os.println();
206     if (success)
207         os.println("The result of the distributed transaction is successful.");
208     else
209         os.println("The result of the distributed transaction is failed.");
210     os.println("</pre>");
```

Lines 179 to 185 are the business logic to determine if the distributed transaction should be committed or rolled back. If both numbers of record affected of the tables meet the all the required success conditions, the distributed transaction will be committed by calling *utx.commit()* method; otherwise *utx.rollback()* will be called to cancel all changes made within the transaction boundaries.

19. Open MainframeServlet.java in the RAD if you have not done so.



20. Now modify the program code to change back to the original record values.

Modify the line 155 to

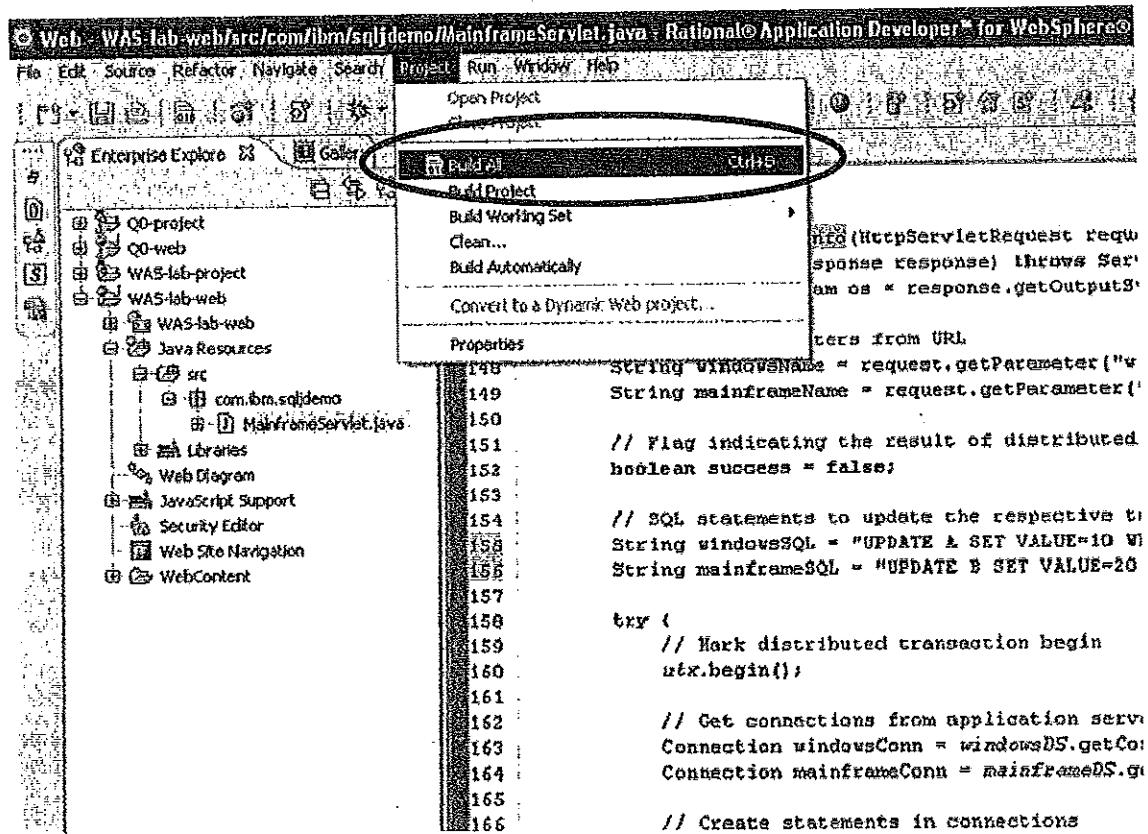
```
String windowsSQL = "UPDATE A SET VALUE=10 WHERE  
NAME=" + windowsName + " ;
```

Modify the line 156 to

```
String mainframeSQL = "UPDATE B SET VALUE=20 WHERE  
NAME=" + mainframeName + " ;
```

```
140     String windowsName = request.getParameter("windowsName");  
141     String mainframeName = request.getParameter("mainframeName");  
142  
143     // Flag indicating the result of distributed transaction  
144     boolean success = false;  
145  
146     // SQL statements to update the respective table in SAMPLE and MF databases  
147     String windowsSQL = "UPDATE A SET VALUE=10 WHERE NAME=" + windowsName + " ;"  
148     String mainframeSQL = "UPDATE B SET VALUE=20 WHERE NAME=" + mainframeName + " ;"  
149  
150     try {  
151         // Mark distributed transaction begin  
152         utx.begin();  
153  
154         // Get connections from application server  
155         Connection windowsConn = windowsDS.getConnection();  
156         Connection mainframeConn = mainframeDS.getConnection();  
157  
158         // Create statements in connections  
159         Statement windowsStmt = windowsConn.createStatement();  
160         Statement mainframeStmt = mainframeConn.createStatement();  
161  
162         // Commit the transaction  
163         utx.commit();  
164  
165         // Rollback the transaction  
166         utx.rollback();  
167  
168     } catch (Exception e) {  
169         e.printStackTrace();  
170     }
```

21. Save the file and select Project -> Build All to compile the code and commit the changes on the WebSphere Application Server.



22. Open FireFox and enter the link (<http://localhost:9080/WAS-lab-web/MainframeServlet?action=update&mainframeName=MF&windowsName=SAMPLE>). It shows the distributed transaction successful.

Distributed Transaction - Display

Running SQL on SAMPLE database: SELECT NAME, VALUE FROM A

NAME	VALUE
SAMPLE	10

Running SQL on MF database: SELECT NAME, VALUE FROM B

NAME	VALUE
MF	20

23. Now revert the program code to change back to the SQL statements as follows. Then save the file and select Project → Build All. If you are not sure, please refer to step 21 above. **CAUTION! DO NOT RUN THE SERVLET IN FIREFOX AGAIN.** This step is mandatory for the lab exercise of Chapter 5 – Access Mainframe DB2 from WebSphere.

Modify the line 155 to

```
String windowsSQL = "UPDATE A SET VALUE=9 WHERE NAME='"
+ windowsName + "";
```

Modify the line 156 to

```
String mainframeSQL = "UPDATE B SET VALUE=21 WHERE
NAME=' " + mainframeName + " ";
```

Congratulations, you have finished Task C of this lab. This is the end of the lab.

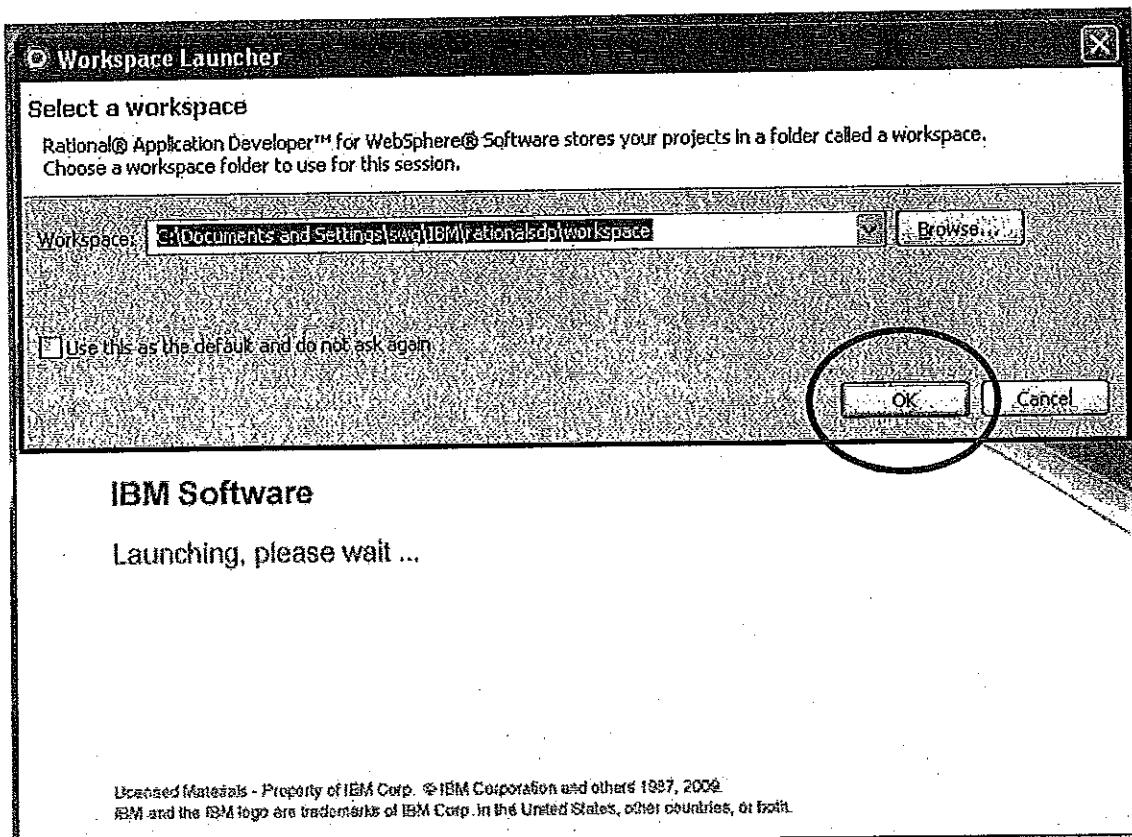
## Supplementary Sheet for Chapter 3 – Task B

Before executing Step 1 of Task B, please start RAD and WebSphere Application Server.

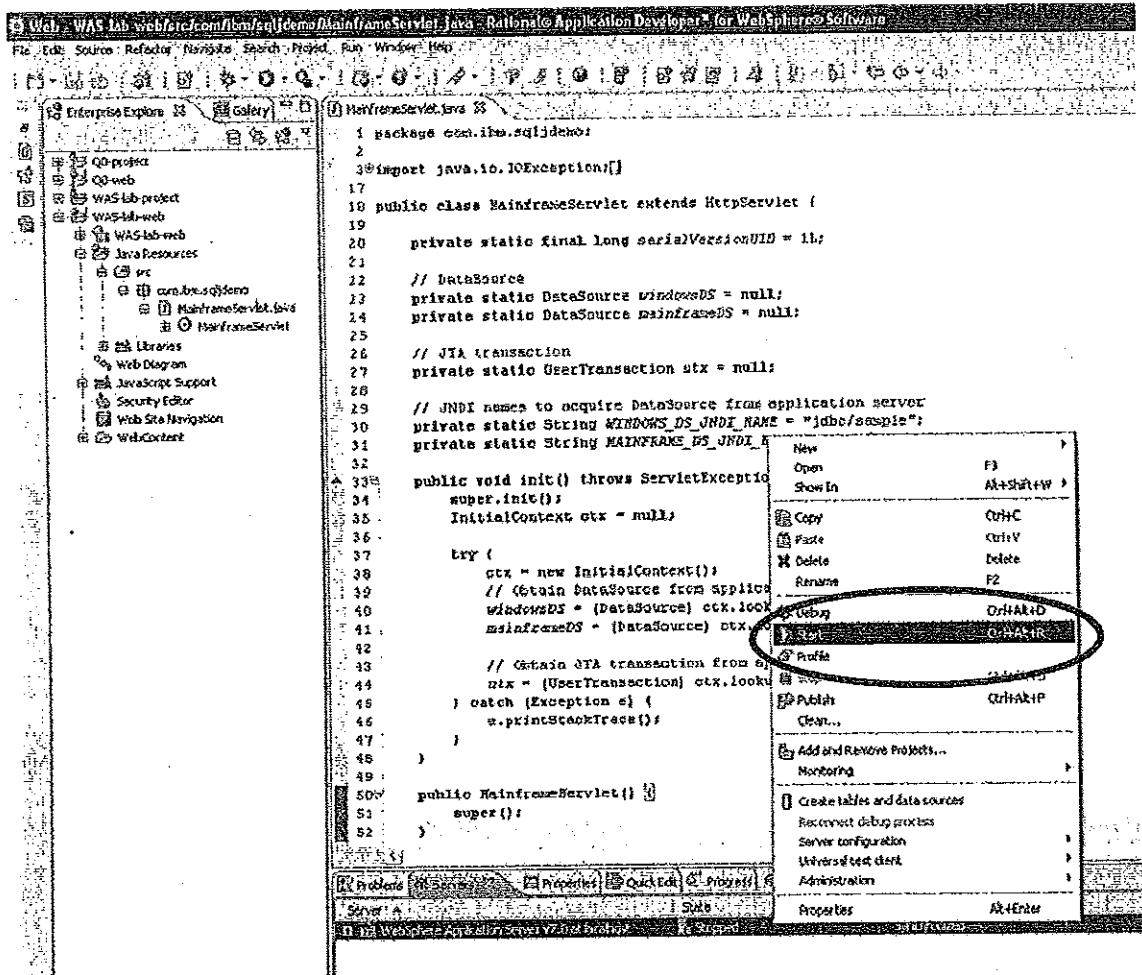
1. Double click on the **IBM Rational Application Developer** icon (RAD) which is located on desktop



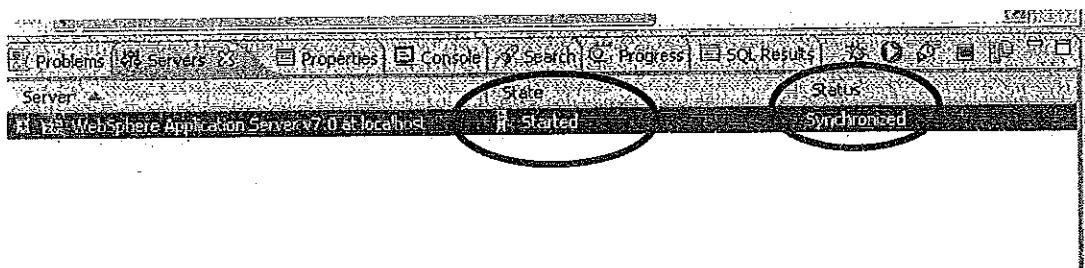
2. Click OK to accept the default workspace location



- Start the WebSphere Application Server instance by right clicking WebSphere Application Server v7.0 at localhost and selecting Start.



- Check the server status, which should be "State = Started" and "Status = Synchronized" (server start-up time highly depends on the machine power, which should be within 1-5 minutes)



You may now go back to follow Step 1 of Task B to continue the lab.

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IBM

Information Management

**IBM Inter-University Programming Contest 2011 Training**

Chapter 4: WebSphere Portal Introduction

Software Group, IBM

IBM Inter-University Programming Contest 2011 January 29, 2011 (Saturday) Cetnus Central © 2008 IBM Corporation

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**Agenda**

- Value Proposition of a Portal
- What is a Portal?
- WebSphere Portal V7.0 Architecture
- Methods to quickly populate your Portal with existing content and applications
  - > Feeds
  - > Static HTML
  - > Dynamic web applications
- WebSphere Portal delivers Exceptional Mobile Experience

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**WebSphere Portal – What it Does**

WebSphere Portal:

- provides a framework,
- for delivering role based, contextual & process driven composite applications,
- that make more people, more productive,
- in the context of what they do everyday.

TechWorks

**WebSphere Portal Strategy**

**Delivering Exceptional User Experiences:**

- Deliver the user experiences they choose to their partners, employees, customers, or citizens, with flexibility for change and based on open standards.
- Quickly leverage existing investments, through market-leading composite application tooling and robust framework
- Create highly personalized applications that adapt to users' context, community, role, actions, location, and preferences
- Interact with information from the user's device of choice
- Deliver a front-end to SOA, enabling business flexibility and agility
- Speed time to value with Prebuilt Portal snapshots for specific business problems

Service oriented  
architect

## An IBM Proof of Technology

**WebSphere Portal V5.1**

**Exceptional User Experience**

IBM enables organizations to quickly deliver rich, personalized web sites that optimize business goals and generate loyalty.

**Partners**

**Customers**

**Employees**

**TechWorks**

**Exceptional "User Experience" Drives Productivity**

- Contemporary, Fresh Look and Feel
- Fly Out Menus and Page navigation
- Drag & drop support
- Portlet Palette
- Search
- Menus delivered "in context"
  - Appropriate actions based on the portal object
  - Only shows the "actions" allowed by the "User Role" (Security)
- Super-responsive, rich and interactive portlets, content and applications

**Introducing the Web 2.0 Theme Pack**

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**On Demand Workplace: Manager Portal**

Seamless "Work With Your Employee" Tools

Personalized Manager Content

Manager Resources Portlet

Work-embedded Learning

Act Now Calendering Functions

**Projected Impact** (2006-2009)
 

- 12 hours and 11 minutes saved per manager
- \$1.1M annual savings from 100 managers
- \$1.1M annual savings from 10,000 managers

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**TechWorks**

**Service Oriented Architecture: The Blueprint for Change**

An on demand business is an enterprise whose business processes—integrated end-to-end across the company and with key partners, suppliers and customers—can respond with speed to any customer demand, market opportunity or external threat.

**Why SOA?**

- Flexibility
- Facilitates re-use of existing applications
- Supports effective business process implementations
- Designed for change

**Portal is the front end of SOA**

Aligns Business and IT goals to grow revenue and contain costs

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## Agenda

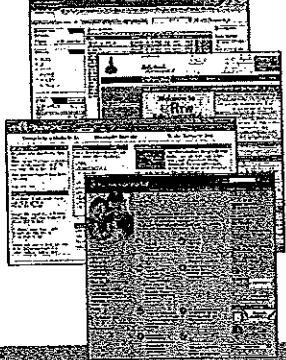
- Value Proposition of a Portal
- What is a Portal?
- WebSphere Portal V7.0 Architecture
- Methods to quickly populate your Portal with existing content and applications
  - Feeds
  - Static HTML
  - Dynamic web applications
- WebSphere Portal delivers Exceptional Mobile Experience

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## Portal Principle

- Combines portlets together into one unified presentation
- Delivers a highly personalized experience, considering role, personal settings, and device settings
- Separates
  - site design
  - site/page assembly
  - administration
  - application design
- Provides application integration, collaboration, single sign-on services and much more



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## Pages and Portlets

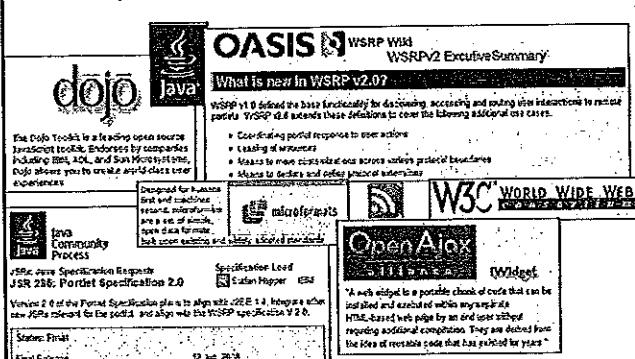
- A portlet is a "window" on a page
  - Each portlet is a separate application
  - Can be placed anywhere on page
  - Each portlet has its own state (max, min, edit, etc)
  - Dynamic deployment and configuration
  - Supports multiple markups
  - Business logic can be shared between portlets
  - Can be rendered independently
- A theme is the overall design and navigation for a page
  - Includes "Web 2.0" capabilities
  - Enforces branding, style
  - Can include functions, e.g., search bar
- A skin is the border of a portlet
  - Can be invisible to user
  - Presents customization options to user
  - Also enforces branding, style

page  
theme  
navigation  
skins  
portlets

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## IBM Incorporates Open Standards



What is new in WSRP v2.0?
   
WSRP v2.0 defines the basic functionality for describing, accessing and editing user interactions to remote portlets. WSRP v2.0 extends these definitions to cover the following additional cases:
 

- Coordinating portlet responses to user actions
- Handling of user interactions across multiple portlet boundaries
- Allowing users to access and edit user interface elements

dojo Java

The Dojo Toolkit is a leading open source JavaScript library for building rich Internet Applications (RIAs). It includes DojoX, Dojox, and Sunburst systems. Dojo allows you to create web-based user experiences.

OpenAjax

"A web widget is a portable chunk of code that can be installed and executed within any compliant HTML-based web page by an application developer, requiring no additional components. They are defined from the idea of reusable code that has existed for years."

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## An IBM Proof of Technology

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### Leverage Your Investments to Populate Portal

Tremendous Flexibility and choice

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### Putting Pages, Applications & Other Content into Portal

1. Display Existing HTML/Web Apps  
Web Clipping, Web Application Integration\*
2. Install Existing Portlets Out-of-the-Box or from the Portlet Catalog  
Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), etc., Green Screen Dashboard, etc. (drag and drop on pages)
3. Use HTML tools ("Static Pages")  
Build HTML/CSS with HTML editor. Add portlets, live text, instant messaging, etc.
4. Lotus Web Content Management  
HTML/US content, Personalization, Web Content Integrator, Doc Libraries\*
5. Use Built-in Web 2.0 Services\*  
Semantic Tagging (Live Text), Client Side aggregation, AJAX, REST
6. Incorporate Collaboration Awareness, Instant messaging, Team spaces, etc.
7. Consume a Web Service or WSRP  
Standard-based integration, WSRP 2.0\*
8. Build Composite Applications, eForms & Business Processes  
C2A\*, Cooperative portlets, HATS, App templates, Process Portal, Lotus Forms
9. Develop Custom Portlets  
Portlet Factory, EAI (Java™, JSR, Web Services, AJAX, REST, WSRP, Specification Request (JSR 283)\*, Run .net apps as Java apps (Microsoft®))
10. Extend the Browser  
Use Java-enabled mobile clients, e.g., Expander, Comet portlets, Mobile Portlets

\*New for E1

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Rorate  
Portlet.

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### Portlets

Provided with WebSphere Portal 6.1

- Mail / PIM Solutions - Lotus Notes®, Exchange, IMAP/POP3
- Web App Integration Bookmarks, Banner, QuickLinks, Webpage, Web Clipper, Really Simple Syndication (RSS), File Server, Java Server Page (JSP) Server, Servlet Broker, Web Services (producer and consumer)
- Personal Organization: Reminder, PDF Document Viewer, World Clock, My SQL Query Reports, Retirement Planner, Currency Calculator, My To-Do's, Comma Separated Values (CSV) file viewer
- News and Information: Events, News, Links, My Weather, My Vertical News, My Stock, Company Tracker,
- Administration Portlets - Site Management, Manage Pages, Manage Portlets, Themes and Skins, Web Services, Manage Search, Web Content Libraries, Syndication, Virtual Portal manager, etc.
- Collaboration: Lotus Instant Messaging Contact List, Who Is Here, People Finder, My Team Workplaces, Web Conferencing, Domino Web Access, Domino Document Manager, NotesView, Notes Mail, Calendar, Tasks, ToDo, Discussion, Teamroom
- Utility Portlets: Login, Profile Management, About WebSphere Portal, Directory Search, Search Center, Instant Messaging connect
- Search: Document Search, Search Center, Suggested Links
- Content Integration: Web Content Management, Productivity Components, converters and viewers
- Business Process Integration: My Tasks and process portlets
- Sample Portlet Applications: Basic, Struts framework, cooperative portlets

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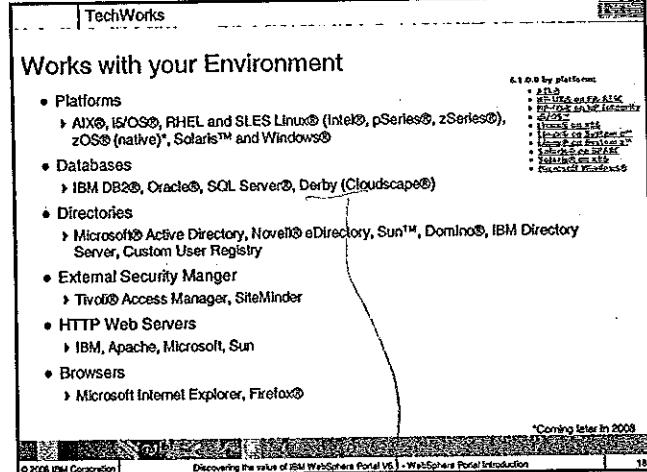
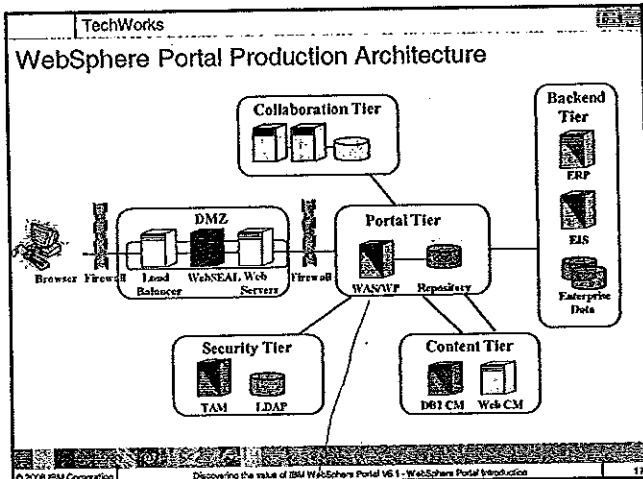
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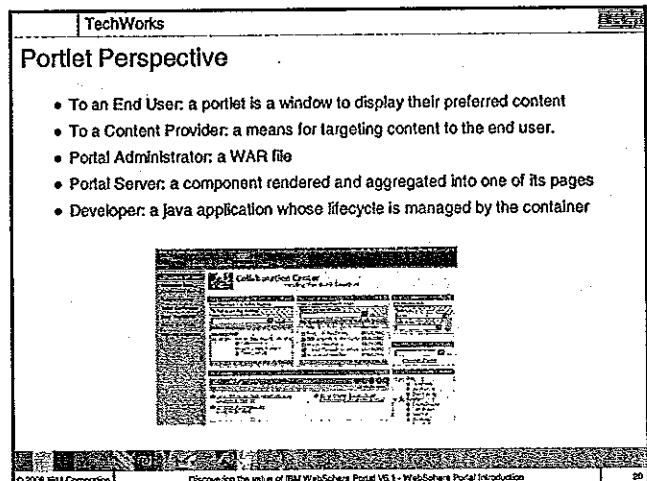
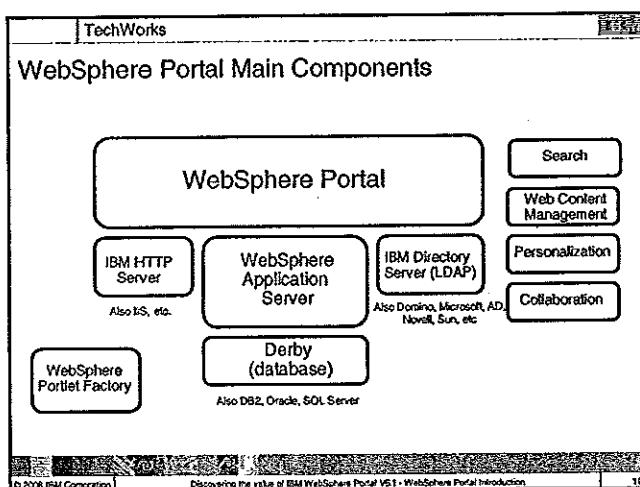
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websphere  
a platform  
server.

Portal lightweight  
database.

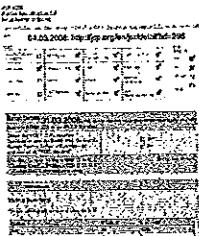


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### Portlet Standards

- Java™ Specification Request (JSR) 286 – Java Portlet Specification V2.0
  - IBM is leading this JSR, all major Java technology portal (commercial and open source) vendors represented
  - Approved: March 04th 2008 (WebSphere complete April 9th)
- Web Services for Remote Portlets (WSRP) V2.0
  - Standard protocol for accessing portlets as web service
  - Defined at OASIS, chaired by IBM, Approved: March 31st 2008
- Common goals
  - Enable coordination between portlets and allow building composite applications based on portlet components (events and render context (e.g. public render parameters))
- WebSphere Portal seamlessly integrates JSR168, JSR286 and WSRP 2.0 Portlets.
- Also Integrates IBM Portlet API and WSRP 1.0



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### Agenda

- Value Proposition of a Portal
- What is a Portal?
- WebSphere Portal V7.0 Architecture
- Methods to quickly populate your Portal with existing content and applications
  - Feeds
  - Static HTML
  - Dynamic web applications
- WebSphere Portal delivers Exceptional Mobile Experience



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### Various Methods to Display Portal Content

- Provide links to existing content\*
- Display existing static pages\*
- Include dynamic web applications\*
- Leverage feed sources\*
- Build custom portlets
- Supplied email and Lotus portlets
- Download vendor portlets from IBM® Portal Catalog\*
- Render Web Services for Remote Portlets (WSRP)\*
- Web Content Manager
- Others?

\* We will cover these during this presentation

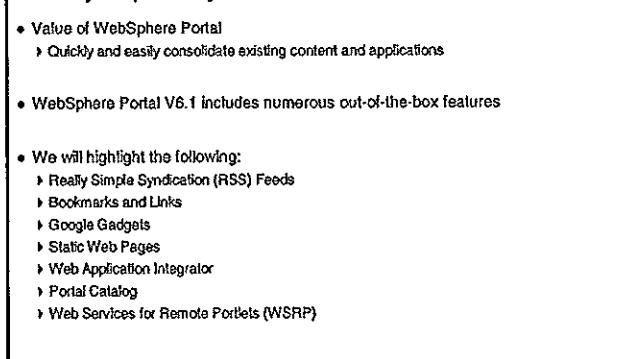


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### Quickly Populate your Portal

- Value of WebSphere Portal
  - Quickly and easily consolidate existing content and applications
- WebSphere Portal V6.1 includes numerous out-of-the-box features
- We will highlight the following:
  - Really Simple Syndication (RSS) Feeds
  - Bookmarks and Links
  - Google Gadgets
  - Static Web Pages
  - Web Application Integrator
  - Portal Catalog
  - Web Services for Remote Portlets (WSRP)



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### Feed Reader Portlet

- Supplied out-of-the-box
- Supports ATOM and RSS

**Feed settings**

Feed URL: [http://www.sport.com/sports](#)

Feed name: Sports

Feed description: From Yahoo

Number of feed entries per page: 10

Show feed reader  
 Show author of feed entries  
 Show date of feed entries  
 Show headlines only (no images)

**Sports**

AL wins All-Star game 4-3 in 15 innings (AP)  
By ROBERT MELKIN - AP Bureau Writer  
Published: July 10, 2005, 12:14 AM

JO Conforti and Mariano Rivera pitching seven. Old World sources and David Wright could be in good presses. It was the 15th inning of the final All-Star game at Yankee Stadium, and the players were tired. As you can see, it was a long day and it was time to go home. It seemed like a long time ago since the Yankees last won the All-Star Game.

Doping plagues Tour de France again (AP)  
By ROBERT MELKIN - AP Bureau Writer  
Published: July 10, 2005, 12:14 PM

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### Links and Bookmarks

- New Web 2.0 Bookmarks Portlet
- Supplied out-of-the-box
- Web 2.0 user interface makes it fast and easy to use!
- Can bookmark external URLs and internal Portal pages

**WebBookmarks Portlet**

Links:  
 Home  
 About  
 Sports  
 Business  
 Technology  
 Entertainment  
 Travel  
 YesterSports  
 ESPN

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### Google Gadgets

- Place any Google gadget on a page
- Download the IBM Portlet for Google Gadgets™ from the Portal catalog
- Seamless integration with thousands of web-based solutions

**IBM Portlet for Google Gadgets**

AL wins All-Star game 4-3 in 15 innin... | IBM Portlet for Google Gadgets

YAHOO! SPORTS Search

The long goodbye: AL wins All-Star game 4-3 in 15<sup>th</sup>

By ROBERT MELKIN - AP Bureau Writer  
Published: July 10, 2005, 12:14 AM

JO Conforti and Mariano Rivera pitching seven. Old World sources and David Wright could be in good presses. It was the 15th inning of the final All-Star game at Yankee Stadium, and the players were tired. As you can see, it was a long day and it was time to go home. It seemed like a long time ago since the Yankees last won the All-Star Game.

Doping plagues Tour de France again (AP)  
By ROBERT MELKIN - AP Bureau Writer  
Published: July 10, 2005, 12:14 PM

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### Web Application Integrator

- Centralizes access to external web applications within the enterprise
- Integration of web applications occurs by injecting Portal navigation into external web applications themselves
- No portlet development required
- Does NOT use an iFrame element
- Portal markup is "injected" into an external web application by adding an HTML <script> tag to the web app
- User believes he/she is still within the Portal environment
  - In reality, they are natively browsing the external web application
- The integrated web application can use any technology (e.g. .NET, Ruby on Rails™, PHP, PEARL, Domino®, J2EE, etc.)
- Download this portlet from IBM Portal catalog

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### Web Application Integrator

Three easy steps:

- 1) Create a standard Portal URL page, specifying the URL to the external web application
- 2) Use the new *WebApp/Integrator* portlet to generate an HTML <script> tag for your web application
- 3) Add the script tag to the header component of the web application. For some themes, the script tag must also be added to the footer component.

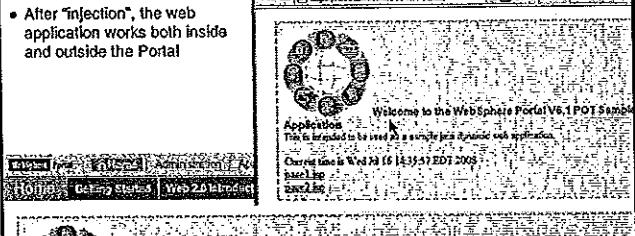
```
<!-- BEGIN PORTAL NAVIGATION INTEGRATION -->
<script type="text/javascript"
src="http://192.168.123.107:10040/wps/mynormal:/ut/p/c5/04_8B9E8xLUM9MSSP
yexec9u_LUJHcAs-
8ktT0o5S_C0VA3QR_YJ0RUUA0g1flw!!/?Portlet3_Page_ID=6_CGAH47L00073F02R4B955S
1007">
</script>
<!-- END PORTAL NAVIGATION INTEGRATION -->
```

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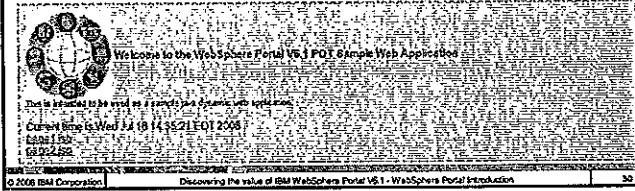
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### Web Application Integrator

- After "injection", the web application works both inside and outside the Portal



Welcome to the WebSphere Portal V5.1 POC Sample Web Application  
This is intended to be used as a sample for dynamic web applications.  
Current time is Wed Jul 16 14:33:17 EDT 2008



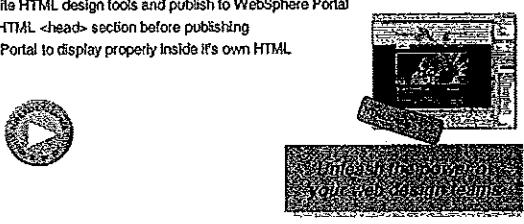
Welcome to the WebSphere Portal V5.1 POC Sample Web Application  
This is intended to be used as a sample for dynamic web applications.  
Current time is Wed Jul 16 14:33:17 EDT 2008

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### Static Web Page Integration

- Allows webmasters to publish web pages directly into Portal
- Simplifies creation of portal pages
- Create smart HTML pages using live text in WebSphere Portal
- Contrast to web clipping
  - Not a "get" from a remote site
  - Use favorite HTML design tools and publish to WebSphere Portal
  - Remove HTML <head> section before publishing
    - Allows Portal to display properly inside its own HTML

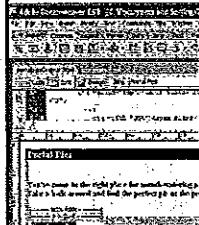


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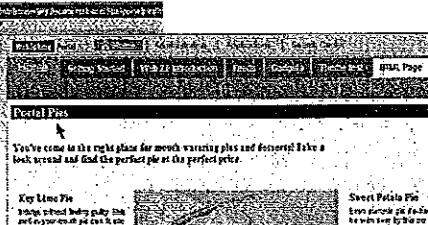
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### Static Web Page Integration

- Create in Adobe® Dreamweaver®
- View inside WebSphere Portal



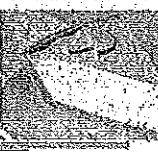
Dreamweaver



Portal Page



Key Lime Pie  
Deli-style turkey salad  
with your choice of lettuce  
and toppings  
Order now - \$7.99



Sweet Potato Pie  
Even though it's not  
as well known as the  
classic pie, it's still  
a favorite. It's made  
from scratch with  
a light, airy texture  
and a sweet, buttery  
taste.

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### Agenda

- Value Proposition of a Portal
- What is a Portal?
- WebSphere Portal V7.0 Architecture
- Methods to quickly populate your Portal with existing content and applications
  - Feeds
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### Techniques for Creating Exceptional Mobile Experiences

**Browser Based, Web Applications**  
Accessible over the Internet without need to download software  
Uses device browser to display content

**Hybrid ? Both Web and Native Components**  
Native looking applications which utilize the browser interface to deliver content  
Provide the ability to use native device features without writing code for each device

**Native**  
Able to make use of phone's native features such as camera, GPS, accelerometer, calendar, etc..  
Supports the richest of user experiences (e.g., gaming applications)

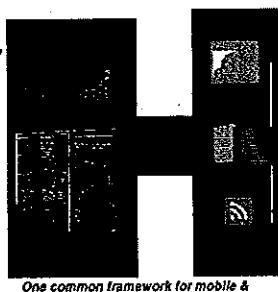
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### Why Leverage a Portal Framework for Mobile Solution Delivery?

To create mobile applications that:

- Integrate with your back-end systems, including web content management
- Are personalized to a user's role, preferences, and behavior
- Support end-user customization
- Are secure
- Can be measured and optimized using analytics
- Can adapt their presentation and functionality according to the device

  
*One common framework for mobile & web applications*

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### Websphere Portal Themes for Smartphones

Extend Portal web experience to mobile devices through the use of Portal themes for smartphones

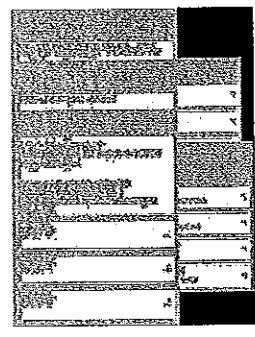
- Optimizes look & feel for smaller screens (site branding, navigation, page layout)
- Optimizes page download size for mobile connections

Create native-looking smartphone Portal themes using familiar technologies and skillsets (HTML, CSS, Javascript)

Two mobile theme options provided:

- Dedicated mobile themes can serve dedicated mobile pages and content
- Single theme can detect the device and serve mobile presentation or full site and content.

Sample themes can be downloaded on Portal Solutions catalog



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### WebSphere Portlet Factory for Smart Phones

Automate the creation of smartphone-optimized applications, eliminating coding and speeding time to market

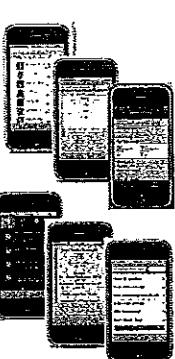
Support your multi-channel strategy. Create once and run on multiple devices and in multiple formats:

- Mobile-optimized applications (iPhone, BlackBerry, Android, iPad)
- Portlets or widgets (WebSphere Portal)
- Web application (WebSphere Application Server)

Quickly Integrate your back-end systems into your mobile applications with a robust set of connectors (SAP, Domino, relational DB, web/REST services, PeopleSoft, Siebel, and more)

Create native-looking smartphone applications using familiar technologies and skillsets (HTML, CSS, Javascript)

Leverage the smartphone application samples to speed development and learn best practice techniques, including how to best support geolocation and phones' orientation features



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### Mobile Portal Accelerator

WebSphere Portal extension that delivers online content and applications to virtually all mobile devices.

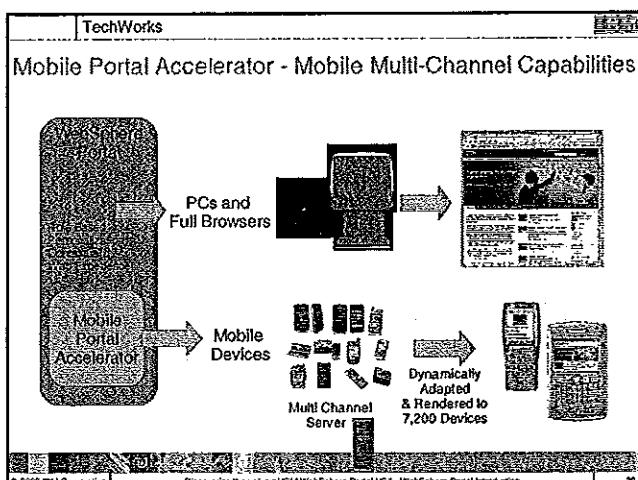
Adapt your content to over 7,200 mobile devices. MPA provides intelligent Multi-Channel Server capabilities that dynamically renders content to specific device characteristics and capabilities.

Speed your development with Mobile Portal Toolkit which enables both the development and testing of XDIME ( XHTML with Device Independent Markup Extensions) portlets in IBM Rational Application Developer.

Keep pace with the latest mobile devices with IBM Mobile Portal Accelerator Device Update. Provides regular updates to mobile device definitions as they become available from device manufacturers.



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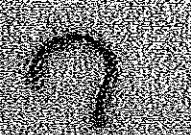
### Presentation summary

- You should now be able to:
  - Describe the business value of WebSphere Portal
  - Explain how companies are using WebSphere Portal
  - Review how IBM uses WebSphere Portal
  - Explain the basic concepts of a portal
  - Identify the benefits of IBM Portal to IT and the business users
  - Explain the value of Web 2.0
  - Describe how Web 2.0 is incorporated into WebSphere Portal
  - Identify easy methods to quickly populate your Portal with existing content and applications
  - Use out-of-the-box WebSphere Portal features
  - Describe how WebSphere Portal delivers exceptional web experience to different end devices

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# Questions



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## Reference materials

- **WebSphere Portal Wiki**
  - <http://www-10.lotus.com/ldd/portalwiki.nsf>
- **Portal Zone on developerWorks**
  - <http://www-128.ibm.com/developerworks/websphere/zones/portal/>
- **Portal Business Solutions Catalog**
  - <http://www-03.lotus.com/lsolutions/portal/>
- **WebSphere Portal Product Information**
  - <http://www-305.ibm.com/software/websphere/portal/>
- **WebSphere Portal Information Center**
  - <http://www-ibm.com/developerworks/websphere/resource/product.html>
- **Self-Help Central for Portal**
  - <http://www-ibm.com/support/docview.wss?rs=53&uid=swg21223691>
- **Migration Central for Portal and Web Content Management**
  - <http://www-1.ibm.com/support/docview.wss?rs=53&uid=swg21223671>
- **IBM Software Events**
  - <http://www-ibm.com/software/sw-events/>

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## Chapter 4: IBM WebSphere Portal

### Overview

In this lab, you will integrate existing web content into your new IBM® WebSphere® Portal. This shows you how easily and quickly you can consolidate existing content into your Portal. You will also configure the portlets and modify your web content source to achieve communication between portlets.

- **Web Page Portlet** – configure and display existing web content

When finished, you will see a portlet for each exercise, and the specified content displayed inside each portlet.

### Requirements

#### Image Requirements:

This lab exercise uses the Portal v7.0 image.

#### Hardware Requirements:

PC Hardware with a minimum of 3 gigabytes of RAM and 40 gigabytes of free disk space.

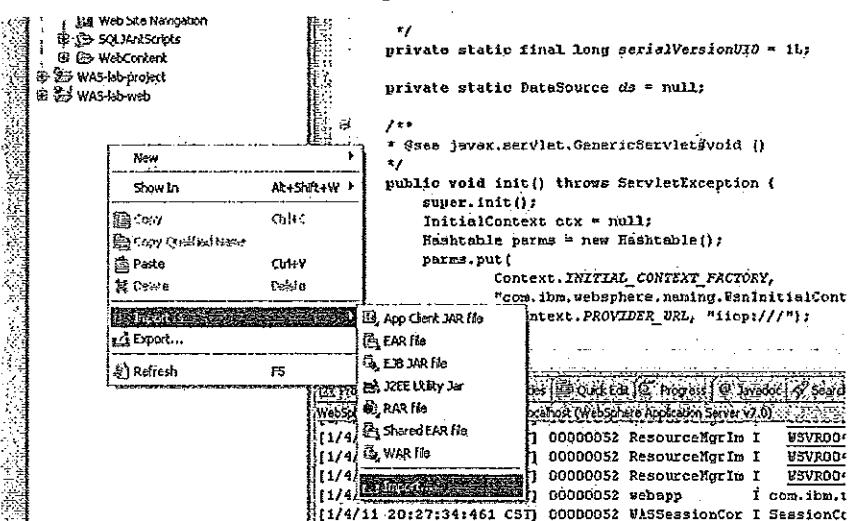
#### Software Requirements:

VMware Workstation version 6

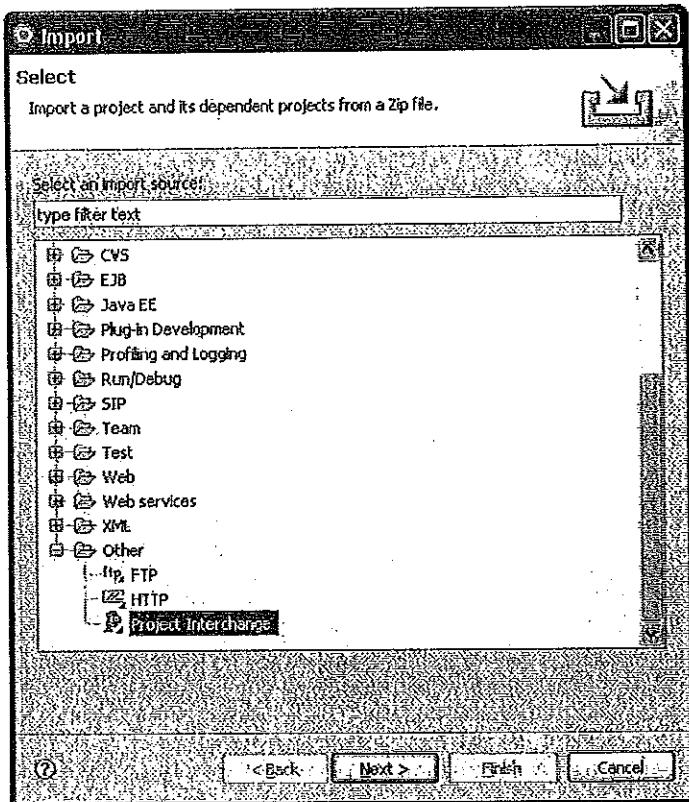
### Create a New Servlet

#### Import a project into RAD

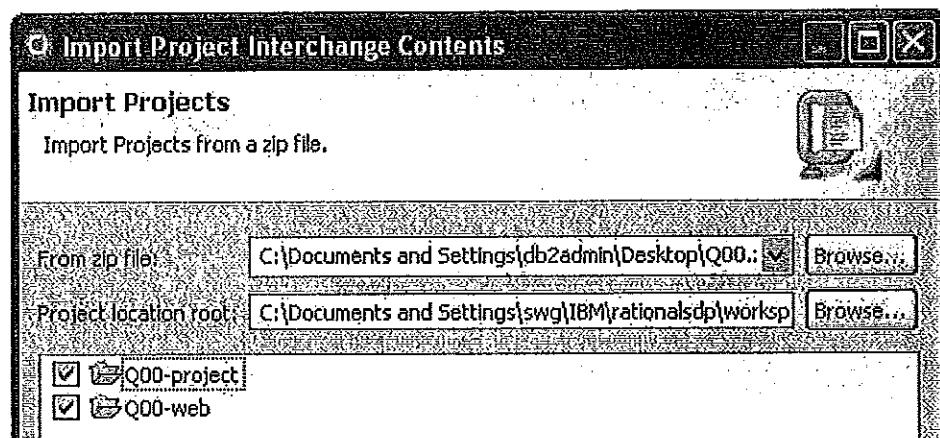
1. Open Rational Application Developer (RAD) and start WebSphere Application Server (WAS) if you have not done so.
2. On the left sidebar of RAD, right-click and select **Import and Import...**



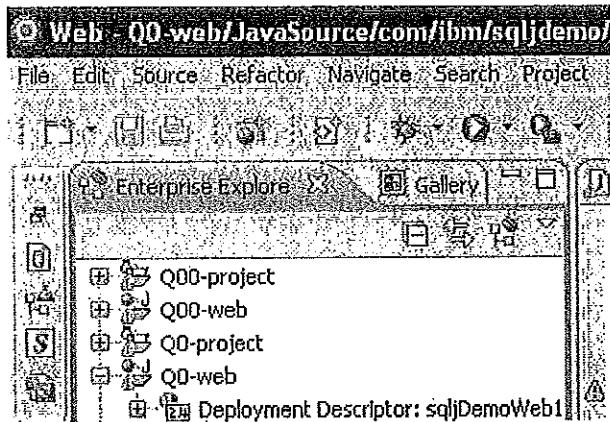
3. Select Project Interchange. Click Next.



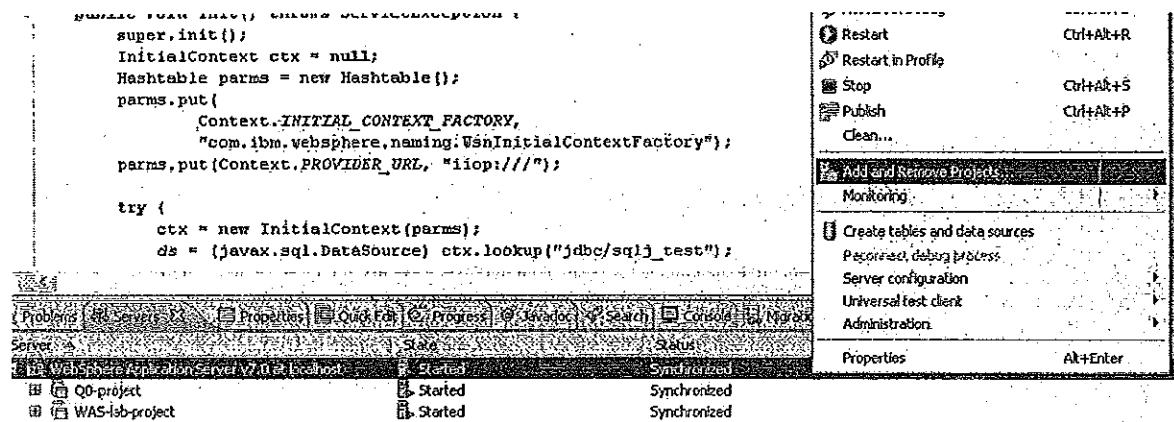
4. Click Browse... and select Q00.zip on Desktop. Select both boxes of Q00-project and Q00-web. Then click Finish.



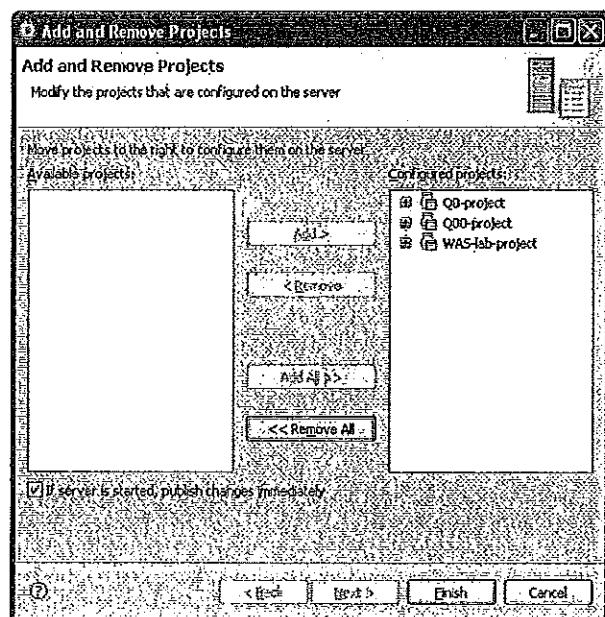
5. You will see Q00-project and Q00-web on the left sidebar.



6. Go to **Servers** at the bottom of RAD and right-click WebSphere Application Server v7.0 at localhost. Then select Add and Remove Projects....

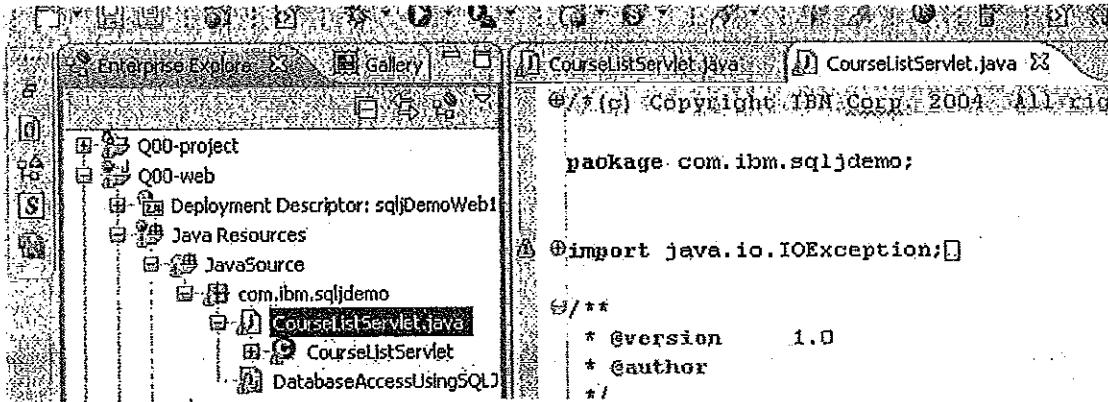


7. Select Q0-project and click Add >.and Finish.



## Create New Web Content

8. Open **CourseListServlet.java** in Q00-web.



```

Enterprise Explorer [ ] Gallery [ ]
[ ] Q00-project
  [ ] Q00-web
    Deployment Descriptor: sqljDemoWeb.xml
    Java Resources
      JavaSource
        com.ibm.sqljdemo
          CourseListServlet.java
          CourseListServlet
          DatabaseAccessUsingSQLJ
CourseListServlet.java [ ] CourseListServlet.java [ ]
Copyright IBM Corp. 2004. All rights reserved.

package com.ibm.sqljdemo;

import java.io.IOException;

/**
 * @version 1.0
 * @author
 */

```

9. Go to line 111 and change **Q0 – Course Selection to My Credits**.

```

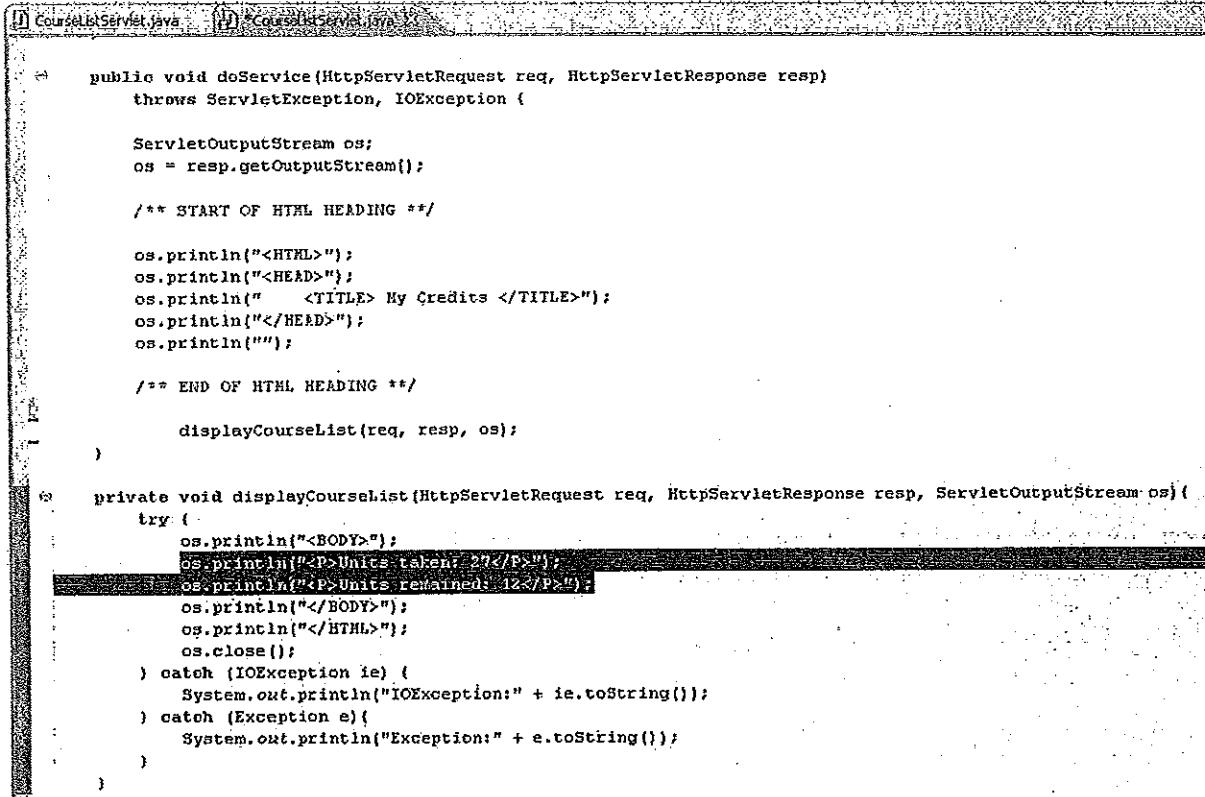
/** START OF HTML HEADING **/

os.println("<HTML>");
os.println("<HEAD>");
os.println("<TITLE>My Credits</TITLE>");
os.println("</HEAD>");
os.println("");

/** END OF HTML HEADING ***/

```

10. Delete from line 117 to line 122, line 124 and from line 131 to line 287, and add the 2 lines shown below. Then click **Ctrl-S** to save and compile.



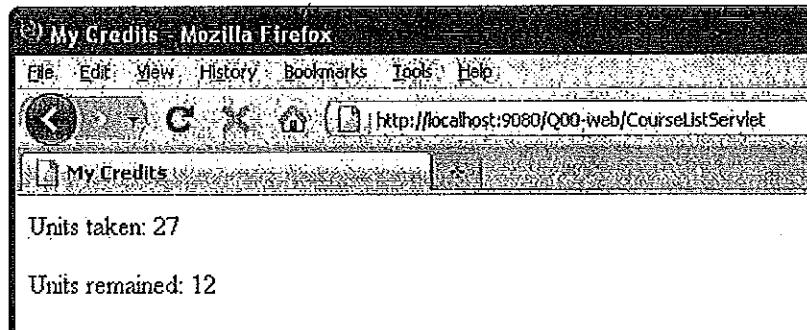
```
public void doService(HttpServletRequest req, HttpServletResponse resp)
throws ServletException, IOException {
    ServletOutputStream os;
    os = resp.getOutputStream();

    /** START OF HTML HEADING **/
    os.println("<HTML>");
    os.println("<HEAD>");
    os.println("  <TITLE> My Credits </TITLE>");
    os.println("</HEAD>");
    os.println("");

    /** END OF HTML HEADING **/
    displayCourseList(req, resp, os);
}

private void displayCourseList(HttpServletRequest req, HttpServletResponse resp, ServletOutputStream os){
    try {
        os.println("<BODY>");
        os.println("<P>Units taken: 27</P>");
        os.println("<P>Units remained: 12</P>");
        os.println("</BODY>");
        os.println("</HTML>");
        os.close();
    } catch (IOException ie) {
        System.out.println("IOException: " + ie.toString());
    } catch (Exception e){
        System.out.println("Exception: " + e.toString());
    }
}
```

11. Open a new browser and enter the URL <http://localhost:9080/Q00-web/CourseListServlet> and you should see the new web content in the servlet you just modified.



## Configure a Web Page Portlet

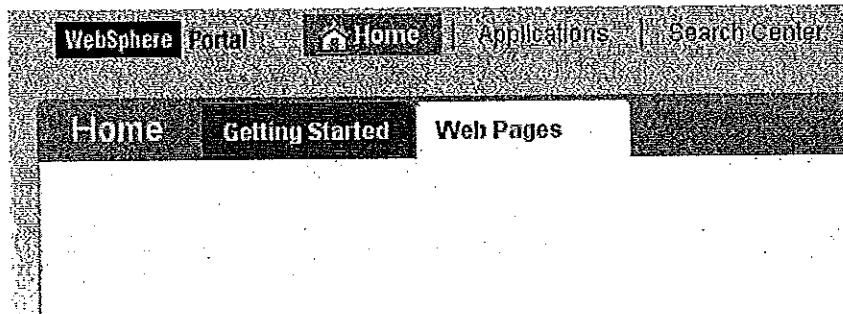
### Add Web Page Portlets to a Portal Page

Follow these steps to add two web page portlets to a portal page.

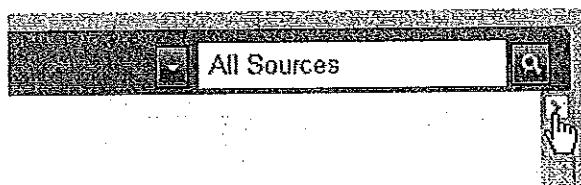
1. Open a new browser and enter URL <http://192.168.10.2/wps/portal>. Login to WebSphere Portal using **teamX/teamX** as your credentials. X is your team number. For example team 1 uses **team1/team1**, team 30 uses **team30/team30**.



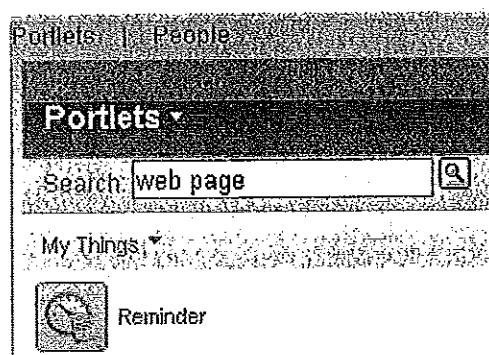
2. Click the **Web Pages** tab. The page is blank, since no portlets are on this page.



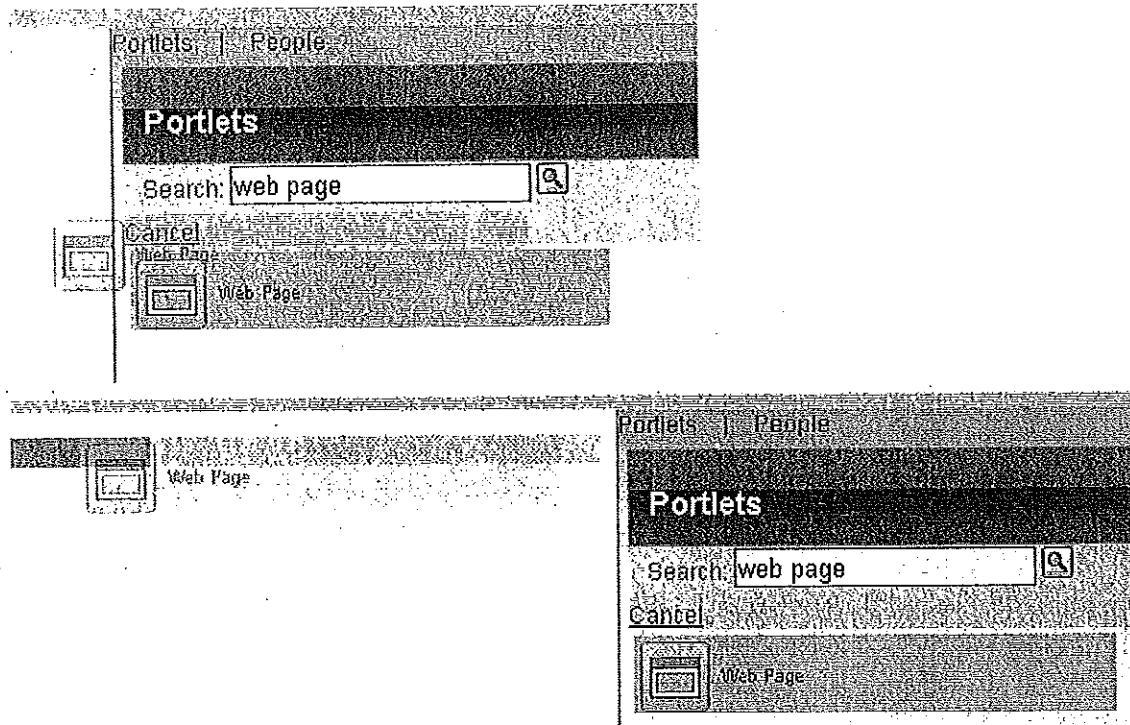
3. Click on the Portal's "Expand Palette" icon.



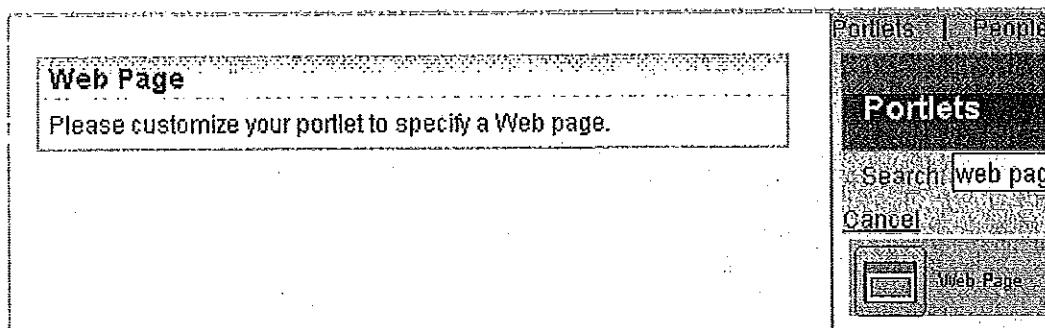
4. TYPE *web page* in the search field. Click the icon.



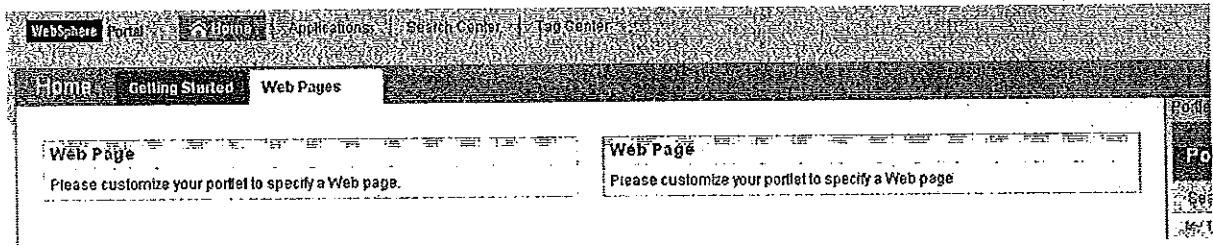
5. Drag and drop the portlet onto the top of the blank Portal page. Place it on top of one of the colored bars in the white space.



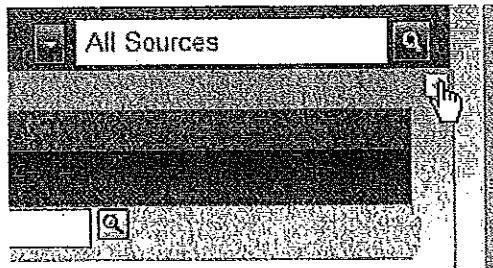
6. You should see the portlet. If it did not work, try again.



7. Add one more to the right hand side of the first one.

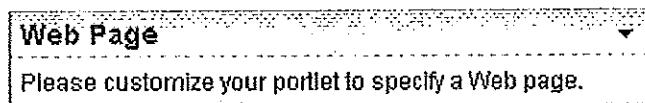


8. Hide the portlet palette by clicking on expand palette the icon again.

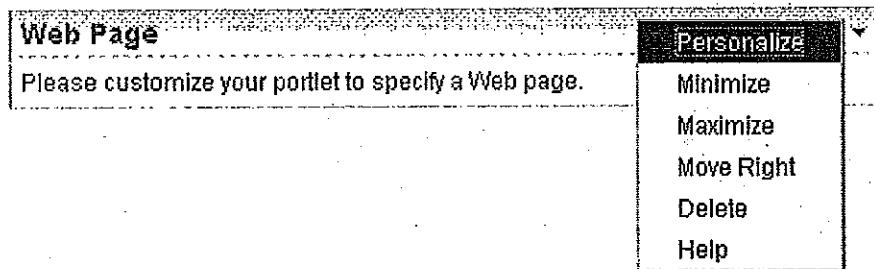


### Configure the portlet

9. Hover over the top-right corner of the portlet. You will see a drop-down arrow.



10. Click on the arrow and select Personalize.



11. Type **Optional Course List** in the Title field and <http://localhost:9080/Q0-web/CourseListServlet> in the URL field. Then click **Save**. The Title you enter will be the name of the iframe in this Web Page portlet. You will need to use this iframe name later to edit the web content source.

**Web Page**

**Configure Web Page**

**Title:**

**URL:**

**Width:**  
 Fit to column  
  pixels

**Height:**  pixels

**Authentication Options**

**Save** **Cancel**

12. Do the same for the other portlet, but enter **Credits** as the Title. Then you should see both portlets displaying the Option Course list.

Course Code	Title	Offering Faculty	Unit
ENG0104	Engineering mathematics	Engineering	3
ENG0106	Digital logic	Engineering	6
ENG0107	Foundations of computer science	Engineering	6
CSE0120	Computer programming I	Engineering	6
CSE0122	Computer programming II	Engineering	6
CSE0119	Introduction to data structures & algorithms	Engineering	6
CHI0102	Putonghua course for Engineering students	Arts	3
SOC0118	Japanese society	Social Sciences	3

Course Code	Title	Offering Faculty	Unit
ENG0104	Engineering mathematics	Engineering	3
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CSE0119	Introduction to data structures & algorithms	Engineering	6
CHI0102	Putonghua course for Engineering students	Arts	3
SOC0118	Japanese society	Social Sciences	3

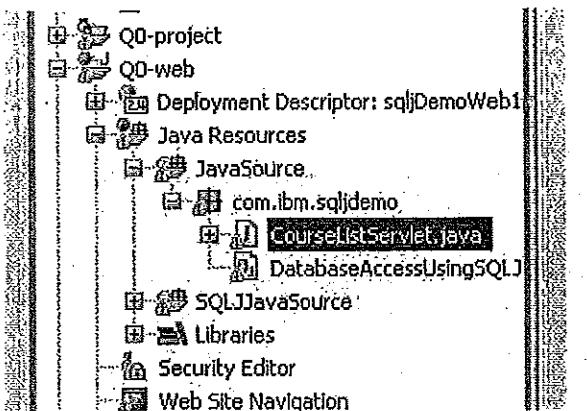
13. **Optional:** You can modify the size of the Web Page portlet (size of the iframe) by entering the pixels of width and height.

## Develop Communications between Portlets

### Trigger Refresh Action between Portlets

The following steps show how to edit the web content source in RAD so that when a button is clicked in a portlet, the other portlet will refresh and show the web content that you would like to display. You will add a button named "My Credits" in the "Optional Course List" portlet. When you click the button, the "Credits" portlet will automatically refresh to the "My Credits" web page, which is the new web content (servlet) that you created at the beginning of this exercise.

1. Open **CourseListServlet.java** in **Q00-web** in RAD.



```
-----  
Initial  
Hashtab  
parms.p  
  
parms.p  
  
try {  
    ctx  
    ds.  
} catch  
{  
}
```

2. Add the following lines after line 111. Notice that you have put the iframe name **Credits** and the path "**../Q00-web/CourseListServlet**" in the source. It means that in this function "refresh", it triggers the portlet with iframe name **Credits** to refresh and display the new URL <http://localhost:9080/Q00-web/CourseListServlet>.

```
/* START OF HTML HEADING */  
  
os.println("<HTML>");  
os.println("<HEAD>");  
os.println("    <TITLE> Q0 - Course Selection </TITLE>");  
os.println("    <SCRIPT TYPE='text/javascript'>");  
os.println("        function refresh(){");  
os.println("            window.parent.Credits.location.assign('../Q00-web/CourseListServlet');");  
os.println("        }");  
os.println("    </SCRIPT>");  
os.println("</HEAD>");  
os.println("");  
  
/* END OF HTML HEADING */  
  
String tran = req.getParameter("action");  
if (tran.equals("refresh")) {  
    refresh();  
}
```

3. Add the following line after line 270. This adds a button that triggers the "refresh" function to the end of the "Optional Course List" portlet.

```
os.println("</TD>");  
os.println("</TR>");  
os.println("</TABLE>");  
  
os.println("<BUTTON ONCLICK='refresh()>My Credits </BUTTON>");  
  
os.println("</BODY>");  
os.println("</HTML>");  
os.close();  
} catch (IOException ie) {  
    System.out.println("IOException: " + ie.toString());
```

4. Click **Ctrl-S** to save and compile. Then go back to WebSphere Portal and refresh the portal page. Scroll down the "Optional Course List" portlet and you should see the button "My Credits".

The screenshot shows a table of optional courses with columns for Course Code, Title, Faculty, and Credits. Below the table are filtering options for 'COURSE CODE' and 'Offering Faculty'. At the bottom are buttons for 'List of Faculty', 'Show border', and 'My Credits'.

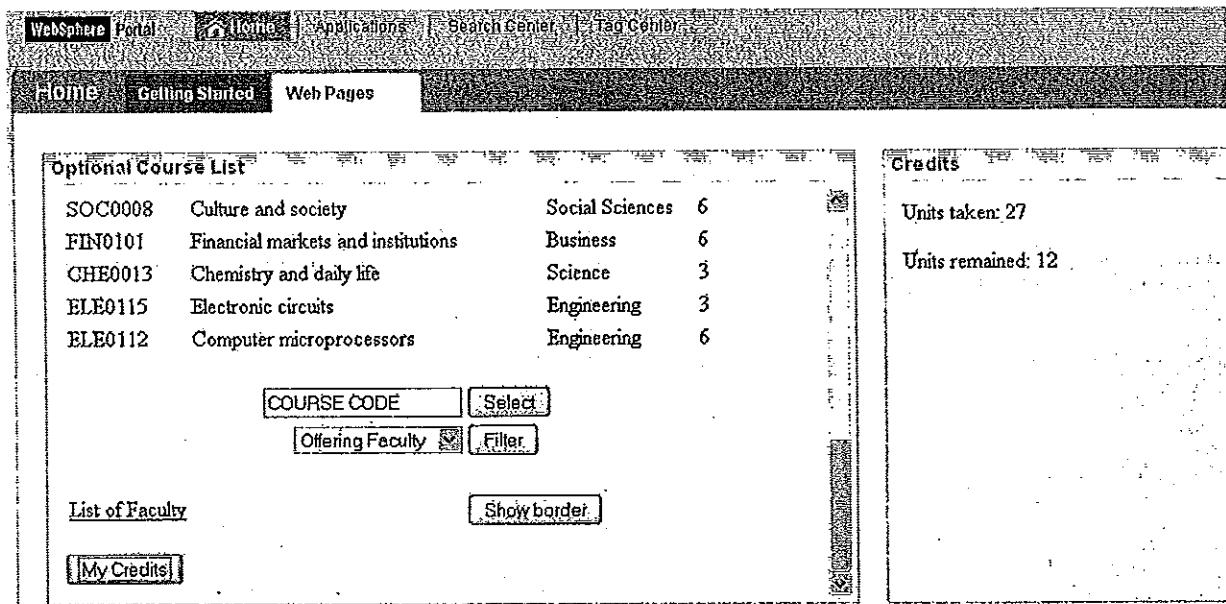
COURSE CODE	Title	FACULTY	CREDITS
SOC0008	Culture and society	Social Sciences	6
FIN0101	Financial markets and institutions	Business	6
CHE0013	Chemistry and daily life	Science	3
ELE0115	Electronic circuits	Engineering	3
ELE0112	Computer microprocessors	Engineering	6

**COURSE CODE** **Select**  
**Offering Faculty** **Filter**

**List of Faculty** **Show border**

**My Credits**

5. Click the **My Credits** button and you should see the portlet on the right has refreshed to display the "My Credits" web page that created earlier.



The screenshot shows a WebSphere Portal interface with a navigation bar at the top. The main content area contains two portlets:

- Optional Course List**: A table listing courses with their details and credit values. The table includes columns for Course ID, Course Name, Faculty, and Credits.
- Credits**: A summary section showing the total units taken and units remained.

Below the portlets are several buttons and links:

- COURSE CODE** and **Select** buttons.
- Offering Faculty** and **Filter** buttons.
- List of Faculty** and **Show border** buttons.
- My Credits** button.

## End of Exercise

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**IBM Inter-University Programming Contest 2011 Training**

Chapter 5: Access Mainframe DB2 from WebSphere

Software Group, IBM

IBM Inter-University Programming Contest 2011      1/31

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## Chapter Outline

- Mainframe History
- Mainframe Major Hardware Features
- Operating Systems running on Mainframe
- DB2 Connect Topologies

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## Mainframe – Yesterday and Today

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before the line 7/6/11  
above the line 7/6/11

IBM

Information management system

full program partitioning  
virtual partitioning

DB2  
dynamic address translation

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## The changing mainframe footprint

9021-9X2 - 470 MIPS in 1994  
Bipolar, Water Cooled Mainframes transition to smaller CMOS technology

© 2008 IBM Corporation

Block transfer  
System assist P10(11)  
Open Systems support  
Java  
Linux

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## zEnterprise z196 Functions and Features (GA Driver 86 – August, 2010)

Five hardware models
Quad core FPU chip
Up to 80 processors configurable as CPs, 2xAPs, IIPs, PLs, IOPs, or optional EAPs
Increased capacity processors
Out-of-order instruction execution
Over 130 new and enhanced instructions
Improved processor cache design
Up to 12 subcapacity CPs at capacity settings 4, 5, 6, 7
Up to 3 TB of Redundant Array of Independent Memory (RAIM)
Unified Resource Manager suites
Cryptographic enhancements
On Demand enhancements
Energy efficiency

2 New OSA CHPDs – DSX and DSM  
Three subchannel sets per LCSS  
8 slots, 2 domain I/O drawer  
Concurrent I/O driver add, remove, replace  
FICON Recovery and autoconfiguration  
Doubled HyperScale to 32  
Physical Coupling Links increased to 80  
Doubled Coupling CHPDs to 128  
DFCC Level 17  
Optional water cooling  
Optional High Voltage DC power  
Optional overhead I/O cable exit  
SIP enhancements  
zBX-002 with IBM Smart Analytics Optimizer, IBM GlobalLink

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## IBM Disk Storage

Mainframe environment > IBM disk storage: DS8000

A more recent disk system, the DS8000 series, is based on ESS 800 technology, so it also works with open systems and has built-in hardware-based disaster recovery functions. These built-in functions maintain a synchronous copy—always up-to-date with the primary copy—of data in a remote location. Customers use this backup copy to quickly recover from failures without losing any transactions or data.

The amazing difference between the ESS 800 and the DS8000 is capacity. With the DS8000, IBM has increased potential disk storage capacity from 55 up to 195 terabytes, in a footprint that is approximately 20% smaller than the ESS 800.

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## IBM Tape Storage

Mainframe environment > IBM tape storage

Just as disk storage improves significantly from one generation of machines to the next, tape storage devices also have come a long way since the archetypal reel-to-reel machines of the early 1960s. Although modern tape storage machines might be an equivalent size to the reel-to-reel machines, their design and technology is far more advanced and provides exponentially improved capacity.

An example of a modern tape storage device is the IBM System Storage™ TS3500 Tape Library, which resides in one base frame that can be connected with up to 15 additional expansion frames. The TS3500 base and expansion frames each have a footprint of approximately 10 square feet (almost one square meter), so a full bank of frames has a footprint of 160 square feet (almost 15 square meters).

Inside the TS3500 frames are tape controllers or drives, which connect the tape library with the z9 EC, and tape cartridges, which store data.

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## Who uses mainframes?

- Most Fortune 1000 companies use a mainframe environment
- 60% of all data available on the Internet is stored on mainframe computers
- Typical usage
  - Large-scale transaction processing
    - Thousands of transactions per second
  - Support thousands of users and application programs simultaneously accessing resources
  - Terabytes of information in databases
  - Large-bandwidth communications
- There are more CICS transactions processed daily than Web pages served

The foundation of modern business  
The new world needs Integration with the legacy Business

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## Why customers choose zSeries ?

- Highest availability
  - 52 \* 7 \* 24 99.999%
  - Planned as well as unplanned outages
- Capability & Scalability
  - Multiple LPARs and I/O sharing
  - Load balancing between workloads
  - Workload priority management
- Largest database capability
  - Multi-Terabytes
  - On line backup/recovery
- Maximum Investment protection & leverage
  - Use existing zSeries skills
  - Incremental upgrades
  - Platform compatibility and stability over many years
- Security
  - Business data is critical and sensitive company & customer information
  - Potential damage through unauthorized access often underestimated
  - zSeries is the acknowledged industry leader in all aspects of IT security

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## Mainframe Operating Systems

- z/VSE
- z/VM
- z/Linux
- z/TPF
- z/OS

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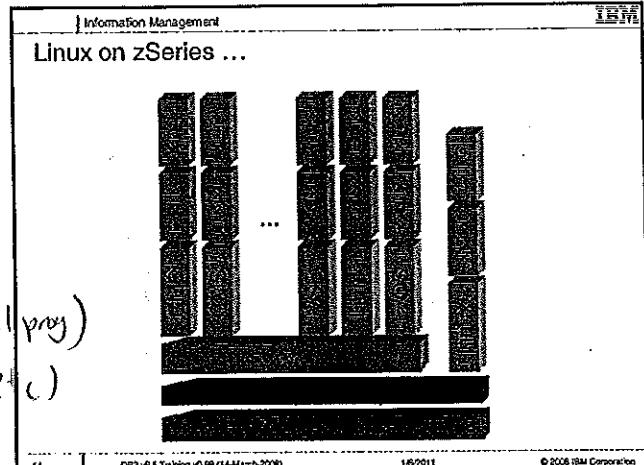
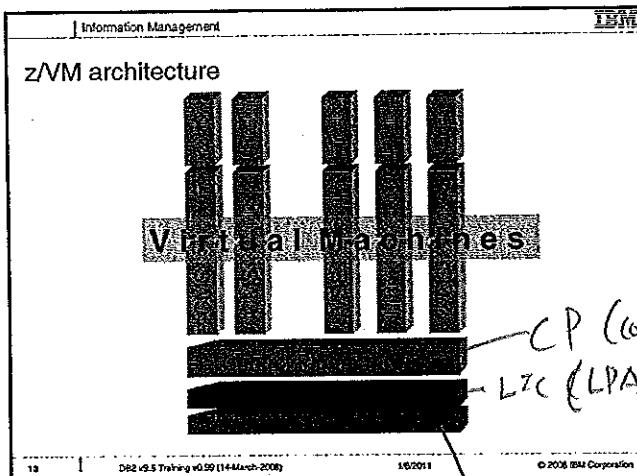
## z/VSE

- z/VSE - Replacement for VSE/ESA
  - To enable network integration and infrastructure simplification
    - Large integration capabilities with Linux
  - To protect and leverage VSE information assets

VSE Workload

- CICS Online Applications
- Access to VSAM, DL/I and DB2 data
- Batch applications

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z-Series hardware.

Information Management

**Linux on zSeries (zLinux)**

- What Is It?
  - A native zSeries operating environment
    - Pure Linux, an ASCII environment (vs. EBCDIC on z/OS & z/VM)
    - Exploits IBM zSeries hardware, including IEEE floating point
    - Linux for S/390 - 32-bit
    - Linux for zSeries - 64-bit
  - Not a unique version of Linux or other operating system
  - Not a replacement for other IBM zSeries operating systems
- zSeries Linux benefits
  - The most reliable hardware platform available
  - Scalability
    - Both Physical and Logical
    - Non-disruptive capacity upgrade on demand
  - Designed to support mixed work loads
    - Complete work load isolation
    - High speed inter-server connectivity
    - High Internal Bandwidth
    - Virtualization

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**z/Transaction Processing Facility Enterprise Edition (z/TPF) v1.1**

- High-performance operating system
  - Edit architecture
  - Large in-memory data tables
  - Up to 32 z/TPF images connectable
- Special purpose system
  - High volume transaction processing
  - High availability
- Open development environment - z/TPF
  - uses the GNU tool chain
  - can share applications, tooling, and development infrastructure with, Linux
- Customer usage
  - Airline reservation systems
  - Credit card companies
  - Public utilities (e.g. Railways)
- The z/Transaction Processing Facility Database Facility (z/TPFDF) (5748-F15), provides database management functions to z/TPF.
  - To virtualize the physical database.

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## z/OS – The ultimate zSeries OS – Components ...

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## z/OS component terminology

- JES2 or JES3 - Job Entry Subsystem
- TSO - Time Sharing Option
- ISPF/PDF – Interactive System Productivity Facility
- WLM – Work Load Manager
- RMF – Resource Measurement Facility
- SMF – System Measurement Facility
- RACF – Resource Access Control Facility
- Communications Server for z/OS - VTAM and TCP/IP
- DFSMS – Data Facility Storage Management Subsystem
- USS – Unix System Services

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## z/OS provides the platform for access to Data and Databases

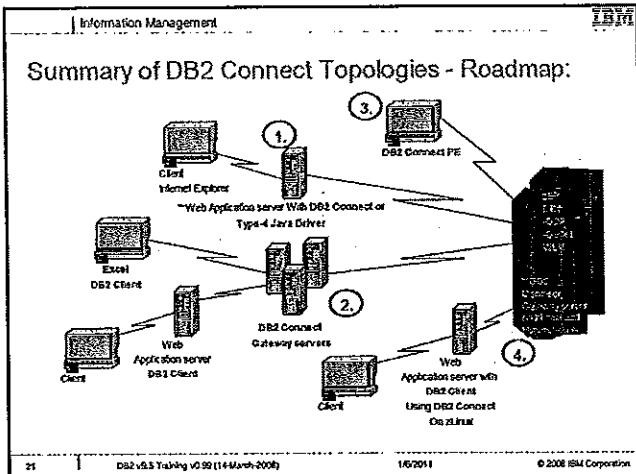
- Traditional data access methods & formats on z/OS
  - VSAM (KSDS, ESDS, RRDS, Linear),
  - Sequential (SAM, QSAM, BDAM, ..),
  - Partitioned (PDS, PDSE)
- Hierarchical File System for Unix System Services
  - /etc/...
- z/OS Database
  - Hierarchical Database
    - IMS Database Manager, also called DL/I
  - Relational Database
    - DB2
  - 3rd Party Vendors – IDMS, CA-Datacom, Adabas, Oracle
- Information Integration with existing z/OS data sources
  - "Websphere Information Integrator Classic Federation for z/OS"

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## The classic mainframe TSO 'green screen'

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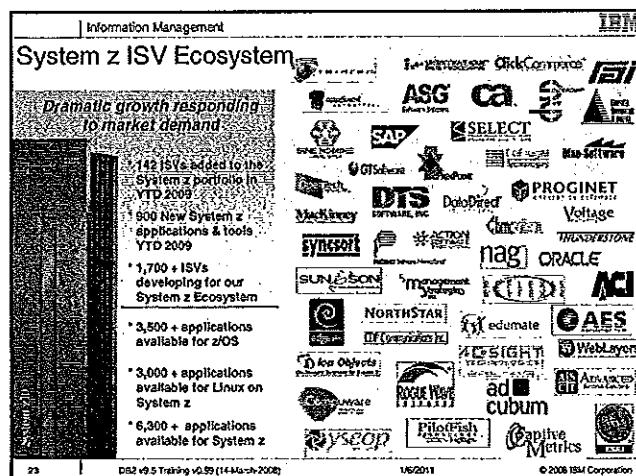
**Information Management**

```

Display Filter View Print Options Help
SDSF DA SYSL FOOD PROG CPU/L 3/*** LINE 1-18 (ES) SCROLL ==> ...
COMMAND INPUT ==>
HOLDING STATE UNIT CODE + EXECUTIVE SYSTEMS
*MASTER* ST005002 MASTER+ NS FF 2028 0.00 0.00
*ALLOCAS ALLOCAS
*ANTASD00 ANTASD00 IEPPROC NS FF 1252 0.00 0.00
*ENTRAN1 PUTRAN1 IEPPROC NS FB 1259 0.00 0.00
*PRM PRM IEPPROC NS F4 427 0.00 0.00
*SPXINIT EPXINIT EPXINIT IN FF 256 0.28 0.00
*CATALOG CATALOG IEPPROC NS FF 1056 0.00 0.00
*GEN GEN IEPPROC NS FB 2918 0.00 0.00
*CICS CICS IEPPROC NS FE 5025 0.00 0.00
*CONSOLE CONSOLE DB2 Address Spaces D0026 START2 NS FE 1393 0.00 0.00
*DISPATCH DISPATCH IEPPROC NS FE 3350 0.00 0.00
*DSCFEM1 DSCFEM1 IEPPROC ST005027 START2 NS FE 10T 0.00 0.00
*ESREP1ST ESREP1ST IEPPROC ST005027 START2 NS FE 39T 0.00 0.00
*DSCOFLM DSCOFLM IEPPROC ST005023 START2 NS FE 3634 0.00 0.00
*DSCONSTR DSCONSTR IEPPROC ST005023 START2 NS FE 2347 0.00 0.00
*DSCONSTR DSCONSTR IEPPROC ST005023 START2 NS FE 2225 0.00 0.00
*DEVMAN DEVMAN IEPPROC NS FE 429 0.00 0.00
*DLF DLF DLF NS FE 267 0.00 0.00
03/02/21

```

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**IBM Inter-University Programming Contest 2009 Training**

Chapter 5: DB2 Operation Overview

**Software Group, IBM**

IBM Inter-University Programming Contest 2011 January 29, 2011 Stanford University, California, USA

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# **Chapter 5: Access Mainframe DB2 From WebSphere**

## **Objectives**

In this exercise, we will learn:

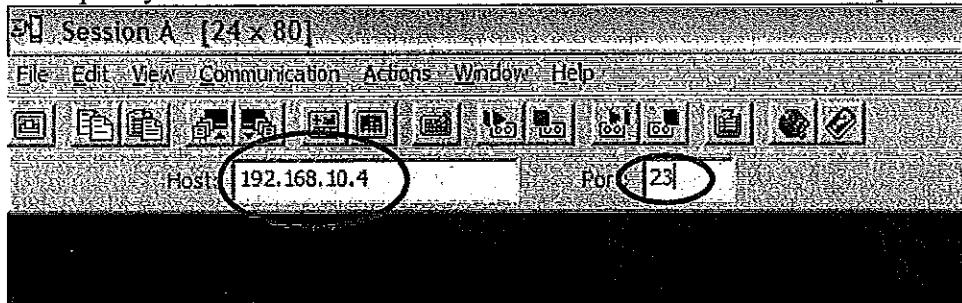
- How to login Mainframe using TN3270 terminal emulator
- How to delete table using DB2 tool on Mainframe
- How to create table, index and insert 1 record using DB2 tool on Mainframe
- How to login WebSphere Administration Console
- How to create authentication alias for Mainframe access
- How to modify local Data source to access Mainframe DB2
- How to run the servlet to access Mainframe DB2

## **Exercises**

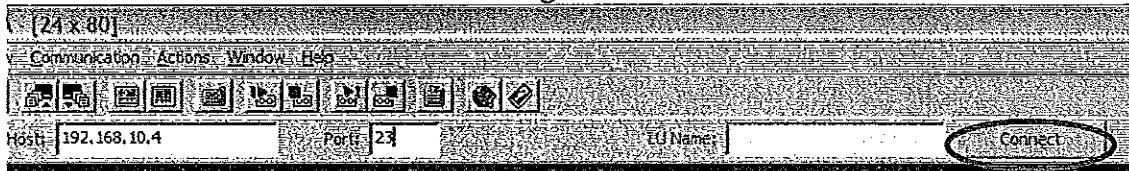
1. Click the icon to start TN3270 terminal emulator from Desktop:



2. Specify 192.168.10.4 for mainframe IP address and 23 for telnet port



3. Click **Connect** button on the right hand side



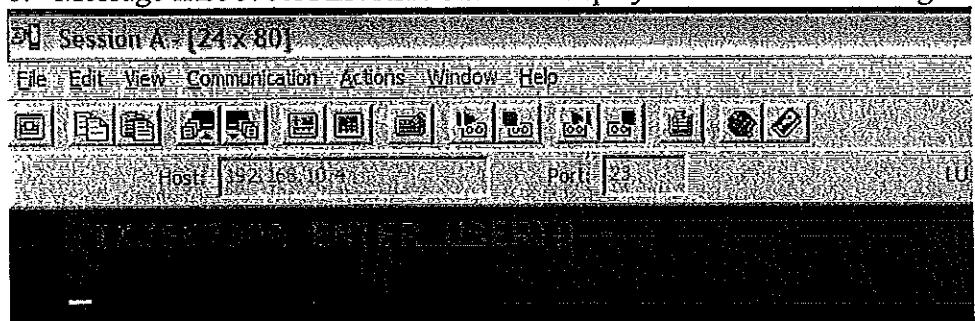
4. Mainframe logon screen appears and waiting for user signin.

This image shows a terminal window titled 'SD Session A (24/001)'. The window has a menu bar with 'File', 'Edit', 'View', 'Communication', 'Actions', 'Window', and 'Help'. The status bar at the bottom right shows 'IP Address = 192.168.10.103' and 'TSM Terminal = 8080/TSM'. The main area of the window is a dark grey terminal screen. It displays several lines of text, including:  
- A welcome message from the system.  
- A list of available users or sessions.  
- A prompt for the user to enter their name.  
- A message indicating that the user can now logon.  
- A final message at the bottom about the system's purpose and availability.

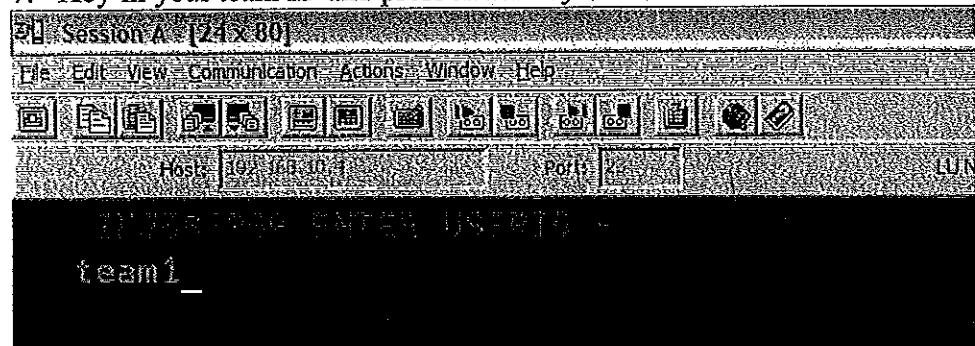
5. Key-in 'L TSO' and press Enter key to login into mainframe Time Sharing Option (TSO).

This image shows a terminal window titled 'SD Session A (24/001)'. The window has a menu bar with 'File', 'Edit', 'View', 'Communication', 'Actions', 'Window', and 'Help'. The status bar at the bottom right shows 'IP Address = 192.168.10.101' and 'TSM Terminal = 8080/TSM'. The main area of the window is a dark grey terminal screen. It displays:  
- A prompt for the user to enter their name.  
- The user has typed 'L TSO' and pressed Enter.  
- A message confirming the user is now logged on.  
- A final message at the bottom about the system's purpose and availability.

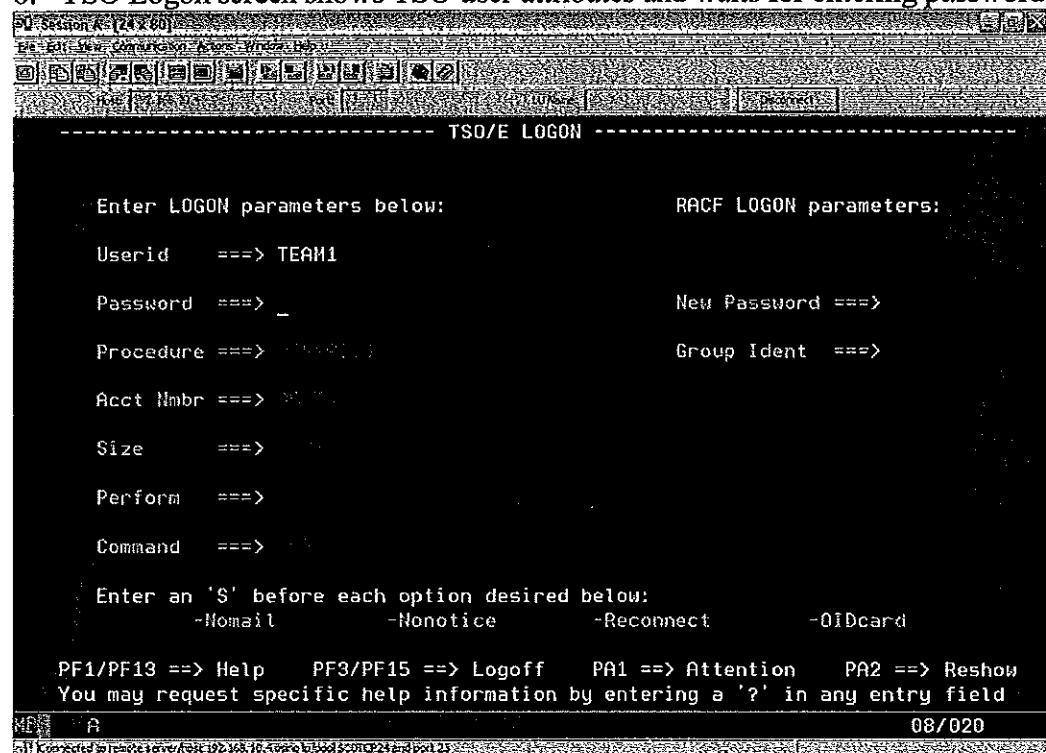
6. Message IKJ56700A ENTER USERID displays and asks for TSO login USER ID



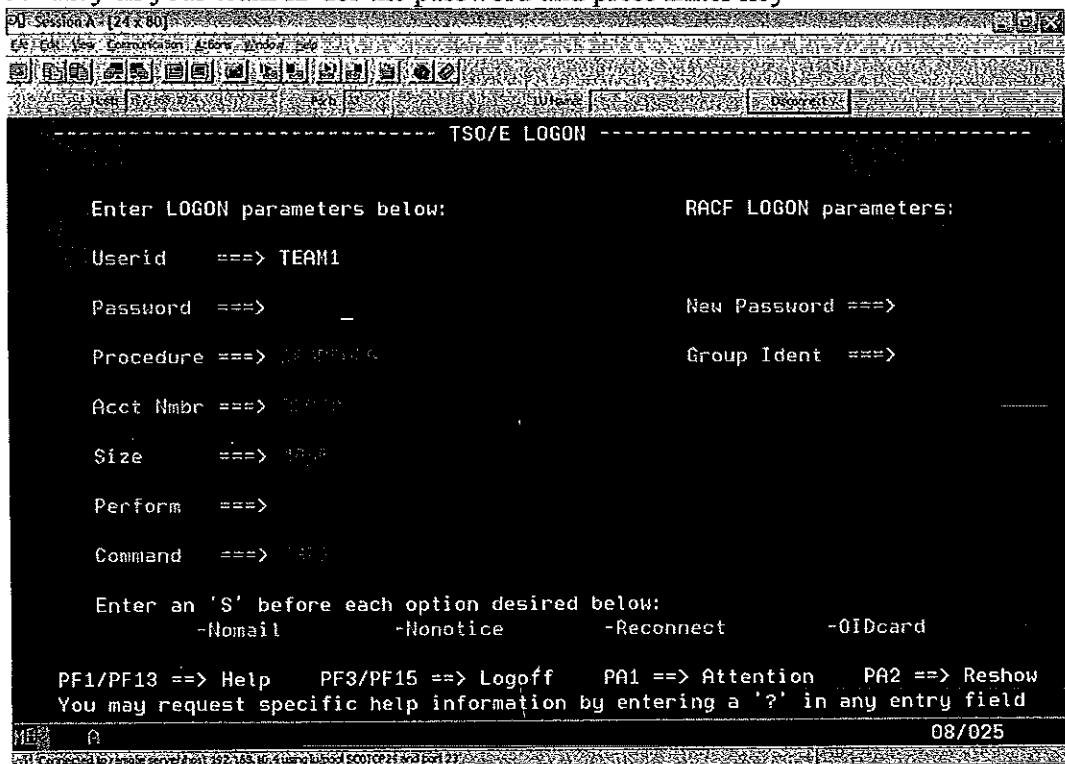
7. Key-in your team ID and press Enter key



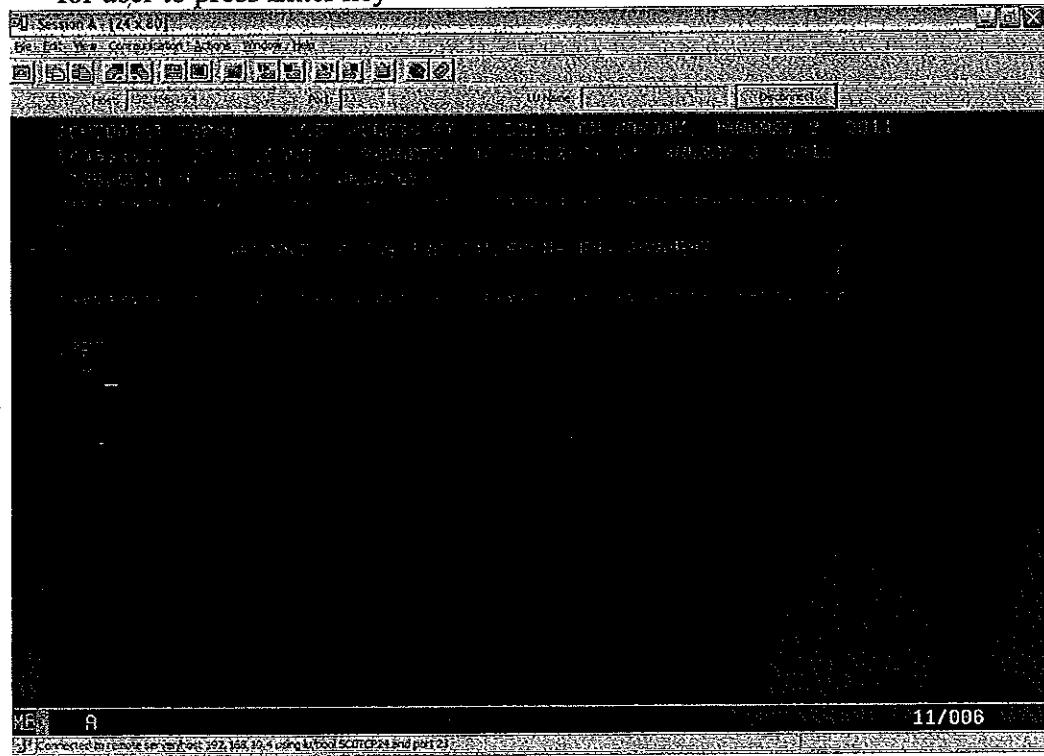
8. TSO Logon screen shows TSO user attributes and waits for entering password.



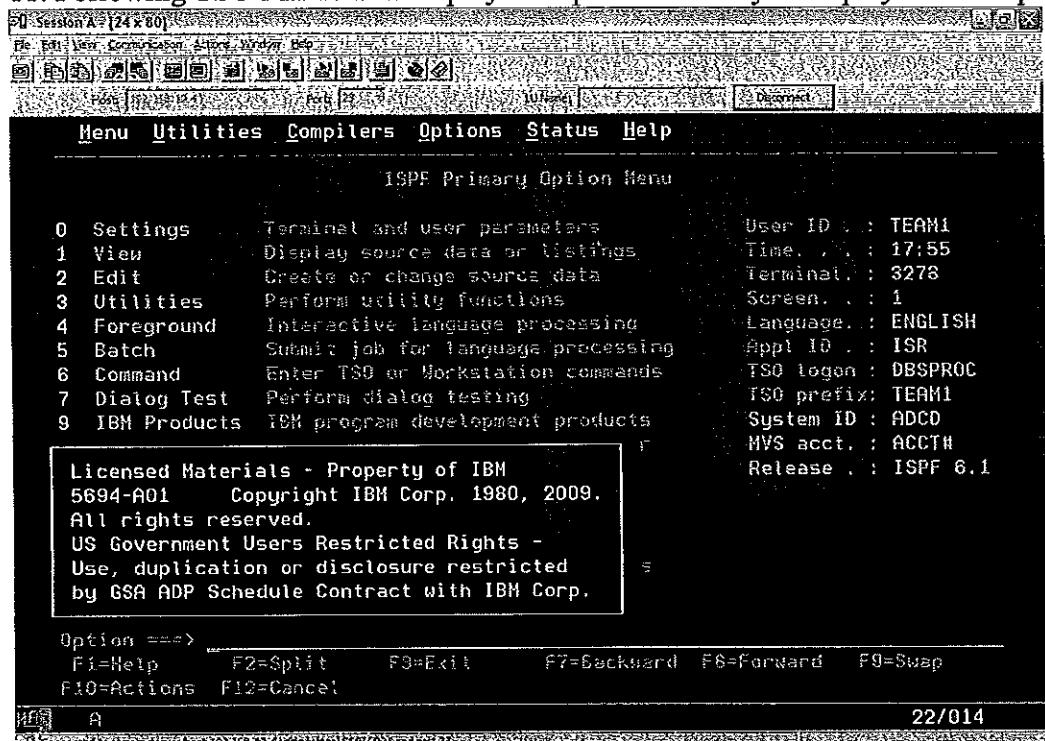
9. Key-in your team ID for the password and press Enter key



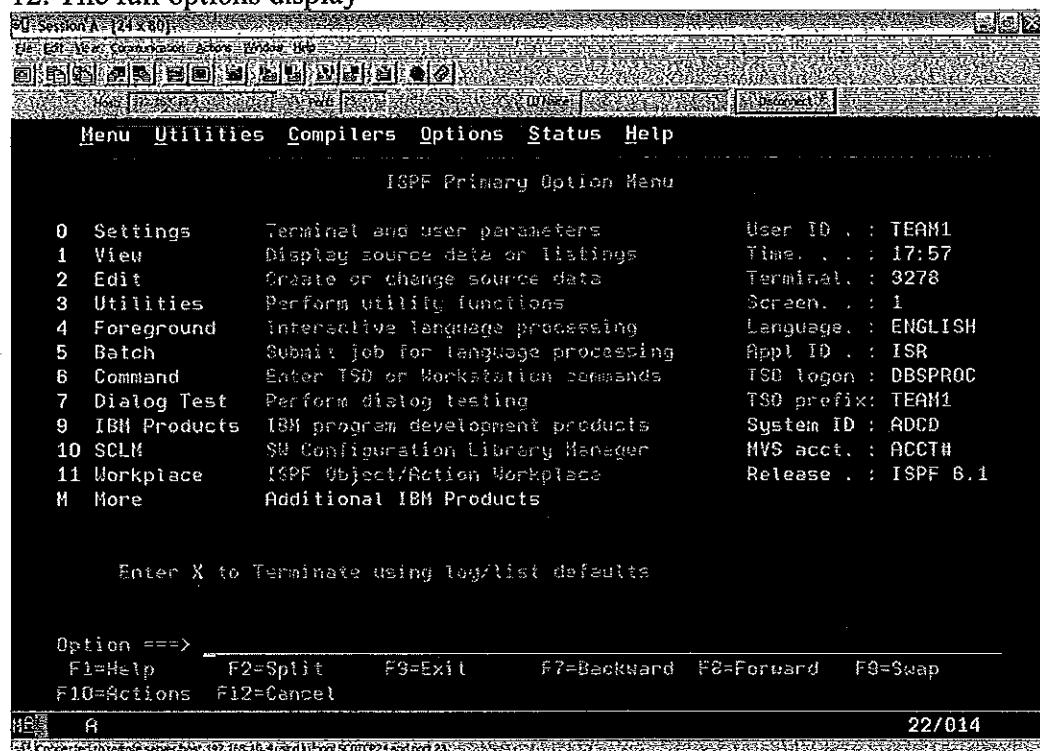
10. After entering correct password, the following TSO welcome page displays and wait for user to press Enter key



11. Following TSO Main Panel displays and press Enter key to display the full options.



12. The full options display



13. Key-in 'm' at the bottom command line to select Additional IBM products and press Enter key

```

Session A (24x80)
File Edit View Communication Actions Help
ISPF Primary Option Menu
Menu Utilities Compilers Options Status Help

0 Settings Terminal and user parameters User ID . : TEAM1
1 View Display source data or listings Time . . . : 18:02
2 Edit Create or change source data Terminal. : 3278
3 Utilities Perform utility functions Screen. . . : 1
4 Foreground Interactive language processing Language. : ENGLISH
5 Batch Submit job for language processing Appl ID . : ISR
6 Command Enter TSO or Workstation commands TSO logon : DBSPROC
7 Dialog Test Perform dialog testing TSO prefix: TEAM1
9 IBM Products IBM program development products System ID : ADCD
10 SCLM SW Configuration Library Manager MVS acct. : ACCT#1
11 Workplace ISPF Object/Action Workplace Release : ISPF 6.1
M More Additional IBM Products

Enter X to Terminate using log/list defaults

Option ==> m
F1=Help F2=Split F3=Exit F7=Backward F8=Forward F9=Swap
F10=Actions F12=Cancel
22/015

```

14. Key-in '16' at the bottom command line to select DB2ADM (DB2 Administrator Tool) and press Enter key

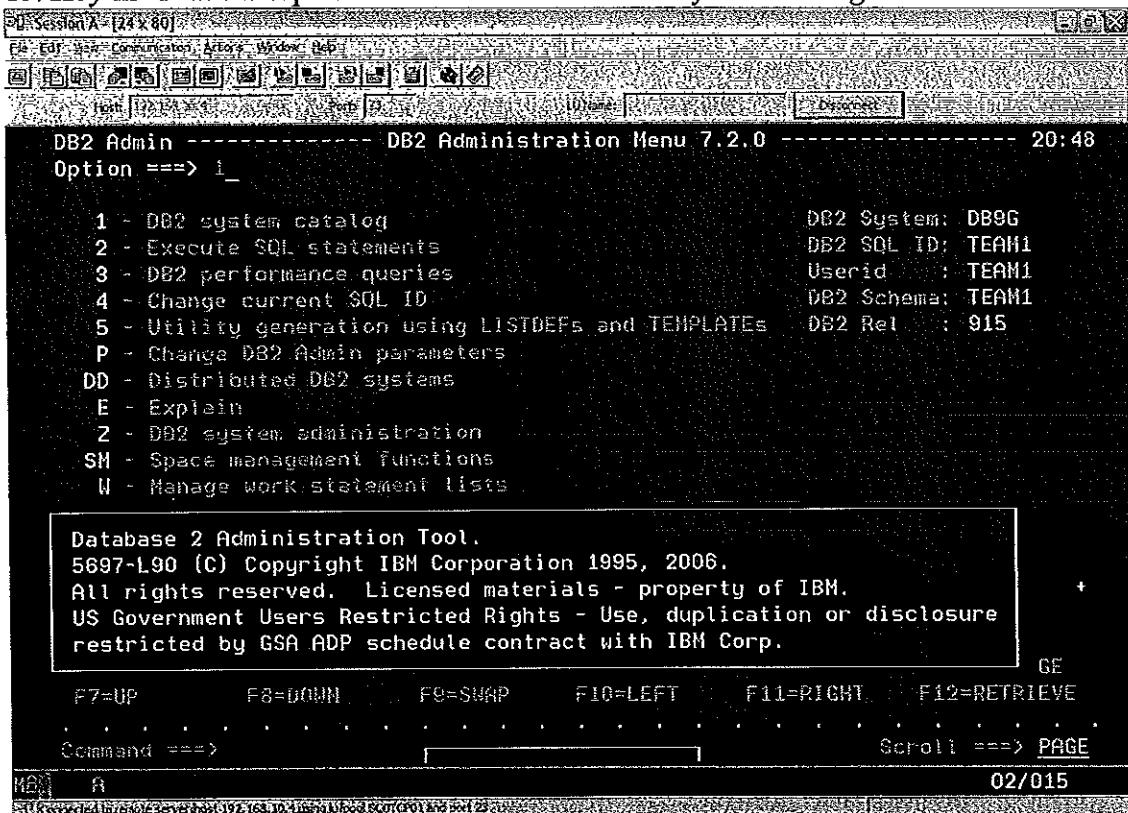
```

Session A (24x80)
File Edit View Communication Actions Help
IBM Products Panel
More: +
Menu Help

1 SMP/E System Modification Program/Extended
2 ISMF Integrated Storage Management Facility
3 RACF Resource Access Control Facility
4 HCD Hardware Configuration Dialogs
5 SDSF Spool Search and Display Facility
6 IPCS Interactive Problem Control System
7 DITTO DITTO/ESA for MVS Version 1
8 RMF Resource Measurement Facility
10 OMVS MVS OpenEdition
11 MQ MQ Series Operations and Control
12 WLM Workload Manager
13 FMN File Manager Operations and Control
14 RRS Resource Recovery Services
15 DB2 V9 DB2 9.1.0 Must use volume S9D891 & TSOPROC DBSPROC9
16 DB2ADM Data Base Admin Tool 7.2.0
17 QMF V9 QMF 9.1.0 Must use volume S9D892 & TSOPROC DBSPROC9
Option ==> 16
F1=Help F2=Split F3=Exit F7=Backward F8=Forward F9=Swap
F10=Actions F12=Cancel
22/016

```

15. Key-in '1' at the top command line to select DB2 system catalog



16. Key-in 't' at the top command line and press Enter key to show all tables in the DB2.



17. Following screen shows tables in DB2.

DB2 Admin ----- DB2G Tables, Views, and Aliases - Row 1 to 10 of 662

Commands: GRANT MIG ALL  
Line commands:  
C - Columns A - Auth L - List X - Indexes S - Table space D - Database  
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping  
? - Show all line commands

Set	Name	Schema	T DB Name	TG Name	Cols	Rows	Checks
	SYSOBDS	SYSIBM	T DSNDB06	SYSALTER	10	-1	0
	SYSCTXTAUTHIDS	SYSIBM	T DSNDB06	SYSCTX	7	-1	0
	SYSCTXTRUSTATTRS	SYSIBM	T DSNDB06	SYSCTX	5	-1	0
	SYSCONTEXT	SYSIBM	T DSNDB06	SYSCTX	16	-1	0
	SYSCOPY	SYSIBM	T DSNDB06	SYSCOPY	33	-1	0
	SYSFIELDS	SYSIBM	T DSNDB06	SYSDBASE	13	-1	0
	SYSTABLESPACE	SYSIBM	T DSNDB06	SYSDBASE	46	-1	2
	SYSTABLES	SYSIBM	T DSNDB06	SYSDBASE	55	-1	7
	SYSTABLEPART	SYSIBM	T DSNDB06	SYSDBASE	44	-1	3
	SYTABAUTH	SYSIBM	T DSNDB06	SYSDBASE	30	-1	0

Command ==> Scroll ==> PAGE  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=REFIND F6=RECHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE

22/015

18. To show the table **B** in your TEAM database, move the cursor under Name, left click and type 'B' over the \* character

DB2 Admin ----- DB2G Tables, Views, and Aliases - Row 1 to 10 of 661

Commands: GRANT MIG ALL  
Line commands:  
C - Columns A - Auth L - List X - Indexes S - Table space D - Database  
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping  
? - Show all line commands

Set	Name	Schema	T DB Name	TG Name	Cols	Rows	Checks
	SYSOBDS	SYSIBM	T DSNDB06	SYSALTER	10	-1	0
	SYSCTXTAUTHIDS	SYSIBM	T DSNDB06	SYSCTX	7	-1	0
	SYSCTXTRUSTATTRS	SYSIBM	T DSNDB06	SYSCTX	5	-1	0
	SYSCONTEXT	SYSIBM	T DSNDB06	SYSCTX	16	-1	0
	SYSCOPY	SYSIBM	T DSNDB06	SYSCOPY	33	-1	0
	SYSFIELDS	SYSIBM	T DSNDB06	SYSDBASE	13	-1	0
	SYSTABLESPACE	SYSIBM	T DSNDB06	SYSDBASE	46	-1	2
	SYSTABLES	SYSIBM	T DSNDB06	SYSDBASE	55	-1	7
	SYSTABLEPART	SYSIBM	T DSNDB06	SYSDBASE	44	-1	3
	SYTABAUTH	SYSIBM	T DSNDB06	SYSDBASE	30	-1	0

Command ==> Scroll ==> PAGE  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=REFIND F6=RECHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE

10/038

19. Press Tab key 3 times, the cursor under DB Name, type 'TEAMxDB' where TEAMx is your team ID and press Enter key

DB2 Admin ----- DB9G Tables, Views, and Aliases - Row 1 to 10 of 661

Commands: GRANT MIG ALL  
Line commands:  
C - Columns A - Auth L - List X - Indexes S - Table space D - Database  
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping  
? - Show all line commands

Seq	Name	Schema	T DB Name	TS Name	Cols	Rows	Checks
B	TEAM1DB						
	SYS0BDS	SYSIBM	T DSNDDB06	SYSALTER	10	-1	0
	SYSCONTEXTUTHIDS	SYSIBM	T DSNDDB06	SYSCONTX	7	-1	0
	SYSCTXTRUSTATTRS	SYSIBM	T DSNDDB06	SYSCONTX	5	-1	0
	SYSCONTEXT	SYSIBM	T DSNDDB06	SYSCONTX	16	-1	0
	SYSCOPY	SYSIBM	T DSNDDB06	SYSCOPY	33	-1	0
	SYSFIELDS	SYSIBM	T DSNDDB06	SYSDBASE	13	-1	0
	SYSTABLESPACE	SYSIBM	T DSNDDB06	SYSDBASE	46	-1	2
	SYSTABLES	SYSIBM	T DSNDDB06	SYSDBASE	55	-1	7
	SYSTABLEPART	SYSIBM	T DSNDDB06	SYSDBASE	44	-1	3
	SYTABAUTH	SYSIBM	T DSNDDB06	SYSDBASE	30	-1	0

Command ==> Scroll ==> PAGE  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SUAP F10=LEFT F11=RIGHT F12=RETRIEVE

HEX A 10/045

20. System auto-converts to upper case and you get the below table display

DB2 Admin ----- DB9G Tables, Views, and Aliases --- Row 623 from 661

Commands: GRANT MIG ALL  
Line commands:  
C - Columns A - Auth L - List X - Indexes S - Table space D - Database  
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping  
? - Show all line commands

Seq	Name	Schema	T DB Name	TS Name	Cols	Rows	Checks
B	TEAM1DB						
	TEAM1	TEAM1	T TEAM1DB	TEAM1TS	2	-1	0

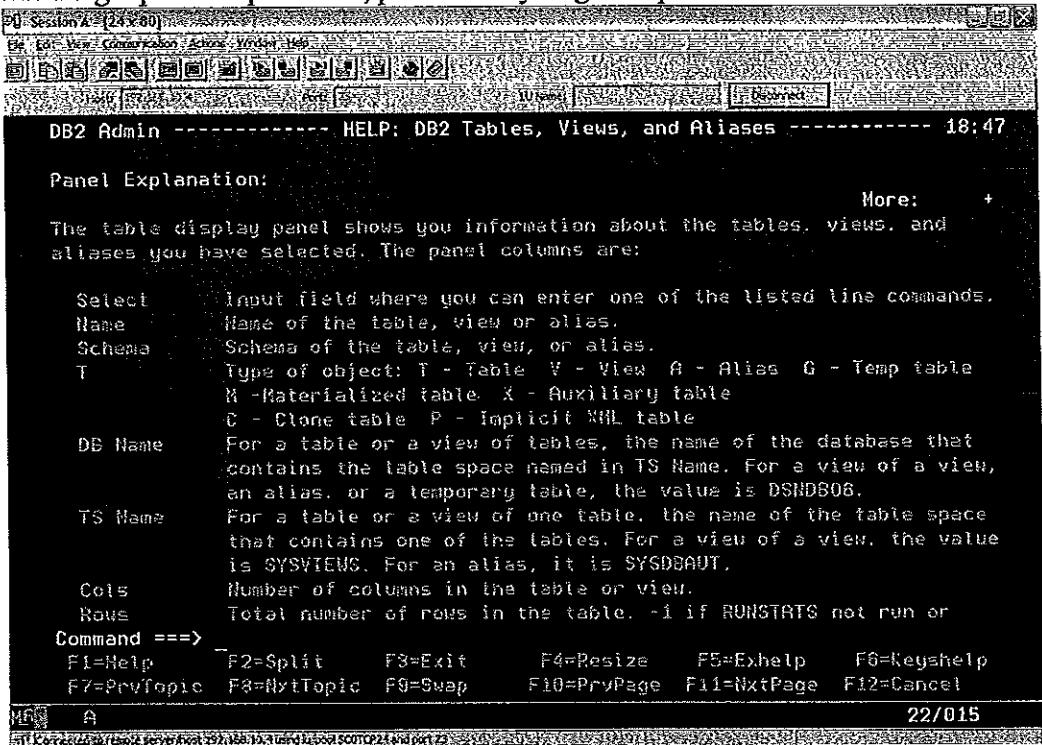
END OF DB2 DATA

Command ==> Scroll ==> PAGE  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SUAP F10=LEFT F11=RIGHT F12=RETRIEVE

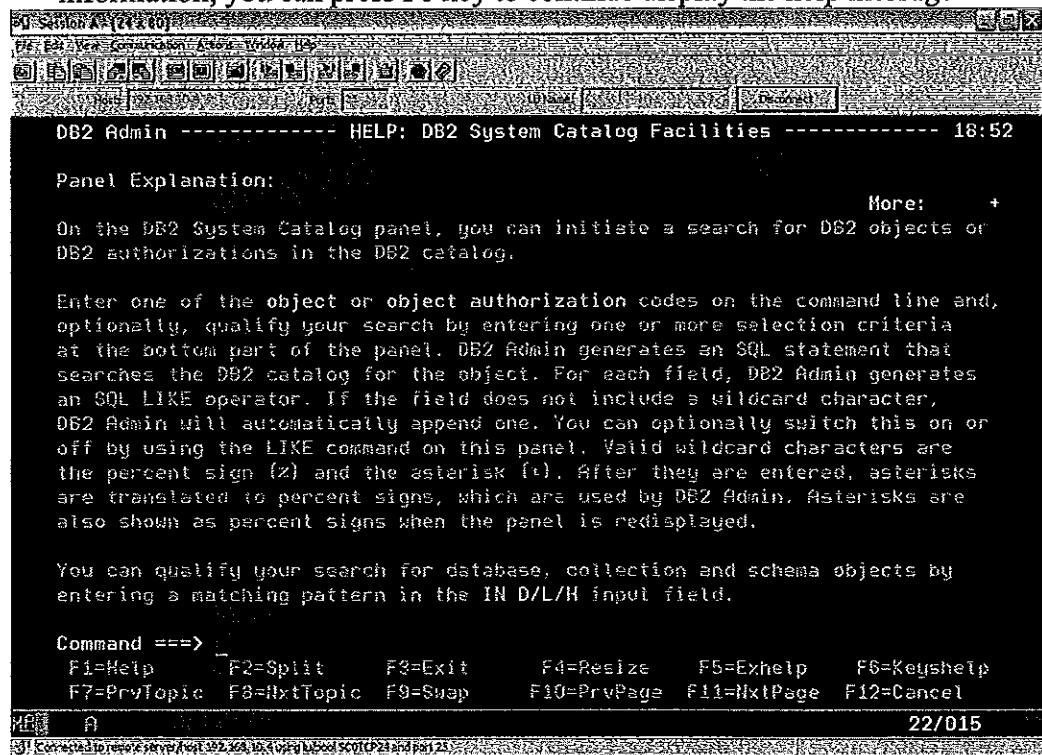
HEX A 22/015

All Conversions to remote server/001 10.4.169.104 were successful and port 2525 was used.

21. To get panel explanation, press F1 key to get help



22. When 'More +' appears at upper right hand corner to indicate that it has more information, you can press F8 key to continue display the help message



23. Press F3 key to return the calling panel and this table has 2 columns and 'ROWS -1" indicates that there is no RUNSTATS performed

```

DB2 Admin ----- DB2G Tables, Views, and Aliases --- Row 623 from 661

Commands: GRANT MIG ALL
Line commands:
C - Columns A - Auth L - List X - Indexes S - Table space D - Database
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping
? - Show all line commands

Sel Name Schema T DB Name TS Name Cols Rows Checks
Bx          TEAM1  T TEAM1DB TEAM1TS   2      -1      0

```

DB2 Admin ----- DB2G Tables, Views, and Aliases --- Row 623 from 661

Command ==> Scroll ==> PAGE

F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

22/015

24. Move the cursor under Sel and the table B, key-in 'c' to show table column and press Enter key

```

DB2 Admin ----- DB2G Tables, Views, and Aliases --- Row 623 from 661

Commands: GRANT MIG ALL
Line commands:
C - Columns A - Auth L - List X - Indexes S - Table space D - Database
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping
? - Show all line commands

Sel Name Schema T DB Name TS Name Cols Rows Checks
Bx          TEAM1  T TEAM1DB TEAM1TS   2      -1      0

```

DB2 Admin ----- DB2G Tables, Views, and Aliases --- Row 623 from 661

Command ==> Scroll ==> PAGE

F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

22/003

Corrected in reccore review/lost 192.168.10.4 user1 used SC01CP50 and port 23

25. It shows columns information:

DB2 Admin -- DB9G.Columns in Table TEAM1.B ----- Row 1 to 2 of 2

Line commands:  
 T - Tables X - Indexes A - Auth GR - Grant H - Homonyms I - Interpret  
 UR - Update runstats LAB - Label COM - Comment DI - Distribution stats  
 ? - Show all line commands

Select Column Name	Col No	Col Type	Length	Scale	Null	Def	FP	Col Card
NAME	1	VARCHAR	48		N	N	N	-1
VALUE	2	INTEGER	4		Y	Y	N	-1

\*\*\*\*\* END OF DB2 DATA \*\*\*\*\*

Command ==> Scroll ==> PAGE  
 F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
 F7=UP F8=DOWN F9=SHAP F10=LEFT F11=RIGHT F12=RETRIEVE

22/015

26. Press F3 key to return the previous panel, \* indicates that the column display action is done

DB2 Admin ----- DB9G Tables, Views, and Aliases --- Row 623 from 661

Commands: GRANT MIG ALL

Line commands:  
 C - Columns A - Auth L - List X - Indexes S - Table space D - Database  
 V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping  
 ? - Show all line commands

Sel	Name	Schema	T	DB Name	TS Name	Colc	Rous	Checks
*	B	TEAM1	T	TEAM1DB	TEAM1TS	2	-1	0

\*\*\*\*\* END OF DB2 DATA \*\*\*\*\*

Command ==> Scroll ==> PAGE  
 F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
 F7=UP F8=DOWN F9=SHAP F10=LEFT F11=RIGHT F12=RETRIEVE

22/015

27. To get help of using line command(s), move the cursor under Sel and the table, key-in “?” and press Enter key

DB2 Admin ----- DB9G Tables, Views, and Aliases --- Row 623 from 661

Commands: GRANT MIG ALL

Line commands:

C - Columns A - Auth L - List X - Indexes S - Table space ID - Database  
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping  
? - Show all line commands

Set	Name	Schema	T	DB Name	TS Name	Cols	Rows	Checks
?	B	TEAM1	T	TEAM1DB	TEAM1TS	2	-1	0

Command ==> ?

Scroll ==> PAGE

F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

12/003

28. It shows the line commands and descriptions. The right upper corner shows there are 84 line commands.

DB2 Admin ----- Line Commands ----- Row 1 to 11 of 84

Line commands:

S - Execute this line command on previous panel.

Select	Line Command	Description
	/	Show all columns for this row
	A	Authorizations on table
	AL	Alter table or materialized table
	ALC	Alter table columns with DB2 Admin ALTER
	ALIAS	Show alias
	ALK	Alter table add materialized table query (DB2 V8 and higher)
	AUX	Display associated auxiliary table (DB2 V6 and higher)
	AUXR	Display associated AUX data column (DB2 V6 and higher)
	BASE	Display associated base table (DB2 V6 and higher)
	BR	BROWSE
	C	Show columns

Command ==> ?

Scroll ==> PAGE

F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

22/015

29. Press F8 key to continue display the line commands:

```
DB2 Session A [24x80]
DB2 Admin ----- Line Commands ----- Row 12 to 22 of 84

Line commands:
S - Execute this line command on previous panel.

Line
Select Command Description
*   CDI      Show column distribution statistics
    CH       Referential integrity, show child tables
    CHK      Show table check constraints
    CHR      Referential integrity, show child relations
    CLONE    Display clone table                               (DB2 V9 and higher)
    COM      Create a comment/remark
    CON      Show constraints on table                      (DB2 V7 and higher)
    COUNT    Count(*) function
    CRE      Create a similar object
    CREA     Create an auxiliary table
    CREAL    Create alias on table

Command ===>          Scroll ===> PAGE
F1=HELP   F2=SPLIT   F3=END     F4=RETURN   F5=RFIND    F6=RCHANGE
F7=UP     F8=DOWN    F9=SWAP    F10=LEFT    F11=RIGHT   F12=RETRIEVE
MEN A                                              22/015
```

30. Move the cursor under Select and beside Count(\*) function, left click, key-in 's' and press Enter key to execute this function against this table:

```
DB2 Session A [24x80]
DB2 Admin ----- Line Commands ----- Row 12 to 22 of 84

Line commands:
S - Execute this line command on previous panel.

Line
Select Command Description
s_ CDI      Show column distribution statistics
    CH       Referential integrity, show child tables
    CHK      Show table check constraints
    CHR      Referential integrity, show child relations
    CLONE    Display clone table                               (DB2 V9 and higher)
    COM      Create a comment/remark
    CON      Show constraints on table                      (DB2 V7 and higher)
    COUNT    Count(*) function
    CRE      Create a similar object
    CREA     Create an auxiliary table
    CREAL    Create alias on table

Command ===>          Scroll ===> PAGE
F1=HELP   F2=SPLIT   F3=END     F4=RETURN   F5=RFIND    F6=RCHANGE
F7=UP     F8=DOWN    F9=SWAP    F10=LEFT    F11=RIGHT   F12=RETRIEVE
MEN A                                              18/003
```

31. There is 1 row in this table:

DB2 Admin -- Browse Result of SQL Select ----- Row 1 to 1 of 1

L OWNER NAME	RDUS
TEAM1 B	1

----- END OF DB2 DATA -----

Command ==> Scroll ==> PAGE  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE

HDR A 22/015

32. Press F3 key to return previous panel

DB2 Admin ----- DB9G Tables, Views, and Aliases --- Row 623 from 661

Commands: GRANT MIG ALL  
Line commands:  
C - Columns A - Auth L - List X - Indexes S - Table space D - Database  
V - Views T - Tables P - Plans Y - Synonyms SEL - Select prototyping  
? - Show all line commands

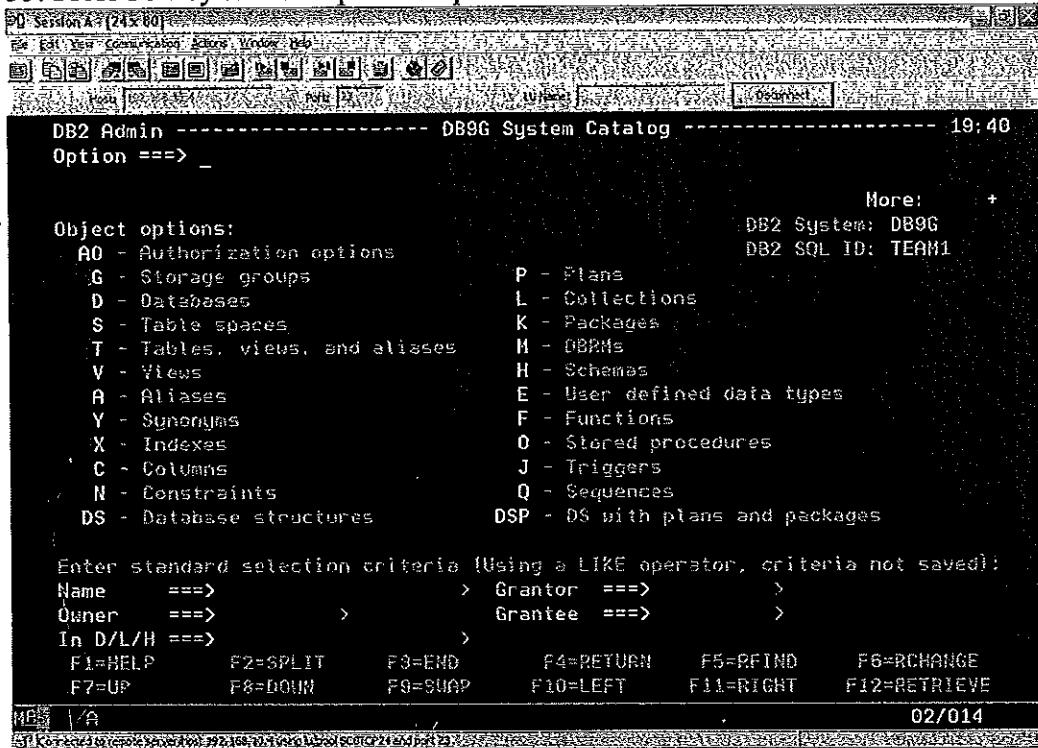
Set	Name	Schemas	T DB Name	TG Name	Cols	Rows	Checks
COUNT B	TEAM1	TEAM1DB	TEAM1TS		2	-1	0

----- END OF DB2 DATA -----

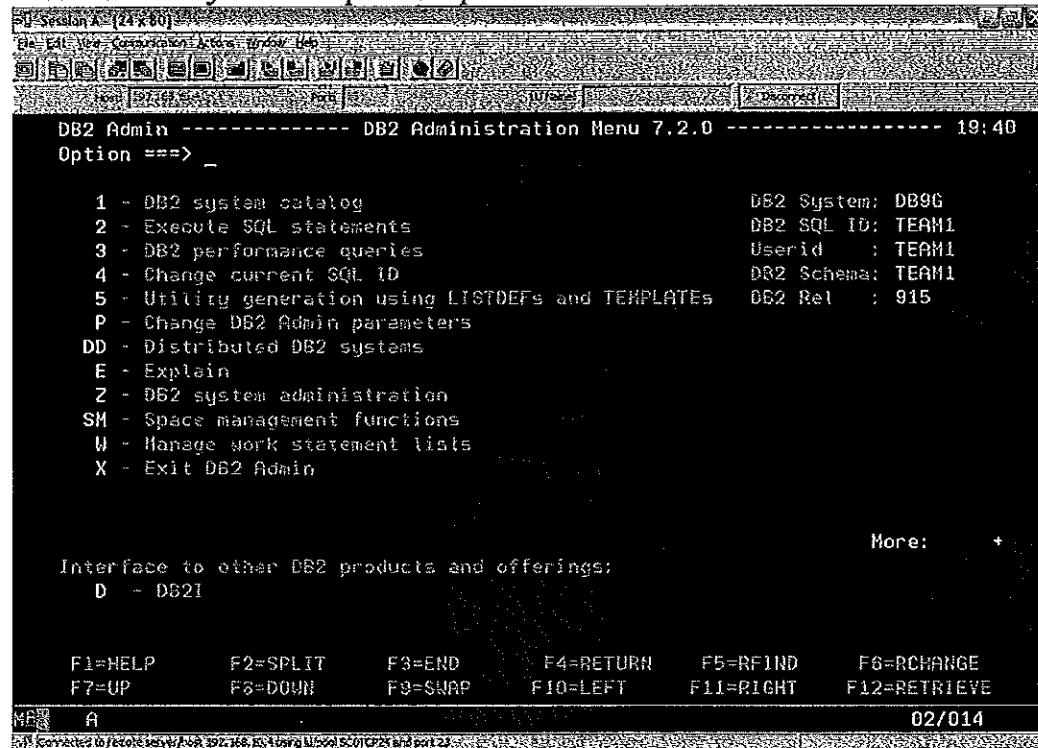
Command ==> Scroll ==> PAGE  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE

HDR A 22/015

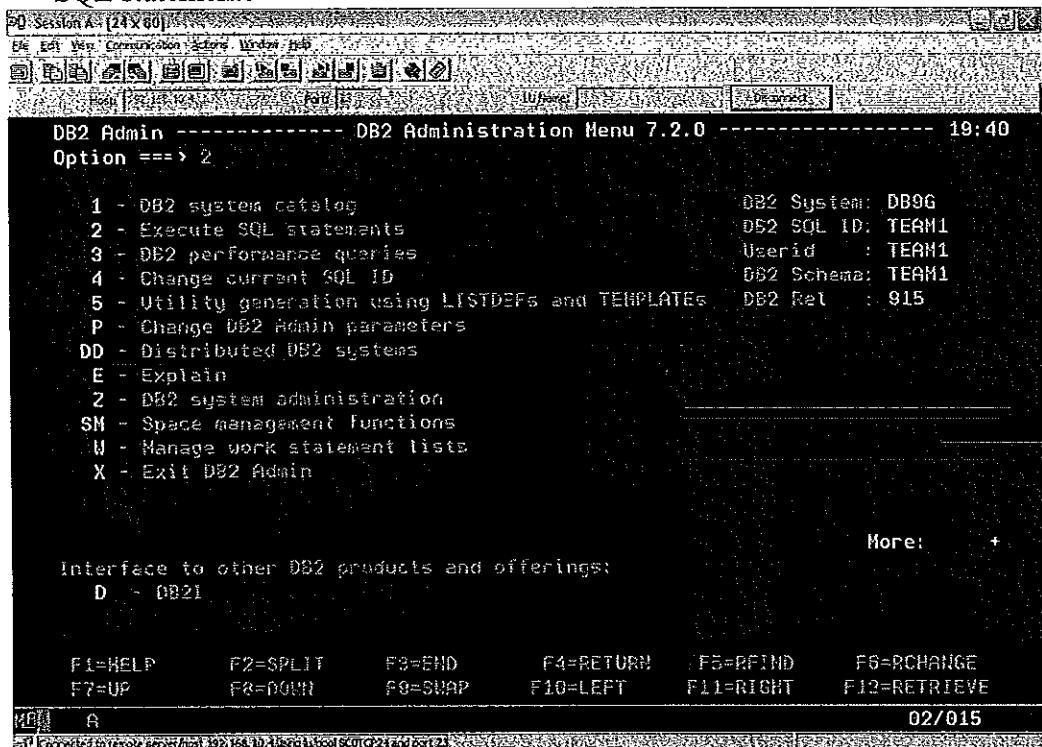
33. Press F3 key to return previous panel



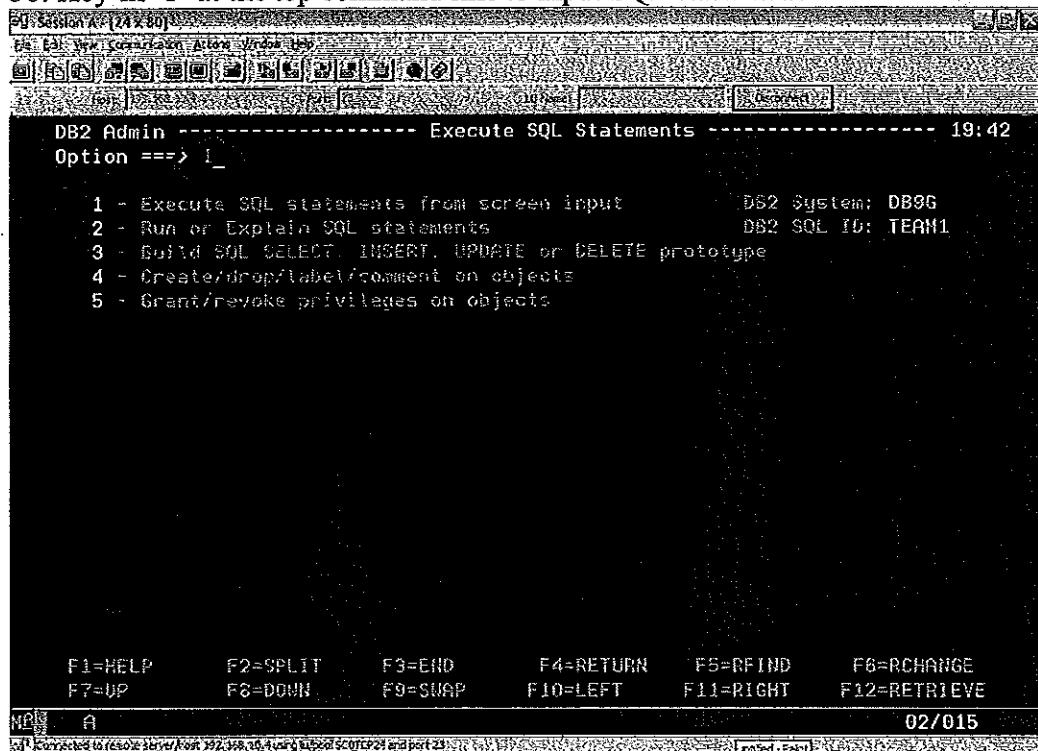
34. Press F3 key to return previous panel



35. Key-in '2' at top command line and press Enter key to provide a panel to execute SQL statements



36. Key-in '1' at the top command line to input SQL statements



37. In the right hand side, ensure that DB2 SQL ID is your team ID

DB2 Admin ----- Execute SQL Statements from Screen Input ----- 19:44  
Command ==>  
SQL statement:  
-  
DB2 System: DB9G  
DB2 SQL ID: TEAM1  
>  
Press ENTER to execute the SQL statement, or enter EDIT on the command line to  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE  
MEN A 06/002

38. Under SQL statement, key-in **DROP TABLE B**; and press Enter key to delete table from your database:

DB2 Admin ----- Execute SQL Statements from Screen Input ----- 12:02  
Command ==>  
SQL statement:  
DROP TABLE B:  
DB2 System: DB9G  
DB2 SQL ID: TEAM1  
>  
Press ENTER to execute the SQL statement, or enter EDIT on the command line to  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE  
MEN A 06/015

39. DB2 displays “DROP stmt executed” to indicate the table to be deleted.

The screenshot shows a terminal window titled "DB2 Admin ----- Execute SQL Statements from Screen Input ----- 12:03". The menu bar includes "File", "Edit", "View", "Communication", "Actions", "Window", and "Help". A toolbar with various icons is at the top. The main area displays the following text:

```
DB2 Admin ----- Execute SQL Statements from Screen Input ----- 12:03
Command ==>
DB2 System: DB9G
DB2 SQL ID: TEAM1
SQL statement:
DROP TABLE B;

Press ENTER to execute the SQL statement, or enter EDIT on the command line to
F1=HELP      F2=SPLIT      F3=END      F4=RETURN      F5=REFIND      F6=RCHANGE
F7=UP        F8=DOWN       F9=SWAP      F10=LEFT       F11=RIGHT      F12=RETRIEVE
MAP          R           08/002
```

The bottom status bar shows "MAP" and "R" on the left, and "08/002" on the right.

40. To verify table to be deleted, key-in the following statement with replacing TEAMx to your team ID and press Enter key

```
SELECT * FROM SYSIBM.SYSTABLES WHERE CREATOR =
  'TEAMx' and NAME = 'B';
```

41. No rows returned indicates that the table does not exist in the system catalog

DB2 Admin ----- Execute SQL Statements from Screen Input ----- 12:05  
Command ==>  
SQL statement:  
SELECT \* FROM SYSIBM.SYSTABLES WHERE CREATOR = 'TEAM1' AND NAME = 'B';  
Press ENTER to execute the SQL statement, or enter EDIT on the command line to  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE  
06/002

42. Press F3 key to return previous panel:

DB2 Admin ----- Execute SQL Statements ----- 20:49  
Option ==>  
1 - Execute SQL statements from screen input DB2 System: DB9G  
2 - Run or Explain SQL statements DB2 SQL ID: TEAM1  
3 - Build SQL SELECT, INSERT, UPDATE or DELETE prototype  
4 - Create/drop/label/comment on objects  
5 - Grant/revoke privileges on objects  
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE  
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE  
06/002

43. Key-in '2' at the top command line and press Enter key to RUN saved SQL statements

Session A [24x80] File Edit View Conversation Actions Window Help

DB2 Admin ----- Execute SQL Statements ----- 20:52

Option ==> 2

1 - Execute SQL statements from screen input DB2 System: DB9G  
2 - Run or Explain SQL statements DB2 SQL ID: TEAM1  
3 - Build SQL SELECT, INSERT, UPDATE or DELETE prototype  
4 - Create/drop/label/comment on objects  
5 - Grant/revoke privileges on objects

F1=HELP F2=SPLIT F3=END F4=RETURN F5=REFIND F6=RECHANGE  
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

MENU A 02/015

44. Key-in '1' at the top command line, specify 'TEAMx.LIB' where TEAMx is your team ID and press Enter key

DB2 Admin - Run or Explain SQL Statements 12:05  
Option ==> I

1 - Run SQL statements from a data set DB2 System: DB9G  
EDIT first ==> YES (Yes/No) DB2 SQL ID: TEAM1

2 - Run or Explain SQL located in a program  
Program type ==> (1=COBOL, 2=PL/I)

ISPF library:  
Project ==>  
Group ==> ==> ==> ==>  
Type ==>  
Member ==> (blank for member selection list)

Other partitioned or sequential data set:  
Data Set Name ==> 'TEAM1.LIS'  
Volume Serial ==> (if not catalogued)

Alternative pre-allocated DD name:  
DD name ==> (use ddname(member) for members)

F1=HELP	F2=SPLIT	F3=END	F4=RETURN	F5=RFINID	F6=RCHANGE
F7=UP	F8=DOWN	F9=SWAP	F10=LEFT	F11=RIGHT	F12=RETRIEVE

14/042

45. Ensure TEAMxDB.TEAMxTS and TEAMxIX are your team ID. If not, replace TEAMx with your team ID and then press F3 key to save or exit

```

Session A (24x80)
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      TEAM1.LIB                                         Columns 00001 00072
          Top of Data
-Warning- The UNDO command is not available until you change
          your edit profile using the command RECOVERY ON.
000001 CREATE TABLE B
000002   NAME VARCHAR(48) NOT NULL .
000003   VALUE INTEGER
000004   PRIMARY KEY(NAME)
000005   IN TEAM1DB.TERMLITS;
000006 CREATE UNIQUE INDEX TEAMIX ON B
000007   ( NAME ASC )
000008   BUFFERPOOL BPO;
000009   INSERT INTO B (NAME, VALUE) VALUES
000010   ('MP', 20);
          Bottom of Data
Command ==>                                     Scroll ==> CSR
F1=Help   F2=Split   F3=Exit   F5=Rfind   F6=Rchange   F7=Up
F8=Down  F9=Swap    F10=Left  F11=Right  F12=Cancel
22/015

```

46. Following screen displays

```

Session A (24x80)
File Edit Edit_Settings Menu Utilities Compilers Test Help
DB2 Admin ----- Run or Explain SQL Statements ----- 12:11
Option ==> _

1 - Run SQL statements from a data set                               DB2 System: DB9G
  EDIT first ==> NO  (Yes/No)                                         DB2 SQL ID: TEAM1
2 - Run or Explain SQL located in a program
  Program type ==>  (1=SQL, 2=PL/I)

ISPF library:
Project ==>
Group    ==>           ==>           ==>
Type     ==>
Member   ==>           (blank for member selection list)

Other partitioned or sequential data set:
Data Set Name ==> 'TEAM1.LIB'
Volume Serial ==>           (if not catalogued)

Alternative pre-allocated DD name:
DD name      The input was not saved. Press ENTER to execute it
F1=HELP      F6=RCHANGE
F7=UP        F8=DOWN     F9=SWAP   F10=LEFT   F11=RIGHT  F12=RETRIEVE
22/014

```

47. Press Enter key to execute, it creates table B, index and insert one record into table B.  
It takes a while to execute until INSERT stmt executed

```
DB2 Session A (24x80)
DB2 Admin ----- Run or Explain SQL Statements ----- 12:13
Option ==> _
  1 - Run SQL statements From a data set           DB2 System: DB9G
      EDIT first ==> NO  (Yes/No)                   DB2 SQL ID: TEAM1
  2 - Run or Explain SQL located in a program
      Program type ==>  (1=COBOL, 2=PL/I)

ISPF library:
Project ==>
Group ==>          ==>          ==>          ==>
Type ==>
Member ==>          (blank for member selection list)

Other partitioned or sequential data set:
Data Set Name ==> 'TEAM1.LIB'
Volume Serial ==>          (if not cataloged)

Alternative pre-allocated DD name:
DD name ==>          (use ddname(member) for members)

F1=HELP   F2=SPLIT   F3=END   F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SNAP   F10=LEFT    F11=RIGHT  F12=RETRIEVE
M   A                                              02/014
```

48. Press F3 key to return to previous panel

```
DB2 Session A (24x80)
DB2 Admin ----- Execute SQL Statements ----- 21:09
Option ==> _
  1 - Execute SQL statements from screen input       DB2 System: DB9G
  2 - Run or Explain SQL statements                 DB2 SQL ID: TEAM1
  3 - Build SQL SELECT, INSERT, UPDATE or DELETE prototype
  4 - Create/Drop/Label/Comment on objects
  5 - Grant/Revoke privileges on objects

F1=HELP   F2=SPLIT   F3=END   F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SNAP   F10=LEFT    F11=RIGHT  F12=RETRIEVE
M   A                                              02/014
```

49. keyin '1' at top command line to execute SQL statement to verify the table B

```
DB2 Session A (24x80) 
File Edit View Communication Options Window Help
DB2 Admin ----- Execute SQL Statements ----- 21:09
Option ==> i_
1 - Execute SQL statements from screen input      DB2 System: DB9G
2 - Run or Explain SQL statements                 DB2 SQL ID: TEAM1
3 - Build SQL SELECT, INSERT, UPDATE or DELETE prototype
4 - Create/drop/label/comment on objects
5 - Grant/revoke privileges on objects

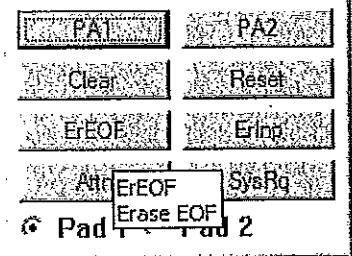
F1=HELP      F2=SPLIT      F3=END      F4=RETURN      F5=RFIND      F6=RCHANGE
F7=UP        F8=DOWN       F9=SWAP      F10=LEFT       F11=RIGHT     F12=RETRIEVE
02/015
```

50. To clear the full statement left over, move the cursor under the SELECT and right click

```
DB2 Session A (24x80) 
File Edit View Communication Options Window Help
DB2 Admin ----- Execute SQL Statements from Screen Input ----- 12:15
Command ==>
          DB2 System: DB9G
          DB2 SQL ID: TEAM1
SQL statement:
SELECT * FROM SYSTEM.SYSTABLES WHERE CREATOR = 'TEAM1' AND NAME = 'B';

Press ENTER to execute the SQL statement, or enter EDIT on the command line to
F1=HELP      F2=SPLIT      F3=END      F4=RETURN      F5=RFIND      F6=RCHANGE
F7=UP        F8=DOWN       F9=SWAP      F10=LEFT       F11=RIGHT     F12=RETRIEVE
06/002
```

51. KeyPad pops up and Click 'ErEOF' to erase to EOF



52. Use below SQL statement to view the table content

```
SELECT * FROM B;
```

53. Key-in select SQL statement and press Enter key

```
DB2 Admin ----- Execute SQL Statements from Screen Input ----- 12:15
Command ==>

SQL statement:
SELECT * FROM B;

DB2 System: DB96
DB2 SQL ID: TEAM1

Press ENTER to execute the SQL statement, or enter EDIT on the command line to
F1=HELP   F2=SPLIT   F3=END   F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SHAP   F10=LEFT    F11=RIGHT  F12=RETRIEVE
06/018
```

54. Show the content of table B:

DB2 Admin -- Browse Result of SQL Select ----- Row 1 to 1 of 1

L NAME	VALUE
MF	20

-----  
SYNOPSIS OF DATA END OF DB2 DATA -----

Command ==> F1=HELP F2=SPLIT F3=END F4=RETURN F5=REFIND F6=RECHANGE  
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

22/015

55. To exit TSO, repeat press F3 key until the following screen appears, then key-in '2' and press Enter key

Specify Disposition of Log Data Set More: \*

Log Data Set (TERMINAL.LOG1.LIST) Disposition:  
Process Option . . . 2 : 1. Print data set and delete  
                      2. Delete data set without printing  
                      3. Keep data set - Same  
                          (allocate same data set in next session)  
                      4. Keep data set - New  
                          (allocate new data set in next session)

Batch SYSOUT class . . .  
Local printer ID or  
username . . .  
Local SYSOUT class . . .

List Data Set Options not available

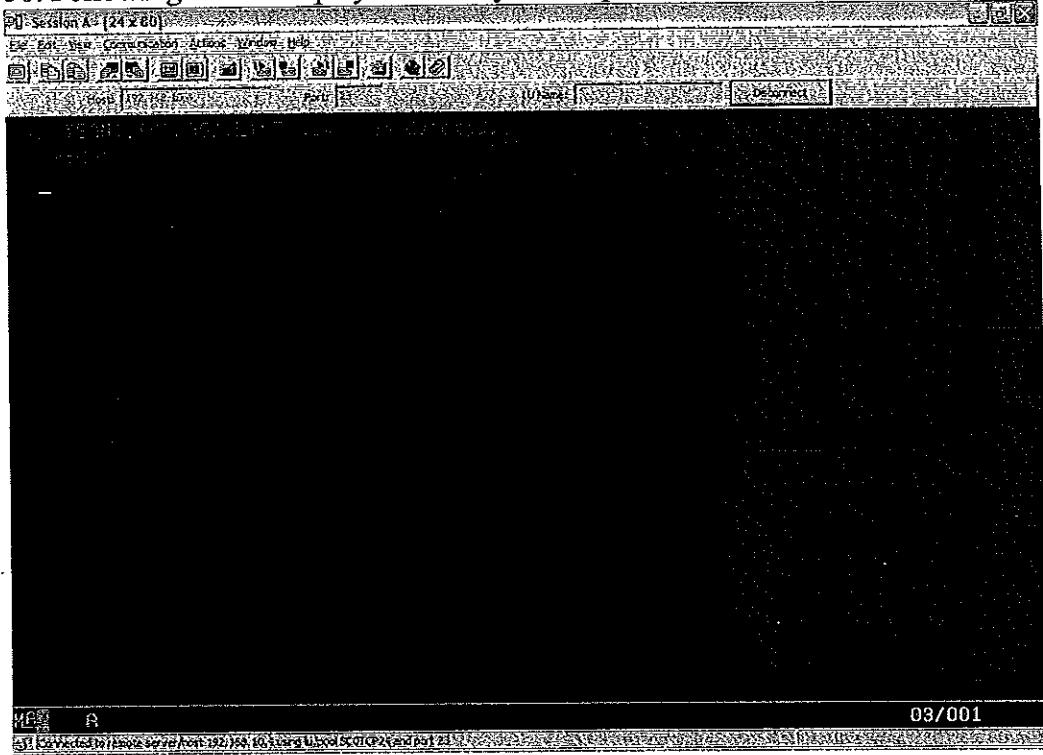
Press ENTER key to complete ISPF termination.  
Enter END command to return to the primary option menu.

Job statement information: (Required for system printer)  
==>

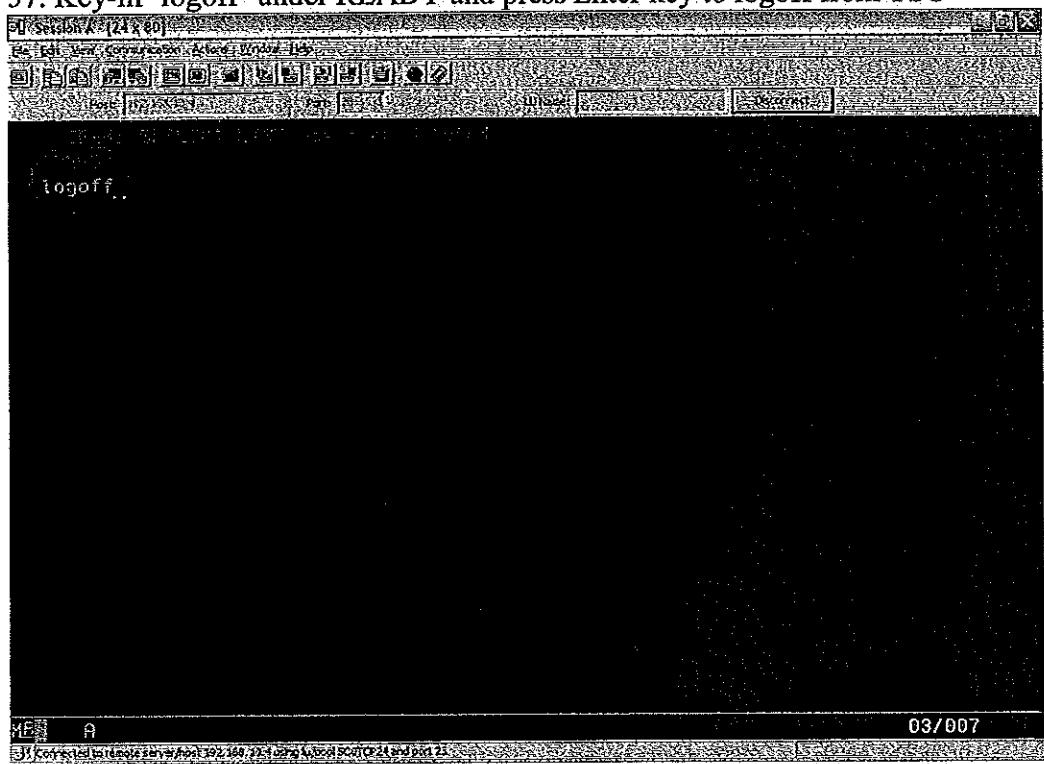
Command ==>  
F1=Help F2=Split F3=Exit F7=Backward F8=Forward F9=Swap  
F12=Cancel

10/025

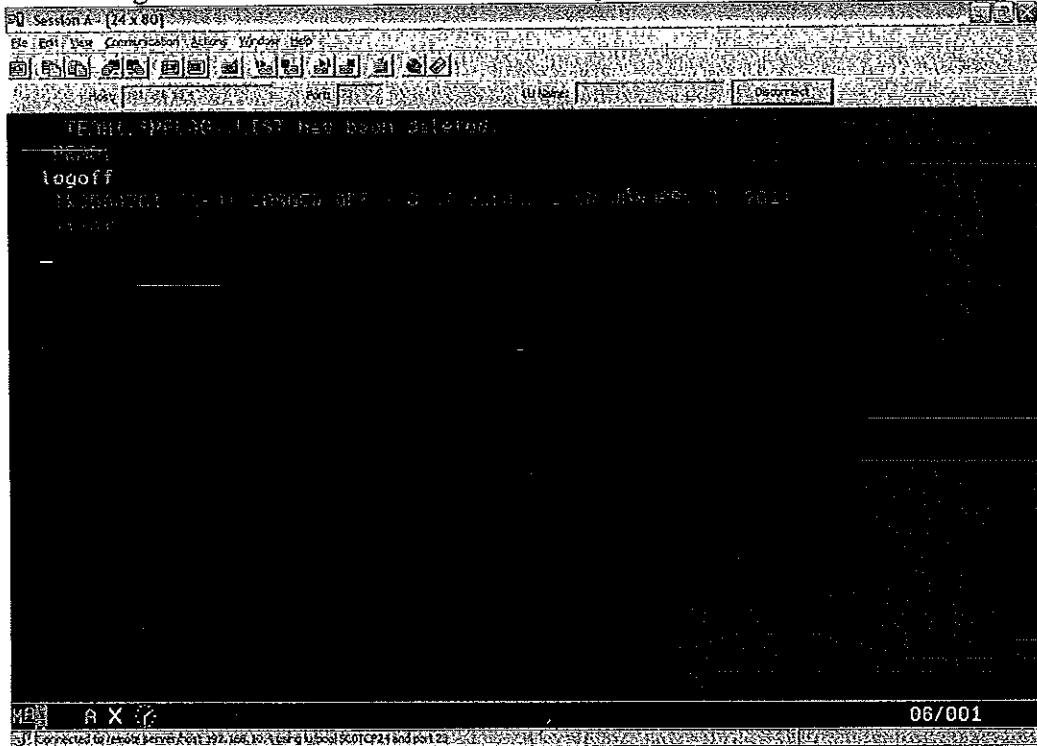
56. Following screen displays and ready to accept TSO command



57. Key-in 'logoff' under READY and press Enter key to logoff from TSO



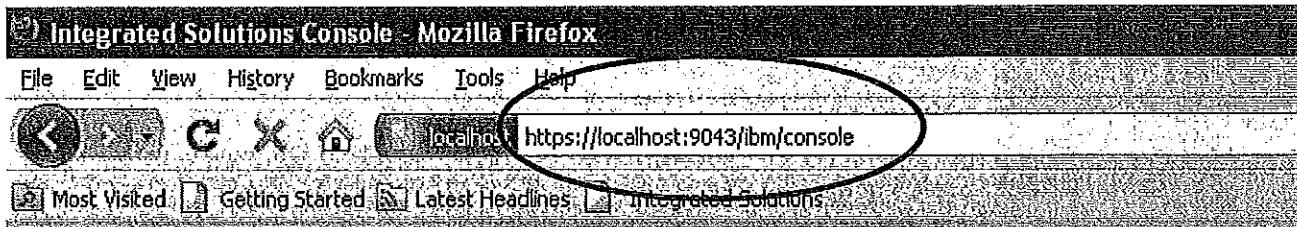
58. Message IKJ56470I indicates successful logoff



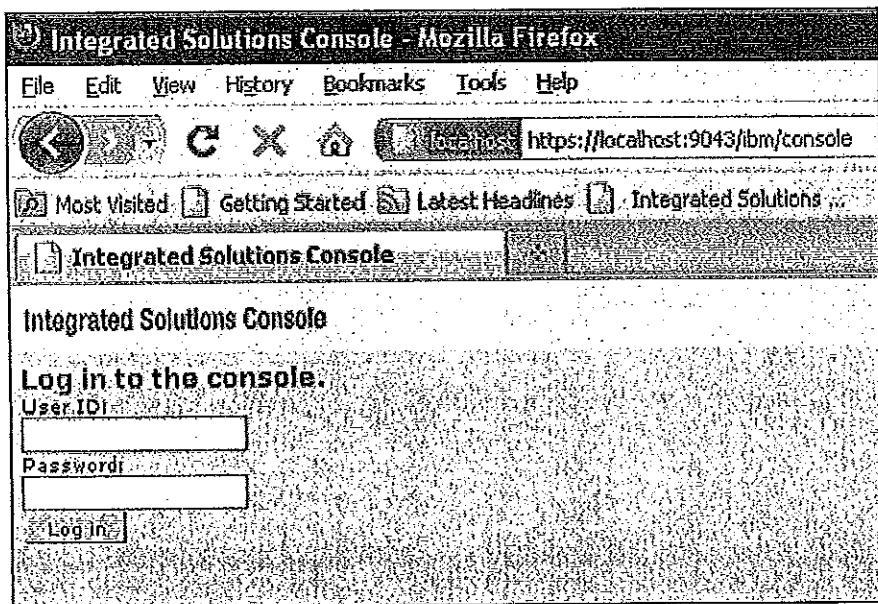
59. Click Mozilla Firefox to start web browser from Desktop



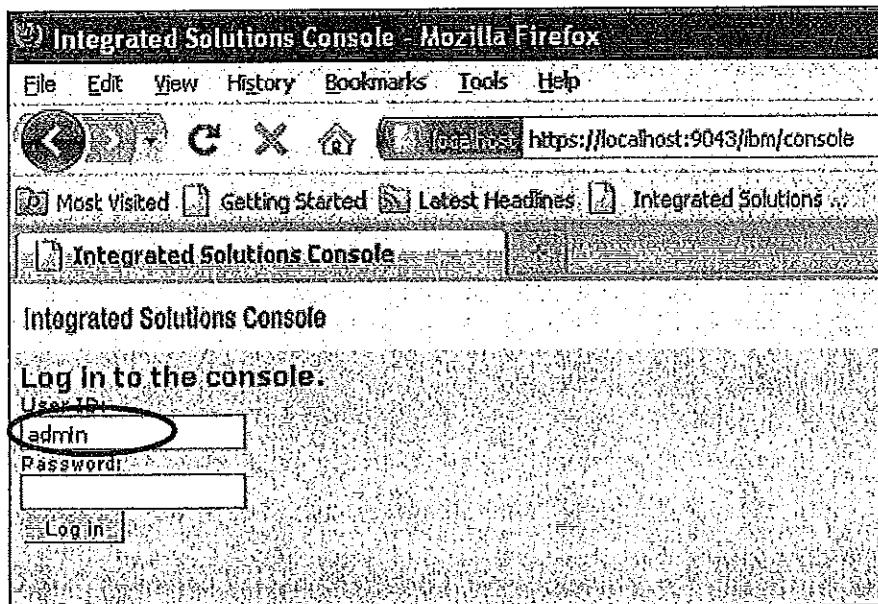
60. Enter <https://localhost:9043/ibm/console> and press Enter to WebSphere Administration Console to do configuration.



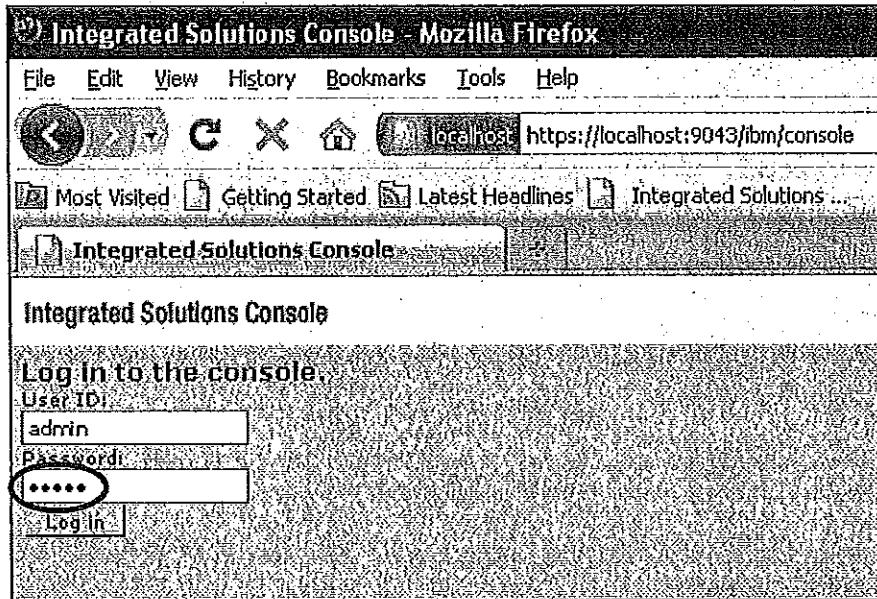
61. Following screen displays and ask for User ID: and Password to logon Administration Console:



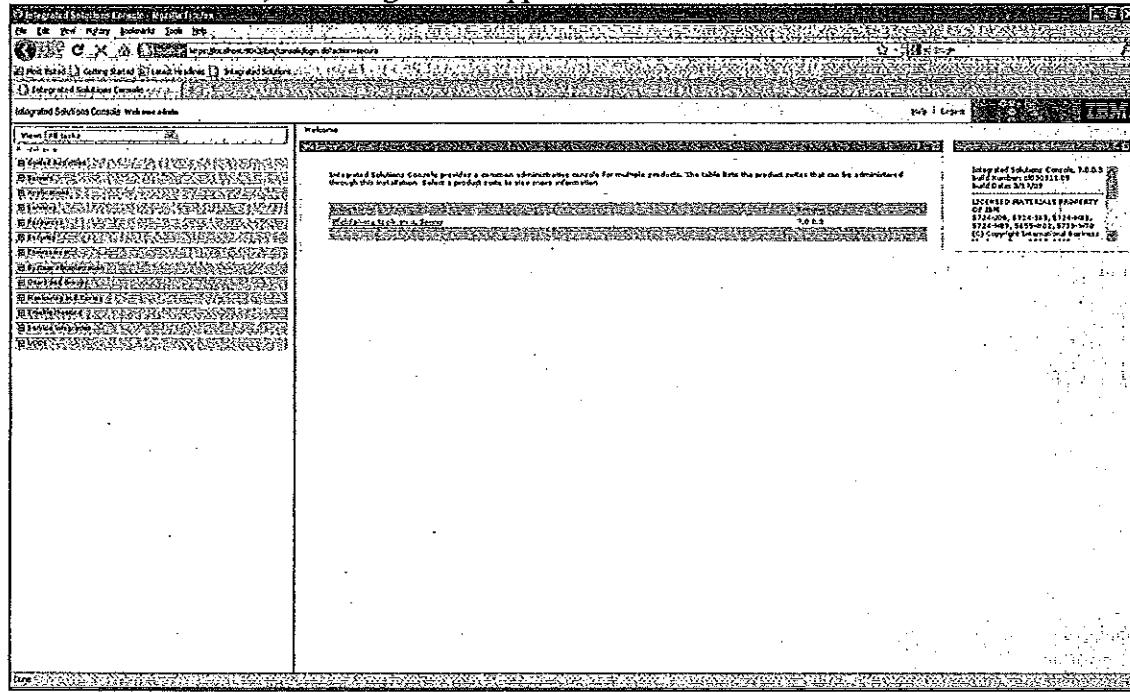
62. Enter admin for User ID:



63. Enter admin for Password; and Click “Log in” to logon WebSphere Administration Console



64. Wait for a while, following screen appears:



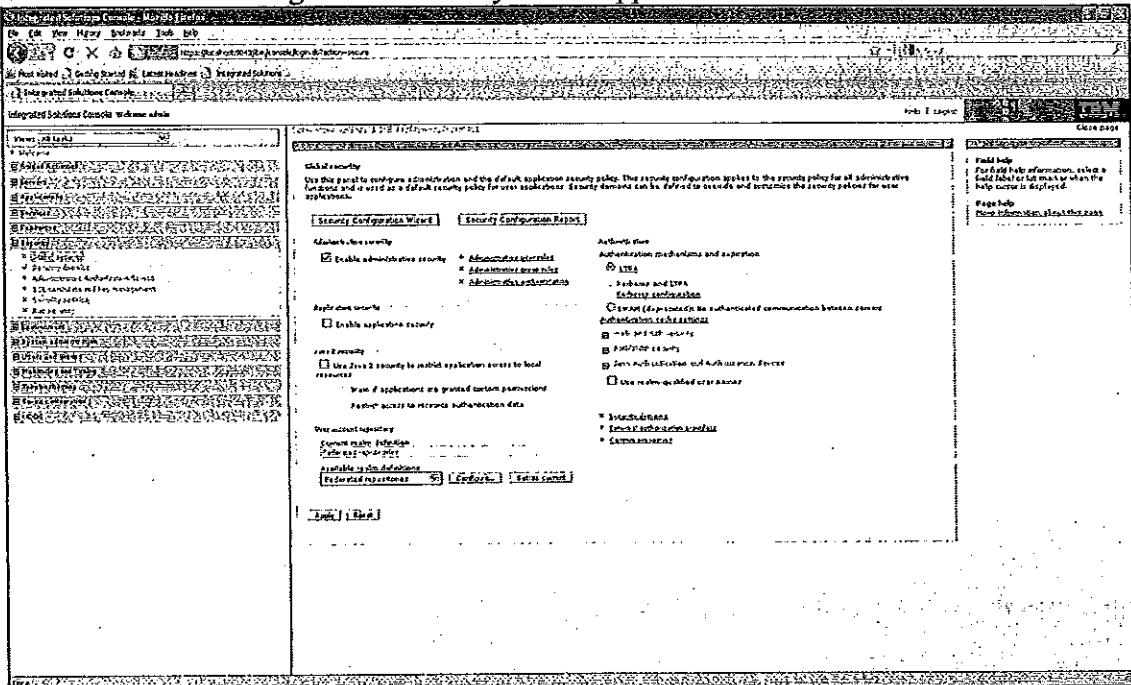
65. In the left hand side, click '■' Security to expand the Security settings

The screenshot shows the 'Integrated Solutions Console - Mozilla Firefox' window. The URL in the address bar is `https://localhost:9043/ibm/console/login.do?action=secure`. The left sidebar has a 'View' dropdown set to 'All tasks' and a list of categories: Welcome, Guided Activities, Servers, Applications, Services, Resources, Security (which is circled in red), Environment, System administration, Users and Groups, Monitoring and Tuning, Troubleshooting, and Service integration. The right panel is titled 'Welcome' and contains a 'Suite Name' field with 'WebSphere Application Server' selected.

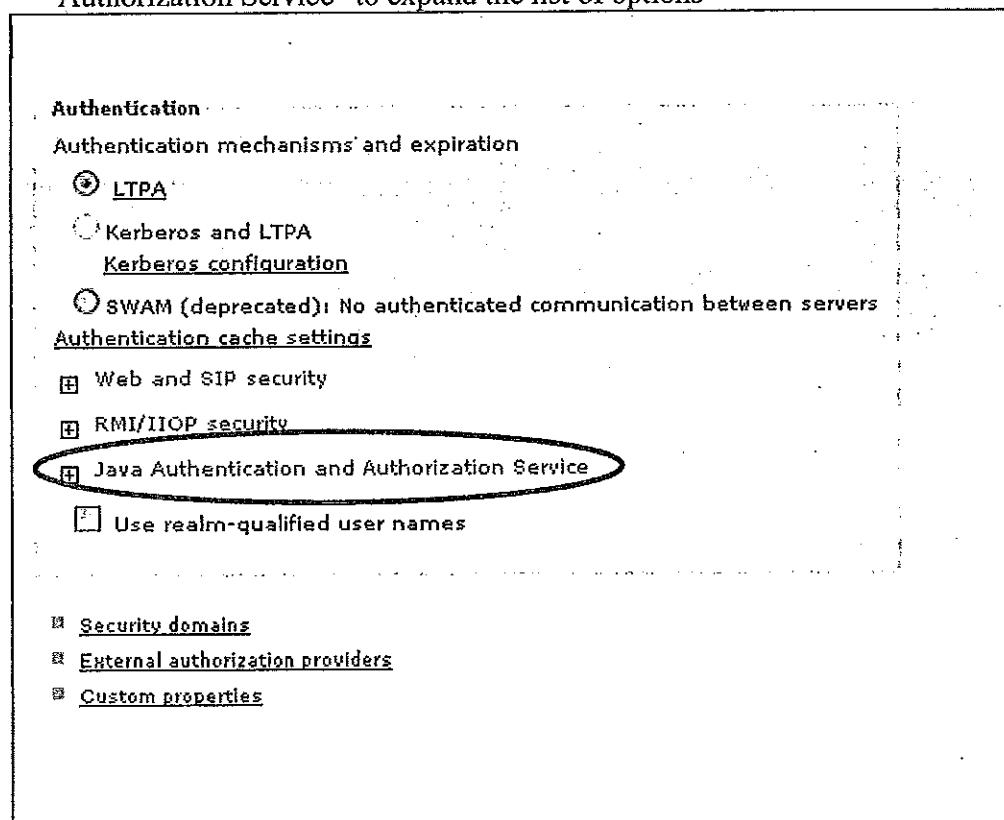
66. Click "Global Security" to create authentication alias for Mainframe access:

The screenshot shows the Integrated Solutions Console interface in Mozilla Firefox. The URL in the address bar is `https://localhost:9043/ibm/console/login.do?action=secure`. The main content area displays a navigation menu with various categories like Welcome, Guided Activities, Servers, Applications, Services, Resources, Security, Environment, System Administration, Users and Groups, Monitoring and Tracing, Troubleshooting, Service Integration, and UDDI. The 'Security' category is expanded, and its sub-item 'Global security' is circled with a red oval. To the right of the main content, there is a sidebar titled 'Welcome' which includes fields for 'Suite Name' (set to 'WebSphere Application Server') and 'Server Name'.

67. Wait until the following Global Security screen appears:



68. In the right hand side, under Authentication box, click “ Java Authentication and Authorization Service” to expand the list of options



69. Click 'J2C authentication data' to create authentication alias for J2EE connector

**Authentication**

**Authentication mechanisms and expiration**

**LTPA**

- Kerberos and LTPA
- Kerberos configuration**

**SWAM (deprecated): No authenticated communication between servers**

**Authentication cache settings**

Web and SIP security

RMI/IICP security

Java Authentication and Authorization Service

- Application logins
- System logins
- J2C authentication data**

Use realm-qualified user names

Security domains

External authorization providers

Custom properties

70. Click '**[ New ]**' button to create new authentication alias to access Mainframe

The screenshot shows the 'Global security' interface with the path 'Global security > JAAS - J2C authentication data'. A note at the top says 'Specifies a list of user identities and passwords for Java(TM) 2 connector security to use.' There is a checked checkbox 'Prefix new alias names with the node name of the cell (for compatibility with earlier releases)'. Below this are 'Apply' and 'Preferences' buttons. Under 'Preferences', there is a 'Maximum rows' input set to '20' and a checked 'Retain filter criteria' checkbox. Below these are 'Apply' and 'Reset' buttons. The main area shows a table of authentication aliases:

Select	Alias	User ID	Description
<input type="checkbox"/>	SAMPLE	db2admin	Auto generated by Web
<input type="checkbox"/>	DB	db2admin	Auto generated by Web
<input type="checkbox"/>	mf_login	db2admin	

A 'New' button is highlighted with a red oval.

71. Specify jdbc/mf\_teamx, replaces the teamx with your TEAM ID

The screenshot shows the 'Global security > JAAS - J2C authentication data > New' dialog. It has a 'General Properties' tab selected. The 'Alias' field contains 'jdbc/mf\_team'. The 'User ID' and 'Password' fields are empty. The 'Description' field is also empty. At the bottom are 'Apply', 'OK', 'Reset', and 'Cancel' buttons. The 'Alias' field is highlighted with a red oval.

72. Provides your team ID for User ID which has been defined in Mainframe as DB2 and TSO user

Global security

Global security > JAAS - J2C authentication data > New

Specifies a list of user identities and passwords for Java(TM) 2 connector security to use.

General Properties

\* Alias

\* User ID  **team1**

\* Password

Description

Apply OK Reset Cancel

73. Provides the password which is same as the team ID and Click 'OK' to confirm the settings

Global security

Global security > JAAS - J2C authentication data > New

Specifies a list of user identities and passwords for Java(TM) 2 connector security to use.

General Properties

\* Alias

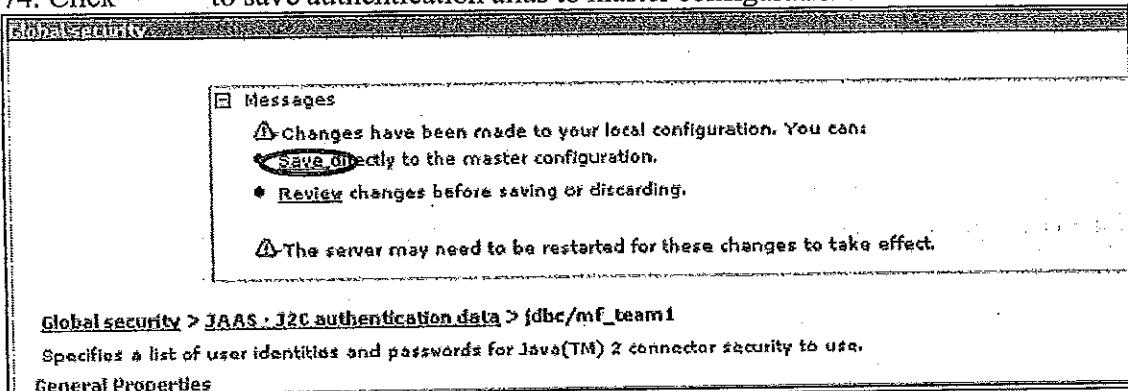
\* User ID  **team1**

\* Password  **team1**

Description

Apply OK Reset Cancel

74. Click 'Save' to save authentication alias to master configuration.



75. In the left hand side, click '⊕' Resource to expand resources definitions

Integrated Solutions Console provides a common administration interface through this installation. Select a product suite to view more details.

Suite Name  
WebSphere Application Server

76. Click '⊕' JDBC to expand JDBC definitions

Integrated Solutions Console provides a common administration interface through this installation. Select a product suite to view more details.

Suite Name  
WebSphere Application Server

77. Click Data sources and wait until below Data source to be displayed. We are going to modify local MF Data source to access Mainframe DB2

	Default Datasource	DefaultDatasource
<input type="checkbox"/>		
<input type="checkbox"/>	ME	jdbc/mf
<input type="checkbox"/>	SAMPLE	jdbc/sample

78. Click MF under Data sources to modify its settings

	Default Datasource	DefaultDatasource
<input type="checkbox"/>		
<input type="checkbox"/>	ME	jdbc/mf
<input type="checkbox"/>	SAMPLE	jdbc/sample

79. Scroll down the scrollbar until you see the Security settings box

**Data sources > MF**

Use this page to edit the settings of a datasource that is associated with your selected JDBC provider. The datasource object supplies for accessing the database.

**Configuration**

**General Properties**

\* Scope  
cells:swgwinxpNode01Cell:nodes:swgwinxpNode01:servers:server1

\* Provider  
DB2 Universal JDBC Driver Provider (XA)

\* Name  
MF

JNDI name  
jdbc/mf

Use this data source in container managed persistence (CMP)

**Description**  
DB2 Universal Driver Database

**Category**

**Data store helper class name**

Select a data store helper class  
Data store helper classes provided by WebSphere Application Server

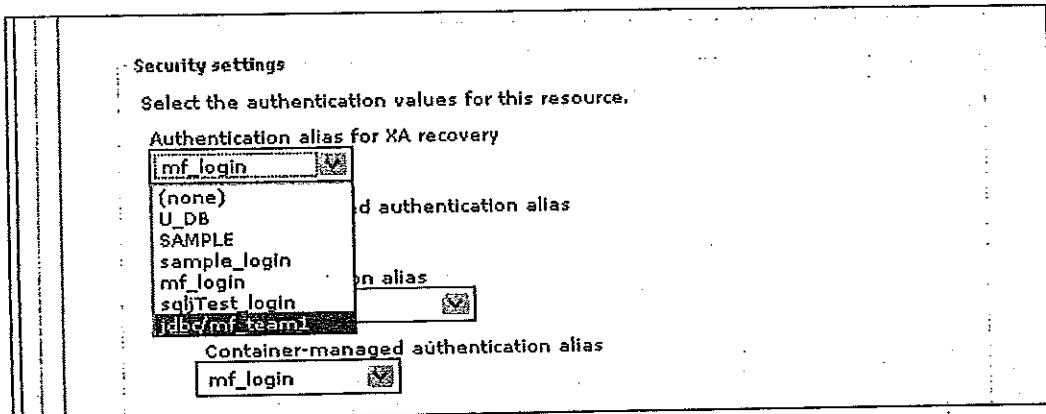
DB2 Universal data store helper  
(com.ibm.websphere.rasadapter.DB2UniversalDataStoreHelper)  
DB2 for iSeries data store helper  
(com.ibm.websphere.rasadapter.DB2AS400DataStoreHelper)

Specify a user-defined data store helper  
Enter a package-qualified data store helper class name

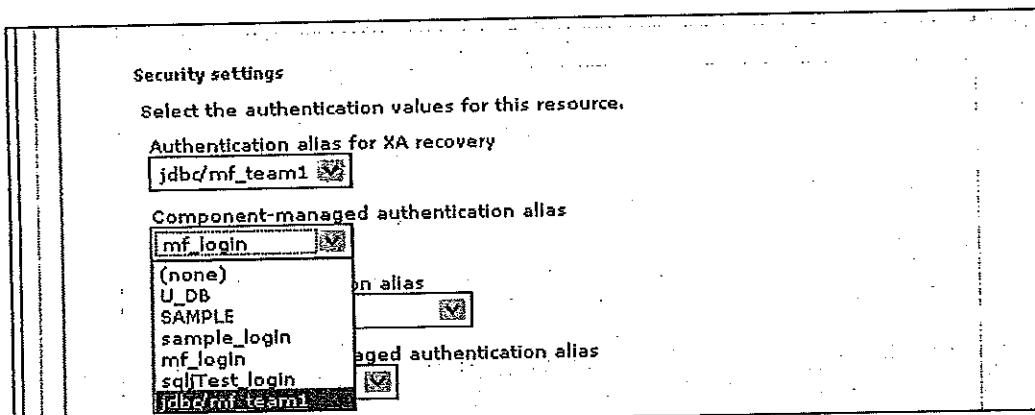
**Security settings**  
Select the authentication values for this resource.

Authentication alias for XA recovery  
mf\_login

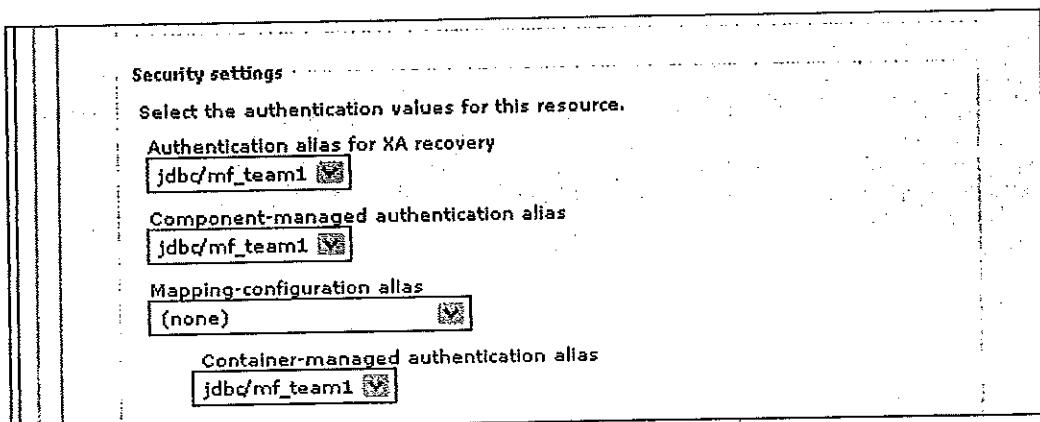
80. In Security settings box, click '☒' under Authentication alias for XA recovery, to select jdbc/mf\_teamx which is defined at the beginning of this lab.



81. In Security settings box, click '☒' under Component-managed authentication alias, select jdbc/mf\_teamx which is defined at the beginning of this lab.



82. In Security settings box, click '☒' under Container-managed authentication alias, select jdbc/mf\_teamx which is defined in the beginning of this lab.



83. Scroll down to Common and required data source properties under Security settings box, change Database name to DALLAS9 which is mainframe DB2 location name.

Mapping configuration alias	<input type="checkbox"/>
(none)	<input checked="" type="checkbox"/>
Container-managed authentication alias	<input type="checkbox"/>
jdbc/mf_team1	<input checked="" type="checkbox"/>
Common and required data source properties	
Name	Value
* Driver type	4 <input checked="" type="checkbox"/>
* Database name	DALLAS9
* Server name	localhost
* Port number	50010

84. In Common and required data source properties box, change Server name to Mainframe IP address (192.168.10.4)

Common and required data source properties	
Name	Value
* Driver type	4 <input checked="" type="checkbox"/>
* Database name	DALLAS9
* Server name	192.168.10.4
* Port number	50010

85. In Common and required data source properties box, change Port number to Mainframe IP port number (5025).

Common and required data source properties	
Name	Value
* Driver type	4 <input checked="" type="checkbox"/>
* Database name	DALLAS9
* Server name	192.168.10.4
* Port number	5025

86. Data Source modification is done, then click '**OK**' to finish the change.

Common and required data source properties

Name	Value
* Driver type	4 (✓)
* Database name	DALLAS9
* Server name	192.168.10.4
* Port number	5025

Apply    **OK** (Circled)    Reset    Cancel

87. Click 'Save' to save the change directly to the master configuration

Cell=swgwinxpNode01Cell, Profile=was70profile1

Data sources

Use this page to edit the settings of a datasource that is associated with your selected JDBC provider. The datasource object supplies your application with access to the database. Learn more about this task in a [guided activity](#). A guided activity provides a list of task steps and more general information.

Scope: Cell=swgwinxpNode01Cell, Node=swgwinxpNode01, Server=server1

Scope specifies the level at which the resource definition is visible. For detailed information on what scope is and how it works, see the [scope settings help](#).

Node=swgwinxpNode01, Server=server1 (Circled)

Preferences

Select	Name	JNDI name	Scope	Provider	Description
<input checked="" type="checkbox"/>	Default Datasource	DefaultDatasource	Node=swgwinxpNode01,Server=server1	Derby JDBC Provider	for Web
<input checked="" type="checkbox"/>	MF	jdbc/mf	Node=swgwinxpNode01,Server=server1	DB2 Universal JDBC Driver Provider (XA)	DB2 Driver

88. To verify whether the connection between the Websphere and Mainframe DB2 is good or not, click '□' of modified MF data source and then click 'Test connection' to test that.

Cell=swgwinxpNode01Cell, Profile=was7Uprofile1

Data sources

**Data sources**

Use this page to edit the settings of a datasource that is associated with your selected JDBC provider. The datasource object supports accessing the database. Learn more about this task in a [guided activity](#). A guided activity provides a list of task steps and more information to help you complete the task.

Scope: Cell=swgwinxpNode01Cell, Node=swgwinxpNode01, Server=server1

Scope specifies the level at which the resource definition is visible. For detailed information on what scope is and how it works, [see the scope settings help](#).

Preferences

Please Wait...

New Delete  Test conn.

Select	Name	JNDI name	Scope	Provider
<input type="checkbox"/>	Default Datasource	DefaultDatasource	Node=swgwinxpNode01,Server=server1	Derby JDBC Provider
<input checked="" type="checkbox"/>	MF	jdbc/mf	Node=swgwinxpNode01,Server=server1	DB2 Universal Provider (XA)
<input type="checkbox"/>	SAMPLE	jdbc/sample	Node=swgwinxpNode01,Server=server1	DB2 Universal Provider (XA)
Total 3				

89. Successful Test connection Message displays as below:

Cell=swgwinxpNode01Cell, Profile=was7Uprofile1

Data sources

Messages

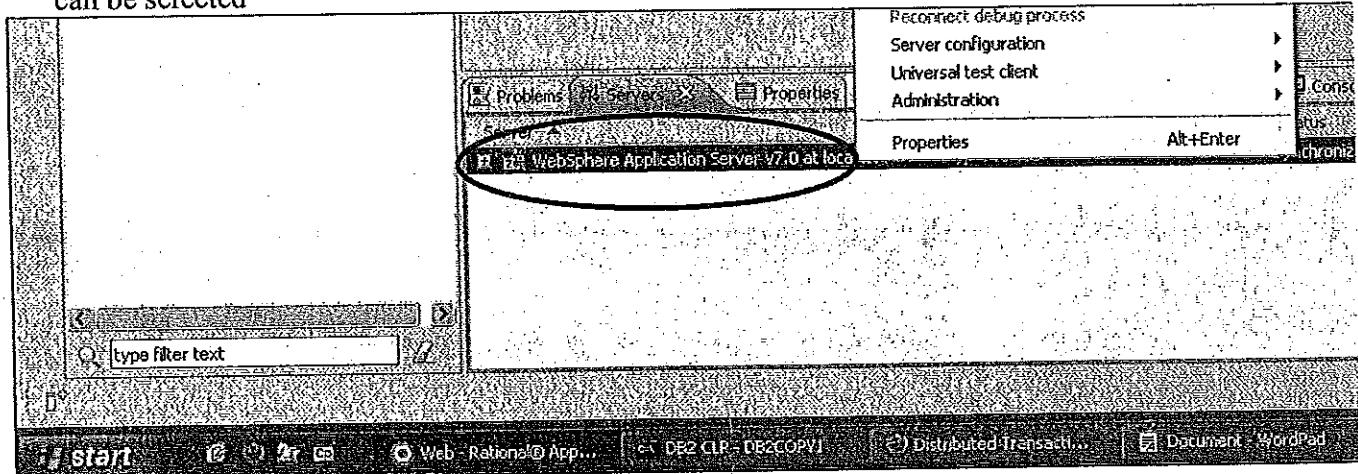
The test connection operation for data source MF on server server1 at node swgwinxpNode01 was successful.

Data sources

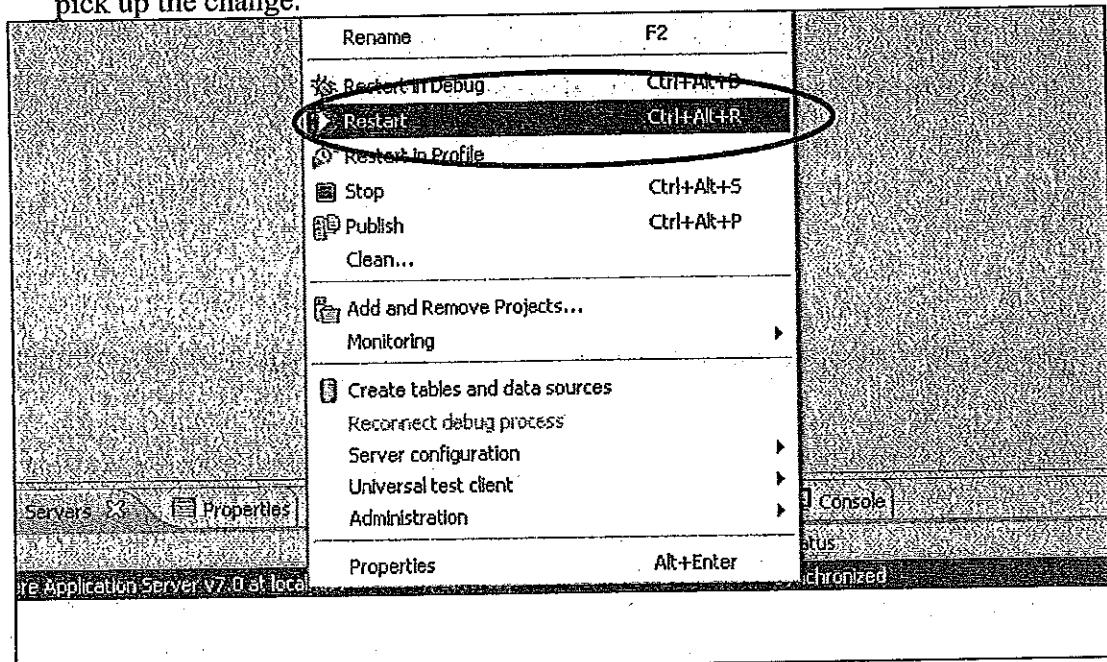
90. Need to recycle WebSphere to pick up the change. Click in the task bar at the bottom of desktop to switch to RAD application development environment.



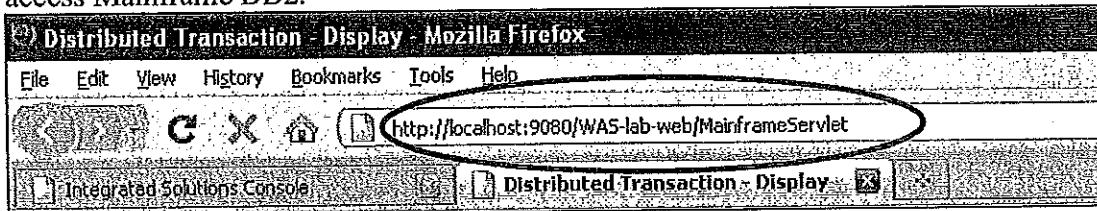
91. Right Click it pops up a list of options that can be selected



92. Click to cycle WebSphere Server to clean up connection pool buffer and pick up the change.



93. Key-in <http://localhost:9080/WAS-lab-web/MainframeServlet> to start Servlet to access Mainframe DB2.



94. The values in the green box are stored in Mainframe DB2 table. You have successfully completed this LAB, Well done. Congratulation.

A screenshot of a web application titled "Distributed Transaction - Display". The main heading is "Distributed Transaction - Display". Below it, a message says "Running SQL on SAMPLE database: SELECT NAME, VALUE FROM A". A table follows with the following data:

NAME	VALUE
SAMPLE	9

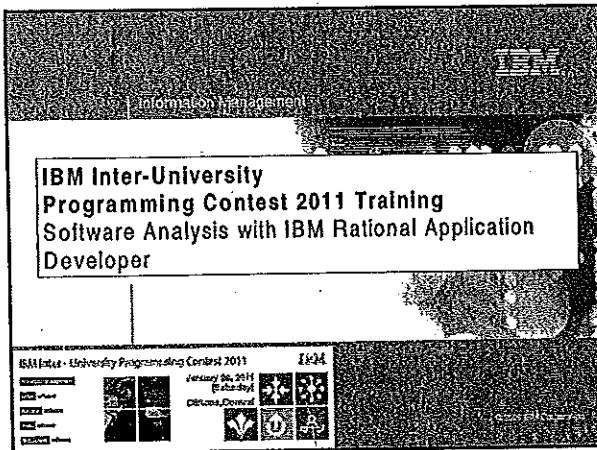
  

Running SQL on MF database: SELECT NAME, VALUE FROM B

NAME	VALUE
MF	20

95. Well done. Congratulation.

## Essentials of IBM Rational Software Analyzer, v7.0



### Agenda

- Introduction to Integrated Development Environment (IDE)
- Introduction to Static Analysis
- Real World Static Analysis Examples
- Lab

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### What is Integrated Development Environment (IDE) ?

- An integrated development environment (IDE) also known as integrated design environment or integrated debugging environment is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of:
  - Source code editor
  - Compiler and/or an Interpreter
  - Code visualisation tool
  - Build automation tools
  - Debugger or Profiler
  - Version Control tool or adaptor
  - Runtime test environment Integration

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### Eclipse (Open Source) IDE

[www.eclipse.org](http://www.eclipse.org) (free to download)

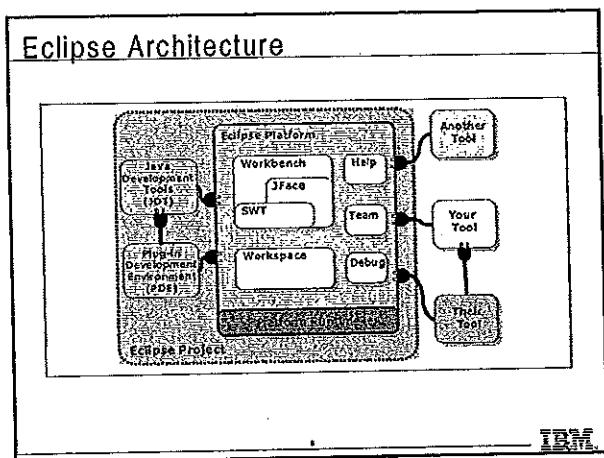


- Multi-language software development environment comprising an IDE and a plug-in system to extend it. It is written primarily in Java and can be used to develop applications in Java and, by means of the various plug-ins, in other languages as well, including C, C++, COBOL, Python, Perl, PHP, and others. The IDE is often called Eclipse ADT for Ada, Eclipse CDT for C, Eclipse JDT for Java and Eclipse PDT for PHP.

Release	Date	Platform Version
Eclipse 3.0	28 June 2002	3.0
Eclipse 3.1	29 June 2003	3.1
Cdt3.1	30 June 2003	3.2
Eclipse	29 June 2007	3.3
Ganymede	25 June 2008	3.4
Galileo	24 June 2009	3.5
Helios	23 June 2010	3.6

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## Essentials of IBM Rational Software Analyzer, v7.0



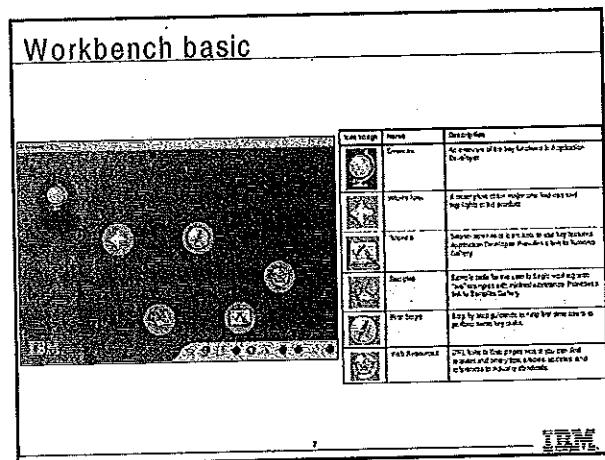
### Commercial Tool: IBM Rational Application Developer

IBM Rational Application Developer for WebSphere Software (RAD) is an integrated development environment (IDE) that extends Eclipse, for:

- Visually designing,
- Constructing,
- Testing, and deploying Web application, web services, portals, and
- Java Enterprise Edition (JEE) applications.

Note: IBM Rational Application Developer V7.0 is based on Eclipse V3.4.2

The screenshot shows the IBM Rational Application Developer interface with multiple tool windows. On the left, there are toolbars for 'Architect / Application Developer' and 'Tester'. The main workspace contains various application components and toolbars. The bottom right corner features the IBM logo.



### Perspectives, views, and editors

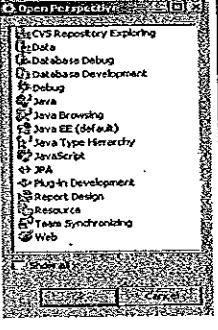
- A perspective is a collection of views, toolbar icons, and menus, grouped to accomplish a specific type of work.
- A view supports editors and presents information differently.
- Editors allow you to modify the code.
- Every perspective has a number of views; most have an edit area.

The diagram illustrates the components of a Perspective. A bracket labeled 'Perspective' groups a 'View' and an 'Edit area'. Arrows point from the labels to their respective parts within the perspective interface.

# Essentials of IBM Rational Software Analyzer, v7.0

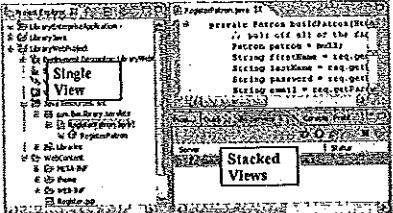
## Perspectives

- A perspective defines the initial set and layout of views in the Workbench window.
- Each perspective provides functionality aimed at accomplishing a specific type of task, or works with specific types of resources.
- Perspectives control what appears in certain menus and toolbars.
  - They define visible action sets, which you can change to customize a perspective.



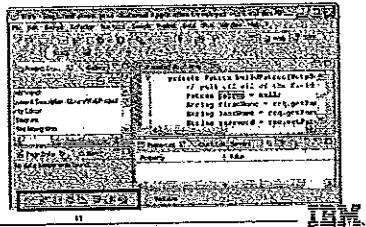
## Views

- There are two states for views
  - Single
    - There are no other views at that position in the perspective
  - Stacked
    - There are other available views, represented by tabs at the top of the view pane



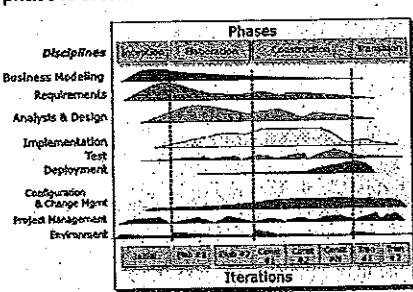
## Fast views

- You can quickly open and close fast views.
  - This functionality is available via the fast view bar
- There are two ways to create a fast view.
  - Drag a view onto the shortcut bar
  - Right-click the view icon and choose Fast View
- To restore a fast view, right-click the icon in the shortcut bar, and clear the Fast View option.



## Rational Unified Process (RUP) Project Lifecycle

- A typical software development process consists of the following phases and disciplines
  - Each phase is broken into iterations

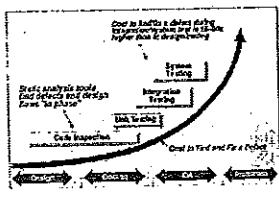


The diagram illustrates the Rational Unified Process (RUP) Project Lifecycle. It features a grid structure with 'Disciplines' listed vertically on the left and 'Iterations' listed horizontally at the bottom. The vertical columns represent the phases: Initiation, Analysis, Design, Implementation, Test, Deployment, Configuration & Change Mgmt, and Project Management Environment. The horizontal rows represent the iterations, labeled from 1 to 10. The grid cells contain wavy lines, indicating the iterative nature of the process. Disciplines listed include Business Modeling, Requirements, Analysis & Design, Implementation, Test, Deployment, Configuration & Change Mgmt, and Project Management Environment.

## Essentials of IBM Rational Software Analyzer, v7.0

### The high cost of fixing defects

- A single defect can cost between \$12-18K.
- Thousands of potential defects in a large piece of software can cost between \$600K-\$2.7M.

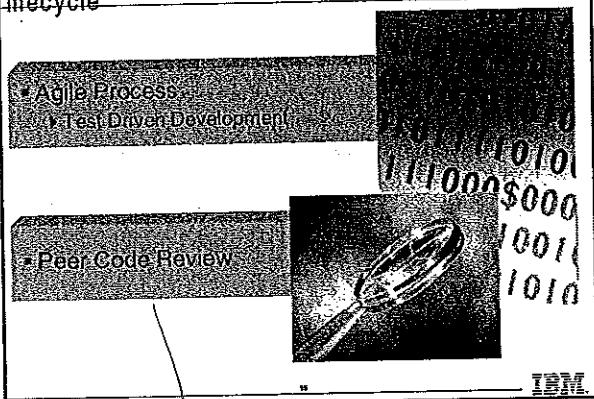


### A real-world example: Ford recall

- A two-year investigation determined that the problem was system-related.
- Pain includes:
  - costs of the recall itself
  - bad PR
  - customer satisfaction
  - potential safety lawsuits
- Potential cost to manufacturer of \$54 million dollars.



### Mechanisms for identifying defects early in the lifecycle



Give different  
Opinion.

### Agile Process - Test Driven Development

- A technique involving short iterations, where:
  - New test cases covering new functionality are written first.
  - Next, the production code necessary to pass tests is implemented.
  - Finally, the software is refactored to accommodate changes.



## Essentials of IBM Rational Software Analyzer, v7.0

Static analysis : 100% coverage.

Runtime analysis : 75%

### Peer code review

- A systematic examination of source code by human experts.

► Intended to find and fix mistakes overlooked in the initial development phase.

► Improves both the overall quality of software and the developers' skills.



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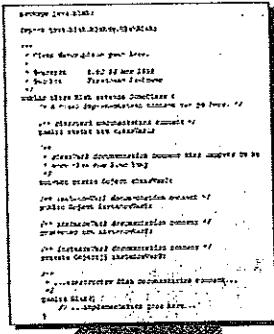
### Adherence to coding guidelines

- Coding guidelines are important for a number of reasons:

► 80% of the lifetime cost of a piece of software goes to maintenance.

► Hardly any software is maintained for its whole life by the original author.

► Adhering to coding guidelines improves the readability of the software, allowing engineers to understand new code more quickly and thoroughly.



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### The static analysis tool

- Processes such as agile development and peer code review are not enough.
- More and more, we need the assistance of automated analysis tools such as IBM Rational Application Developer that can ensure adherence to coding guidelines.
- The best time to find problems is to review the source code as it is written.

Note that static analysis is simply another tool to improve code quality. It is not a complete replacement for manual code reviews.

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### What is static analysis?

- Static analysis is the study of source and/or binary code that is not currently executing.

- Static analysis can:

- Ensure that the source adheres to a predefined coding standard.
- Detect common performance problems.
- Understand the dependencies of the imports of each class.



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## Essentials of IBM Rational Software Analyzer, v7.0

Static analysis vs. runtime analysis	
<ul style="list-style-type: none"><li>▪ <b>Static analysis</b><ul style="list-style-type: none"><li>➢ The study of source and/or binary code that is not currently executing.</li><li>➢ Examines architectural elements of software to find problems relating to dependencies in code (What is the impact of changing a class?)</li><li>➢ Examines the complexity of code (Are there too many paths through the code?)</li><li>➢ Simulates data movement through a system (testing for data security problems (does the password get passed outside the system?))</li></ul></li><li>▪ <b>Runtime analysis</b><ul style="list-style-type: none"><li>➢ Understanding software component behavior by using data collected during the execution of the component.</li><li>➢ Provides information about how the developed component or the whole application behaves when it runs.</li><li>➢ Provides explanations of various exposed or potential misbehaviors.</li></ul></li></ul>	

Categories of static analysis – Code Review
<ul style="list-style-type: none"><li>▪ <b>Performs automated code parsing</b><ul style="list-style-type: none"><li>➢ Each source file is loaded and passed through a parser that looks for particular code patterns violating a set of established rules.<ul style="list-style-type: none"><li>▪ In some languages like C++, rules are built into the compiler or available in external programs like Lint.</li><li>▪ In other languages like Java, the compiler does little in the way of automated code review.</li></ul></li></ul></li><li>▪ <b>Code Review is a good tool to:</b><ul style="list-style-type: none"><li>➢ Enforce coding standards</li><li>➢ Find basic performance problems</li><li>➢ Find possible API abuse.</li></ul></li></ul>

Categories of static analysis – Code Dependency
<ul style="list-style-type: none"><li>▪ Does not examine the format of individual source files.</li><li>▪ Examines the relationships between source files (typically classes) to build a map of the overall architecture of a program.</li><li>▪ Commonly used to discover known design patterns (good) or common anti-patterns (bad) in code.</li></ul>

Categories of static analysis – Code Complexity
<ul style="list-style-type: none"><li>▪ Analyzes the program code and compares it to established software metrics<ul style="list-style-type: none"><li>➢ Determines if it is unnecessarily complex.</li></ul></li><li>▪ If a particular piece of code exceeds a given threshold, it can be flagged as a candidate for refactoring to help improve maintainability.</li></ul>

# Essentials of IBM Rational Software Analyzer, v7.0

## Categories of static analysis – Trending

- Trend analysis does not use code artifacts directly.
- It is the study of improvements/degradations in code quality based on other forms of analysis.
  - Analyzing the results of analysis.
- Results generated by trend analysis typically appeal to managers and executives.
  - They make a statement about the direction of quality improvements, answering the question "Is the code getting better or worse?"

## Real-world Example in Java #1

- Rule: "Always surround if and loop statements with curly braces"

```
if( condition )  
    methodCall();  
    anotherMethodCall();
```

- What was the developer's intended behavior?
- Is this a real bug?

IBM

## Real-world example in Java #1 Solution

- Both method calls should have been called when the "If" was true
- ```
if( condition ) {  
    methodCall();  
    anotherMethodCall();  
}
```
- This was a real bug!

## Real-world example in Java #2

- Rule: "Avoid returning null instead of iterator"

```
public Iterator myMethod() {  
    List list = getList();  
    if( trueCondition ) {  
        return list.iterator();  
    }  
    return null;  
}
```

- What's wrong with this?

→ cast  
return null object

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## Essentials of IBM Rational Software Analyzer, v7.0

### Real-world example in Java #2

- Inline usage of myMethod()

```
for( Iterator it = myMethod(); it.hasNext(); ) {  
    // Do something  
}
```
- Under the right conditions myMethod() can return null resulting in NPE
- This is particularly bad because "the right condition" may not happen until a customer executes the code.

IBM

### Real-world example in Java #2 Solution

- Modify myMethod()

```
public Iterator myMethod() {  
    List list = getList();  
    if( trueCondition ) {  
        return list.iterator();  
    }  
    return new ArrayList(0).iterator();  
}
```

IBM

### Real-world example in Java #3

- Rule: "Avoid multiple invocations of the same method"

```
public static void satisfy( List fullList, IRuleFilter filter ) {  
    for( Iterator it = fullList.iterator(); it.hasNext(); ) {  
        ASTNode node = (ASTNode)it.next();  
  
        boolean satisfied = filter.satisfies( node );  
        if (!filter.isSuccessful())  
            || ((filter.isInclusive() && !satisfied)  
            || (!filter.isInclusive() && satisfied)) {  
            it.remove();  
        }  
    }  
}
```
- Why does filter.isInclusive() get called twice?

cost, (run 2 times)  
use local variable  
result  
(performance problem)

### Real-world example in Java #3 Solution

- Sometimes a seemingly harmless call is expensive
- Add a temporary variable

```
public static void satisfy( List fullList, IRuleFilter filter ) {  
    boolean inclusive = filter.isInclusive();  
    for( Iterator it = fullList.iterator(); it.hasNext(); ) {  
        ASTNode node = (ASTNode)it.next();  
  
        boolean satisfied = filter.satisfies( node );  
        if (!filter.isSuccessful())  
            || ((inclusive && !satisfied)  
            || (!inclusive && satisfied)) {  
            it.remove();  
        }  
    }  
}
```

IBM

radi: 6xx rules!

## Essentials of IBM Rational Software Analyzer, v7.0

### Real-world example in Java #4

- Rule: "Consider using HashSet Instead of List"

```
List employees = new ArrayList();
...
if (!employees.contains(emp)) {
    employees.add(emp);
}
```

- What is wrong with this code?



### Real-world example in Java #4 Solution

- Sets assure uniqueness without requiring programmers to check for duplicates

```
Set employees = new HashSet();
...
employees.add(emp);
...
```

- Better performance since it does not require searching through the entire collection
- If order is important use a LinkedHashSet



### Lab Overview

- Create Rule for Analysis
- Configuration of Analysis
- Analysis the project

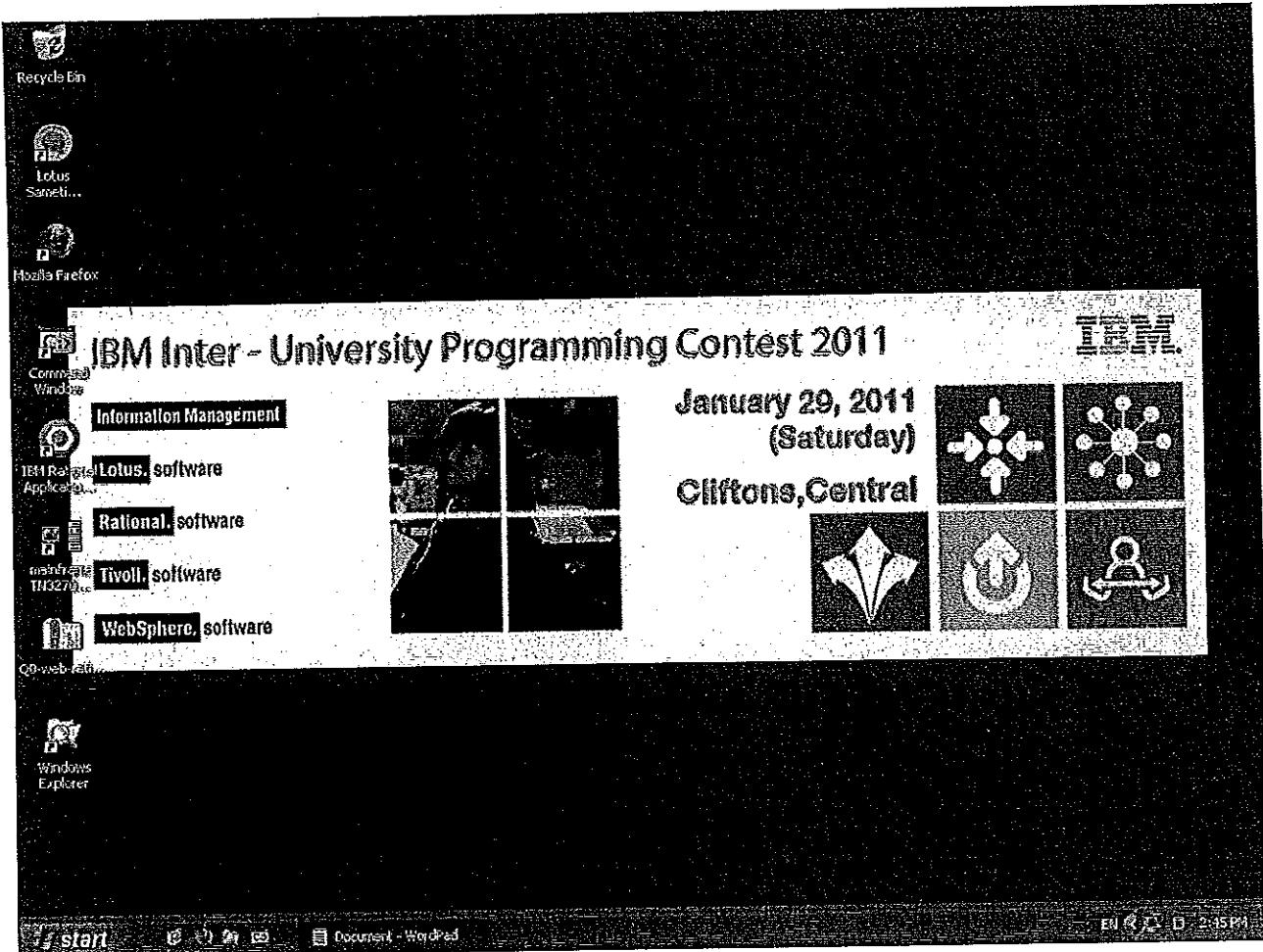
*Enjoy your lab!*



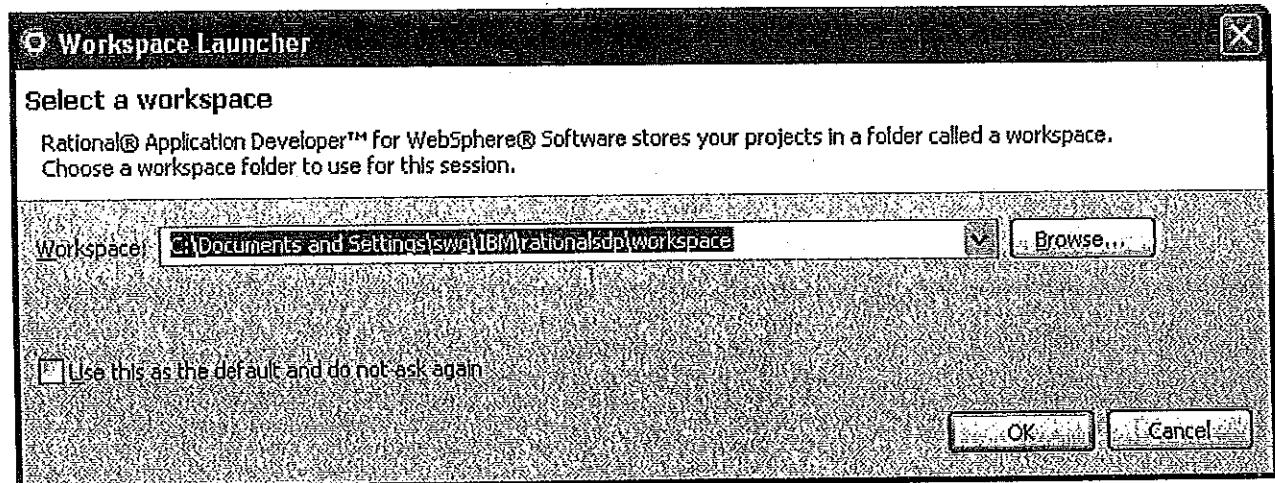
## **Chapter 6a: Software Analyzer using IBM Rational Application Developer**

Start IBM Rational Application Developer (RAD) to develop J2EE application which will be used during the programming contest. RAD is a GUI integrated development environment (IDE) which is used to perform J2EE and web programming. The resultant programs will be published to WebSphere Application Server so that it can be executed in the web environment.

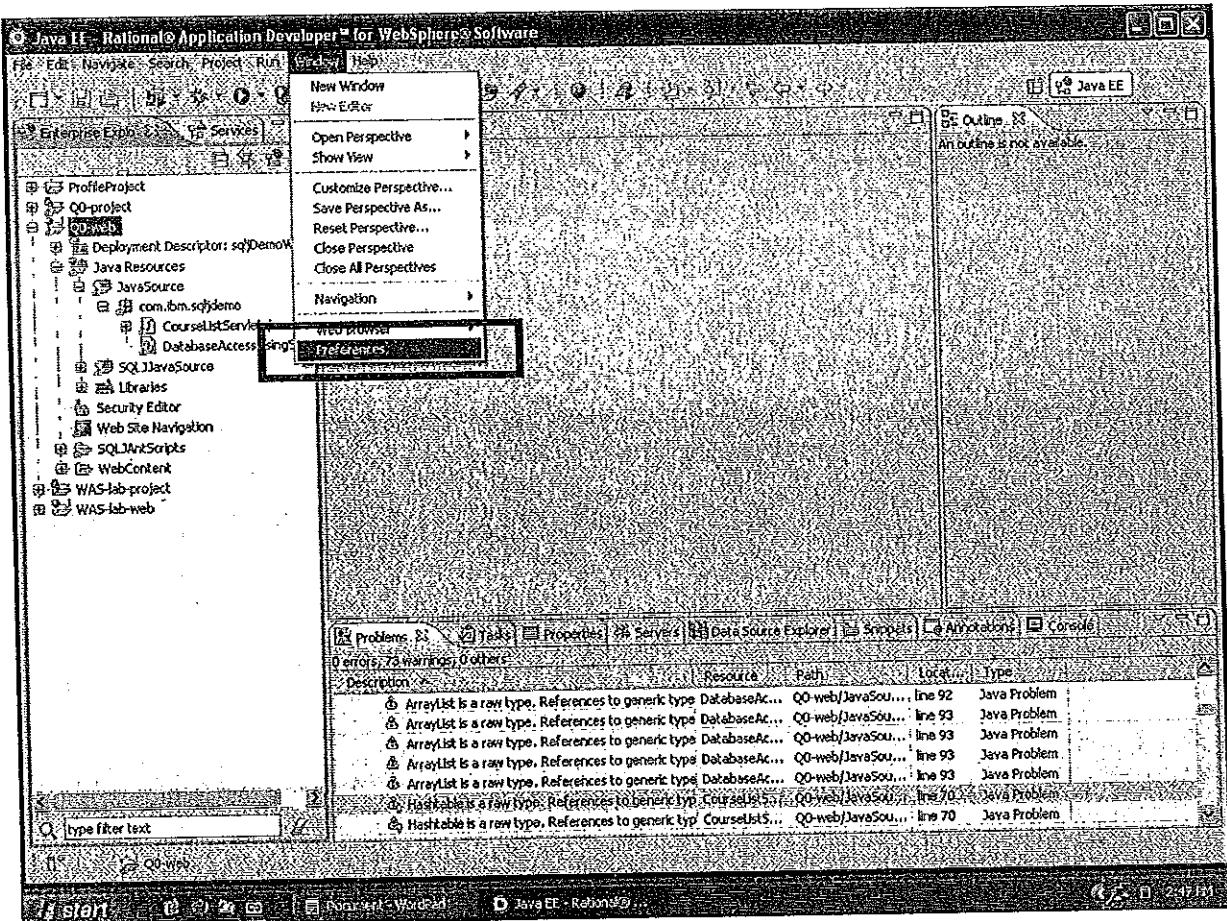
1. Double clicked the icon "IBM Rational Application Developer" on Desktop to start.



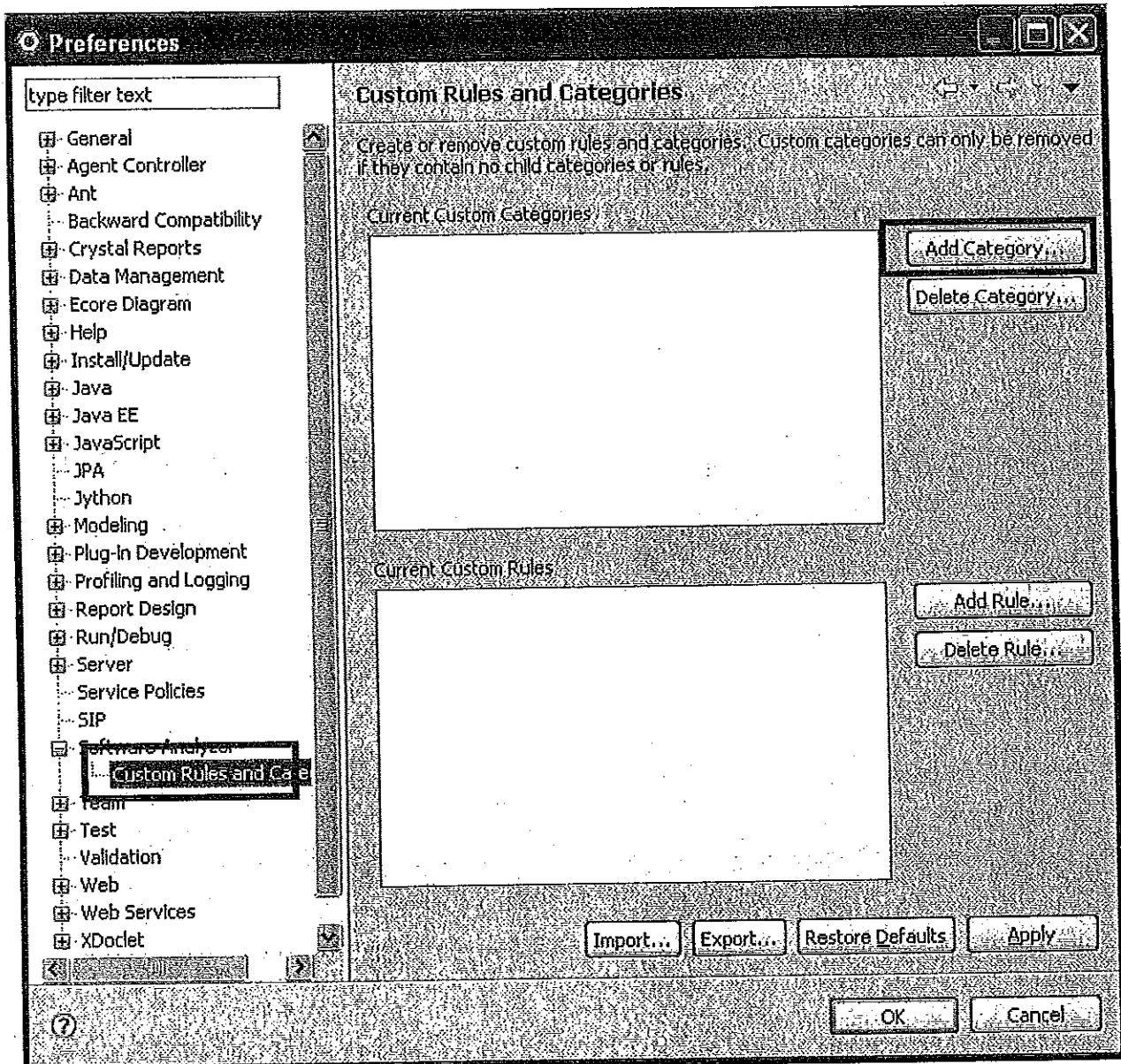
2. Banner will appear and a 'Workspace Launcher' window will appear which allows you to choose the base location of the workspace, type:  
"C:\Documents and Settings\swg\IBM\rational\sdp\workspace" as workspace.



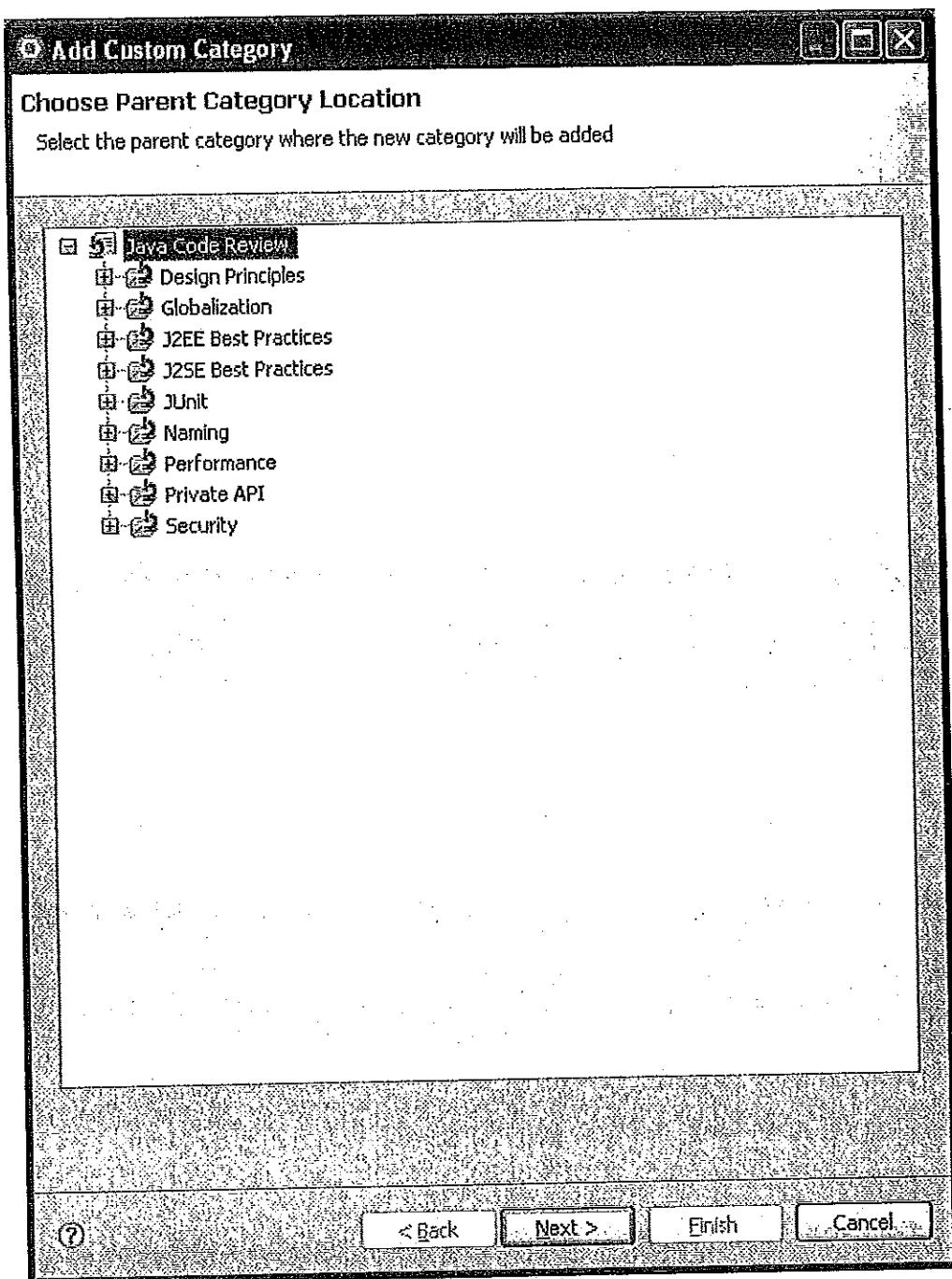
### 3. To config a rule, select window > Preferences



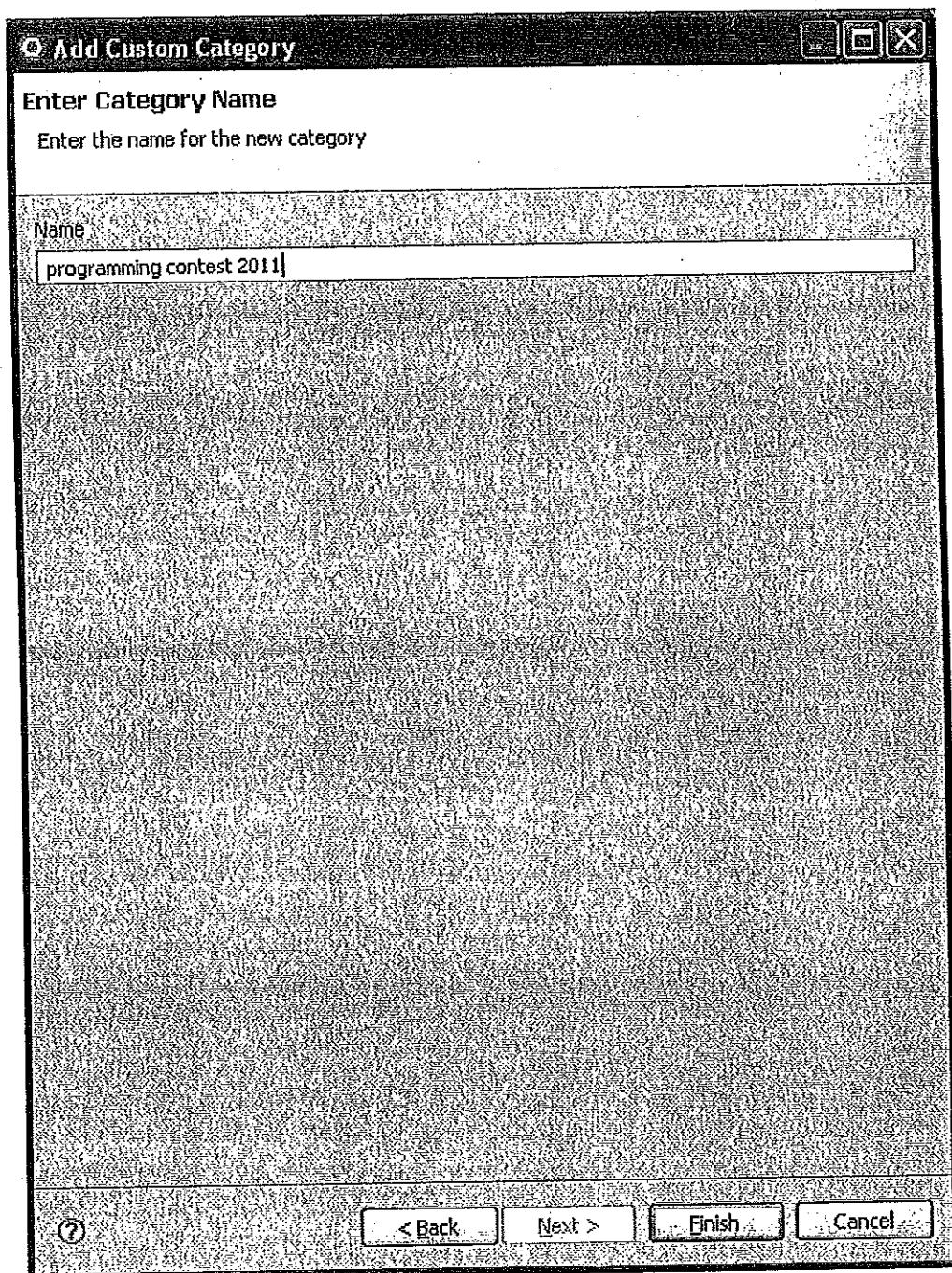
#### 4. Select Software Analyzer > Custom Rules and Categories



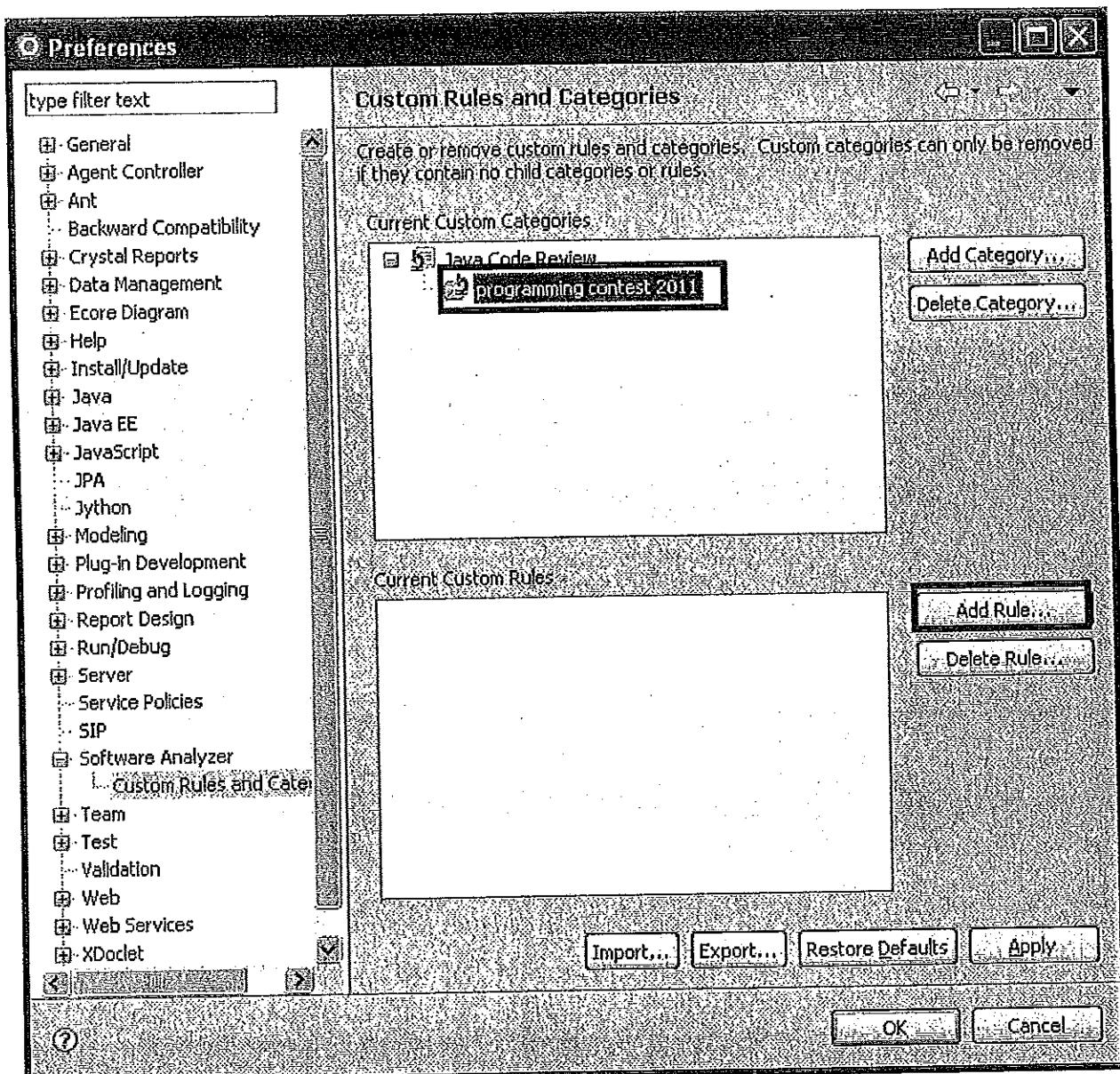
5. Choose Parent Category Location as "Java Code Review"



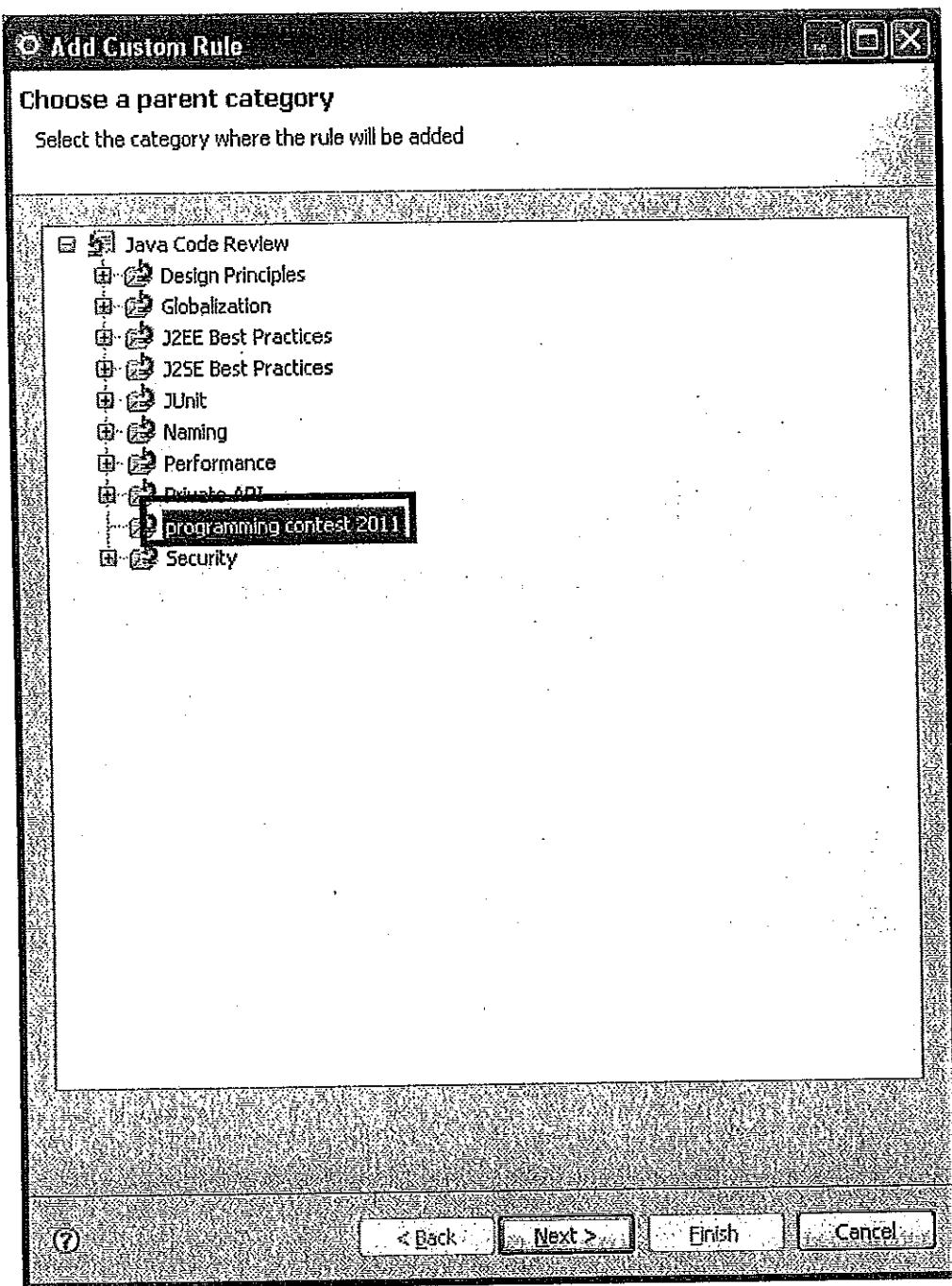
6. Enter Category Name as “programming contest 2011”



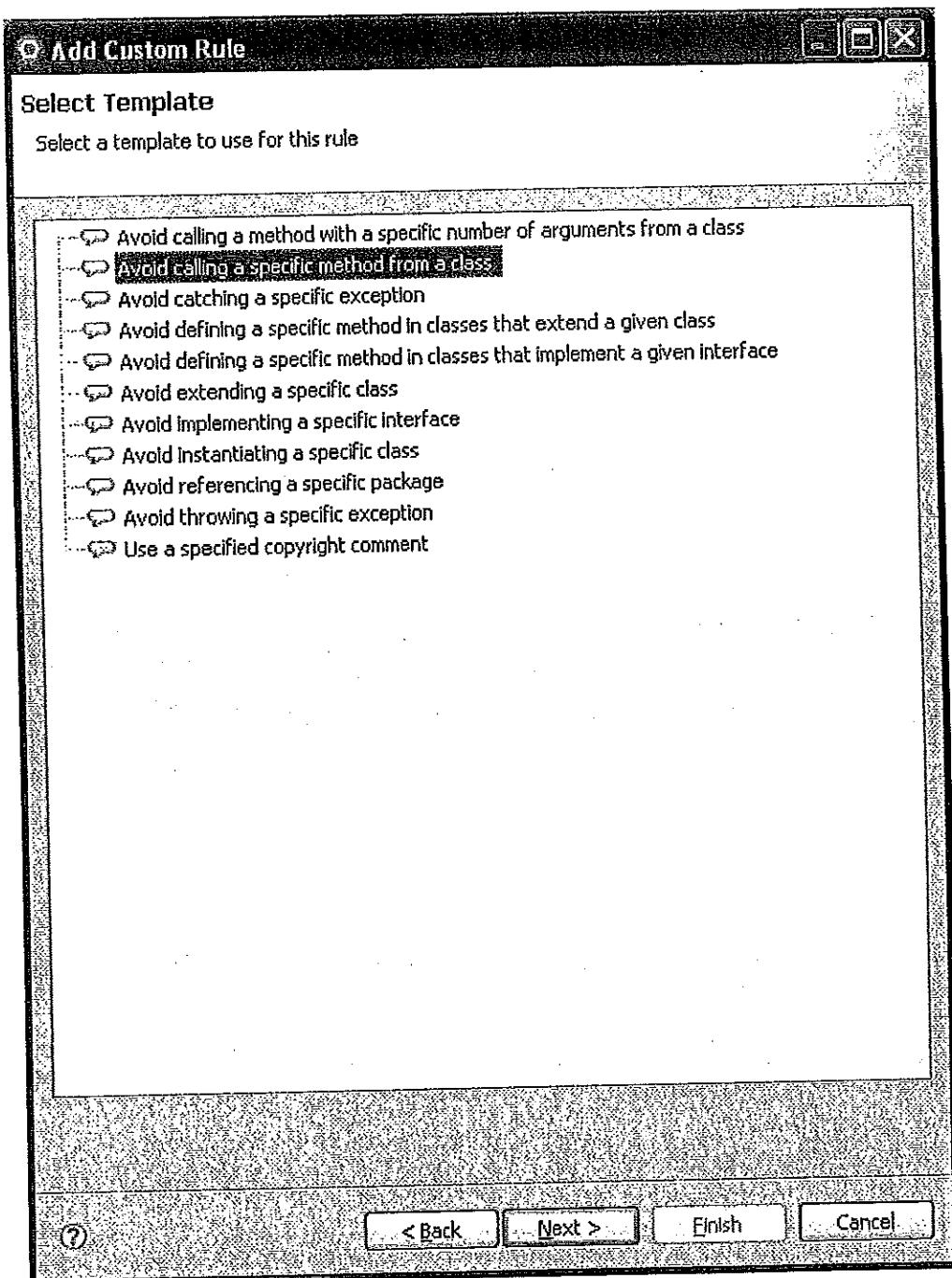
7. Confirm the category created, and "Add Rule..."



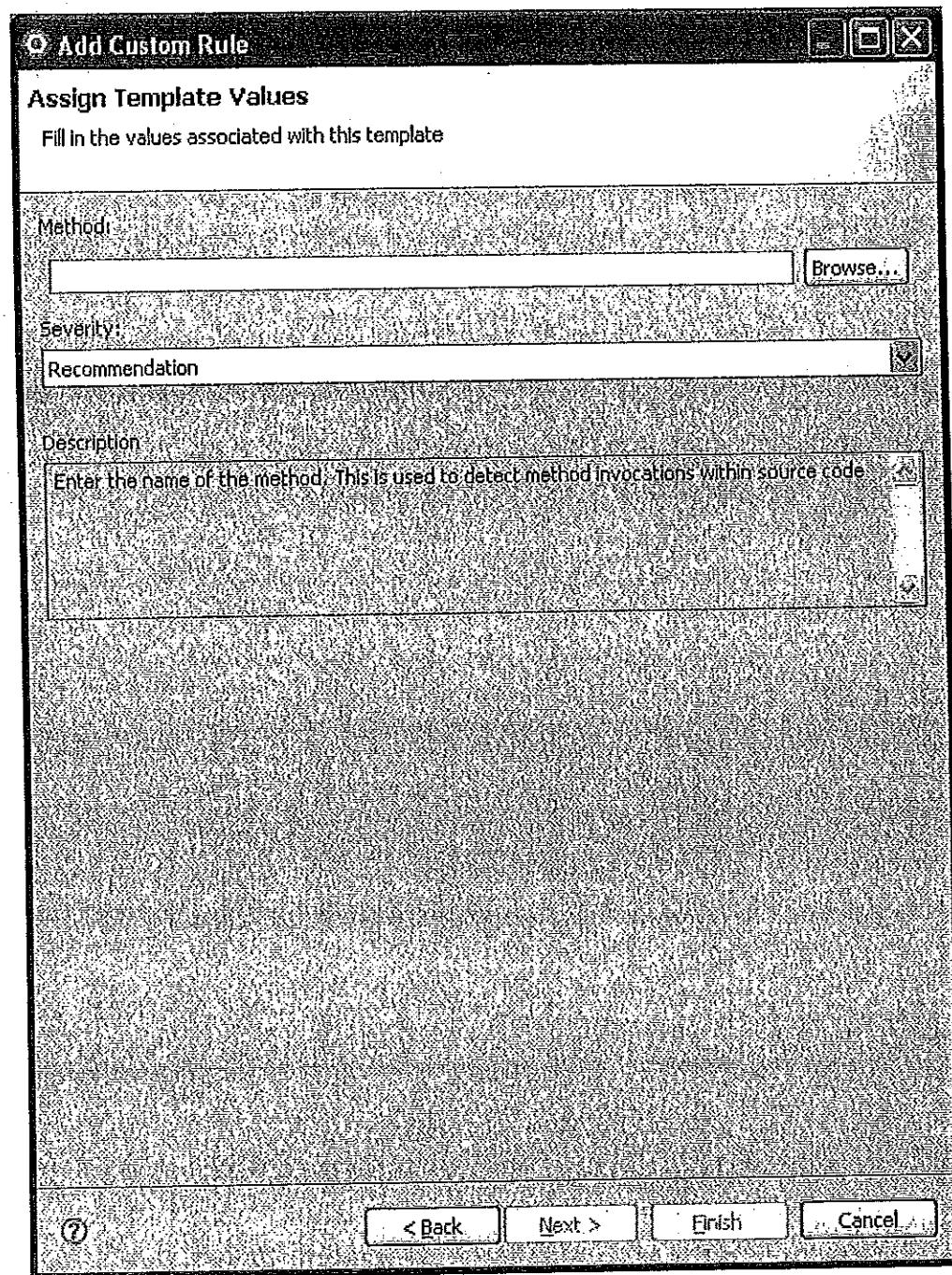
8. Select the parent category as “programming contest 2011”



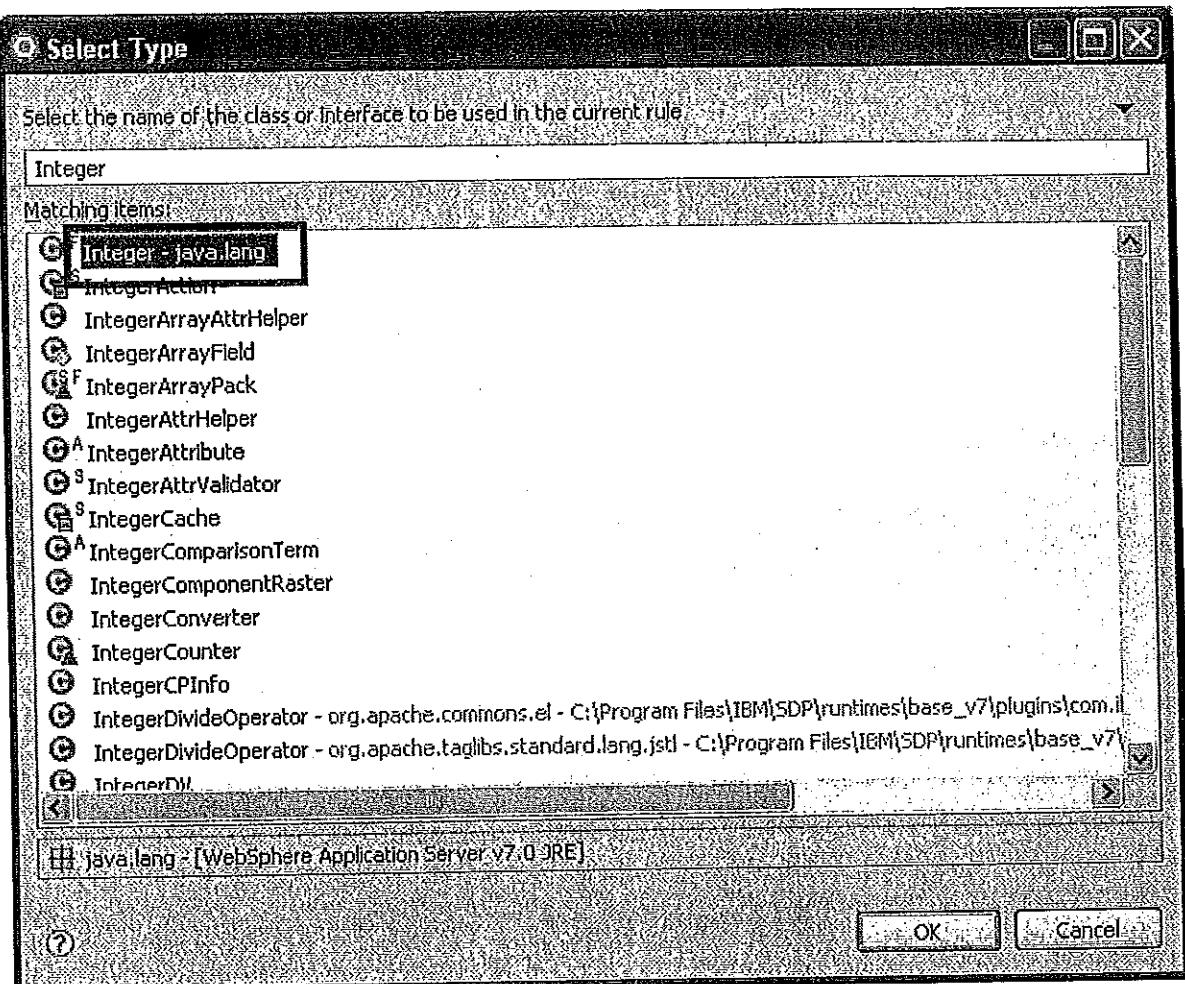
9: select template as "Avoid calling a specific method from a class"



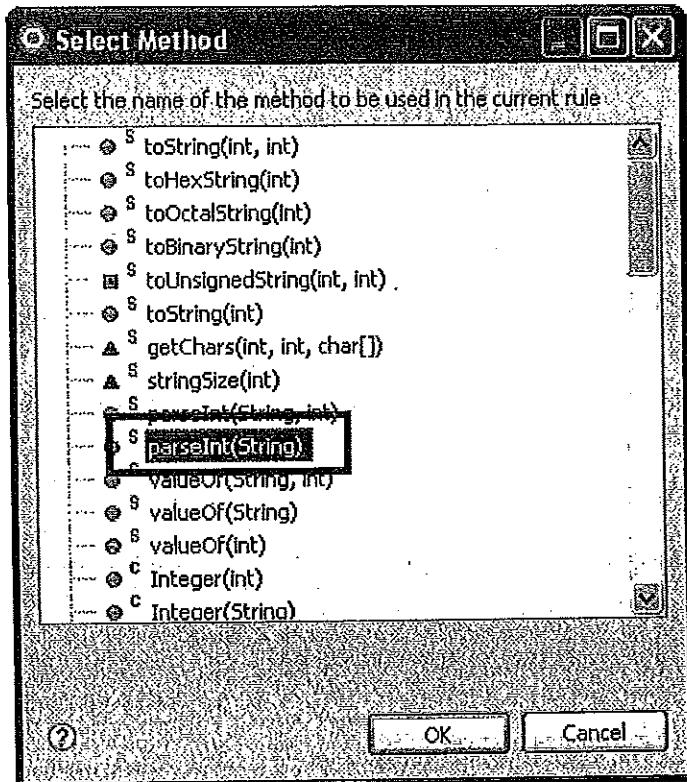
## 9. Assign Template Values



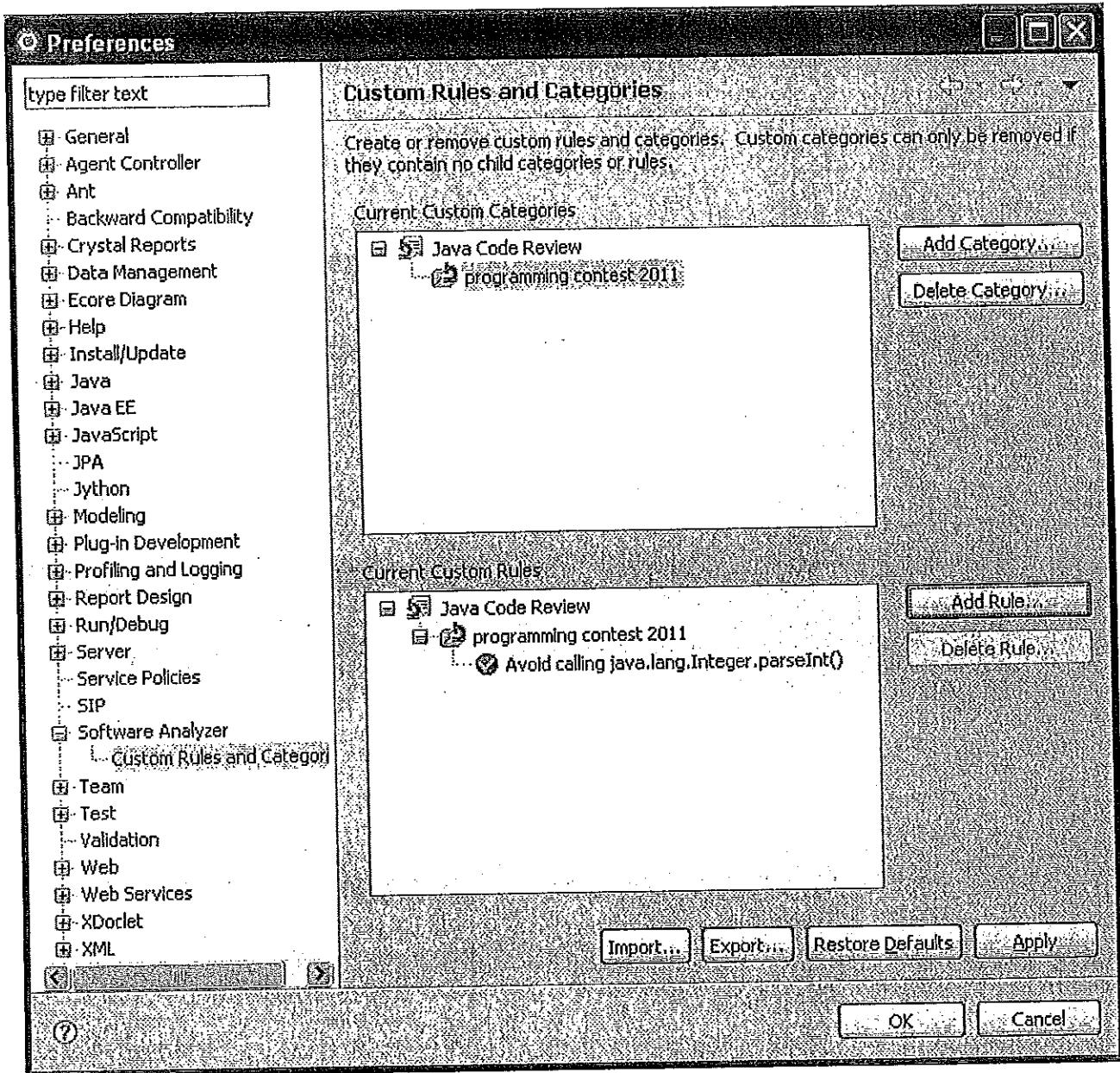
10. Type "Integer" to select matching class.



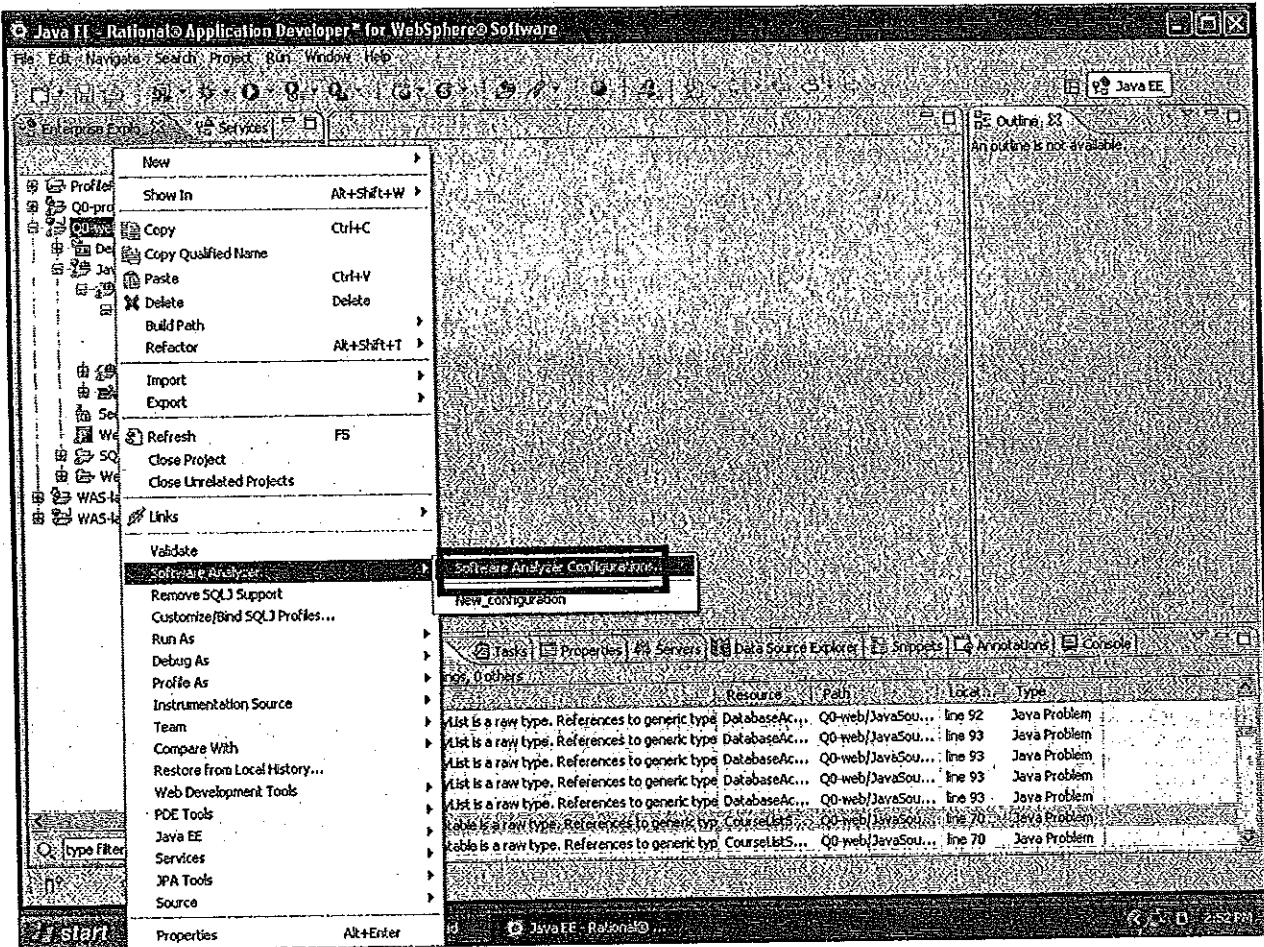
11. Select parseInt(String) as match method.



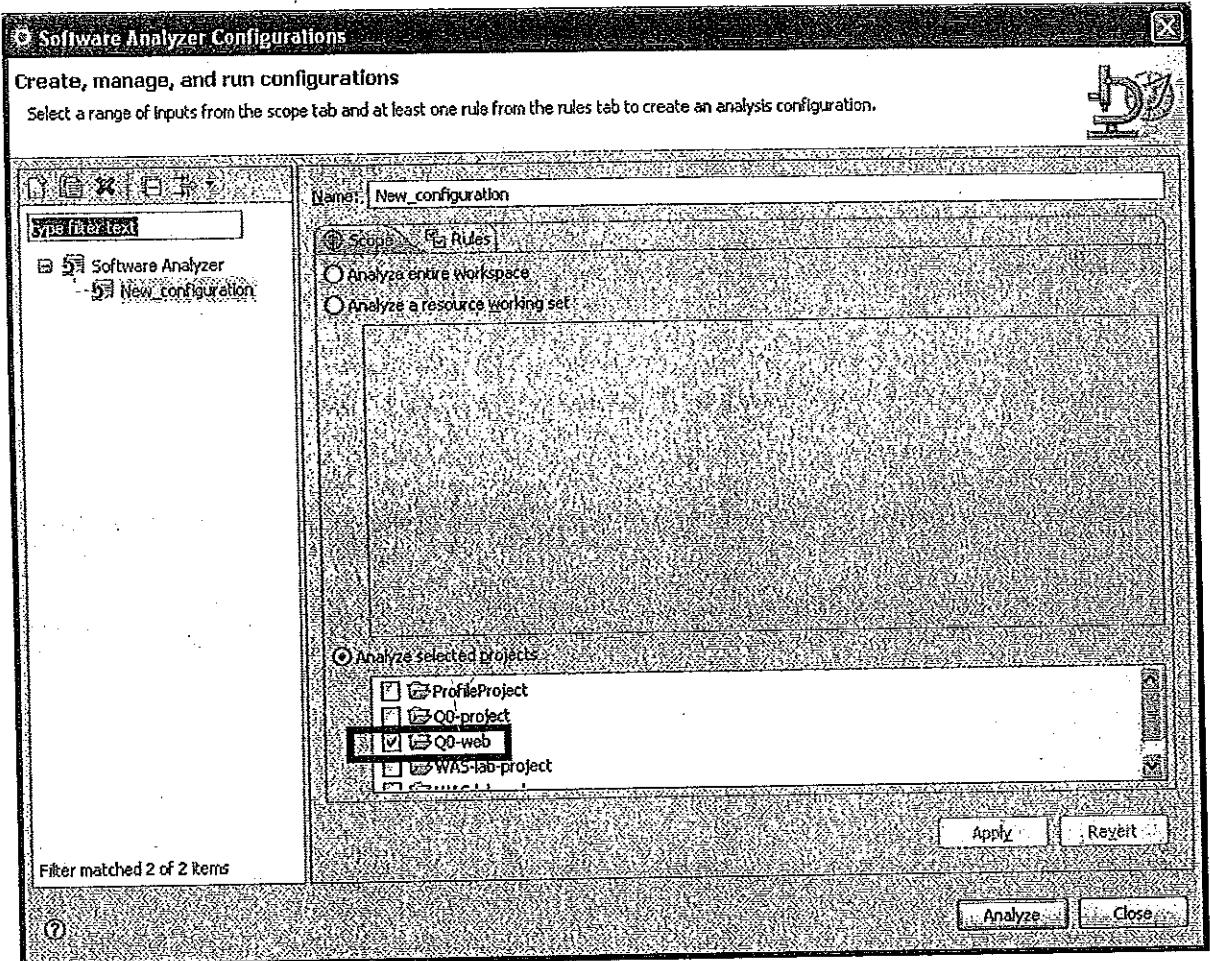
12, confirm the custom rules as follow.



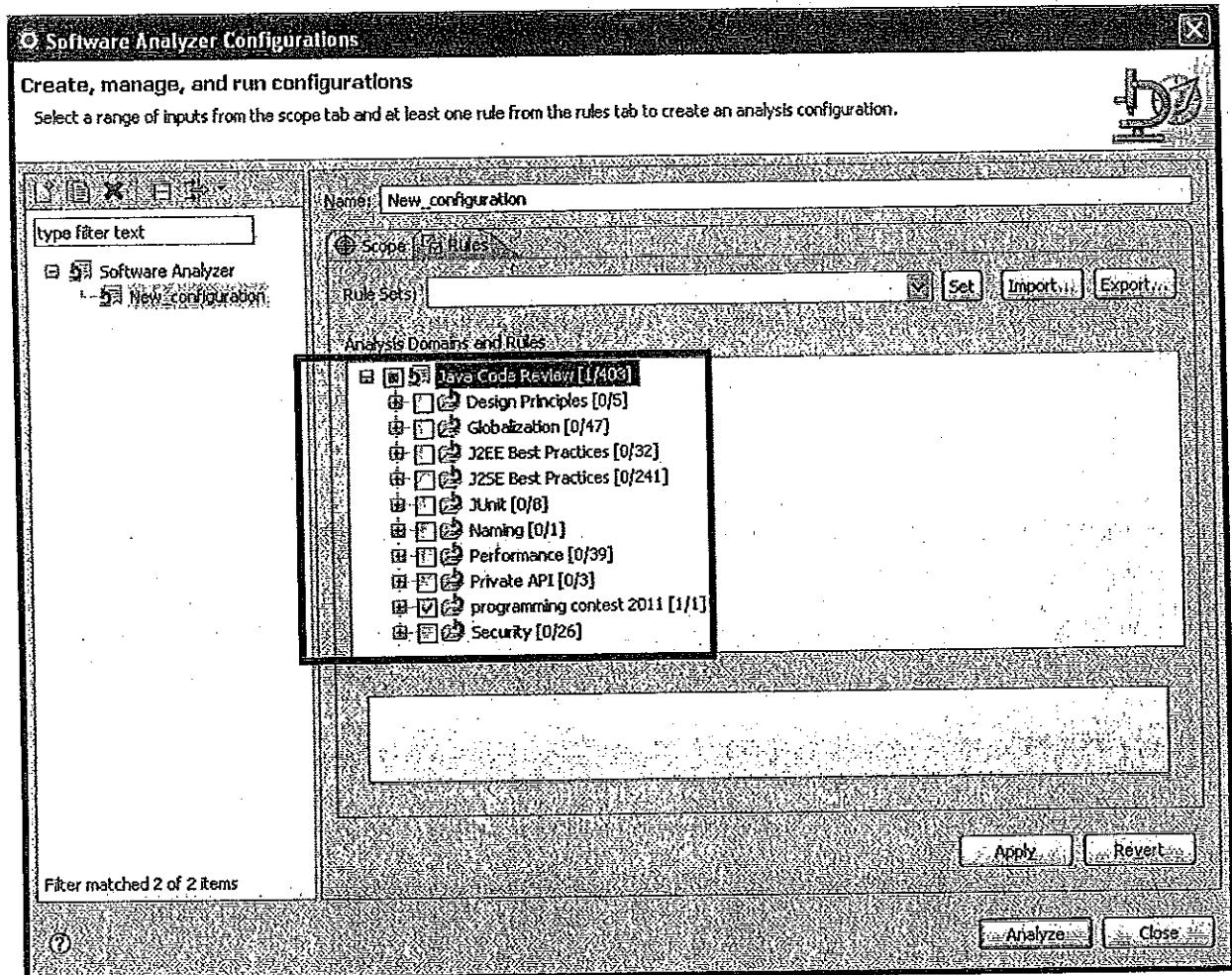
13. Right click the project, and select Software Analyzer > Software Analyzer Configuration...



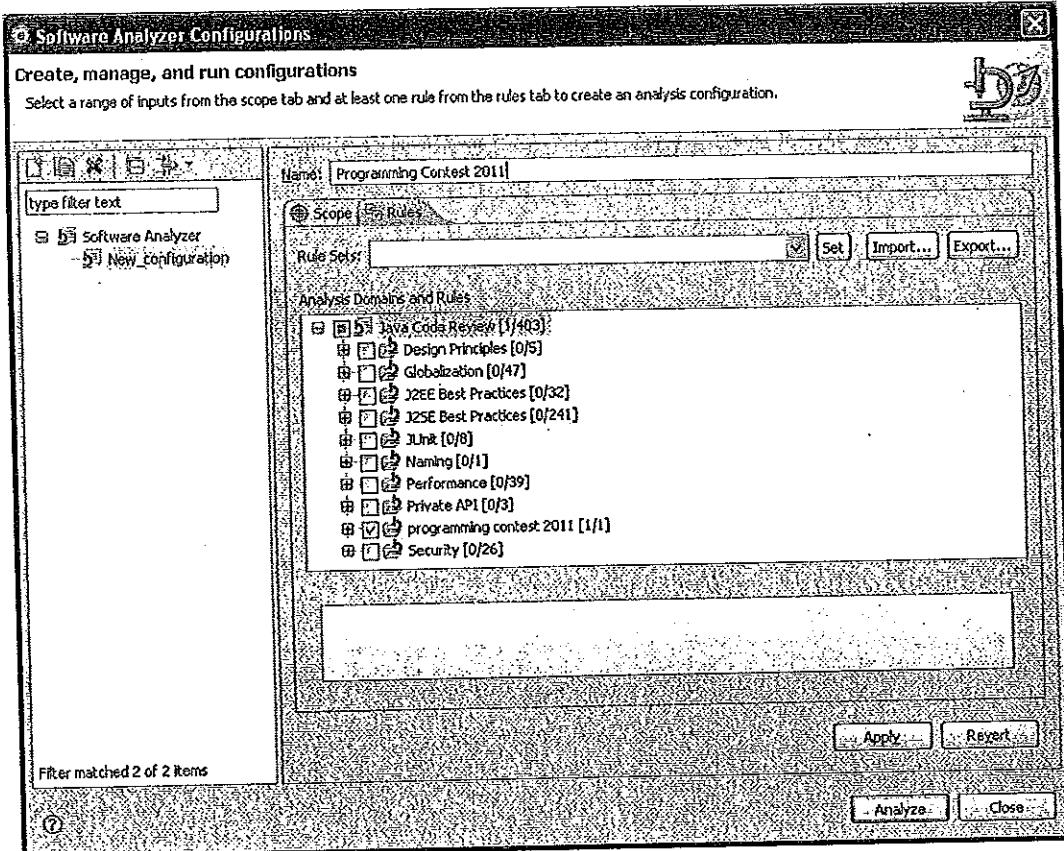
14. Select the “Q0-web” as Analyze selected projects



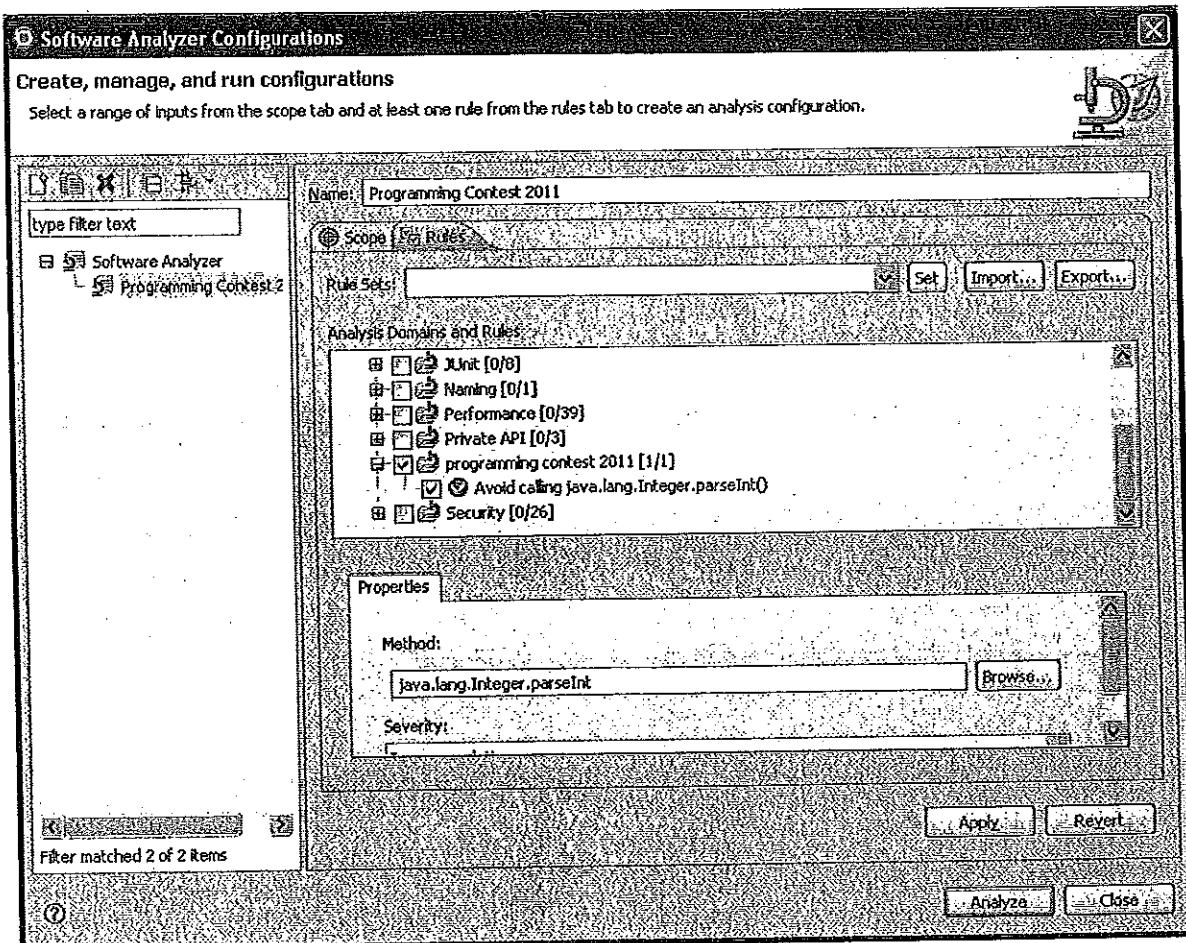
15. Clear the Checkboxes in Analysis Domains and Rules, and check “programming contest 2011”



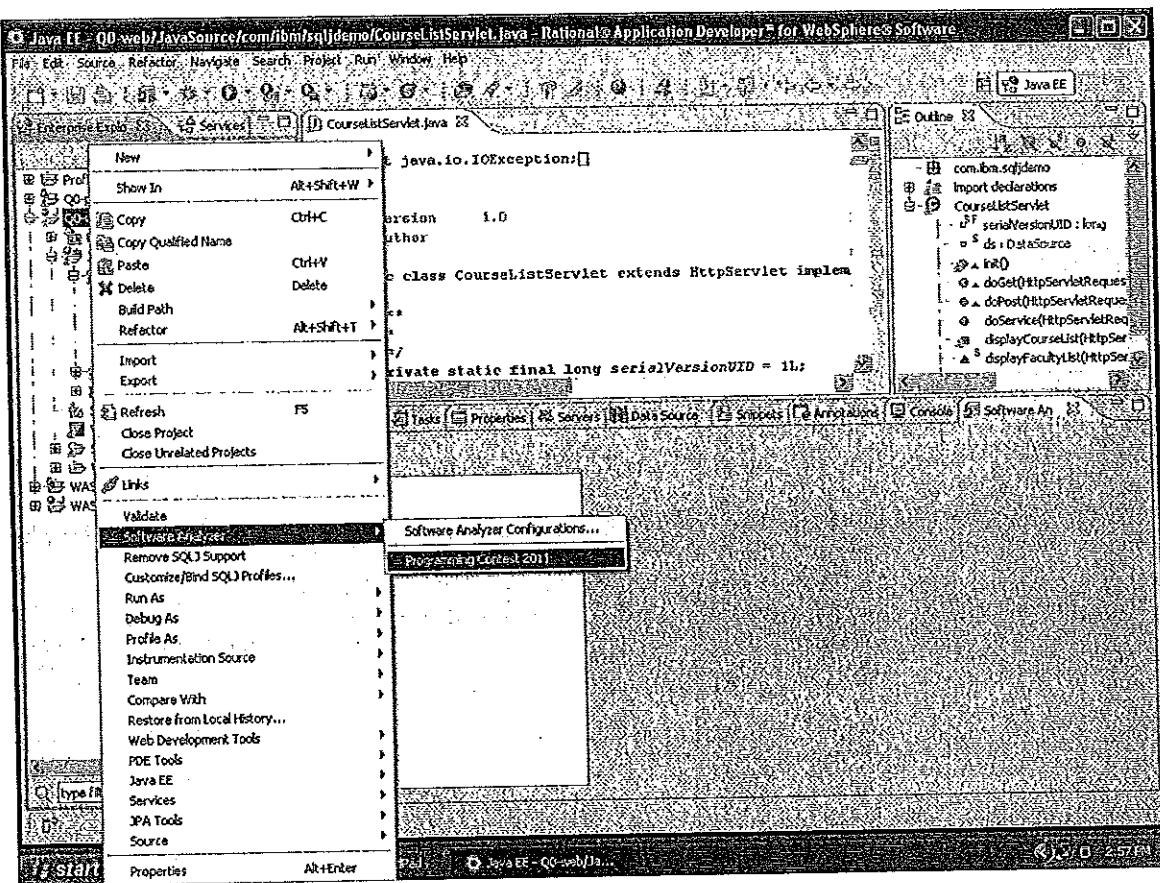
## 16. Rename to “Programming Contest 2011”



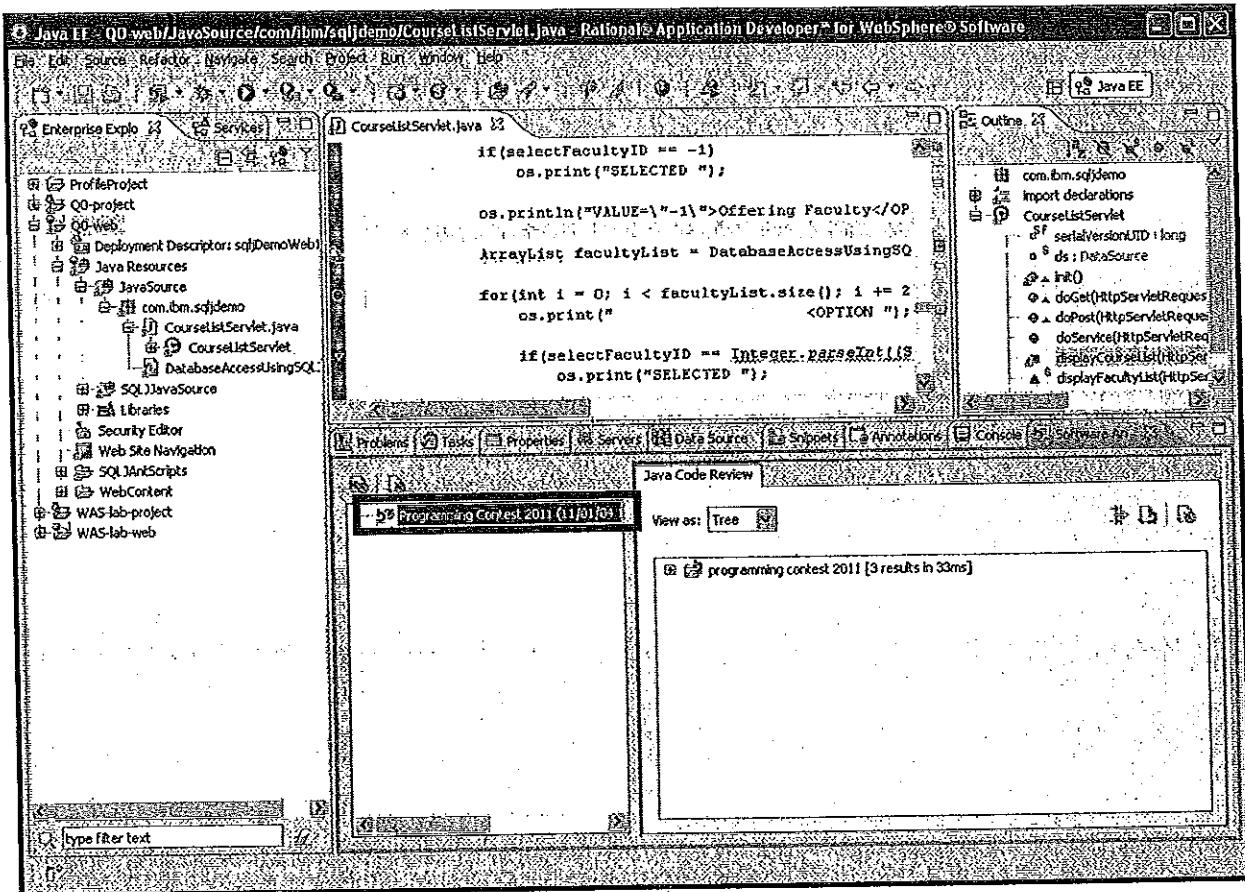
17. Check the “Avoid calling java.lang.Integer.parseInt()”



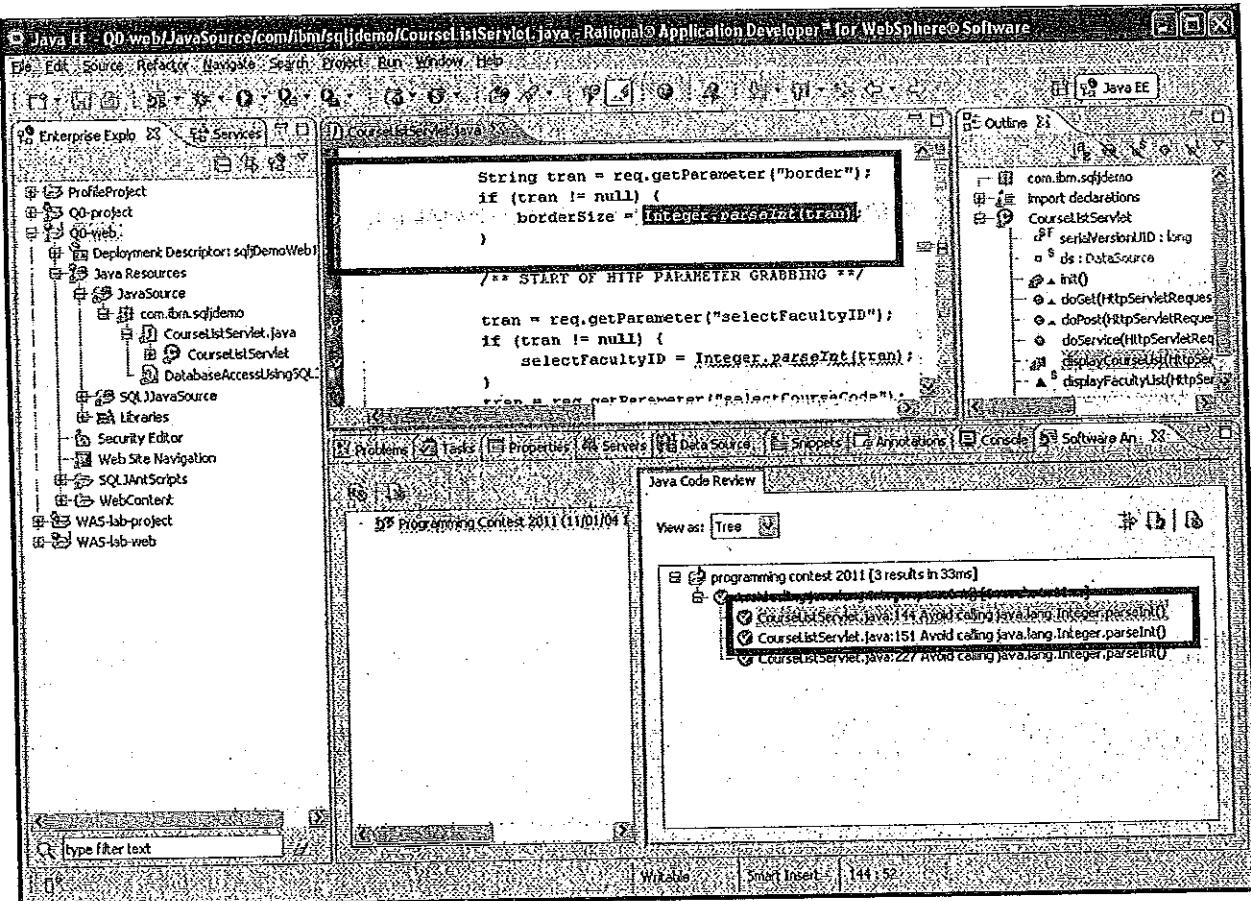
18. Run the analyzer with click Software Analyzer > Programming Contest 2011.



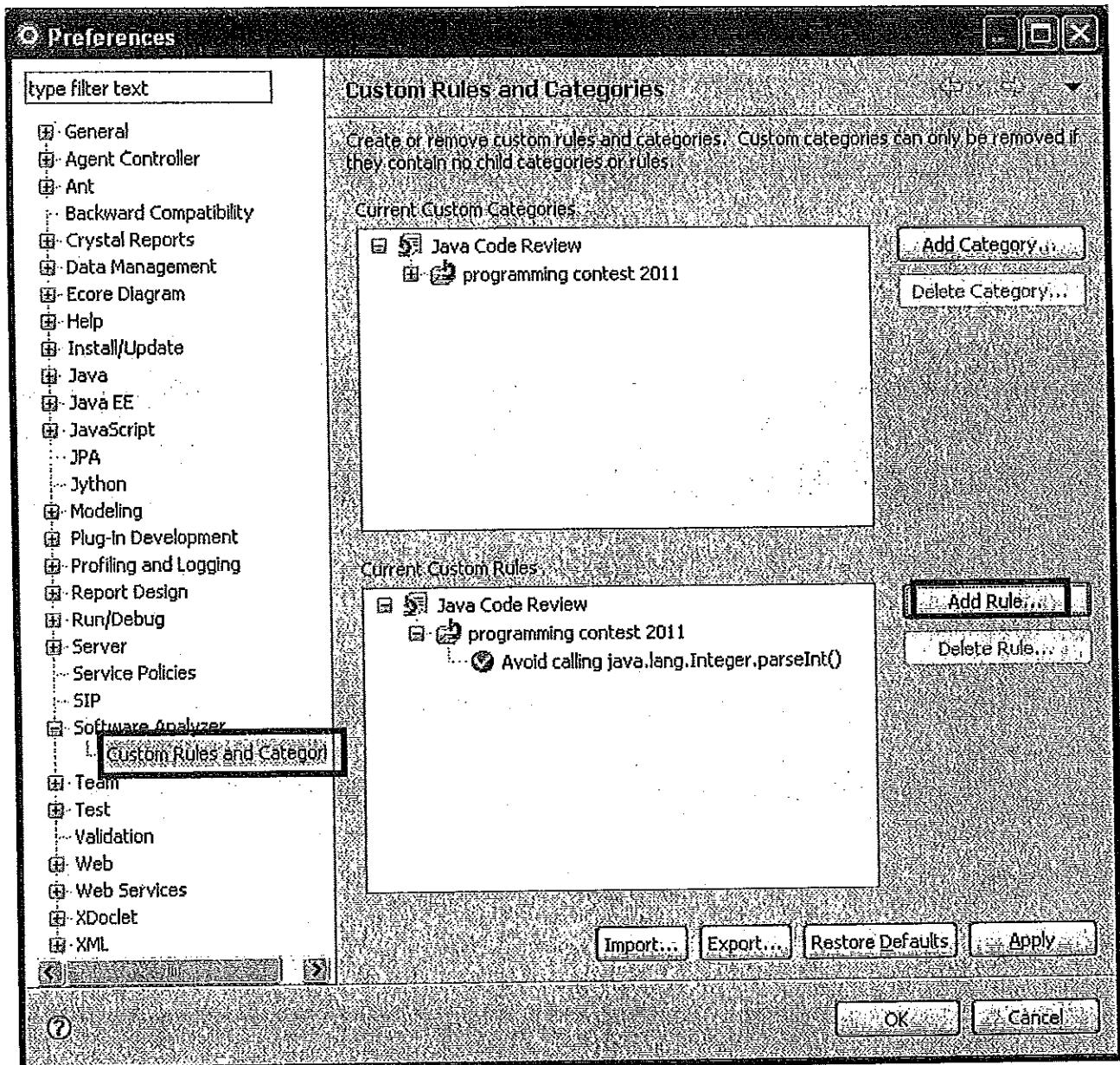
## 19. View the analysis result



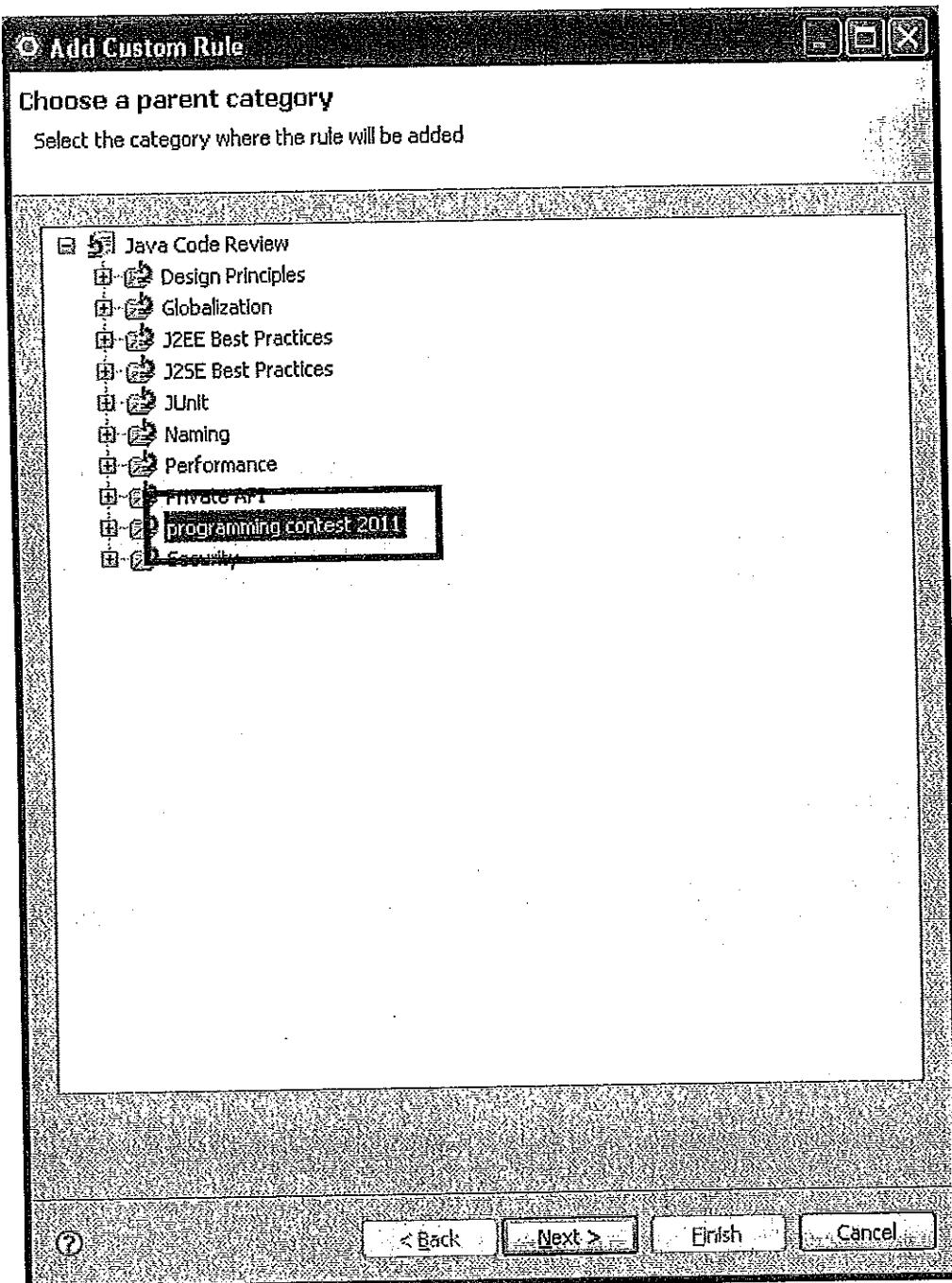
20. Click the node in Java Code Review result pane, will locate to the source with matching pattern.



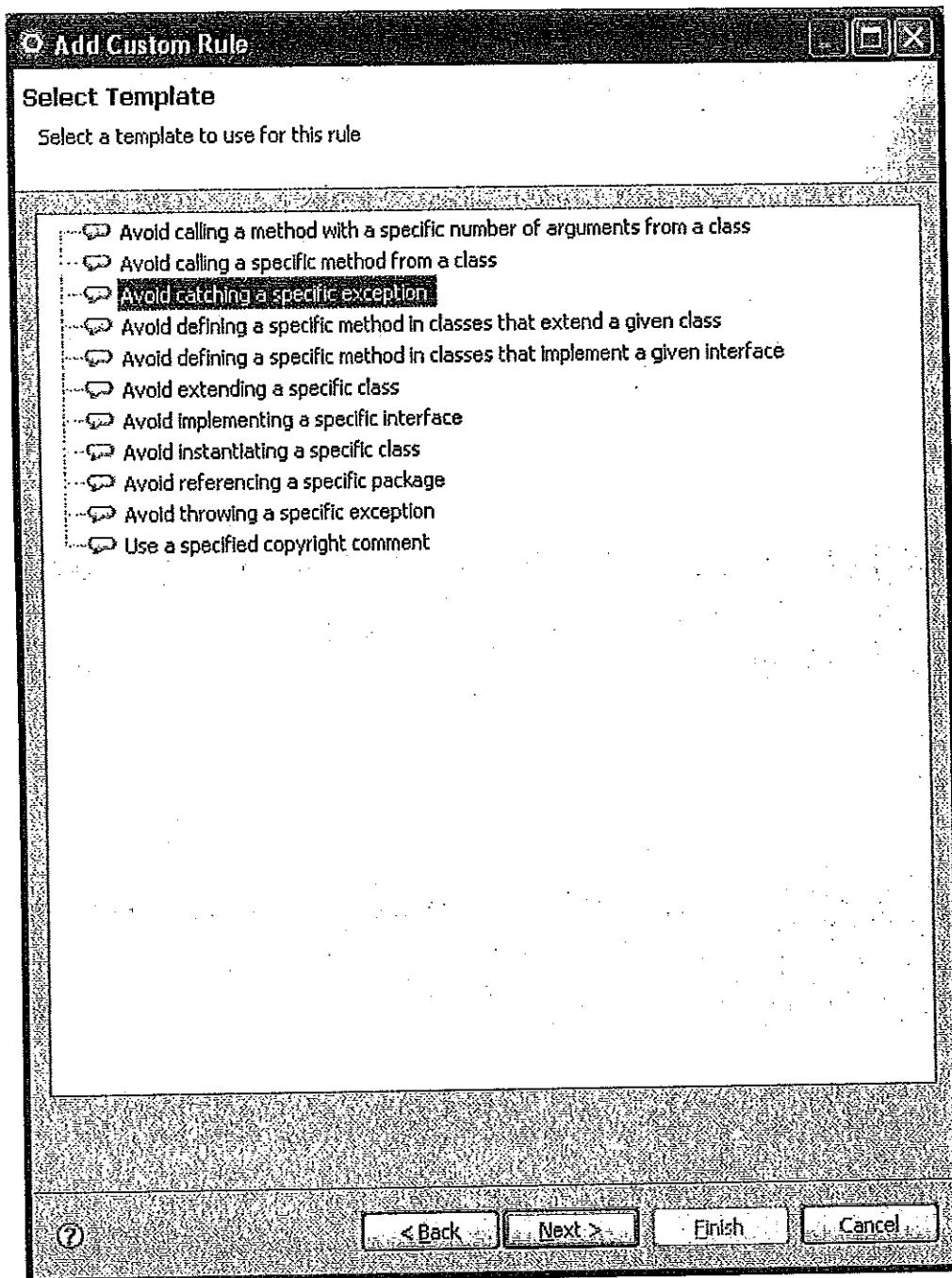
21. In Window > Preferences, select custom rules and category. click Add Rule...



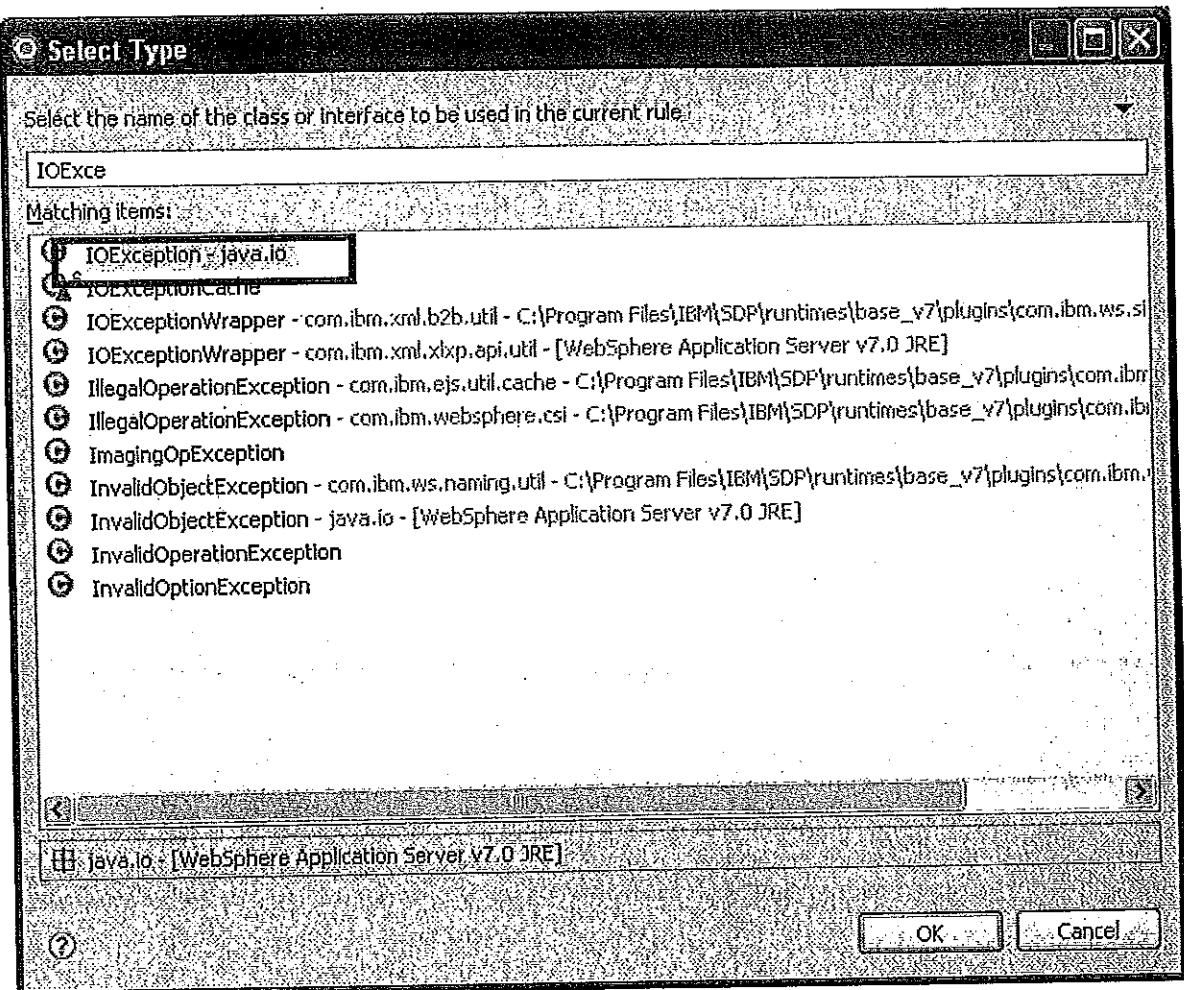
22. Select programming contest 2011 as parent category



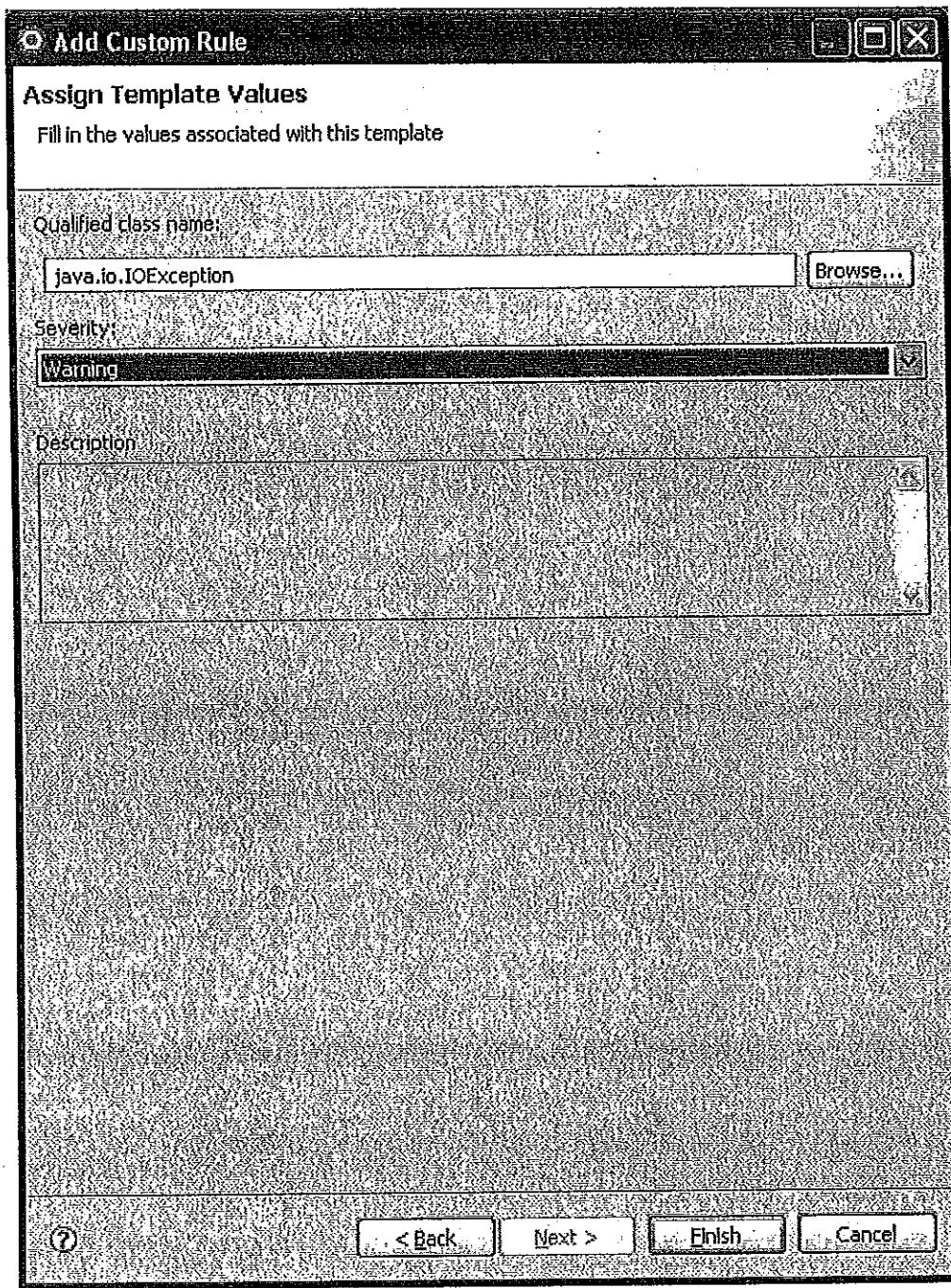
23. Select template as “Avoid catching a specific exception”



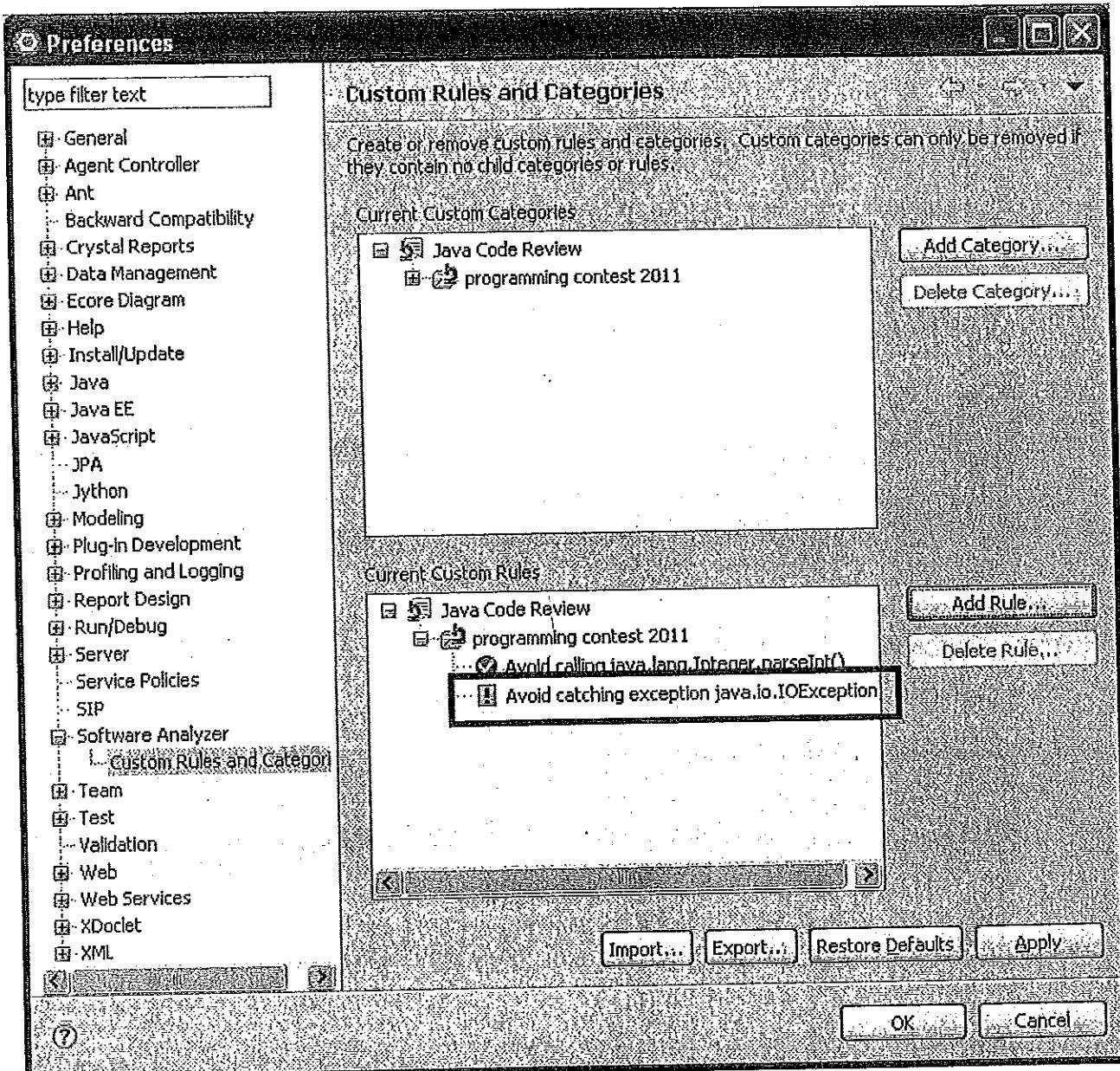
## 24. Look up IOException



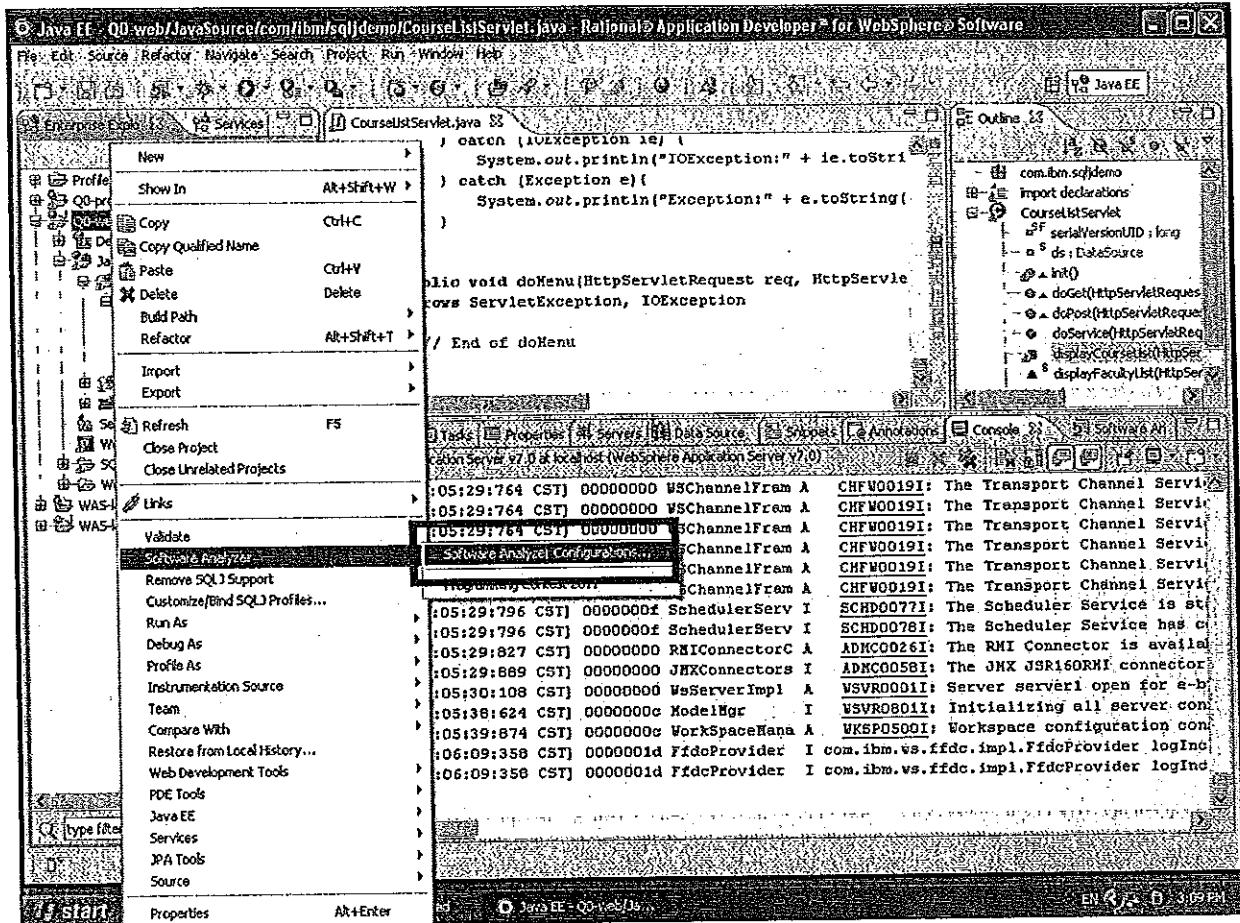
25. Change the severity to “Warning”



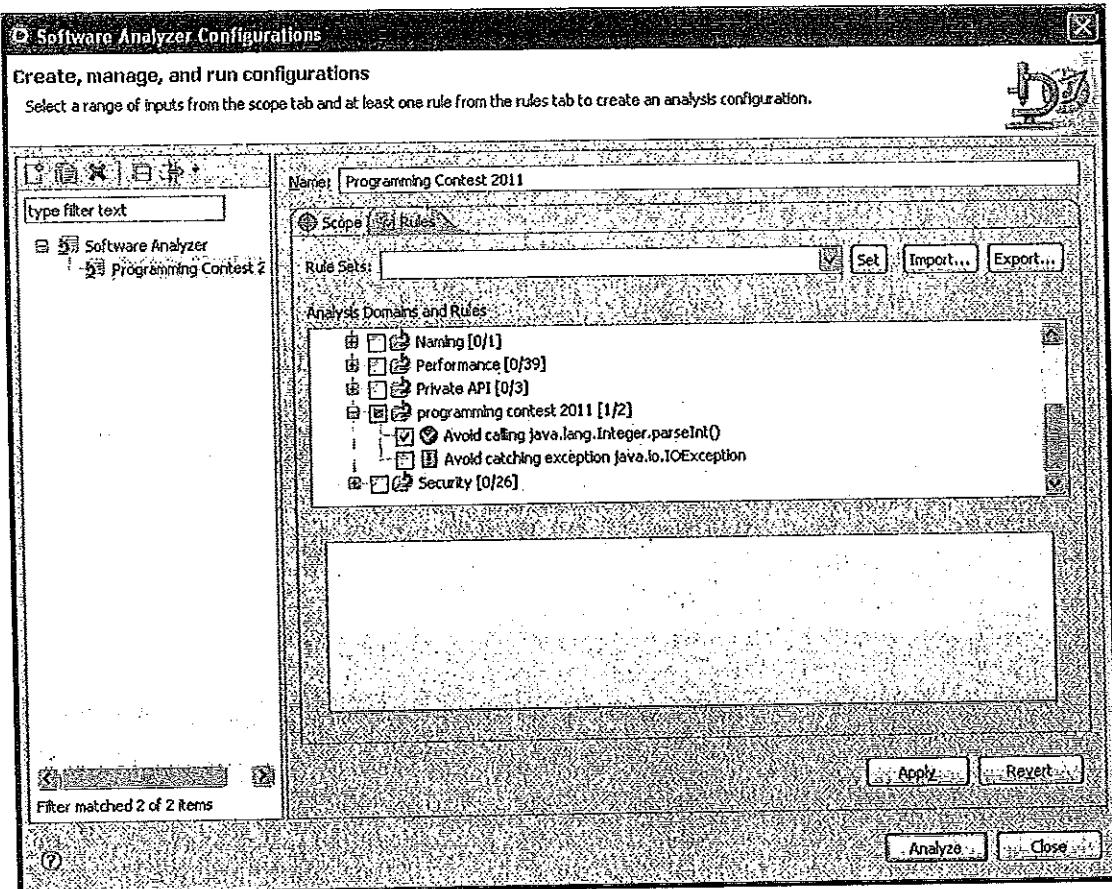
26. Another rule created.



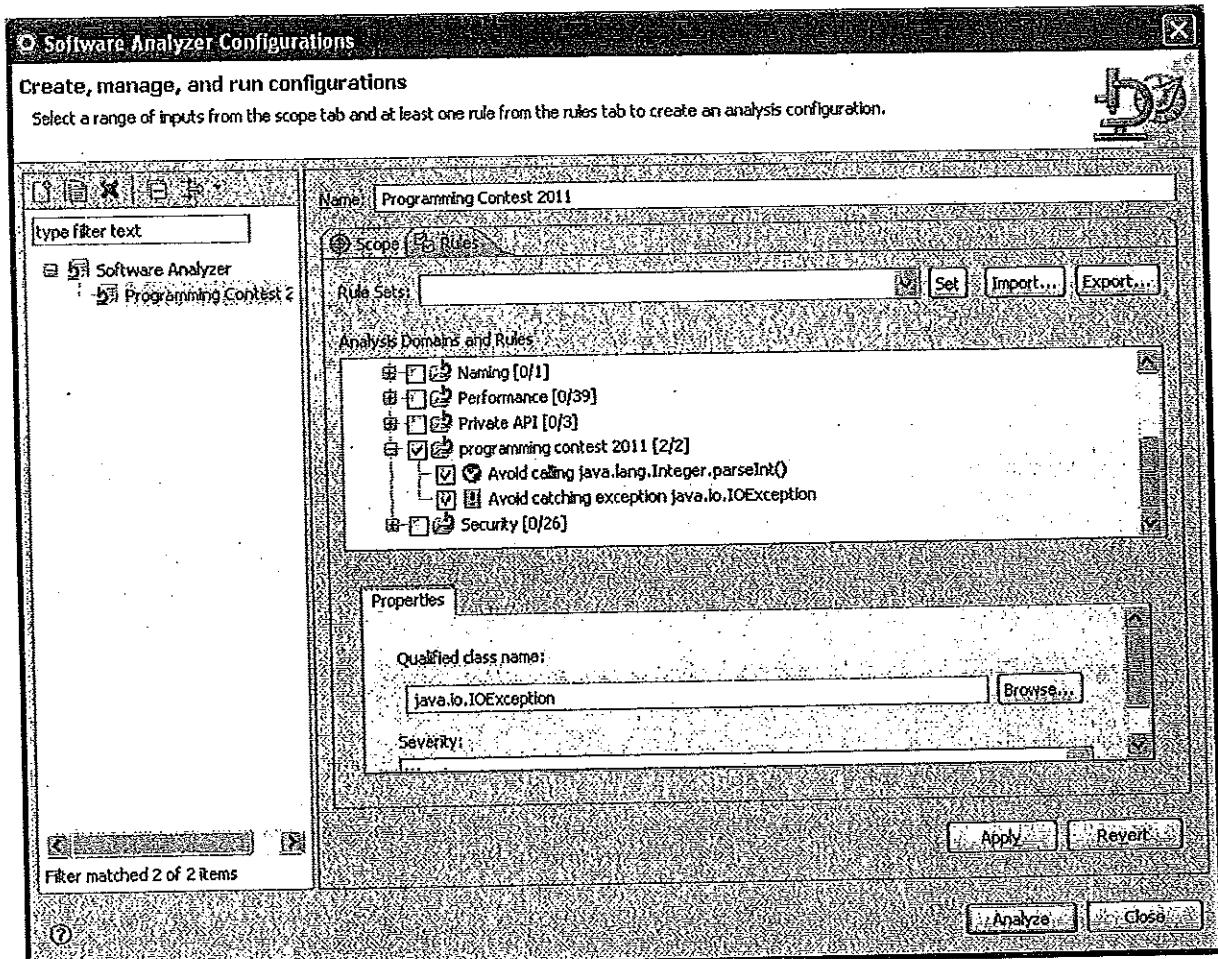
## 27. Config the Software Analyzer Configuration.



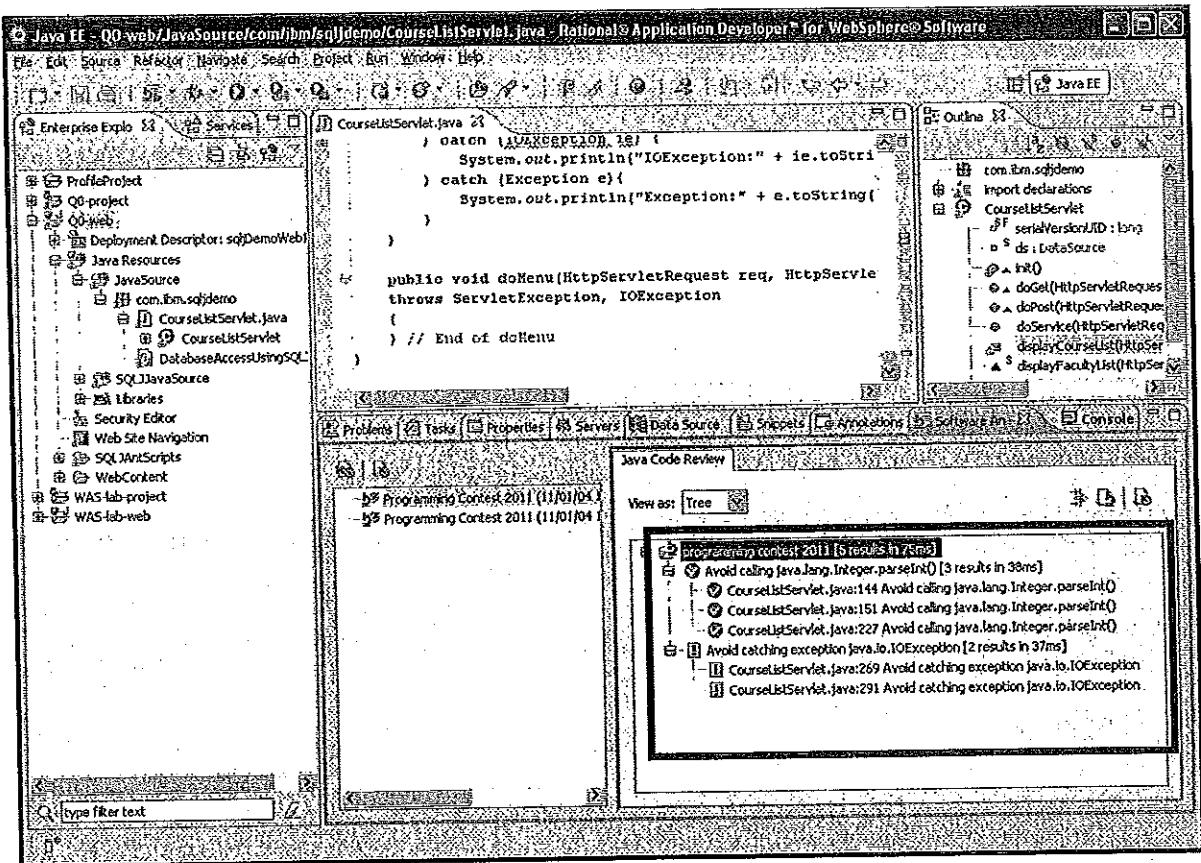
28. Goto the node programming contest 2011.



29. Check the “Avoid Catching exception java.io.IOException” and Apply.



30. Run the analyzer again, and you can see more results.

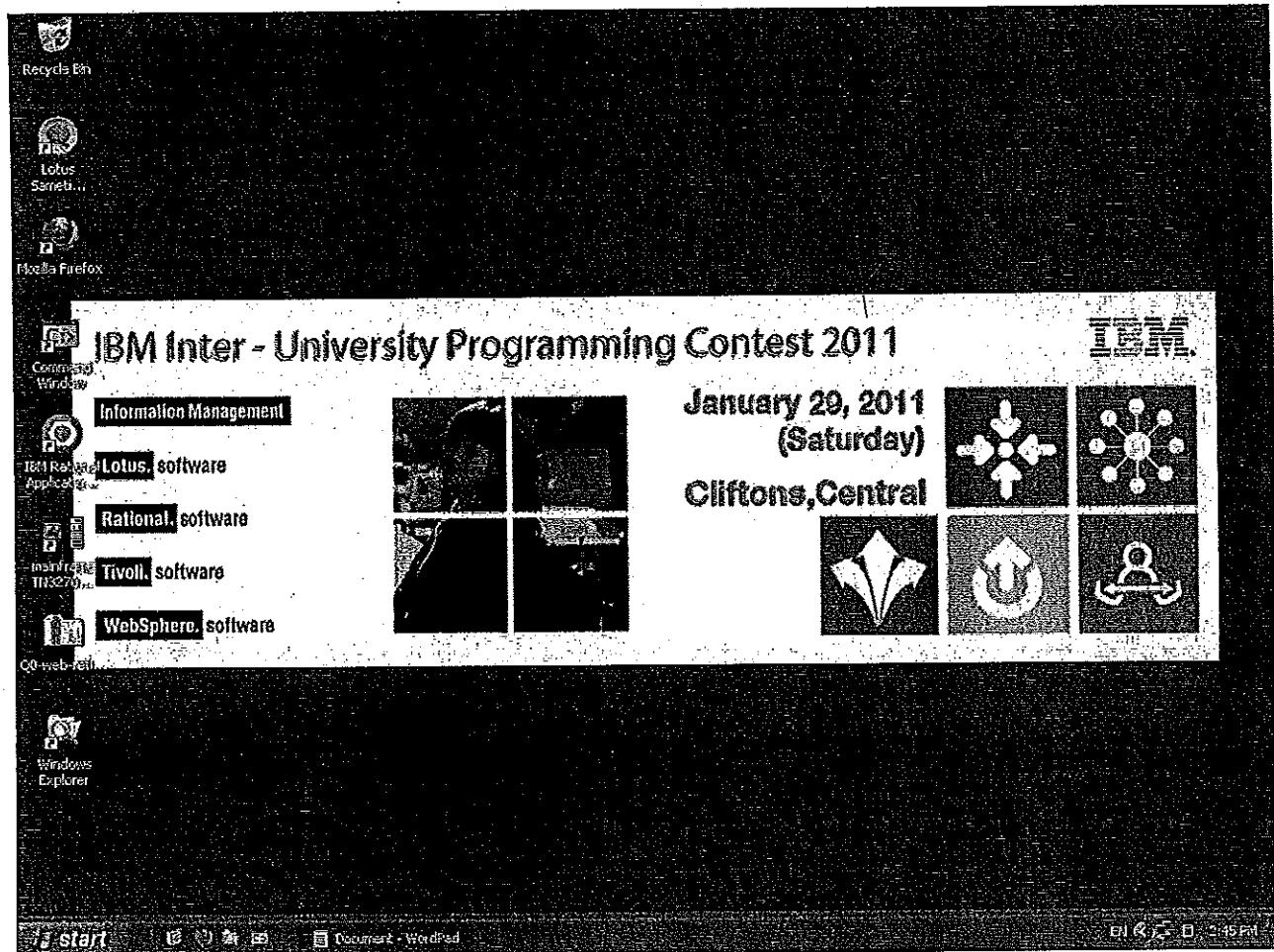


---End of Lab---

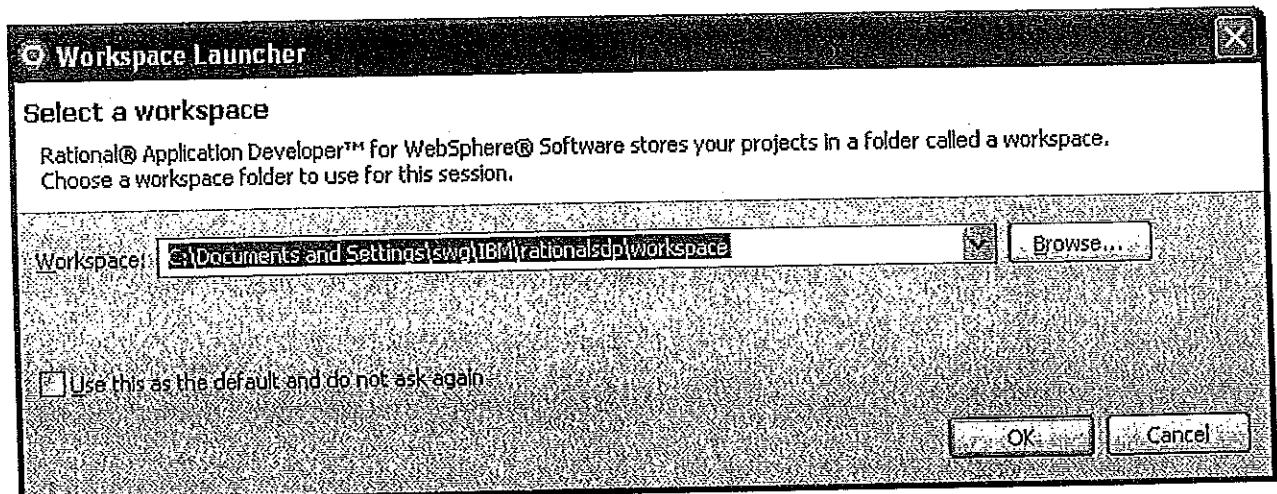
## **Chapter 6b: Debug using IBM Rational Application Developer**

Start IBM Rational Application Developer (RAD) to develop J2EE application which will be used during the programming contest. RAD is a GUI integrated development environment (IDE) which is used to perform J2EE and web programming. The resultant programs will be published to WebSphere Application Server so that it can be executed in the web environment.

1. Double clicked the icon "IBM Rational Application Developer" on Desktop to start.



2. Banner will appear and a 'Workspace Launcher' window will appear which allows you to choose the base location of the workspace, type:  
"C:\Documents and Settings\swg\IBM\rationalsdp\workspace" as workspace.



3. Open the source CourseListServlet.java. Double click the blue left bar at line 172 to create breakpoint

The screenshot shows the Rational Application Developer interface with the Java editor open. The code in the editor is:

```

if (tran != null) {
    selectFacultyID = Integer.parseInt(tran);
}
tran = req.getParameter("selectCourseCode");
if (tran != null && tran.compareTo("") != 0) {
    selectedCoursesCode = new String(tran);
}

/* END OF INPUT PARAMETER RECEIVED */

/* START OF COURSE LIST */

os.println("<B> Optional Courses </B>");
os.println("<TABLE WIDTH=\"500\" BORDER=" + String.valueOf(borderSize) + " ");
os.println("    <TR>");
os.println("        <TH>Course Code</TH>");
os.println("        <TH>Title</TH>");
os.println("        <TH>Offering Faculty</TH>");
os.println("        <TH>Unit</TH>");
os.println("    </TR>");

os.println("        <TD>" );
os.println("            <TD>" + (String) courseList.get(i) + "</TD>" );
os.println("            <TD>" + (String) courseList.get(i + 1) + "</TD>" );
os.println("            <TD>" + (String) courseList.get(i + 2) + "</TD>" );
os.println("            <TD>" + (String) courseList.get(i + 3) + "</TD>" );
os.println("        </TD>");

    
```

A tooltip window is displayed over the code at line 172, showing:

- Multiple markers at line 172
- !breakpoint!CourseListServlet [line: 172] - displayCourseList(HttpServiceRequest, HttpServiceResponse, ServletOutputStream)
- !breakpoint!

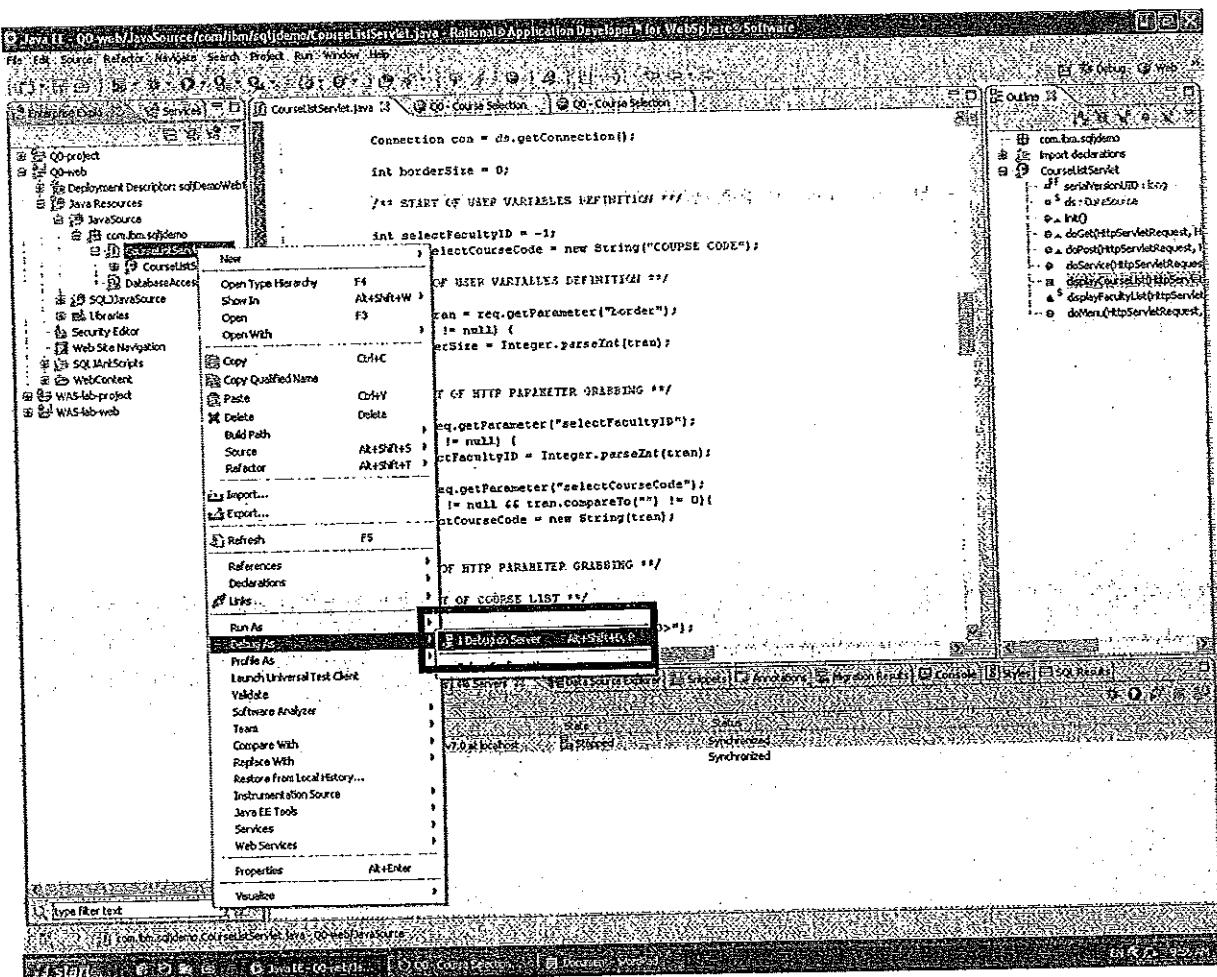
The status bar at the bottom of the IDE displays server logs:

```

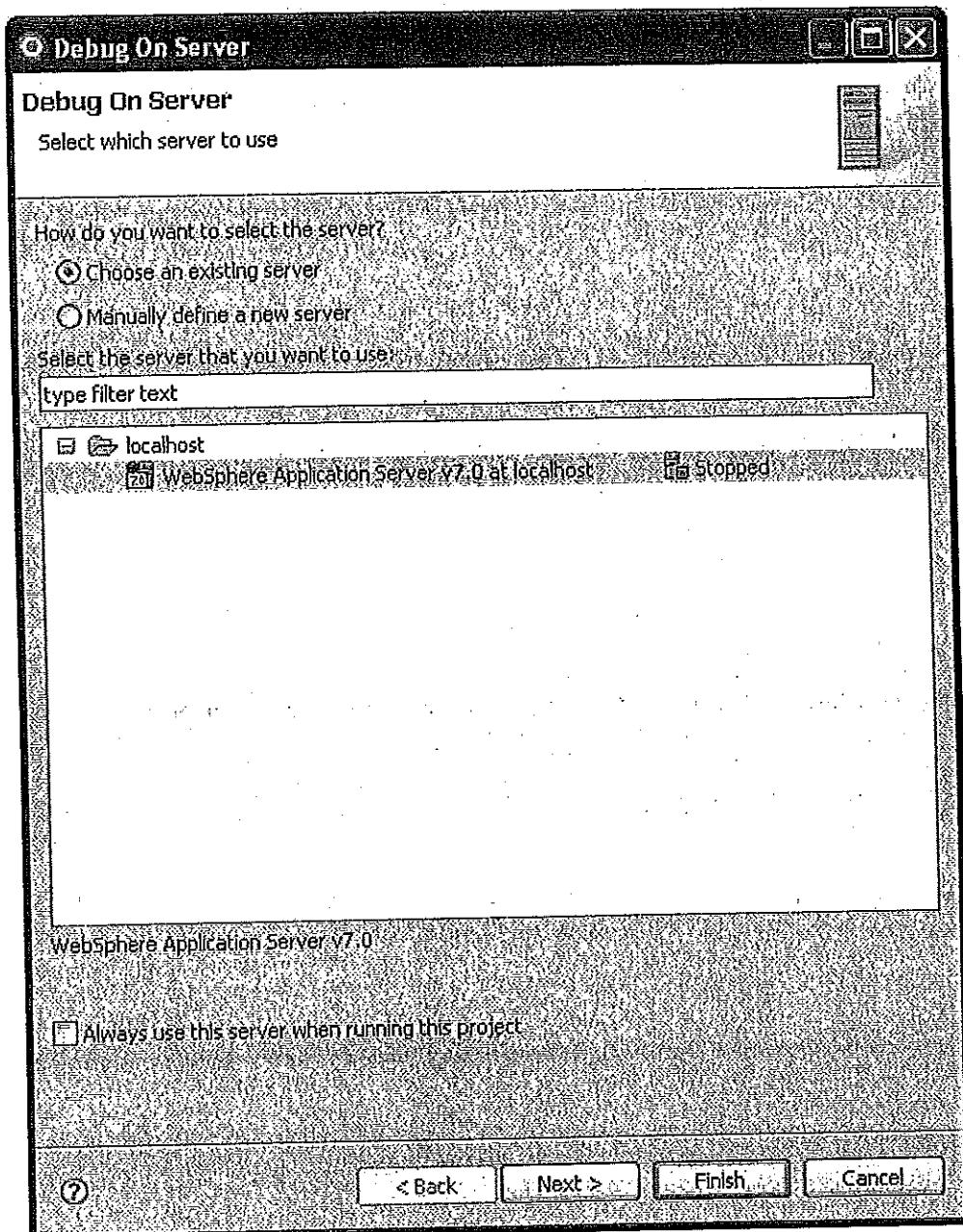
IBRM0016I: Tool information is being logged in file C:\Program Files\IBM\SDP\runtimes\base_V7\profiles\was70profile\logs\server1\startServer.log
IBRM0028I: Starting tool with the was70profile profile
IBRM3100I: Reading configuration for server: server1
IBRM3200I: Server launched. Waiting for initialization status.
IBRM3000I: Server server1 open for e-business; process id is 2252

```

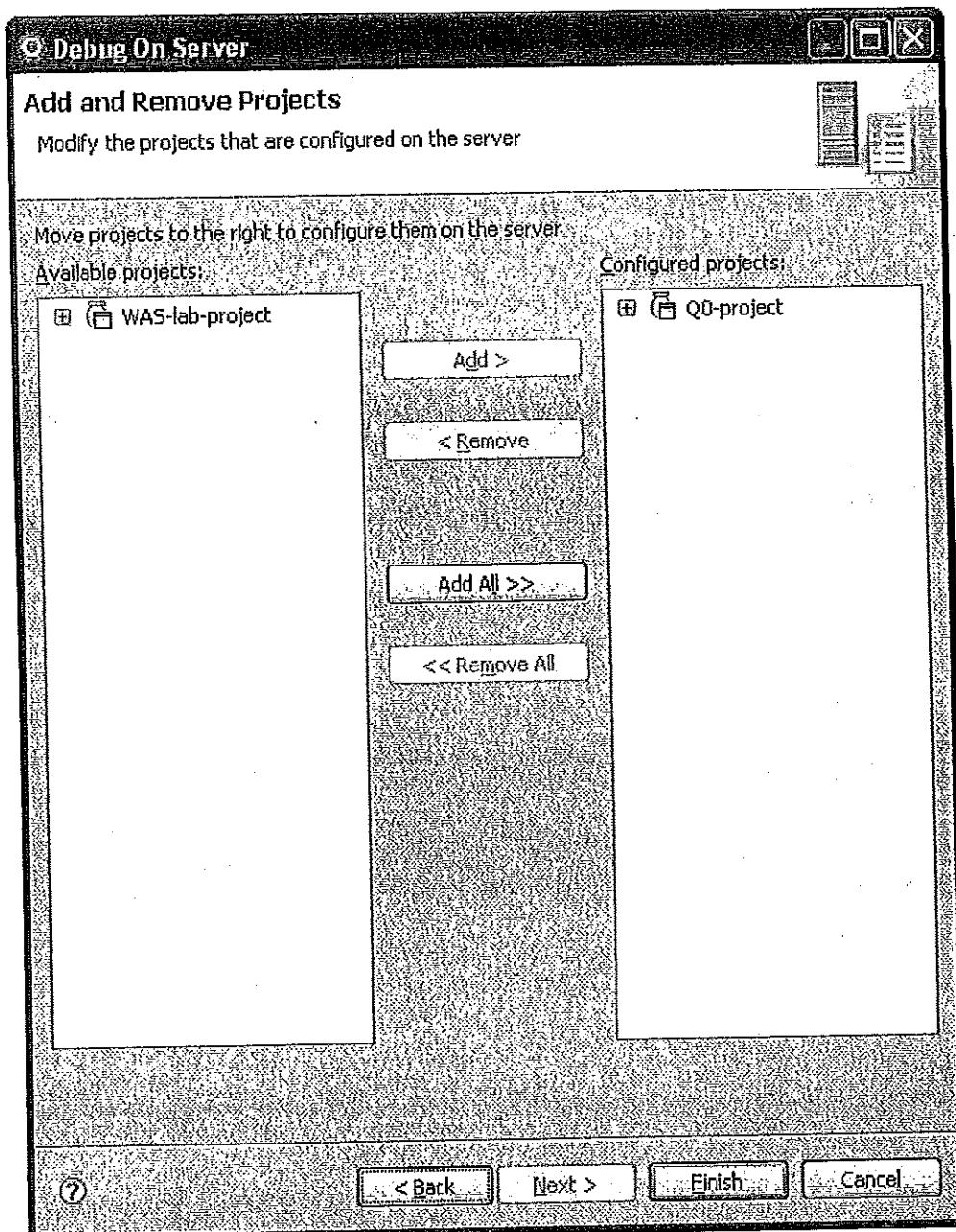
4. Right click the CourseListServlet.java file node, click Debug As > Debug on Server.



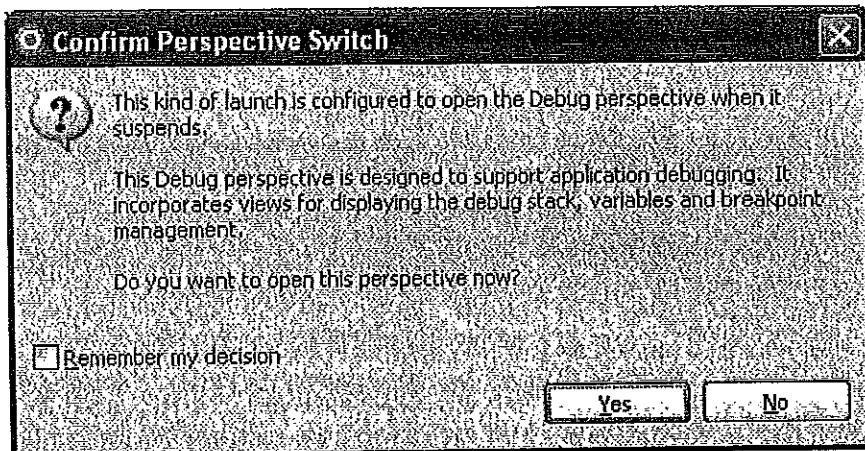
5. Choose WebSphere Application Server v7.0 at localhost as the server.



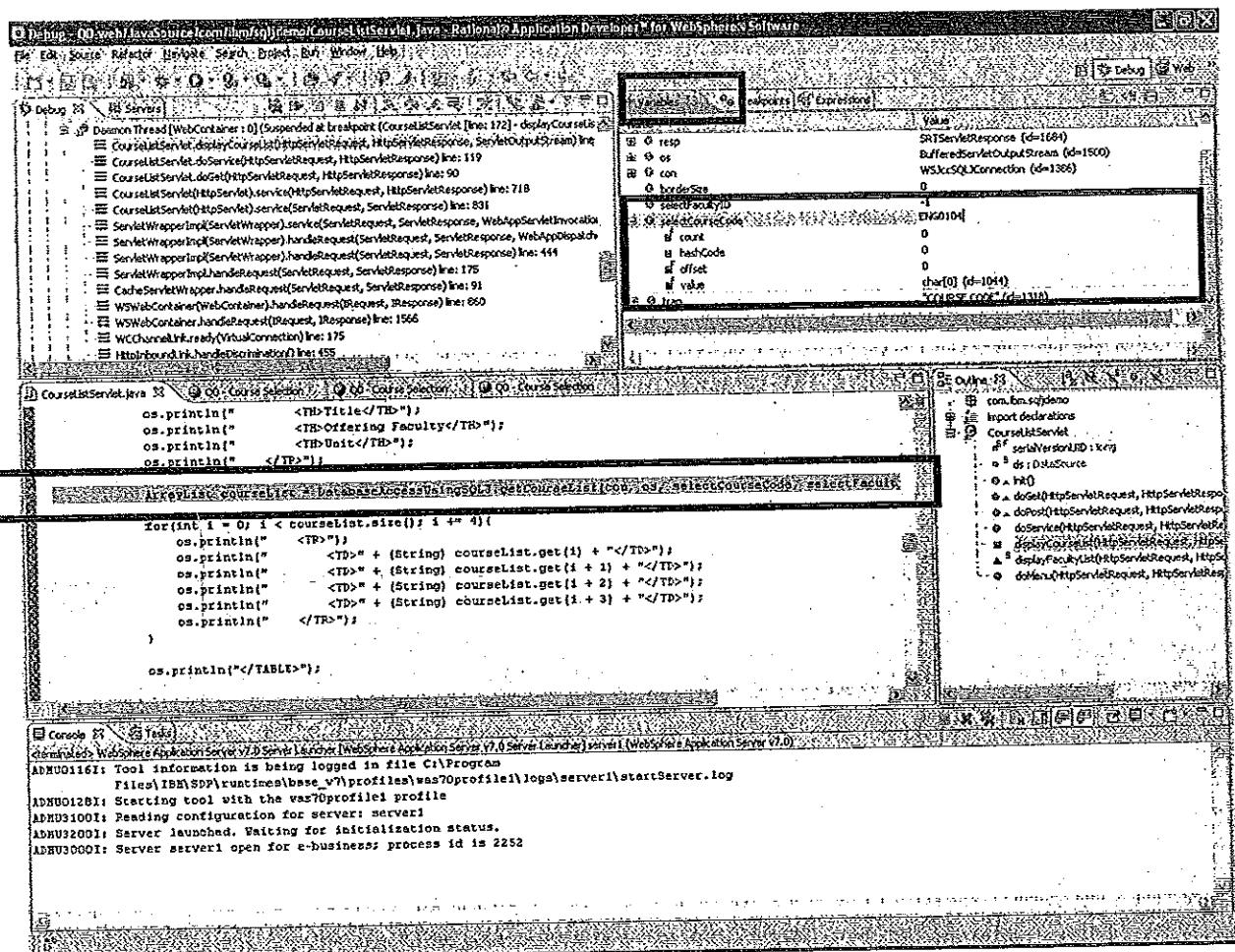
6. Include Q0-project in the Project to debug



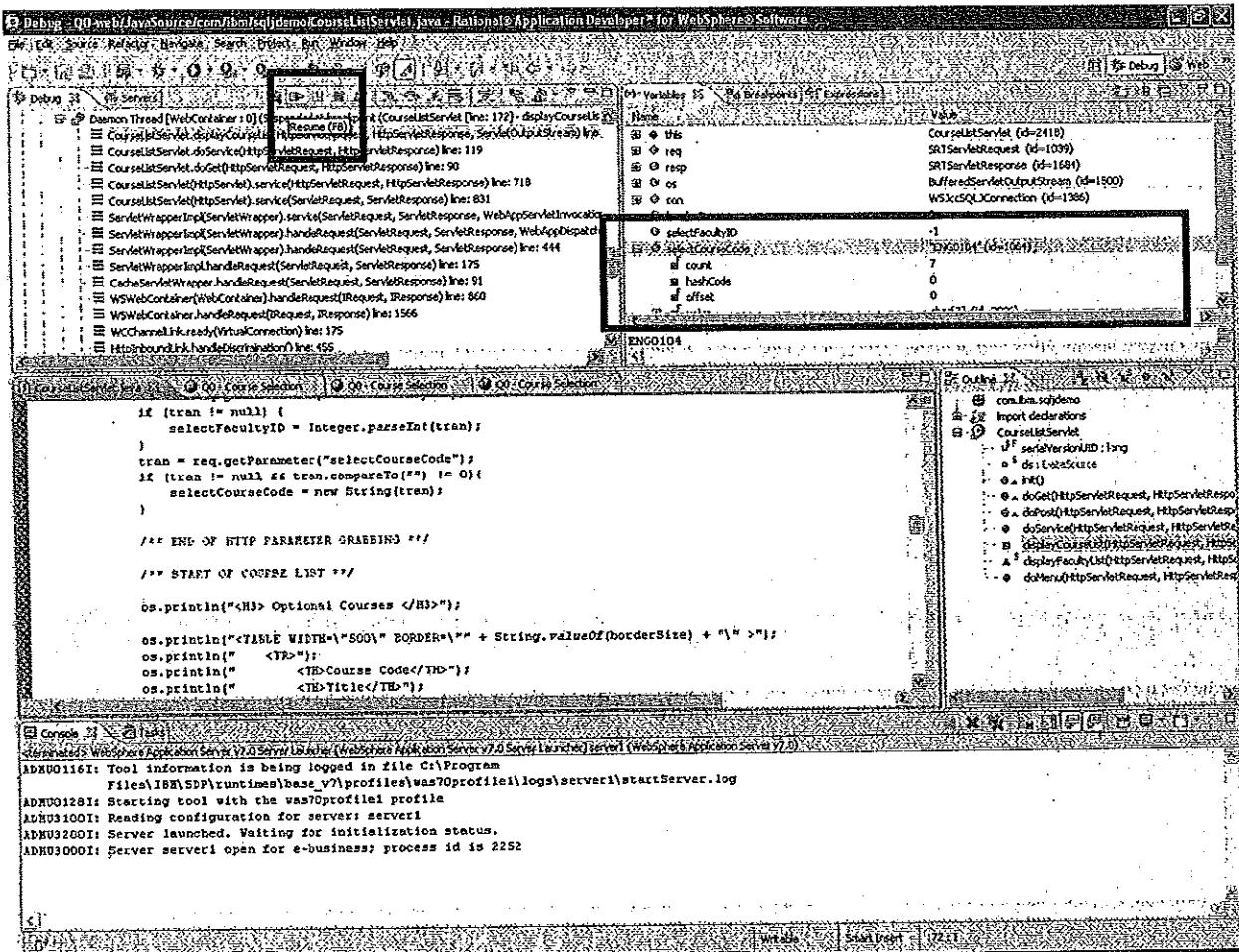
7. It may switch to Debug perspective, click Yes.



8. Prompt the debug perspective, and locate to the breakpoint just defined on line 172. And in Variables View, you may found the node selectCourseCode



9. click the value of selectCourseCode, edit it to "ENG0104", leave the box to save. Click resume.



10. Return to the browser, you may found the value of edit box changed to "ENG0104". Which the value has been updated in debug.

Q0 - Course Selection - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:9080/Q0-web/CourseIdServlet?border=0&selectFacultyID=1&selectCourseID=1

Q0 - Course Selection

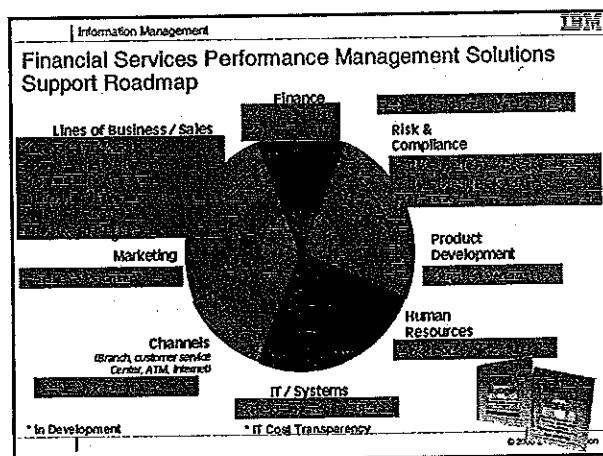
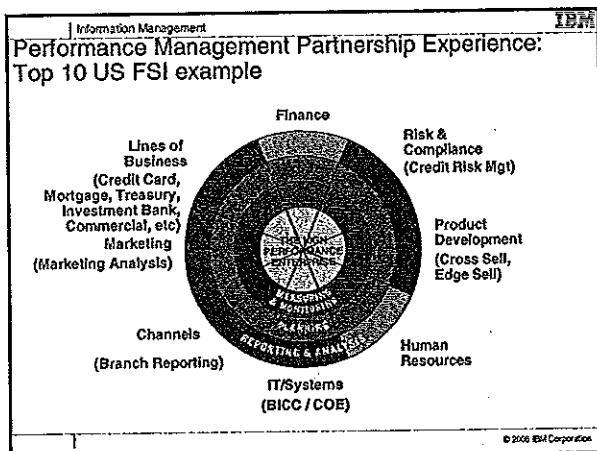
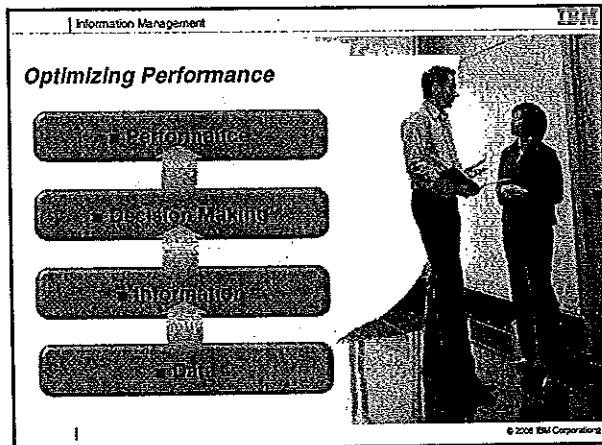
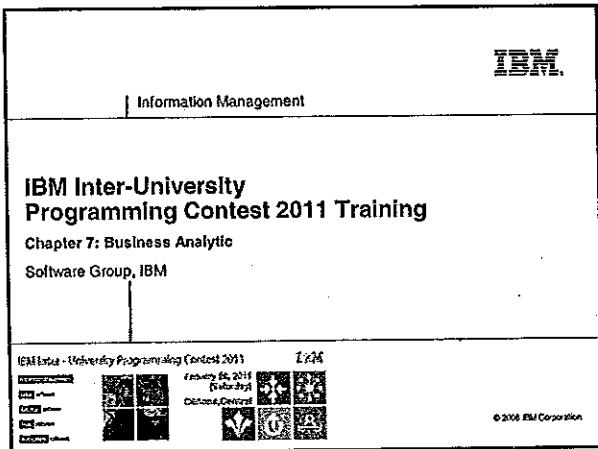
Optional Courses

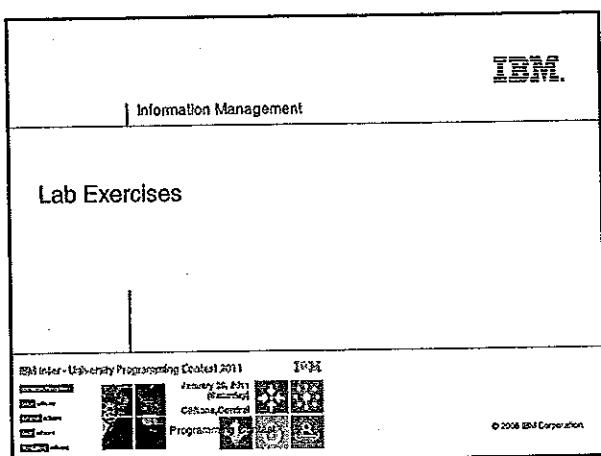
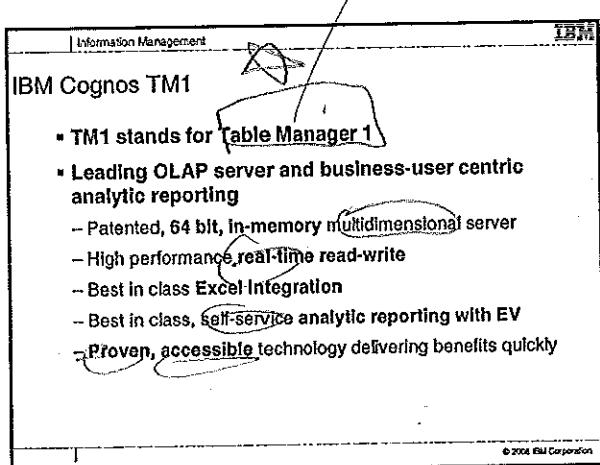
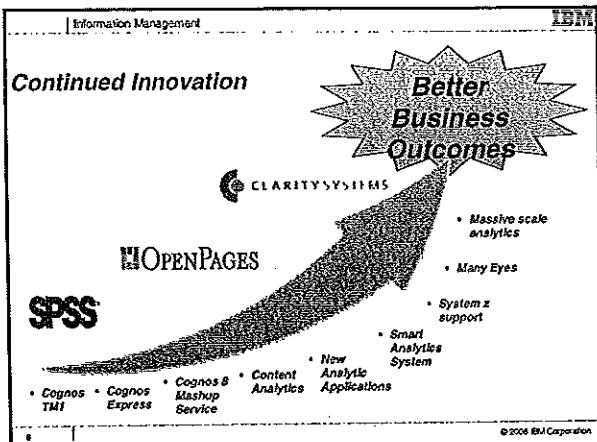
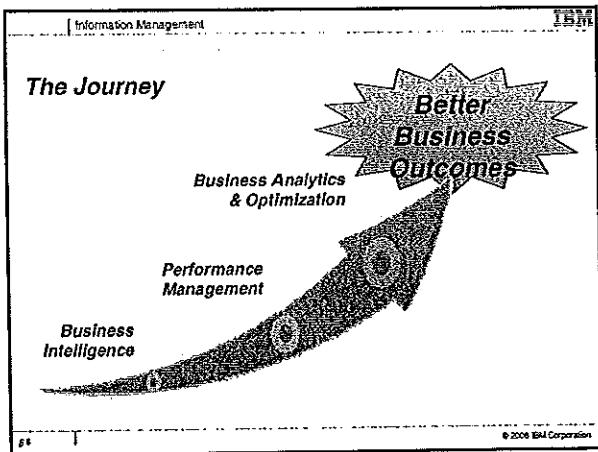
| Course Code | Title                   | Offering Faculty | Unit |
|-------------|-------------------------|------------------|------|
| ENG0104     | Engineering mathematics | Engineering      | 3    |

[List of Faculty](#) [Show border](#)

Done

--end of lab--





IBM Cognos TM1  
real time

**Information Management**

### Multiple Choice Input Process

- Login Screen**
  - User Login / Password
- After login, it will show your team name and your login name with the**

© 2008 IBM Corporation

**Information Management**

### MC Navigation

Click Next for the next Question

Click Summary page to submit

Question navigation bar.

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**Information Management**

### Submission

You can change your answer here. Please click on the submit button to submit your answer. Note that you can only submit once.

Alternatively, you can input your answer here {

Press Submit button when you are done

Cognos software

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**Information Management**

### Submission (Cont'd)

You can change your answer here. Please click on the submit button to submit your answer. Note that you can only submit once.

Status: Scheduled

Status get updated

If you submit again, you will get error message

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**Score Dashboard**

Once submitted, score will be updated immediately

Current Leader: HKU Team 9, UST Team 3

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**Judge Input Score**

Please input the score for each question. The highest among the 3 scores will be the final score for each question.

| Category | Team   | Q1  |     |     | Q2  |     |     | Q3  |     |     | Q4  |     |     |
|----------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          |        | 1st | 2nd | 3rd |
| China    | Team 1 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |
| USA      | Team 2 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |
| Malta    | Team 3 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |
| Denmark  | Team 4 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |
| UK       | Team 5 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |
| China    | Team 6 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |
| Denmark  | Team 7 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |
| HKU      | Team 8 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |     |

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Just input the 3 attempts of each question for each team respectively

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**Administrator Dashboard**

Current Leading Team

Current Leader: HKU Team 9, UST Team 3

Can view the ranking and the Total Score of each team, and the marks difference from the leader, but this is a read-only dashboard

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## **Chapter 7: Multiple Choice Screen Walkthrough**

### **Objectives**

In this exercise, we will learn:

- How to connect to the multiple choice screen
- How to log in
- How to answer each multiple choice question
- How to submit your answer once you are finished
- How to examine your submission status

### **Exercises**

1. In the VM that is started in Chapter 1, open an Internet Explorer and type the URL  
<http://cogserver/tm1web>

You will see the login page like this,

Log In  
Please enter your Information

Admin Host:

TM1 Server:

User Name:

Password:

Please note that after some time of inactivity, the system will log you out automatically and ask you to sign in again.

[Forgot User ID?](#)

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username : team11  
password : password

2. In the Log In screen, just leave the Admin Host blank, and select "planning sample" in the TM1 Server.

Next, Login into the multiple choice application by the supplied credentials. After you had logged in, you can check if the team name and user name is correct.

IBM Cognos Test Web Welcome OneChai Home About Help Log Out

Team 1 User Name: OneChai  
Please click Next or on the bottom tab to go to each question

Q1 Please Provide your question here

A      Ans 1  
 B      Ans 2  
 C      Ans 3  
 D      Ans 4  
 E      Ans 5

**Team Name**

**User Name**

Answer  **Next**

Cognos software

Summary

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Summary

3. After logged in, the first question is displayed and selects the correct answer in the drop down box. Click Next for the next question.

IBM Cognos Test Web Welcome OneChai Home About Help Log Out

Team 1 User Name: OneChai  
Please click Next or on the bottom tab to go to each question

Q1 Please Provide your question here

A      Ans 1  
 B      Ans 2  
 C      Ans 3  
 D      Ans 4  
 E      Ans 5

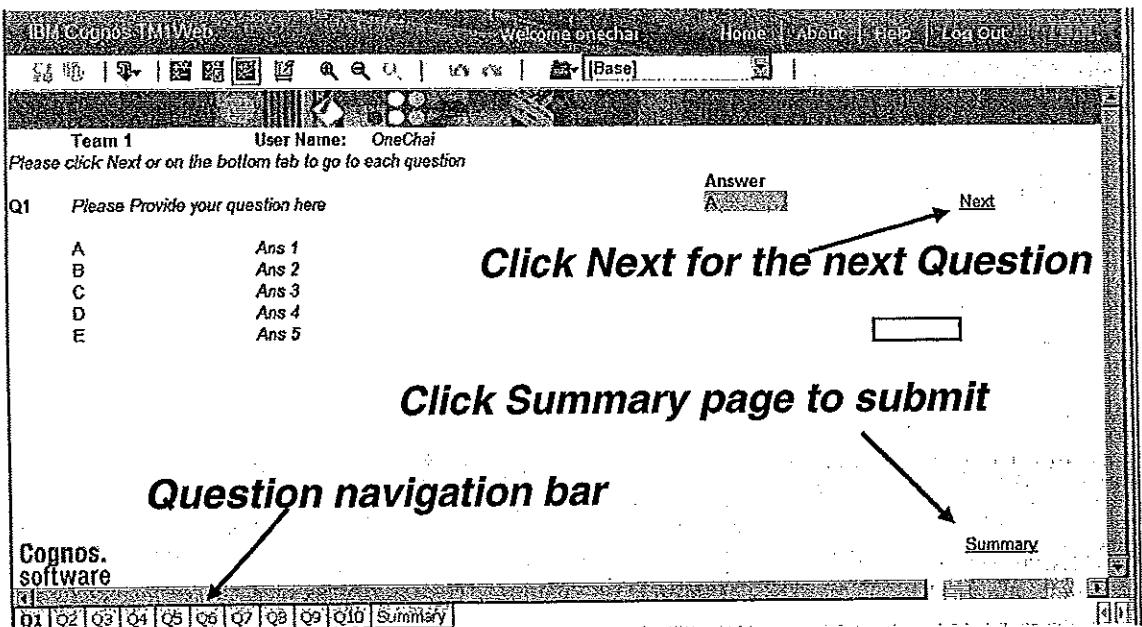
**Select your answer in this drop down box**  **Next**

Cognos software

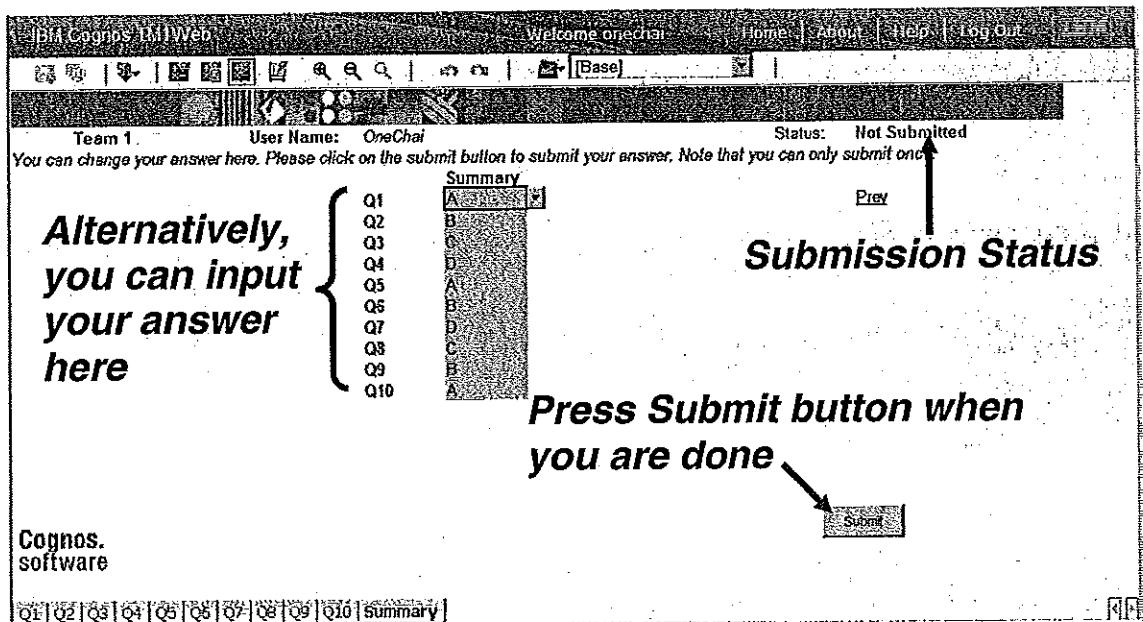
Summary

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Summary

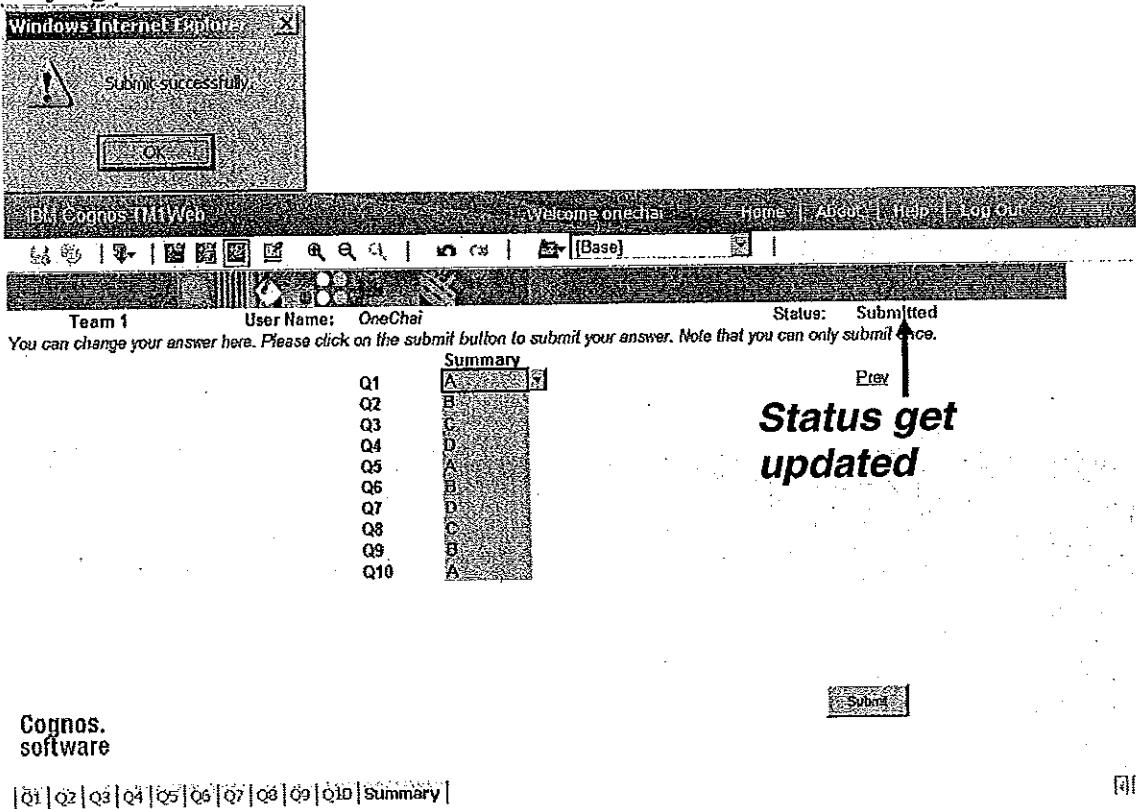
4. To navigate to different questions directly, you may access it through the bottom tab.



5. In order to submit your answer, you must go to the summary page and review your answer. For your convenience, you may also answer the question in this summary page directly from each of the drop down box besides the question number. Note that your Status now should be "Not Submitted". After you confirm it, press the button "Submit".



6. Once you submitted, a confirmation box should be appeared. Also check the status should be changed to "Submitted". If you got an error message, please contact your judge.



7. If you try to resubmit your answer, you will get an error message like this.

Welcome OneChai

Home | About | Help | Log Out

Team 1 User Name: OneChai Status: Submitted

You can change your answer here. Please click on the submit button to submit your answer. Note that you can only submit once.

|    | Summary | Prev |
|----|---------|------|
| Q1 | A       |      |
| Q2 | B       |      |
| Q3 | C       |      |
| Q4 | D       |      |

Windows Internet Explorer

You have already submitted or submitted! Please contact Administrator.

OK

Cognos.  
software

|Q1|Q2|Q3|Q4|Q5|Q6|Q7|Q8|Q9|Q10|Summary|

If you submit again, you will get  
error message



- Once you have submitted your answer, the score will be appeared in the Score Dashboard after a refresh.

