# COMP 102: Computer & Programming Fundamentals I

## Homework Assignment #3

Program design due on **2 August 1996 in class**

Final program due on **9 August 1996 in class**

## Problem Description:

Some supermarkets use computerized scanning equipment that allows the checkout clerk to drag an item across a sensor that reads the bar code on the product container. After the computer reads the bar code, the store inventory database is examined, the item's price and product description are located, counts are reduced, and a receipt is printed. Your task is to write a program that simulates this process.

Your program will need to read the inventory information from the data file a:invent.txt on disk into arrays. The data in the inventory file is written one item per line, beginning with a 3-character product code, followed by a 30-character product description, its price, and the quantity of that item in stock. To make the inventory system efficient you have to keep the items sorted internally by the product codes. Sorting the array allows you to search for a specific data item more efficiently.

Processing customer's orders involves reading a series of product codes with quantities representing each person's purchase from the current inventory. A zero product code is used to mark the end of each customer's order. The inventory shall be updated depending on the customer's order. If the customer's order exceeds the actual inventory for some item X, then ignore the purchase of this item and add in the receipt the message: item X is out of stock. At the end of processing a customer's order, a receipt shall be produced to the standard output (cout) showing the product description and the overall price (i.e. quantity * price). Your program shall continue accepting customer's purchases until the user types in quit so as to terminate the program. Upon termination of the program, the program writes the updated inventory sorted to the file a:inventUpdated.txt.

### A SAMPLE OF INVENT.TXT

```
cdw Cool Dis Water                 4.30    10
dfm Diary Farm Milk                33.90   5
sab Sandwich Bread                 4.60    8
jjc JJ Put-up Chip                 2.50    20
SFB Sugar Fruit Bag                10.80   10
cto Cogate Toothpaste 225G         17.20   24
zls Zip Liquid Soap                9.25    12
bad Bandages Adhesive 250 CT       58.0    30
cfr Cheese Frank 1/2 KG            18.00   15
psa Pork Sausages 1/2 KG           16.00   5
MVe Mixed Vegetables 1 LB          7.20    6
BaS Bacon Sliced 1 LB              16.80   5
```

**A SAMPLE CUSTOMER ORDER**

```
cdw       4
dfm       8
sab       1
MVe       2
00
```

**A SAMPLE RECEIPT**

```
Cool Dis Water                 $13.20
item Diary Farm Milk is out of stock
Sandwich Bread                 $4.60
Mixed Vegetables 1 LB          $14.40
------------------------------------
Total                          $32.20
```

**Program Design (30%)**

- Specify the input and output of the given problem.
- State any assumptions (if any) that you may have.
- Develop an algorithm for solving the problem using stepwise refinement.

**Program Implementation (60%)**

- Develop a C++ implementation of the above design. Turn in both a hard copy and a disk copy of your program.
  - correctness (40%)
  - program style and documentation (20%)

**Test Cases (10%)**

- List the test cases that you used in testing your program.
- For each test case, justify your choice.

**IMPORTANT NOTE**

Unless otherwise stated, the assignments you submit for grading must represent the results of your own independent effort. Suspected cheating will be referred to the relevant University authorities.

Always clean up the temporary working directory in the hard disk after working on a PC in the computer laboratory. Don't be so generous to let others read and copy your programs. You may get into trouble if another student's submission appears similar to yours.