



gITIP
– Bringing 2D Images into Life



Creating Animations from a single Image using gITIP

July 14-17, 2005

The Department of Computer Science, HKUST

Outline



- Creating animations using gITIP
 - Basics
 - Start a new project
 - Define the scene's perspective
 - Camera Settings
 - Movie generation

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What is gITIP ?



- A freeware graphics application which produces visually convincing 3D animation effects from an ordinary 2D image
- Developed by Mr. Nelson Chu, who has finished the Master Degree in HKUST and currently working as a research assistant in our department.
- Based on Tour Into the Picture (TIP) technique.

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Possible applications



- Movies or TV advertisements production
 - Produce the animation of a storyboard quickly
- Interior Design companies
 - Present different views of a scene
- Artists
 - Guide the audience to appreciate their paintings in different views.
- Exhibitionists
 - Convert historical pictures / photos into lively animations.

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Mechanism

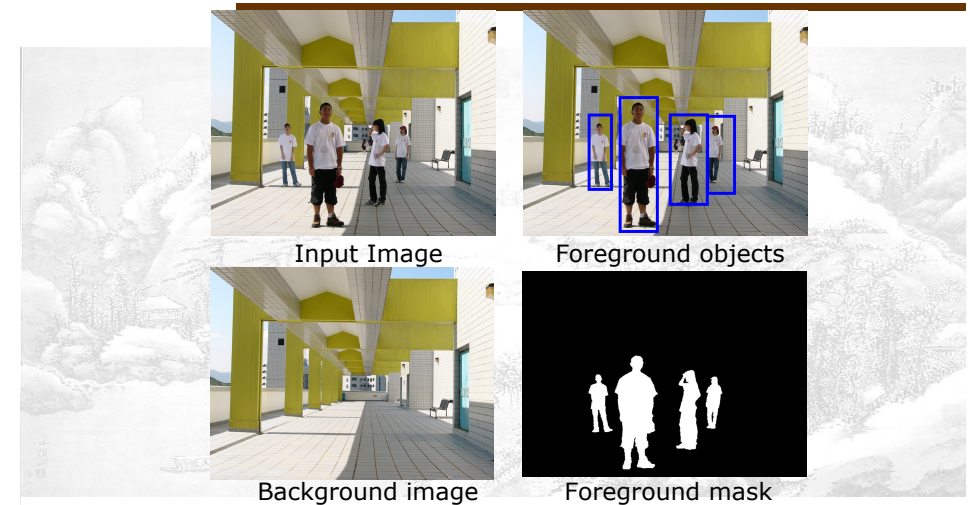


- Based on the visual clues derived from the input image, identify the
 - foreground objects
 - background of the scene
- The user need to use image processing software (e.g.: photoshop) to prepare the
 - foreground mask (using paintbrush & eraser)
 - background image (using clone brush)of the input image as gTIP's input.
- Technical details for making the foreground mask and background image will be covered soon.

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Examples



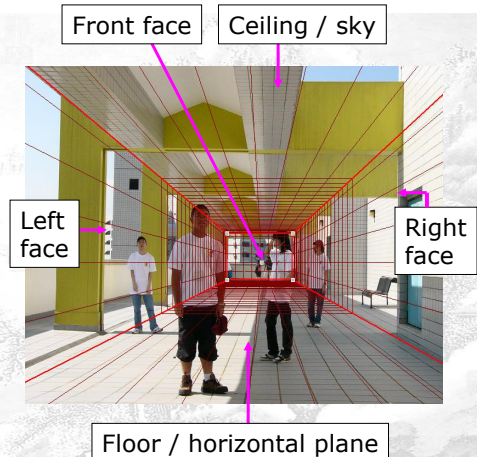
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Mechanism (cont'd)



- The scene will be treated as a rectangular box.
- The 5 boundary faces will be defined using the background image
- The foreground objects become the "billboards" placed inside the box.



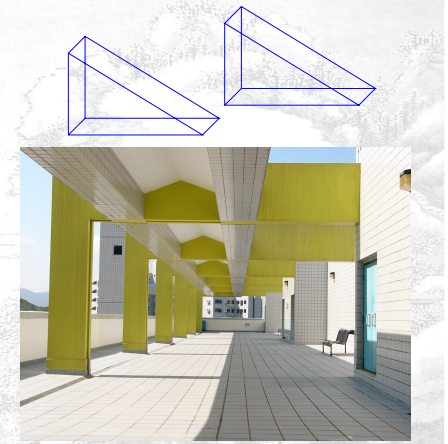
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Basics



- Unlike the 3D models found in high school's mathematics, scene will be perceived as perspective view in human's vision.
- It gives us a sense of depth – if an object is placed nearer from the view point (eyes / camera), it looks bigger.
- As the object moves away from the viewpoint, it looks smaller and smaller.
- The object becomes invisible until a unique point, called *Vanishing Point (VP)* is met.



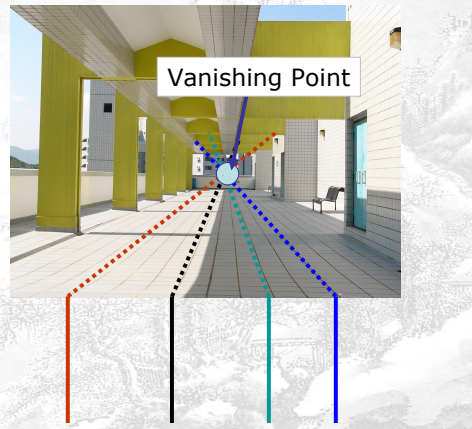
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Observations



- At a fixed viewpoint, if an object is placed nearer to the VP, it looks smaller.
- In 2D world, parallel lines do not intersect.
- However, the lines converge to the VP in perspective view.
- The vanishing point of a scene changes if the scene is viewed at different positions or angles.
- These concepts are useful when you are using gTIP.



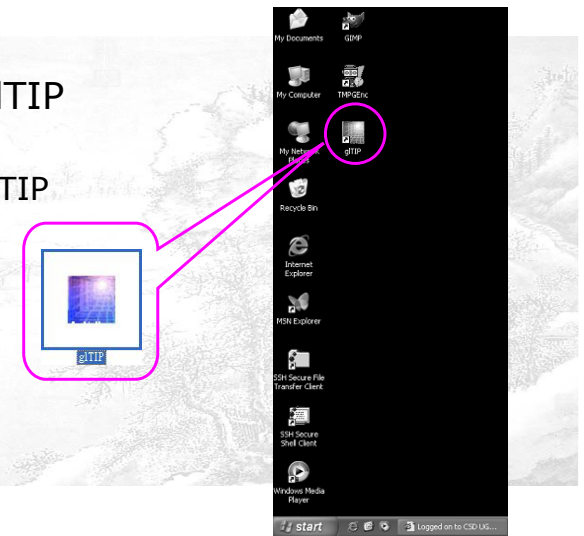
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Open the gTIP application



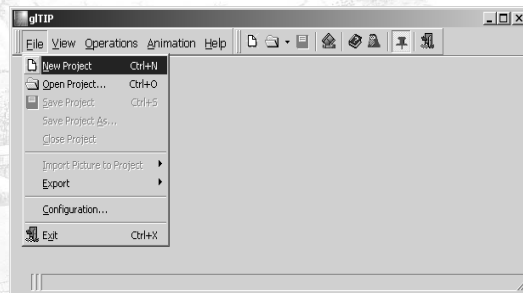
- To open the gTIP program,
 - click on the gTIP icon on the desktop



Open the gTIP application



Choose "File" -> "New Project" at the toolbar to start a new project.



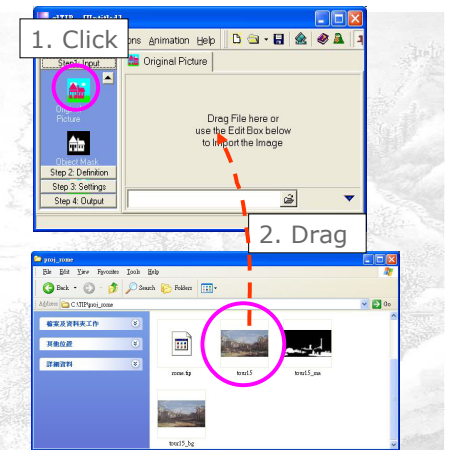
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Step 1 Specify the scene's input



- In the example project directory (proj_rome), an input image and its foreground mask and the background image has been provided.

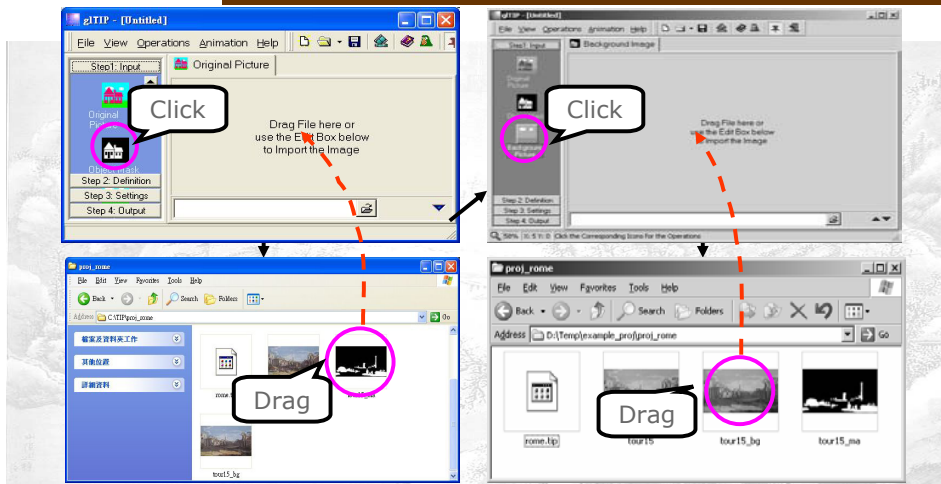


- Click the *Original picture* icon and *Drag* the original image (tour15) to the grey area.

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Step 1 Specify the scene's input (Cont'd)

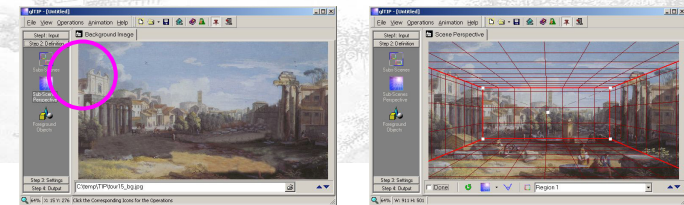


Use similar approach to define the foreground mask (tour15_ma.jpg) and the background image (tour15_bg.jpg)

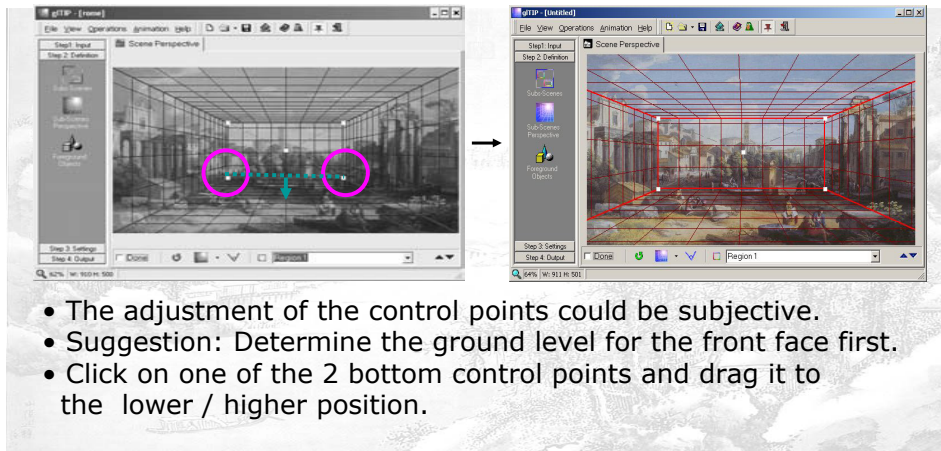
Step 2 Define the scene's perspective



- Click the "Step2: Definition" button and choose "Sub scenes Perspective"
- The spidery mesh (red grids) will appear. They are aimed to show how the 5 boundary faces are defined.
- Also, 5 white dots will attach to the mesh and they are control points.
- The center one is used to define the VP, the rest are used for defining the front face.

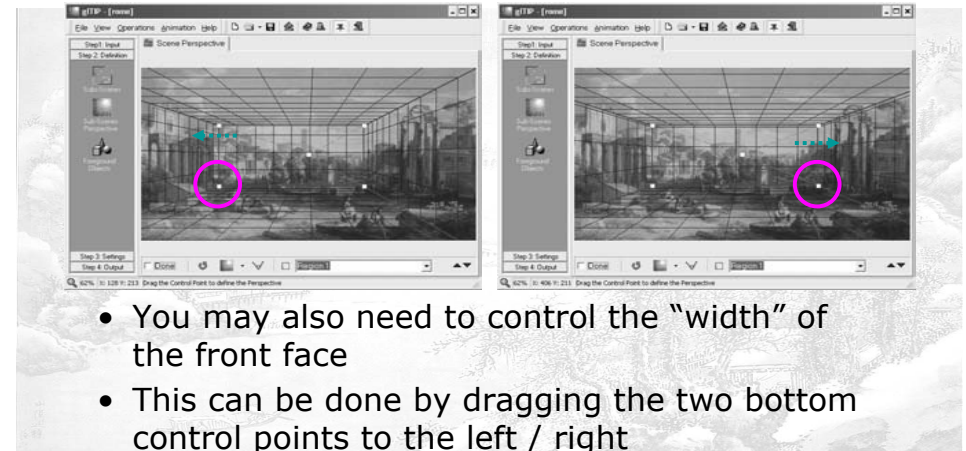


Define the scene perspective by adjusting the control points



- The adjustment of the control points could be subjective.
- Suggestion: Determine the ground level for the front face first.
- Click on one of the 2 bottom control points and drag it to the lower / higher position.

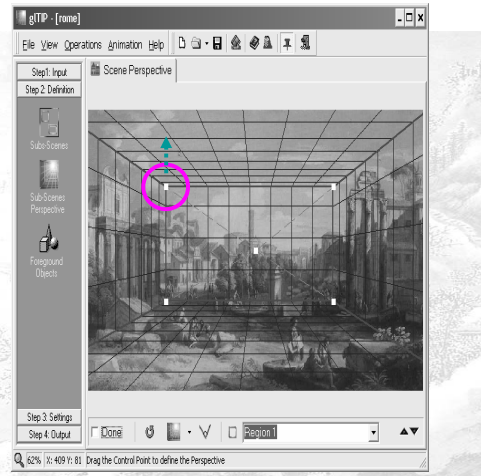
Adjusting the control points (2)



- You may also need to control the "width" of the front face
- This can be done by dragging the two bottom control points to the left / right

Adjusting the control points (3)

- Similarly, the “height” of the front face (as well as the left / right face) can be adjusted by moving the 2 upper control points.
- Hints: The height of the faces should depend on the height of the architectures / objects.

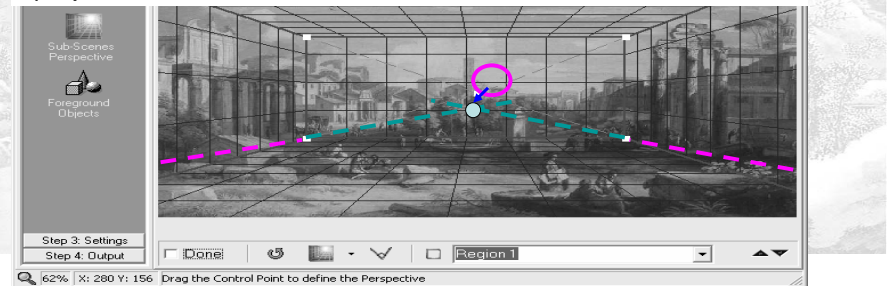


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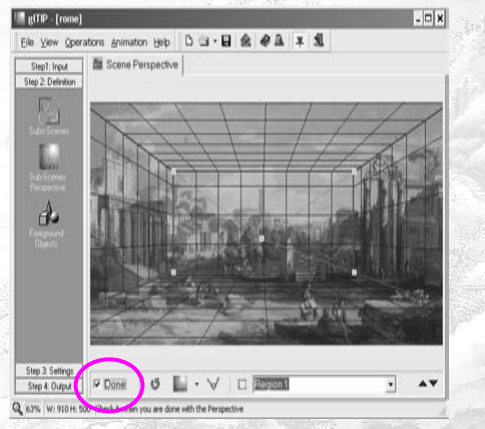
Adjusting the control points (4)

- Finally, click and drag the center control point to adjust the vanishing point (VP)
- Hint: Estimate the baselines for the left & right faces respectively (See purple dotted lines)
- As the baselines should be parallel, by extending the baselines (green dotted lines), the VP can be determined (the yellow spot).



Finalize the scene's perspective

- Check the “Done” button to lock the scene's perspective.
- If you need to re-adjust the control points, you have to uncheck the “Done” button first.
- At this point, the scene's configurations (rectangular box and billboards) has been set.



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Save point

- You are suggested to save the project into the directory containing the input images.
- Choose “File -> save Project As ...” at the toolbar and enter the project name.
- Notice that if the directory contains the same project name, the old version will be overwritten.



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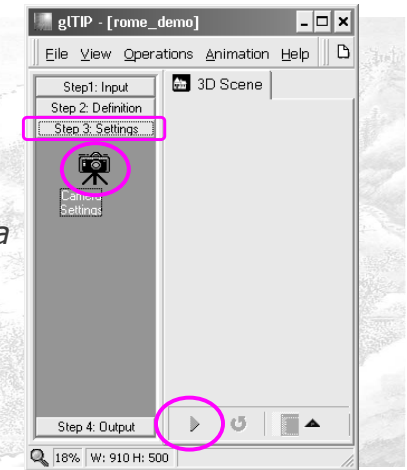
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Step 3 Camera Setting



- To create the virtual touring of the scene, you need to define the camera settings.
- Click on the "Step 3: Settings" button -> "Camera Settings" button -> Green triangle shown at the bottom to make the 3D scene.



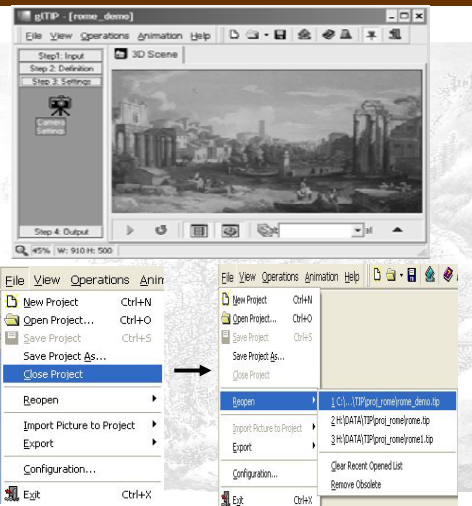
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Troubleshooting



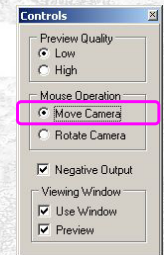
- After you have done the steps described in the previous slide, the gTIP interface should be like the figure at the right.
- Otherwise, please
 - Close the project
 - Reopen the project
 - Perform the steps described in the previous slide



Walkthrough the scene



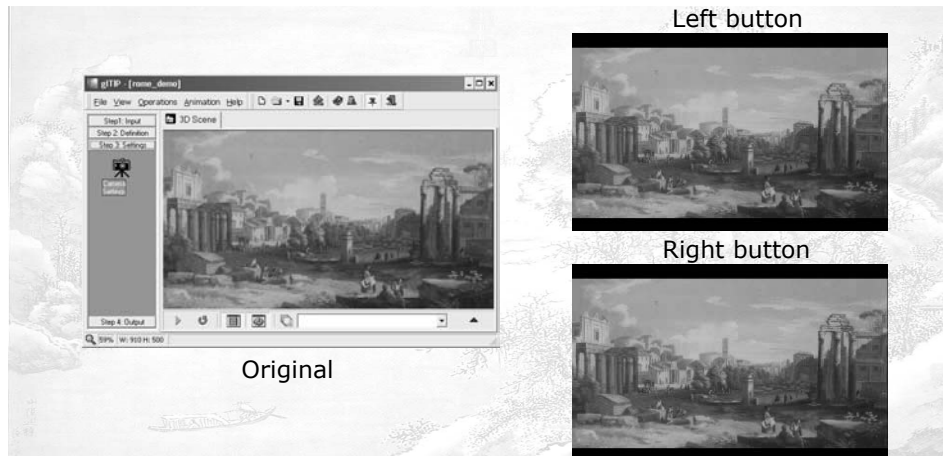
- It's time to be the cameraman.
- Find the "Controls" Window and choose "Move Camera" as the mouse operation.
- Left-click the picture and hold the mouse left button
 - Effect:
The camera's position will move according the mouse's movement
- Right-click the picture and hold the mouse right button
 - When the mouse moves up, the camera moves forward
 - When the mouse moves down, the camera moves backward.



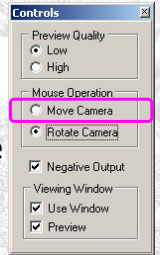
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Walkthrough the scene: Examples



- Find the “*Controls*” Window and choose “*Rotate Camera*” as the mouse operation.
- Left-click the picture and hold the mouse left button
 - Effect:
It looks as if you are looking around the scene
- Right-click the picture and hold the mouse right button
 - When the mouse moves left, the camera rotates in counter-clockwise direction
 - When the mouse moves right, the camera rotates in clockwise direction.



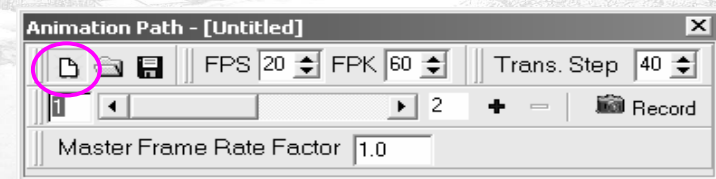
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Rotate the camera: Example



- Just like movies, an animation is formed by a sequence of pictures (frames).
- The scene for each frame is captured at a specific camera position / angle.
- In gTIP, however, you only need to specify the camera positions for the key frames. The pictures between two key frames will be calculated for you.
- To do so, find the “*Animation Path*” window and click on the “*New Animation button*”



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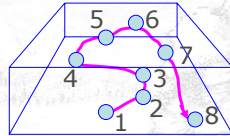
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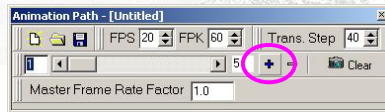
Construct the key frames for the animation path



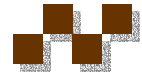
- Basically, you should add a key frame when the camera's direction or angle begins to change.



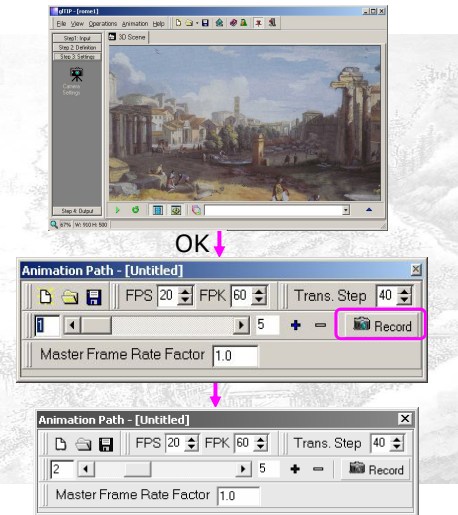
- To do so ...
 - Press the "blue cross" button at the animation path window to add key frames.
 - For convenience, you may first add a few key frames at the beginning and update the camera position for a certain key frames later.



Record the Key frames



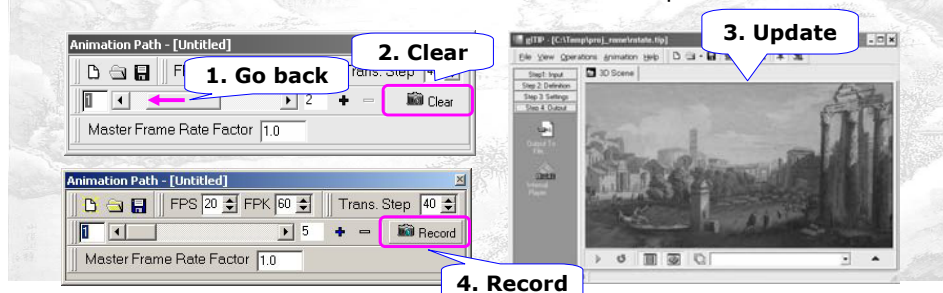
- Now, edit the camera position for each key frame one by one.
- Adjust the camera as described in previous slides to the desired position / angle.
- Press the "record" button to record the key frame.
- Then you can use similar method to record the position for the next key frame.
- Also, you can increase the "Master Frame Rate Factor" (e.g. 1.0 -> 3.0) so that the movie generated can be played in a smoother way.



Update the camera settings of a key frame



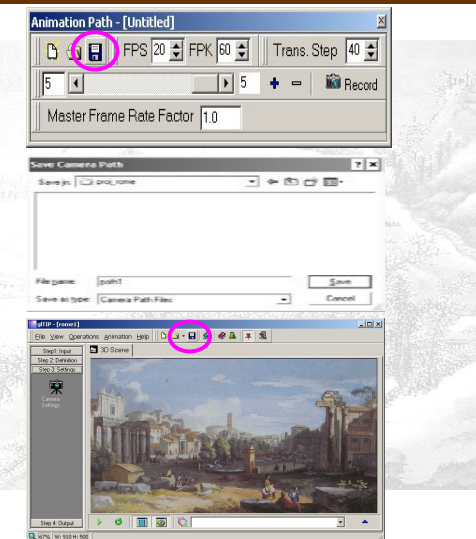
- If you need to update the camera position of a key frame, you can:
 - Use the *slider* to go back to the key frame to be updated
 - Press the "Clear" button (The Clear button will be changed to "Record" mode)
 - Re-adjust the camera position / angle of the key frame
 - Press the "Record" button to confirm the updates.



Save Point



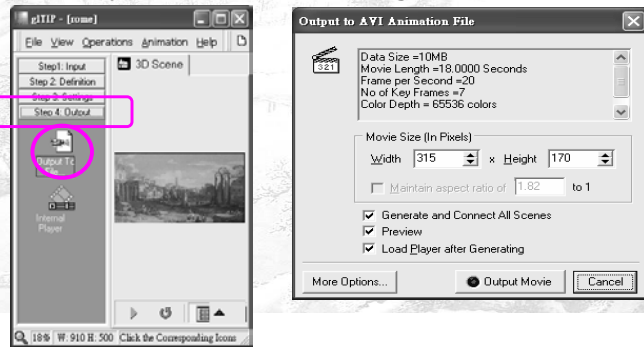
- After you have confirmed the camera settings of all key frames, you can save the animation path.
- Choose the "Save animation path" button and enter the filename.
- Save the project again.
- Now, we are ready to produce the playable movie.



Step 4 Output the Animation



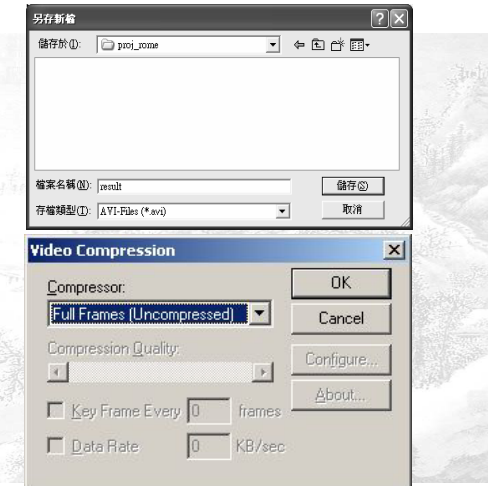
- Click the "Step 4: Output" Button.
- Click the "Output To File..." Button.
- (Optional) You can check the "Preview" Button to check how the output movie looks like.
- Press the "Output Movie" Button to generate the animation.



Output the animation (cont'd)



- Enter the filename of the output animation and press the "Save" button.
- Another window will pop up and ask if you need to compress the output animation.
- Due to the instability of the program, please use the default option [full Frames (uncompressed)].
- Click "OK".



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Output the animation (cont'd)



- It is fine if an error message (see figure 1) is shown. Press "OK" to continue.
- The glTIP program will then show the progress of the movie generation (see figure 2).
- Finally, go to the folder which contains the animation generated.
- Double click the file to enjoy the animation.



Figure 1

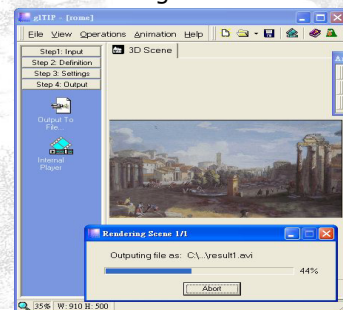


Figure 2

Trouble Shooting



- Sometimes the animation cannot be generated properly.
- If so, please
 - Close the project and re-open it.
 - At the "Animation Path" window, click the "Open Animation Path" window (See figure 1).
 - Select the old path saved.
 - Save the project again (See figure 2).
 - Repeat Step 4) to generate the animation again.

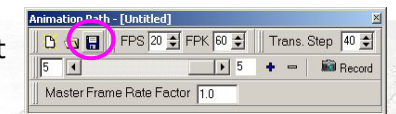


Figure 1

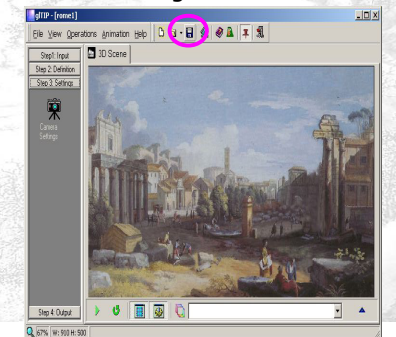


Figure 2





The End

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