# COMPSCI 716 S2 T 2006
## - ASSIGNMENT TWO -

Computer Science

## ASSESSMENT:

- Due date: 12:00pm, Monday 21$^{nd}$ August, 2006
- Submit: Online assignment drop boxes

## REFERENCES:

- The resources for this assignment can be found at the following URL:

  http://www.cs.auckland.ac.nz/compsci716s2t/assignments/

- or you can click the "Assignments" link on the COMPSCI 716 S2 T home page.

## AIMS OF THE ASSIGNMENT:

- Practise how to visualize reconstructed surface.

## NOTES:

- Submit online to COMSPCI 716 Assignment 2 drop box
- Submit a ZIP file containing all the required program files.
- Submit the program documentation in a PDF or a HTML file.
  (include figures for explanation if necessary)
- Late assignment WILL NOT be accepted!
- DO NOT SUBMIT SOMEONE ELSE'S WORK!

**Description:**

In Assignment 1, you have learnt how to obtain surface depth values using the photometric stereo method. However, the results are simply presented as a grey scale format image, where the height values of the surface represented by the grey level intensity values.

In Assignment 2, you will need to visualise the reconstructed surface using surface mesh, apply texture mapping onto the surface, as well as provide the means for the user to examine the obtained surface from different viewing directions.
The 3D coordinates ($x, y, z$) for each point on the surface will be the $x$ and $y$ values of the point in the image, combined with the $z$ value, which was represented by a grey level intensity value.
Your task will be to create a visualization application from the surface that you have reconstructed in A1.
The visualized surface needs to contain the following properties:

1.  Represent the surface in 3D space
    The 3D coordinates ($x, y, z$) for each point determines its location in the visualized 3D space.
2.  The points are joined by surface mesh
    The mesh can be triangular, quadrilateral, or other polygonal mesh.
3.  The surface needs to have texture mapping
    You can obtain surface texture from the original input images.
4.  Animate the surface in 3D or give user means to navigate through the scene and view the object from different directions. You will need to include (but not limited to!) at least the following views.
    a.  Rotation of surface by 360 about the vertical axis
    b.  View from the top or bottom of surface
    c.  Zoom in on the surface to show detailed view
5.  Provide documentation for your program, explaining what the user should do in each step. Also discuss the approaches that you have taken to visualize the surface (e.g. how did you perform texture mapping/mesh/animation, and so on).

**Note:**
1.  If you have not obtained a satisfactory surface in A1, please use the surface and images contained in the sample surfaces folder for visualizing. Please note that the depth values in sample surfaces have been scaled and shown as a grey level BMP. Therefore, you may need to adjust the depth values accordingly to make the surface look proportional. Please discuss any scaling that you have performed in the report.
2.  You can use any application/language to implement your program, as long as the program will execute on standard lab computers.

**Expected results**
Examples of the expected results have been shown in the lecture. I have also put the short clips at the course website for A2.

**Marking guide**
Your assignment will be marked according to steps 1 to 5.
Test your program and make sure that it runs on the lab computers, which will be used for marking. Marks will be deducted if your program fails to run on a standard lab computer.

*Good luck and have fun!!!*