



Computer Graphics Fall 2024

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Computer Graphics

Assignment 01

DUE DATE: Sept. 22, 2024**Purpose:**

- Practice in
 - 2-dimensional window to viewport mapping

Task:

Using the provided [template](#), create a Graphical User Interface (GUI) with two buttons: "Browse" and "Draw." The program should be able to read data from an input file and display it on the viewport.

"Browse" Button: Opens a file dialog, allowing the user to select a text file. Once selected, the program automatically reads the data and parameters from the file. The data should not be displayed at this stage.

"Draw" Button: Displays the loaded data on the viewport.

Text File Structure:

Each line in the input file represents either a vertex, a face, or a viewing parameter. These are defined as follows:

Vertices:

`v <x1> <y1> <z1> //Defines a vertex at coordinates (x1, y1, z1)`

`v <x2> <y2> <z2>`

.

.

.

v <x_n> <y_n> <z_n>**Faces:**

f <k₁> <l₁> <m₁> //Define a face (k, l , and m are integers corresponding to the vertex number)

f <k₂> <l₂> <m₂>

.

.

.

f <k_m> <l_m> <m_m>

w <xmin> <ymin> <xmax> <ymax> // Define 2D Window in world coordinates.

s <xmin><ymin><xmax> <ymax>. //Define viewport (normalized device coordinates)

Notes:

- Each "v" line defines a new vertex with the specified x,y,z coordinates.
- Each vertex is given a unique identifier starting from 1 (*not 0*).
- Each "f" line defines a triangular face by referencing three vertices.
- An s line defines the viewport in the normalized coordinates
- No clipping is required for this lab.

For simplicity this lab assumes a parallel projection with direction of projection being parallel to the z axis with no clipping in the 3- dimensional world (these features will be added in the future labs).

It is assumed that all data are given in right-handed coordinate system. The positive direction of rotation is counter clock-wise when viewed from plus infinity.

Your program should display the data by simply dropping (ignoring) the z coordinates of each vertex (map your data to 2- dimensional world coordinate system), and then map data from 2D window to viewport. You do not need to implement clipping for this lab.

- You can download the template for this assignment [here](#).
- Your program should draw the boundaries of the viewport.
- Resizing the canvas should automatically resize the viewport accordingly.
- You do not need to rename the .txt files
- Your program will be graded according to the grading [Assignment 01 grading guidelines](#)

Sample data files:

- [Pyramid](#)
- [Teapot](#)
- [Teapot_lid](#)
- [Cow](#)

[Demo solution of Assignment 01](#)

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