# Midterm Exam

## 1. Data

Download and extract the files in CG_midterm_data.zip. In the directory, you are given the following files:

- *initial_files* folder includes the initial starter codes. You must use this code.
- *CG_midterm_demo.mp4* is a video that demonstrates a sample output program.
- *CG_Midterm_Report_ID_Surname_Name.docx* is a template for the report.

## 2. Specification

You are given the initial codes that draw a triangle and a rectangle side by side (Figure 1 – Left). You are also given some input controls on which you will implement the callback functions. In the code, you will see some *"TODO: "* comments, read them carefully, they will give insight about how to code the solution. Finally, your program should work as in the sample demo video.

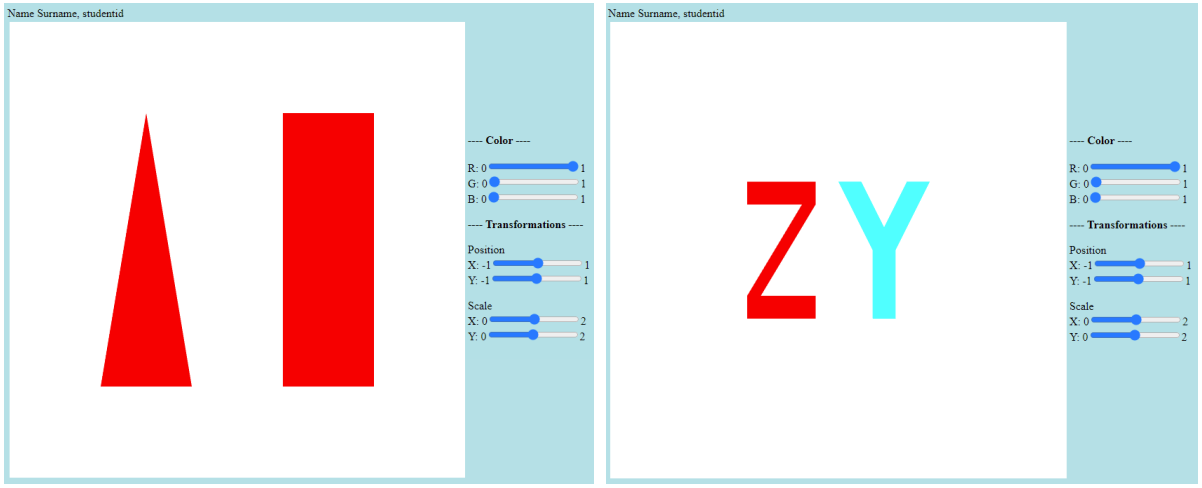


**Figure 1: Left – Output of the Initial code, Right – Sample output (for Zeynep Yıldız).**

**Caution:** This is a WebGL assignment. DO NOT USE ANY NON-WEBGL SOLUTIONS FOR DRAWING TEXT inside canvas. You must also use pure WebGL. DO NOT USE libraries such as Three.js, OpenType.js, etc. which are used for font rendering. You will model the letters as they are 2D geometric objects, just as triangles or rectangles. **!!!Otherwise, you WON'T GET POINTS!!!**

**Task 1 – Modeling**

You will model the geometry of the initial letters of your name and surname, centered at the origin, as shown in Figure 1 – Right. The rules for determining the initial letters and drawing them are as follows:

- Do not bother with Turkish characters (Draw C for Ç, U for Ü, etc.).
- The shapes of the letters do not have to be perfect, but they should highly resemble the corresponding letter.
- If your name and surname have the same initial letters, take the first letter of your name and the second letter of your surname.

- If you have multiple names, you can select either of them. But the selected letter should be different from the letter for the surname.
- The geometry of the letters must be in 2D, they should not consist of just lines. In other words, you will draw using triangles, not lines. (See Figure 2 – Left)
- While calculating vertex coordinates, do not forget the WebGL clip coordinates shown in Figure 2 – Right.

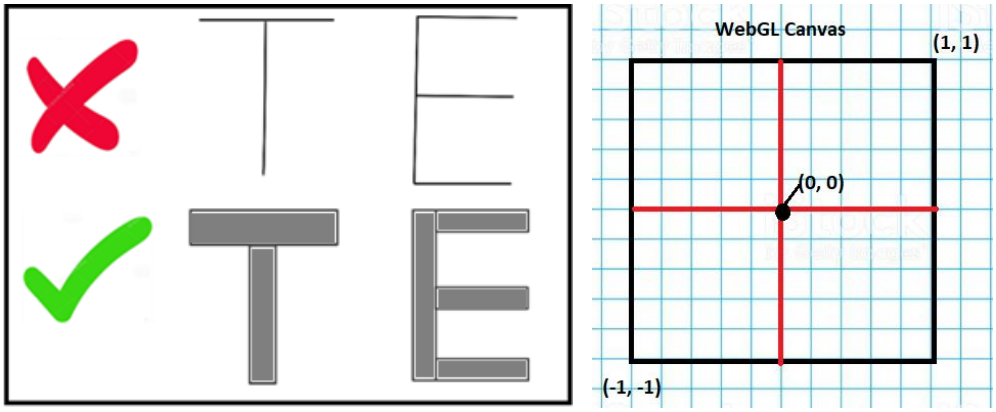


Figure 2: Left – Wrong and correct examples for letters. Right – WebGL coordinate system.

**Task 2 – Interaction**

- **Color:** Pass the color obtained from sliders to the fragment shader to set the color of the first letter. The color of the second letter should be the opposite color of the first letter. You can calculate it as (1-r, 1-g, 1-b).
- **Position:** Perform 2D displacement according to X and Y slider values. (You can see L4 class codes, triangle_move_vertices example.)
- **Scale:** Scale the size of the shapes according to the slider values. (You can see L4 class codes, triangle_move_vertices example.) **(Scaling should be local (about the center of the geometry). It should not change the position.)**
- **Note that we have not covered transformation matrices in class yet. You can perform changing the position and scale of the shape in vertex shader.**

**Task 3 – Report**

Use the report template provided in the data folder. Fill in the required parts, namely:

- Write your name, surname, ID, and submission date.
- Copy and paste the screenshot of your program output.
- Write your reflections about the assignment.
- Copy and paste your source codes.
- Rename the file according to your details and save it in pdf format.

## 3. Submission

- The assignment will be done individually.
- Place all your source files (.html and .js, including Common directory) and report in a zip archive with name **CG_Midterm_StudentID_Surname_Name.zip** and submit through MS Teams.

- Late submissions will not be accepted.

## 4. Grading

| Criteria | Points |
|---|---|
| Report is submitted | 10 |
| Code is submitted | 10 |
| Color control | 20 |
| Transformations | 20 |
| Drawing letters | 40 |
| TOTAL | 100 |

Good Luck…
Dr. Zeynep ÇİPİLOĞLU YILDIZ