



Due Date Part 1: 23:59 pm on Thursday, November 14th, 2024

Due Date: 23:59 pm on Thursday, November 28th, 2024

WebGL2 Transformations and Basic GUI

Part 1

In this part, you will modify the given project by downloading from Piazza resources and obtain the shape of form given in Figure 1.

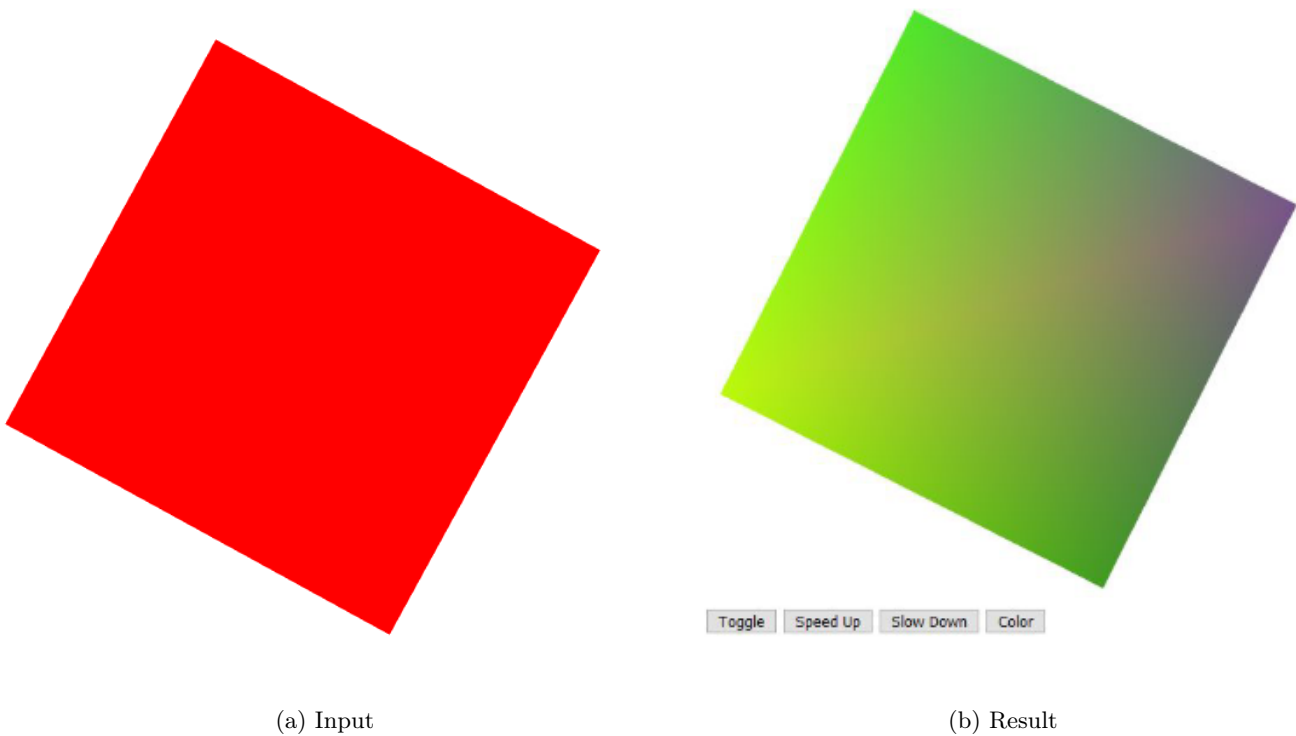


Figure 1: Part 1.

- Download the source code "Experiment3_Part1_template.zip" example from Piazza.
- Add four buttons to change the direction, to speed up, to slow down and to change the color randomly as shown in Figure 1.

Part 2

In this part, you will get familiar with simple scaling, translation and rotation using shader language. You will get GUI inputs and mouse clicks and movements from user and make an animation using the defined functions with respect to the given inputs and mouse cursor position. The steps are explained in the following statements

1. You will create a basic drawing web app with a few buttons in canvas (see Figure 2).
2. You will be able to change the color using colorpicker button as seen in Figure 3.
3. By pressing draw button, you will be able to draw a shape as you wish in Figure 4. Also, you need to change the style of the cursor inside the canvas. You will obtain the vertices from mouse click location.

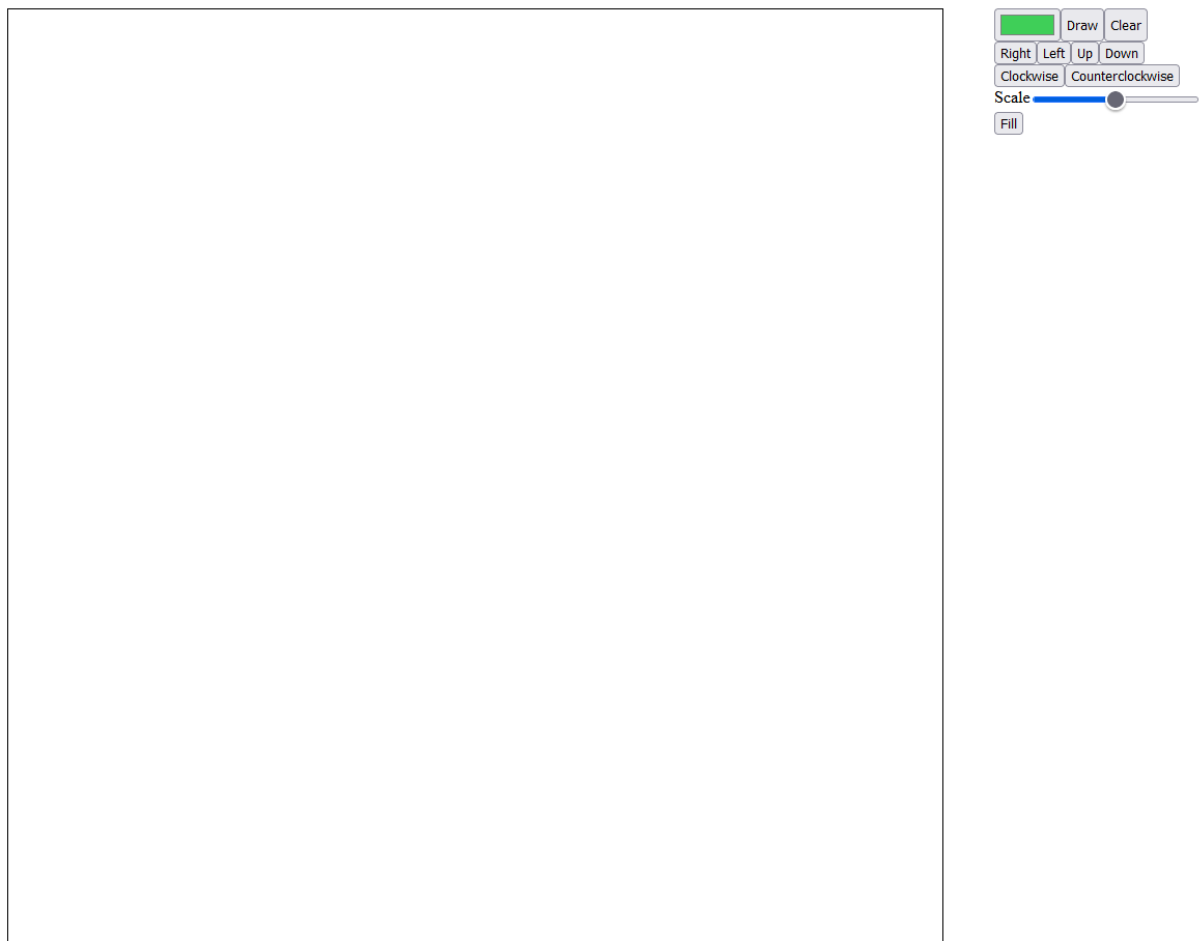


Figure 2: Simple GUI with canvas.

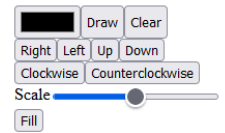
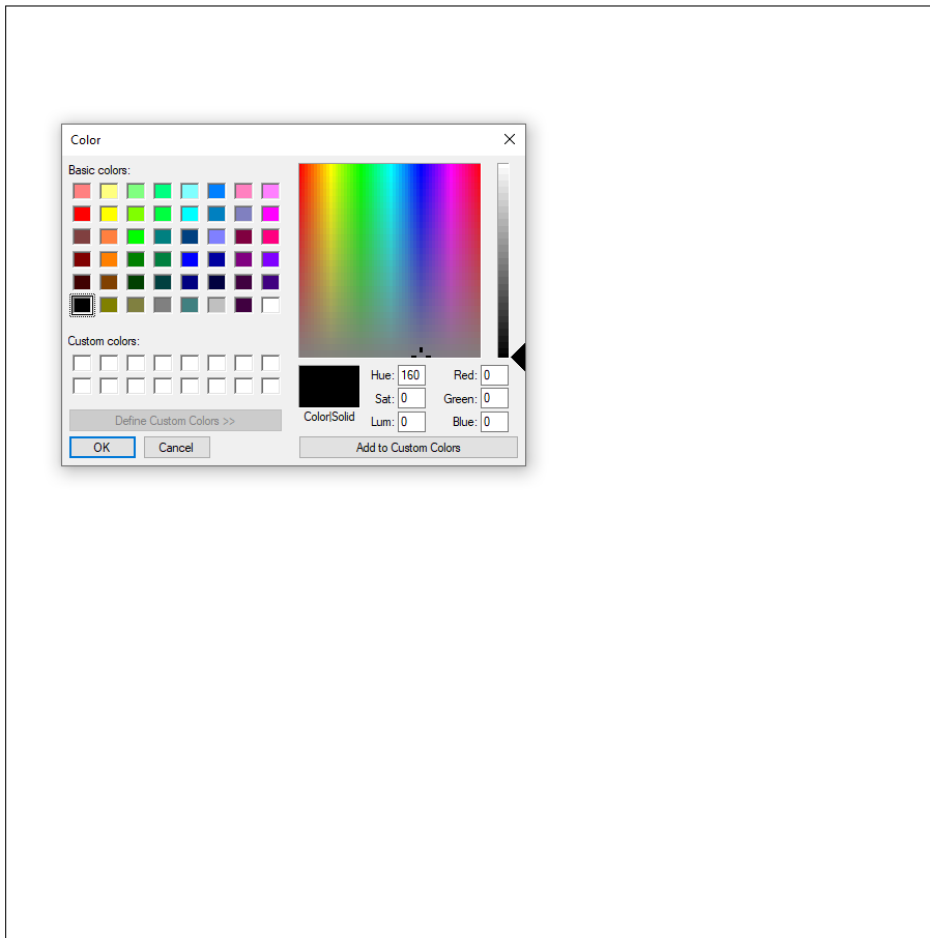


Figure 3: Colorpicker button.

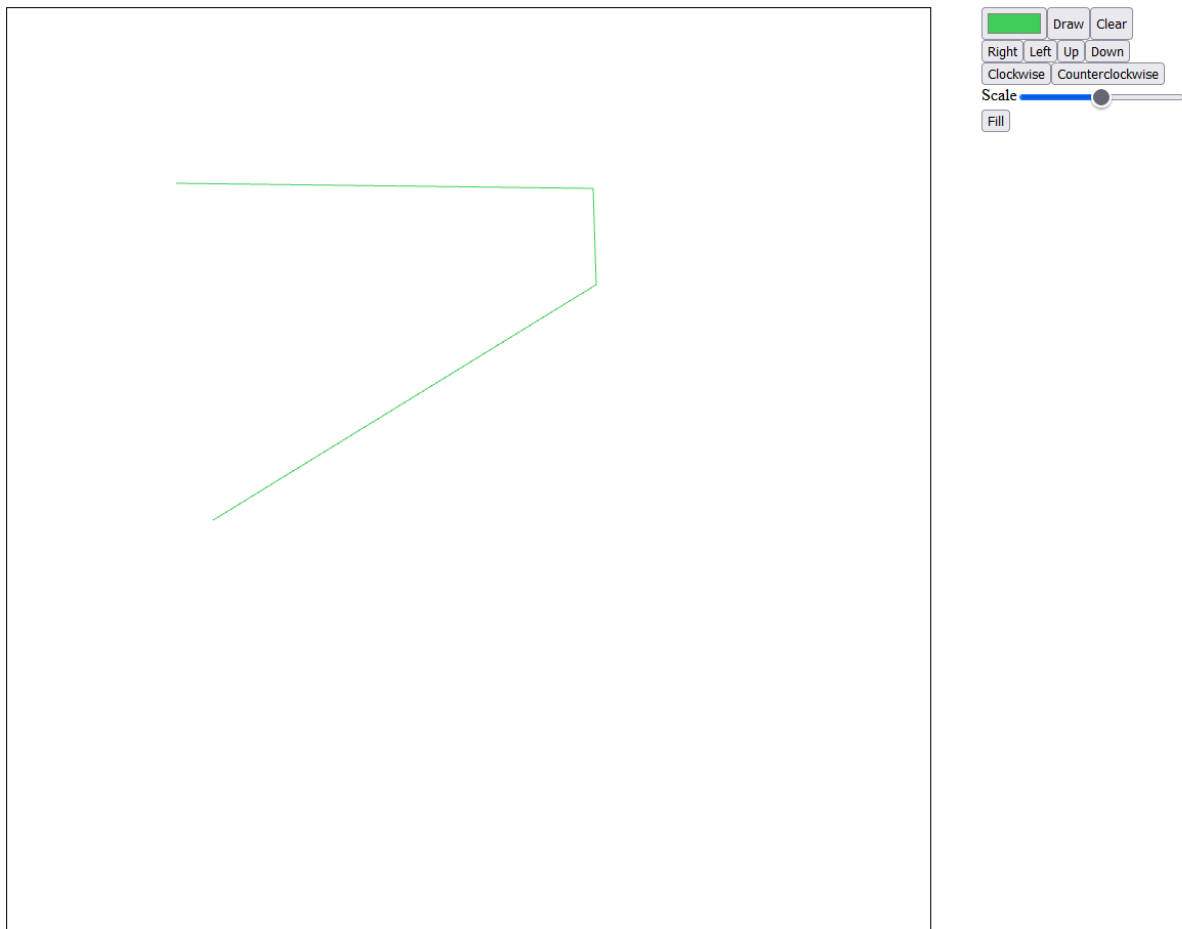


Figure 4: Draw mode.

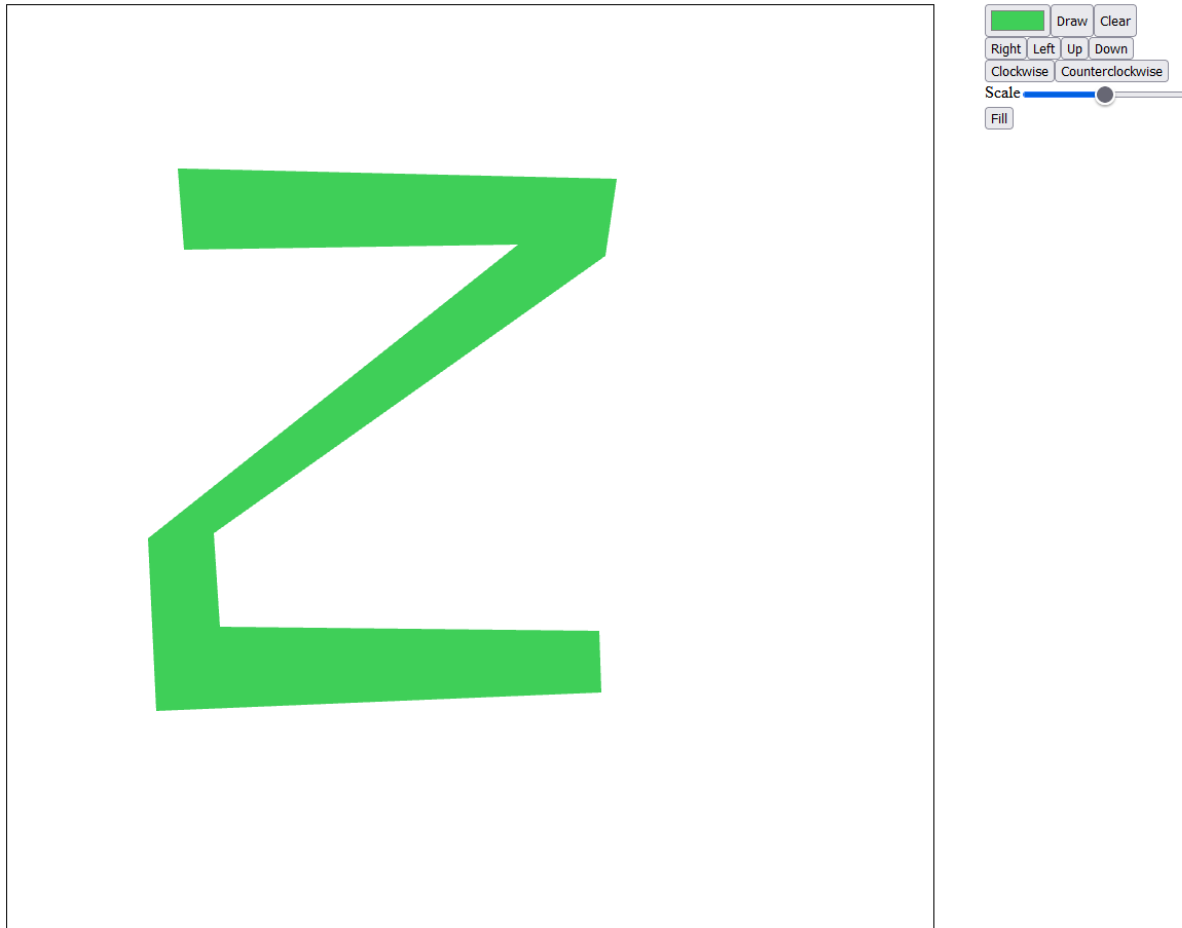


Figure 5: Fill mode.

4. You will fill your shape with pressing fill button as in Figure 5.
5. You will be able to move your shape on four directions, rotate about two directions and scaling up and down as shown in Figure 6.
6. And by pressing clear button, you will delete your shape to start from the beginning to draw another shape as in Figure 2.

The Implementation Details

1. Implement your homework using **WebGL2**. All programming assignments must use the shader-based functionality of **WebGL2**: at least one vertex shader and one fragment shader.
2. The assignment must be original work. Turning in someone else's work, in whole or in part, as your own will be considered as a violation of academic integrity. Please note that the former condition also holds for the material found on the web as everything on the web has been written by someone else. **Detection of such plagiarism in a submission will automatically void the submission and establish grounds to trigger an official disciplinary investigation.** General discussion of the assignment among peers is allowed, but do not share answers, algorithms or source codes. **Also using other resources (example source code, book, webpage etc.) as a code and javascript libraries (except jquery, Angel's book) are not allowed.**
3. Do not write the scripts into the html file. Reference your scripts in html.
4. You should use Netbeans or Webstorm as IDE for your projects.

Hint: Search for pointer lock api to implement mouse input, and loading mesh in webgl.

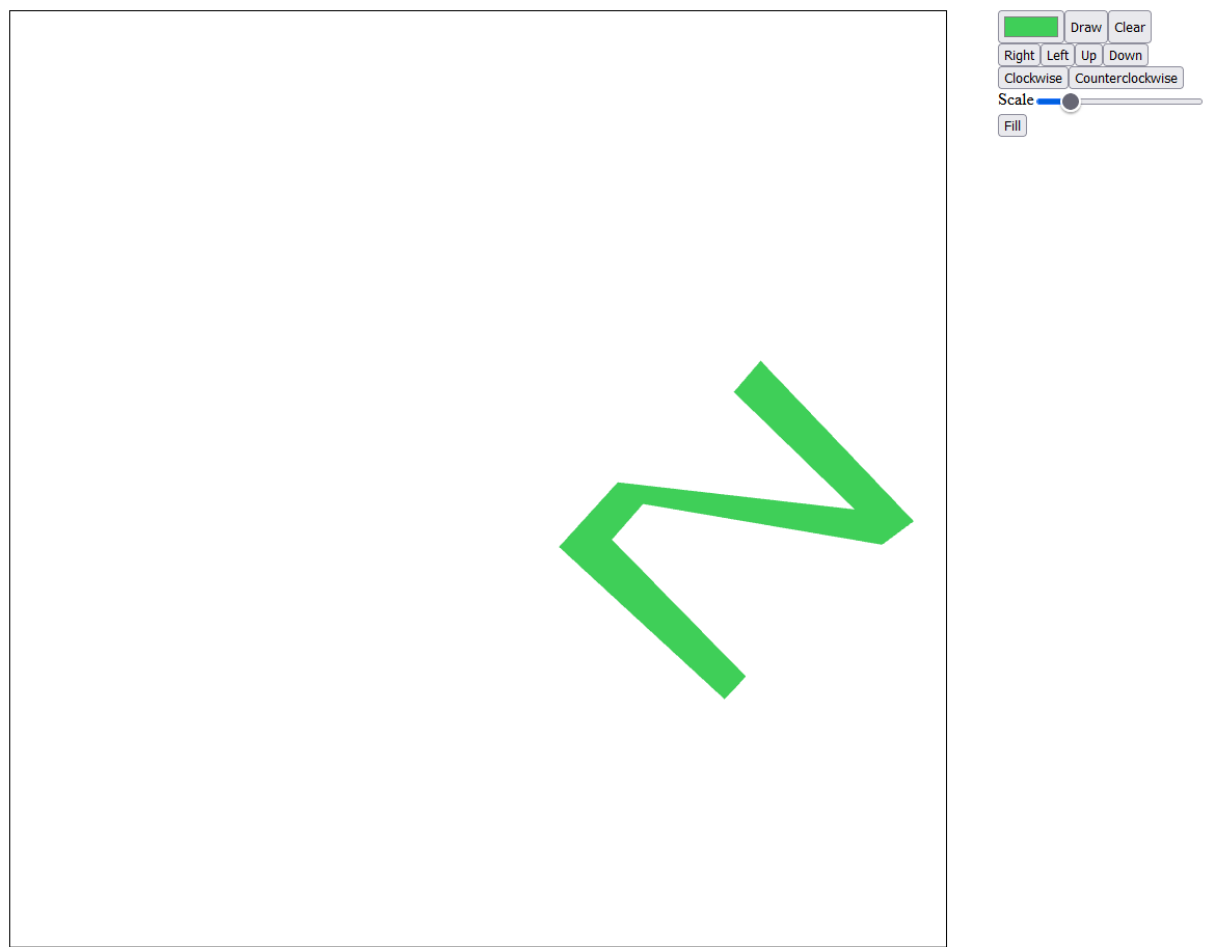


Figure 6: Transformation mode.

The Report

You will write a report on latex for this assignment. You will explain the code parts and algorithm for part 1 and part 2.

What to Hand In

You should submit entire Netbeans or Webstorm project directory including javascript files and html file in a zip file extracted from IDE. Submission file structure is as given in below:

- b<studentNumber>.zip
 - |—Experiment3_2024
 - |—Part 1(**The whole Netbeans or Webstorm project**)
 - |—Part 2(**The whole Netbeans or Webstorm project**)
 - |—report.pdf

Archive this folder as **b<studentNumber>.zip** and submit from submit system.

Grading

The assignment will be graded out of 100:

- PART 1 - CODE:0 (no implementation)
10 (correct solution).
- PART 2 - CODE: 0 (no implementation)
 - 5 (color picker)
 - 10 (draw)
 - 5 (right)
 - 5 (left)
 - 5 (up)
 - 5 (down)
 - 5 (clockwise)
 - 5 (counterclockwise)
 - 10 (scale)
 - 10 (fill)
 - 10 (clear)
- REPORT: 15

Academic Integrity

All work on assignments must be done individually unless stated otherwise. You are encouraged to discuss with your classmates about the given assignments, but these discussions should be carried out in an abstract way. That is, discussions related to a particular solution to a specific problem (either in actual code or in the pseudocode) will not be tolerated. In short, turning in someone else's work, in whole or in part, as your own will be considered as a violation of academic integrity. Please note that the former condition also holds for the material found on the web as everything on the web has been written by someone else.

References

[1] <https://github.com/esangel/WebGL>