CMPE360 Project 2

Transformations

Due Date: 26 October 2023, 23:59

In this project you will implement transformations using JavaScript. You have received an HTML file that features a basic simulation of Drone. **Please download "project2.zip" file from LMS.**

The absent part of this application (which you will be adding) comprises two JavaScript functions. The initial one, GetTransform, yields a 3x3 matrix for transformation based on the provided transformation parameters. Successfully implementing this function is adequate for applying the accurate transformation to the Drone body. The function is defined as follows:

- function GetTransform(positionX, positionY, rotation, scale)

This function accepts four input parameters: positionX and positionY determine the translation element, while the remaining two parameters specify the rotation (in degrees) and scale elements. The resultant transformation should initially apply the scale, followed by rotation, and finally translation. The transformation matrix is returned as a one-dimensional array of values in a column-major format. This means that the array indices correspond to the matrix values in the following manner:

$$\begin{pmatrix} array[0] & array[3] & array[6] \\ array[1] & array[4] & array[7] \\ array[2] & array[5] & array[8] \end{pmatrix}$$

The next function to be developed, **ApplyTransform**, accepts two 3x3 transformation matrices and produces the resulting transformation as a unified 3x3 transformation matrix, maintaining the same column-major format as described earlier. The function is outlined as follows:

You are tasked with implementing the function ApplyTransform(trans1, trans2). The resulting transformation should initially incorporate trans1, followed by trans2. This second function is essential for applying the localized transformations of the four propellers prior to applying the transformation of the Drone body. This is how the propeller are correctly positioned.

To assist you in this project, you have been provided with the following files:

- **project2.html:** This file encompasses the entire implementation, excluding the two functions you will be working on.
- ***project2.js:*** This file contains the placeholders for the two functions and is included in the project2.html file. Ensure both files are in the same directory.

- The project2.html file also includes several image files: ***drone.png, propeller.png, shadow.png, and grass.jpeg***.

Your task is to complete the two functions in the project2.js file so that the Drone moves with its shadow. Afterwards, submit the finalized project2.js file via LMS. Please refrain from altering the filename "**project2.js**" in your submission.

Hint: Pressing the F4 key will reload the project2.js file without refreshing the entire page, allowing you to swiftly test your implementation.

It is advisable to review how the entire application is structured by examining the JavaScript code in the project2.html file.

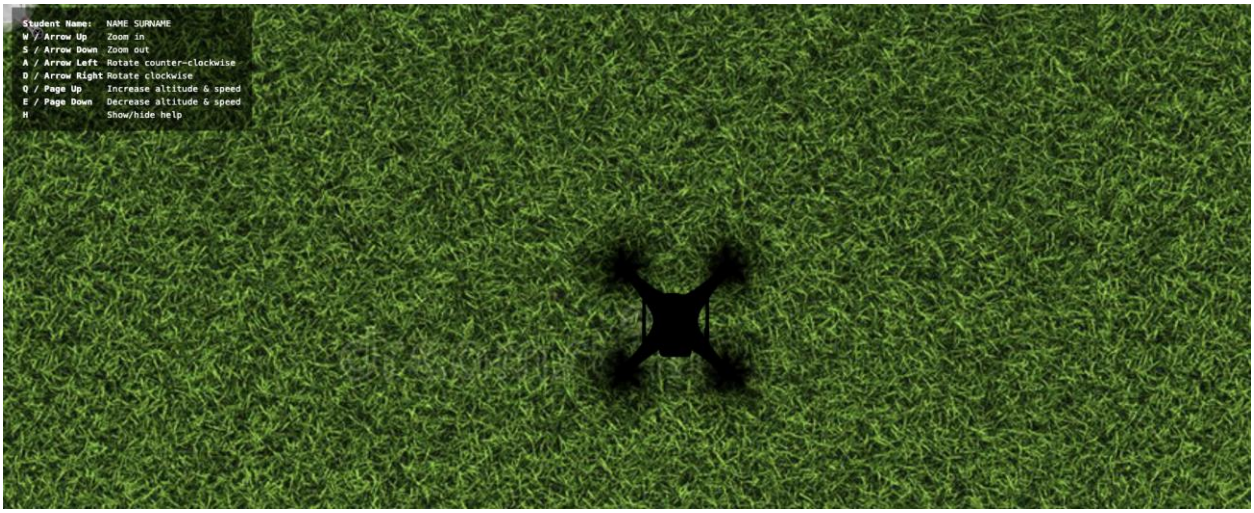

Figure 1 : When you run firstly, you will see this screen

Figure 2: After finishing the work, you will see this screen

IMPORTANT!!

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151   <table>
152       <tr><th>Student Name:</th><td>NAME SURNAME</td></tr>
153       <tr><th>W / Arrow    Up</th><td>Zoom in</td></tr>
154       <tr><th>S / Arrow  Down</th><td>Zoom out</td></tr>
155       <tr><th>A / Arrow  Left</th><td>Rotate counter-clockwise</td></tr>
156       <tr><th>D / Arrow Right</th><td>Rotate clockwise</td></tr>
157       <tr><th>Q / Page     Up</th><td>Increase altitude & speed</td></tr>
158       <tr><th>E / Page   Down</th><td>Decrease altitude & speed</td></tr>
159       <tr><th>H</th><td>Show/hide help</td></tr>
160   </table>
```

Figure 3: Please write your name and surname here.

What to Submit:

Follow the instruction and prepare a pdf report for uploading to the LMS, your pdf report should include all parts. Please make sure your answers are numbered as below:

PART1

- Save and add the image how is work all options with pressing keys. **(5 points)**
- Please record a video the all options and **copy the drive link** to your report. **(15 points)**

PART2

- Explain your GetTransform function in detailed. Please explain all process you wrote in detailed. **(20 points)**
- Explain your ApplyTransform function in detailed. Please explain all process you wrote in detailed. **(20 points)**

PART3

- Quiz part.**(30 points)** (You will take the quiz, the time of the quiz will be announced later via LMS.)
- Don't forget submit your project2.js file to VPL. **(10 points)**
- Don't forget your report as a **pdf** file to the LMS.(Your report will be checked in Turnitin.)

HINT: For screen recording ;

- Windows, Mac and Linux: You can use https://obsproject.com/ tool as a free.
- **For Mac:** You can use the shortcut to record screen, “Shift + Command + 5” after that you can choose Record Options.
- **For Windows:** Windows key + Alt + G after that for start recording you can press Windows key + Alt + R.
- You can also use any tool you want to record the screen

IMPORTANT: You will make 2 different submission in total. The first will be to just upload your project2.js code to VPL on LMS. Secondly, you will upload your report in pdf format to the "Project2 Report Submission" part on LMS.