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COMPUTER GRAPHICS – PROJECT

MANUAL

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Contents

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Week 1

In Week 1, I implemented 3D Transformations i.e. Rotation, Translation, Scaling, Shearing of two objects: house and a cat. I also drew views for them such as Front View, Top View, Side View.

I used HTML, CSS and SVG for this.

Instructions for Week 1:

Open the index.html file and click on one of the 2 buttons to proceed.

Week 2

In Week2, I implemented a Rotating Cube and a Rotating Triangle.

I used HTML, CSS and WebGL for this.

Instructions for Week 2:

Open the index.html file and click on one of the 2 buttons to proceed.

Week 3

In Week 3, I implemented Textures on a Rotating Cube. The textures were Wooden Crate, Metal Crate, Gift Box, Chess Box, Windows Logo, YouTube Logo. I also implemented shadows such that when a face of the cube moves out of focus of the viewer, it darkens and the face which moves in focus, lightens.

I used HTML, CSS and three.js(for WebGL rendering).

Instructions for Week 3:

1.) If you are using Firefox, then the cube appears directly.
   If using Google Chrome, you will have to start a server at the location
   you have downloaded these files using any one of the following commands:-
   If python 3.x is installed: "python -m http.server" to start server
   If python 2.x is installed: "python -m SimpleHTTPServer" to start server
   If npm is installed: "npm install http-server -g" to install http-server module
           Then, type "http-server" to start server

2.) Then, go to where you have hosted the server For example: localhost:8000 or localhost:8080

3.) Click the button on "index.html" to proceed.

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Week 4

In Week 4, I implemented views for a cube such as Parallel Views and Perspective Views. In Parallel Views, I implemented Simple(Front, Top and Side) and Axonometric Views(Isometric, Dimetric, Trimetric). In Perspective Views, I implemented 1-point, 2-point and 3-point views.

I used HTML, CSS and three.js(for WebGL rendering).

Instructions for Week 4:

1.) Go to "index.html" and click on one of the two options to navigate.

2.) While on the page labelled "Simple with Rotation Control",
    a.) You can left click on the cube and drag accross the screen to rotate it.
    b.) You can right click on the cube and move your cursor to move the cube and then left click to place it wherever you want on the screen.
    c.) You can also zoom in and out using the mouse wheel.

Week 5

In Week 5, I combined the work done in first 4 weeks and performed operations on a Cube. The operations involved 3-D Transformations(Translate, Rotate, Scale, Shear). It also included Views/Projections such as Front, Top, Side, Oblique, Isometric, Dimetric, Trimetric. Point Light sources at various locations such as Front of Cube, Top of Cube, Top Near Left, Top Near Right, Top Far Left, Top Far Right, Bottom of Stage. I also implemented Vanishing point Views(1, 2 and 3). I have implemented Textures for the Cube such as Wooden Crate, Metal Crate, Gift Box, Chess Box, Windows Logo, YouTube Logo.

I used HTML, CSS, JavaScript, three.js for Object Design and dat.gui for Object Control.

Instructions for Week 5:

1.) Open "project_week5.html".

2.) For Translate tab in the 3-D Transformations, move slider along X-axis, Y-axis and Z-axis to move the slider around to move the cube around the respective axes.

3.) For Rotate tab in 3-D Transformations, move slider along X-axis, Y-axis and Z-axis to move the slider around to rotate the cube around the respective axes.

4.) For Shear Tab in 3-D Transformations, select the options in the dropdown to shear the cube along the respective axes. Click "Refresh" button(present at the end of the Controls) after each Shear to reset the cube since it shears freshly and not on already sheared cube.

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5.) For Views/Projections Tab, select the options in the dropdown to select the views for the cube. Click "Refresh" button(present at the end of the Controls) after each View to reset the cube as it takes the front face into consideration each time a View is selected.

6.) For Light Tab, select the options in the dropdown to select the PointLight positions for the cube.

7.) For Vanishing Points Tab, select the options in the dropdown to select the number of Vanishing Points for the cube. Click "Refresh" button(present at the end of the Controls) after each option to reset the cube as it takes the front face into consideration each time an option is selected.

8.) For Textures Tab, select the options in the dropdown to select the Textures for the cube.

Week 6/Final Week

In Week 6/Final Week, I added onto work done in week 5 by adding Environmental Mapping and Ambient Light colour selections. I added textures for the stage on which the cube stands.

I used HTML, CSS, JavaScript, three.js for Object Design and dat.gui for Object Control.

Instructions for Week 6/Final Week:

1.) Open "project_final.html".

2.) For Translate tab in the 3-D Transformations, move slider along X-axis, Y-axis and Z-axis to move the slider around to move the cube around the respective axes.

3.) For Rotate tab in 3-D Transformations, move slider along X-axis, Y-axis and Z-axis to move the slider around to rotate the cube around the respective axes.

4.) For Shear Tab in 3-D Transformations, select the options in the dropdown to shear the cube along the respective axes. Click "Refresh" button(present at the end of the Controls) after each Shear to reset the cube since it shears freshly and not on already sheared cube.

5.) For Views/Projections Tab, select the options in the dropdown to select the views for the cube. Click "Refresh" button(present at the end of the Controls) after each View to reset the cube as it takes the front face into consideration each time a View is selected.

6.) For Point Light Tab, select the options in the dropdown to select the PointLight positions for the cube.

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7.) For Ambient Light Tab, Click the colour on the slider to select Ambient Light colour.

8.) For Vanishing Points Tab, select the options in the dropdown to select the number of Vanishing Points for the cube. Click "Refresh" button(present at the end of the Controls) after each option to reset the cube as it takes the front face into consideration each time an option is selected.

9.) For Textures Tab, select the options in the dropdown to select the Textures for the cube.

IMPORTANT NOTES:

1.) While selecting anything from "Views/Projections" tab or "Vanishing Points" tab or "Shear" tab, it is better to keep "Cube Textures", "Floor/Environment" at default. If you plan to change these, change them before you select anything from "Views/Projections" tab or "Vanishing Points" tab or "Shear" tab. It is best to not rotate/move the cube while you are selecting from these tabs.

2.) Also, while selecting from "Views/Projections" tab or "Vanishing Points" tab or "Shear" tab, always click on "Refresh" button(present at the end of the Controls) before you click on another selection from these because the program takes the default view into consideration every time an option among these is clicked. So, when you click on "Refresh", it takes the cube into its default position.

3.) Select 'Top of Cube' option from "Point Light" tab before performing any operation for best lighting.

4.) You can rotate the cube and stage by left-clicking on the cube/stage and dragging it across screen.

5.) You can move the whole setup of the cube and the stage by right-clicking on the screen and dragging across. Release the right-click to place the setup.