# Computer Graphics

## Final Project Report: 3d Objects and Implementations

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# Table of Contents

## Introduction:

The projects aim is to implement the transformations and projections of the 3d objects practically. In this project the features I would implement are Creating and storing of a 3d object, Displaying the 2d elevations of the object, transforming of the object that is Translating, Scaling, Rotating and Shearing of the 3d object. Some other features are developing different views of the 3d object, generating projections of the object, editing, or changing the perspective projection vanishing points (1,2,3), creating texture or bump or environmental mappings for the object. All the features are implemented part by part.

## Implementation:

### Part 1:

In this part of the project, until now I have created a web portal which shows the progress of the project. Then I have selected 3 generic objects house, sliding box and pile of boxes. Created a svg to draw the 2d views of the object. I have developed front, top and side views of the object. Then storing these values, I have developed the 3d model of the object.

I have included all the styling for the webpage in style.css file. I have created the buttons for each object to direct for each object created. And each page has the links for the 3d views.

### Part 2:

In this week, I have implemented the 3d transformations on the object. I have created text boxes fields to enter the values for the change of translation, rotation, scaling and shearing. When the value is entered in the textbox for the Translation, I created function which takes the value from textbox and moves the object to that location.

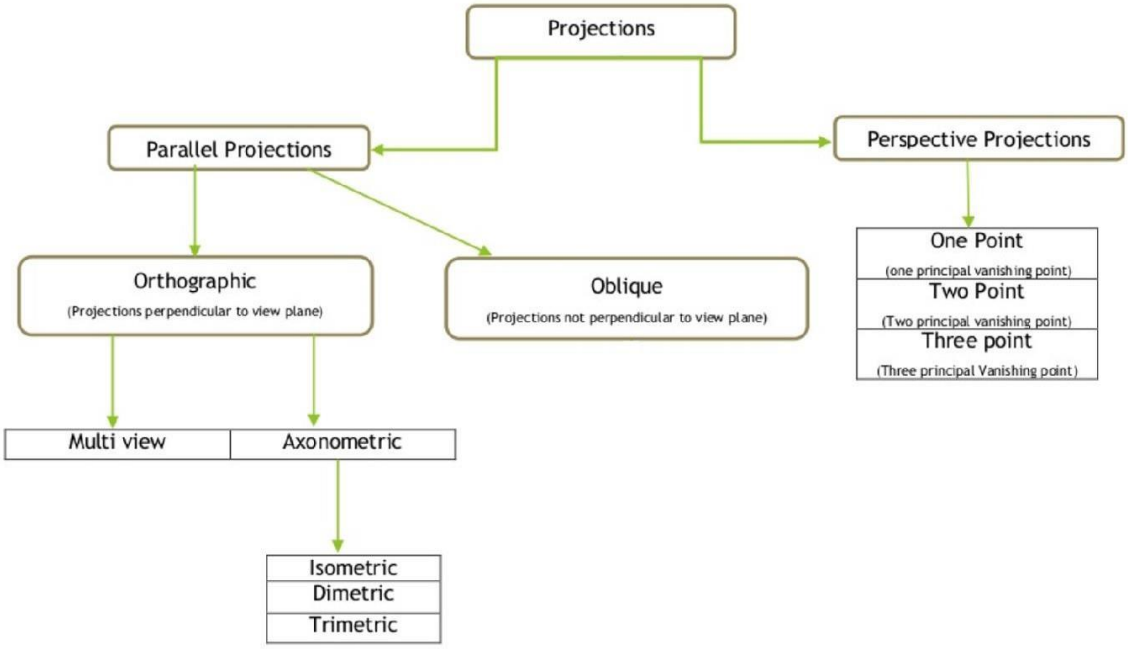
The same was implemented for the rotation, scaling and shearing. We enter the values in the textboxes and the values entered will be taken by the functions in console and they rotate the object with the angle entered, scale the object with the scaling factor and shear the object with the angle.

These 3d transformations are performed on all the objects created in the first part of the object.

### Part 3:

This part of the project I generated the different views and projections of the object. The different type of projections generated are the Parallel and Perspective Projections. In parallel projections I have generated the Oblique, Multiview, and Axonometric Projections. I created the buttons for the different projections and by clicking on the button all the projections of the object I created in the before part can be seen.

Diagrammatic representation or the projections can be seen below.




**Part 4:**

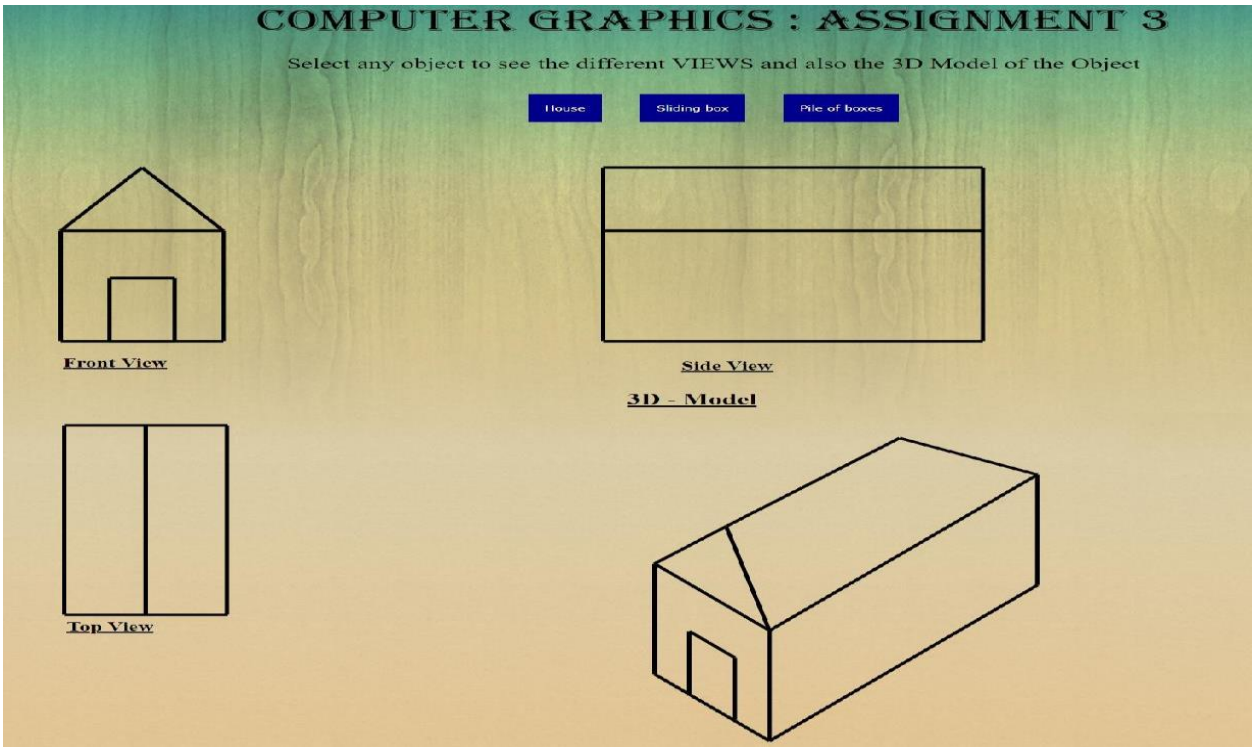
In this part, I used three.js to implement the transformations of objects based on the camera and the light. I have tried to see the changes in the shadow of the object when the light position is changed. I have created 2 objects, sphere, and a cube. Shadows of these objects can be seen. When the light approaches nearer to them, the shadows go longer and when the light moves far away the shadows become shorter. I have also created controls to increase the intensity of the light as well.

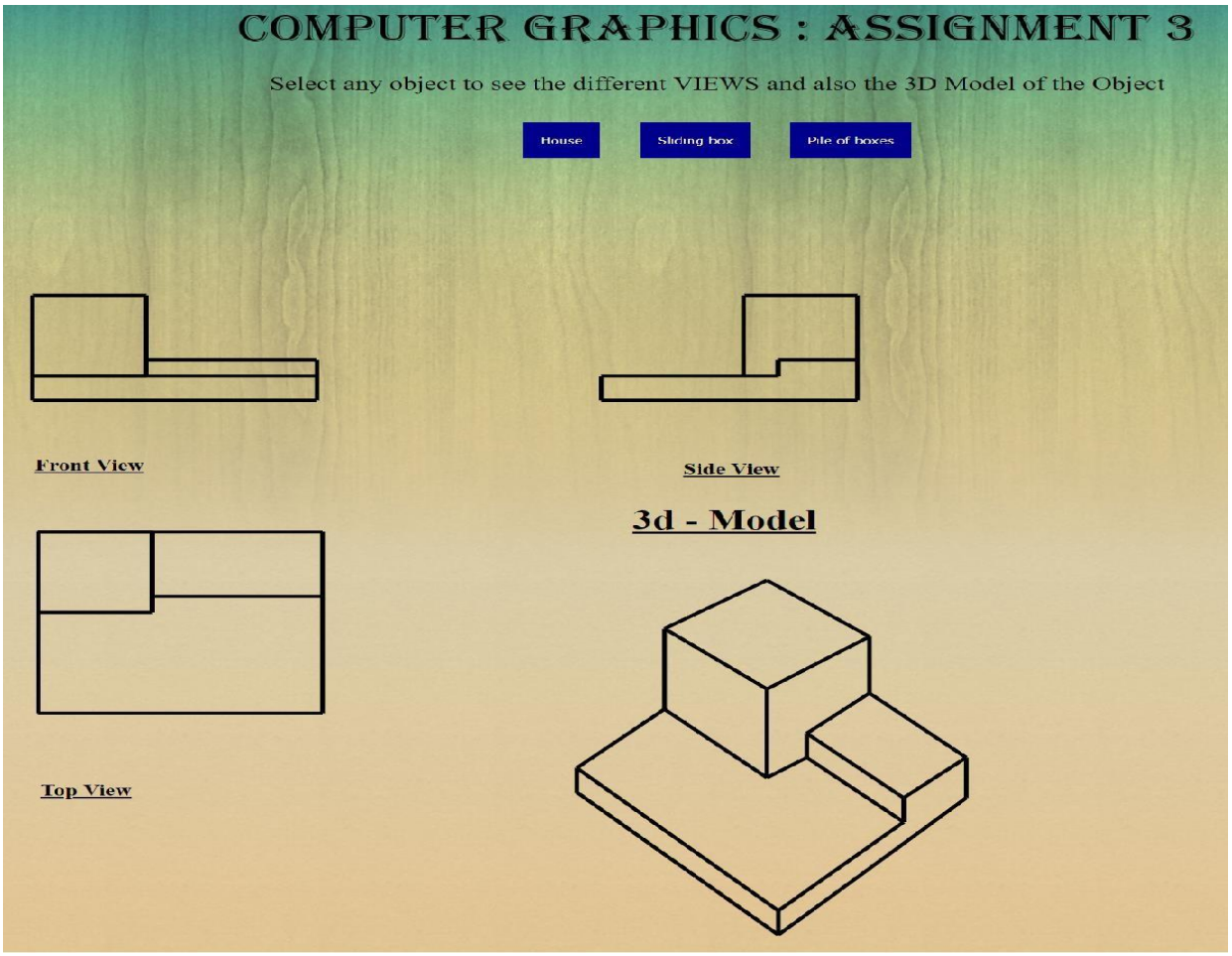
The camera view is the orthographic view, meaning all the lines along the z axis of the cube will be drawn parallel.

## Output:

Here are some of the output screens available, how will the 3d model and views look like. The 3d Transformations of object are also here.

**Part 1:**


COMPUTER GRAPHICS : ASSIGNMENT 3
Select any object to see the different VIEWS and also the 3D Model of the Object
House
Sliding box
Pile of boxes
Front View
Side View
3D - Model
Top View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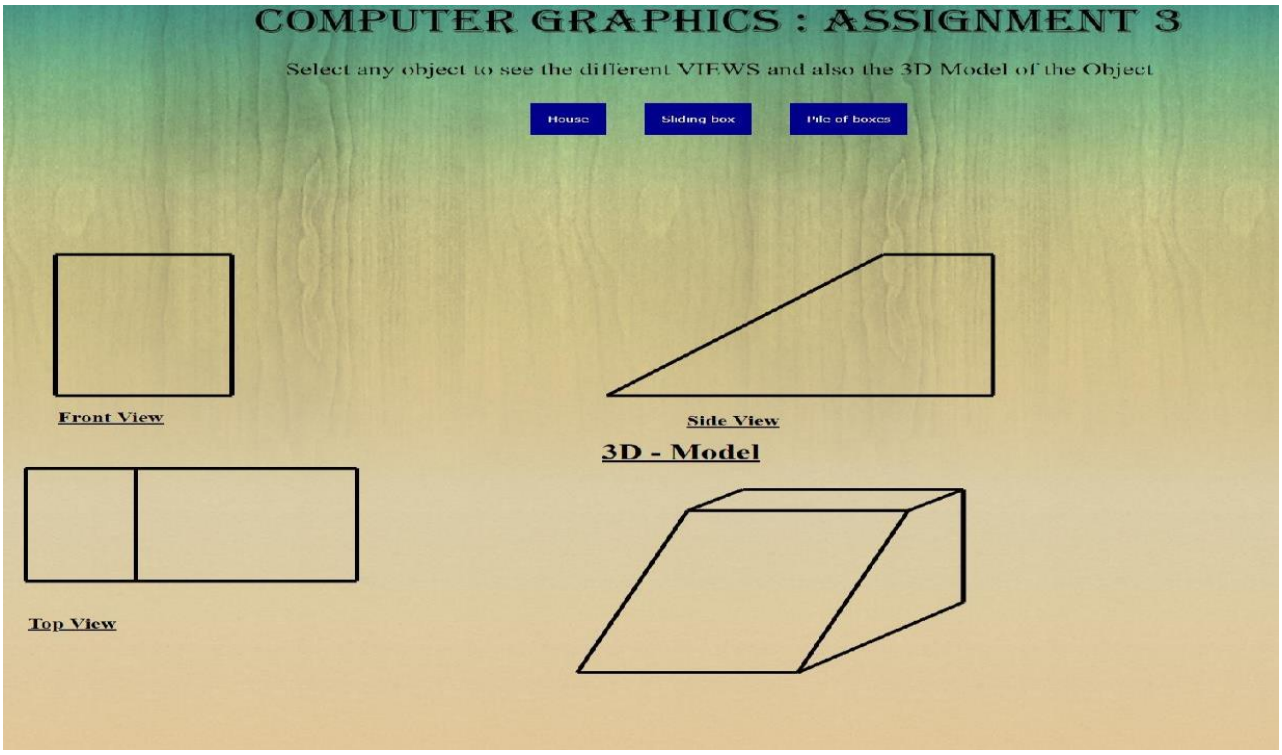
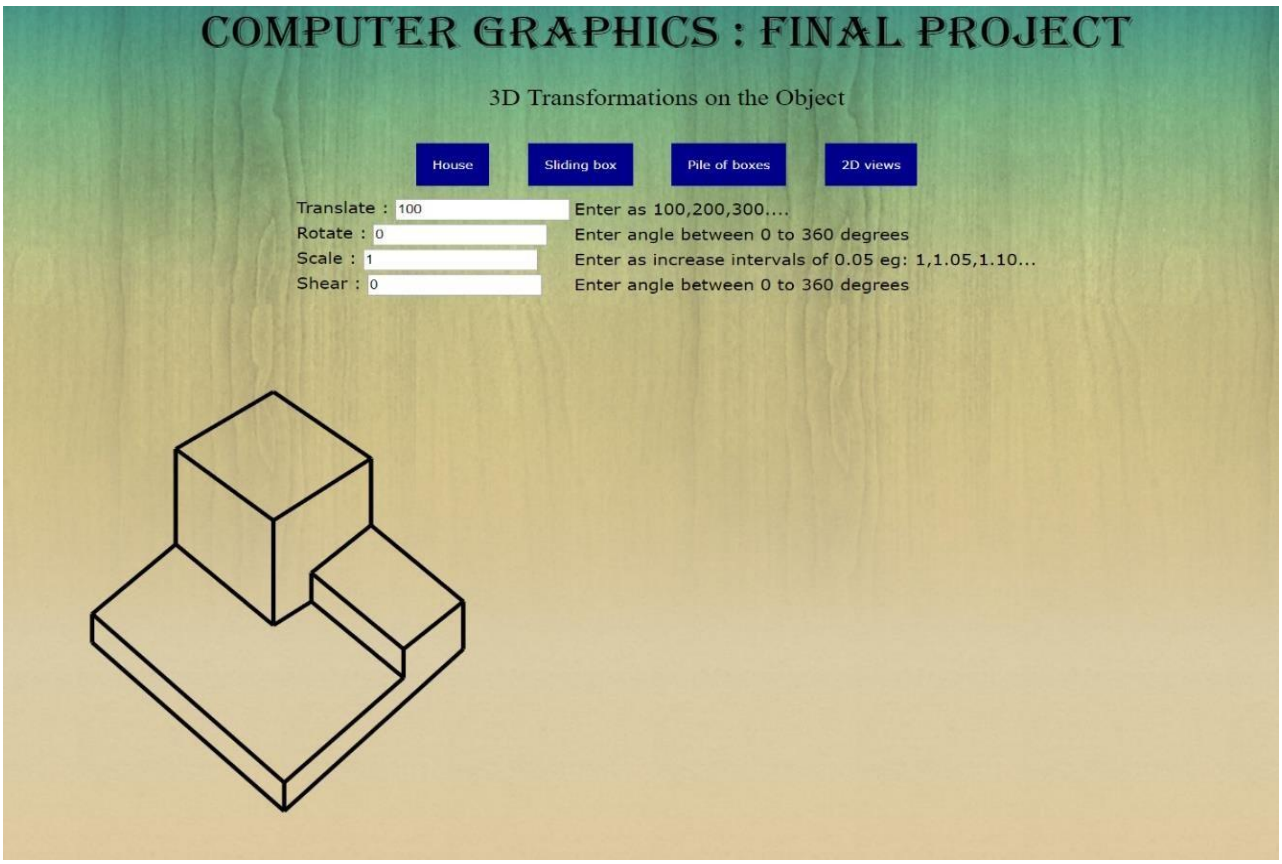
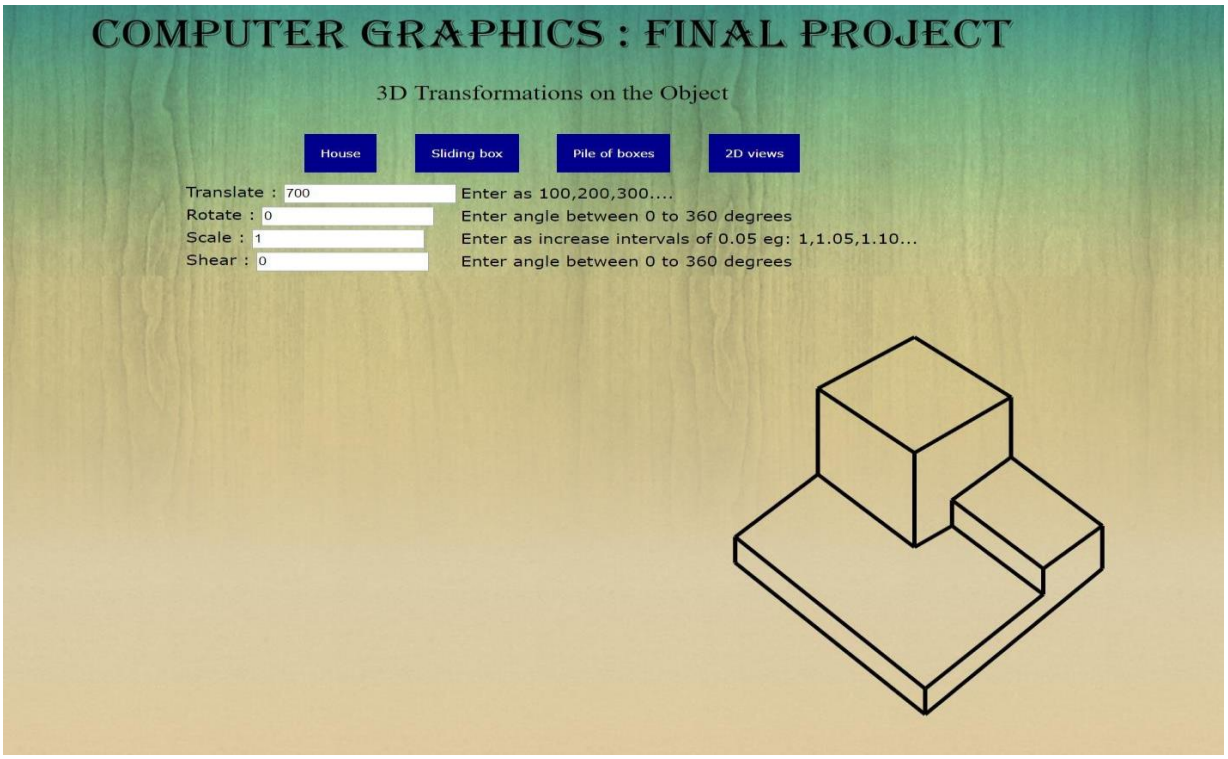



## Part 2:

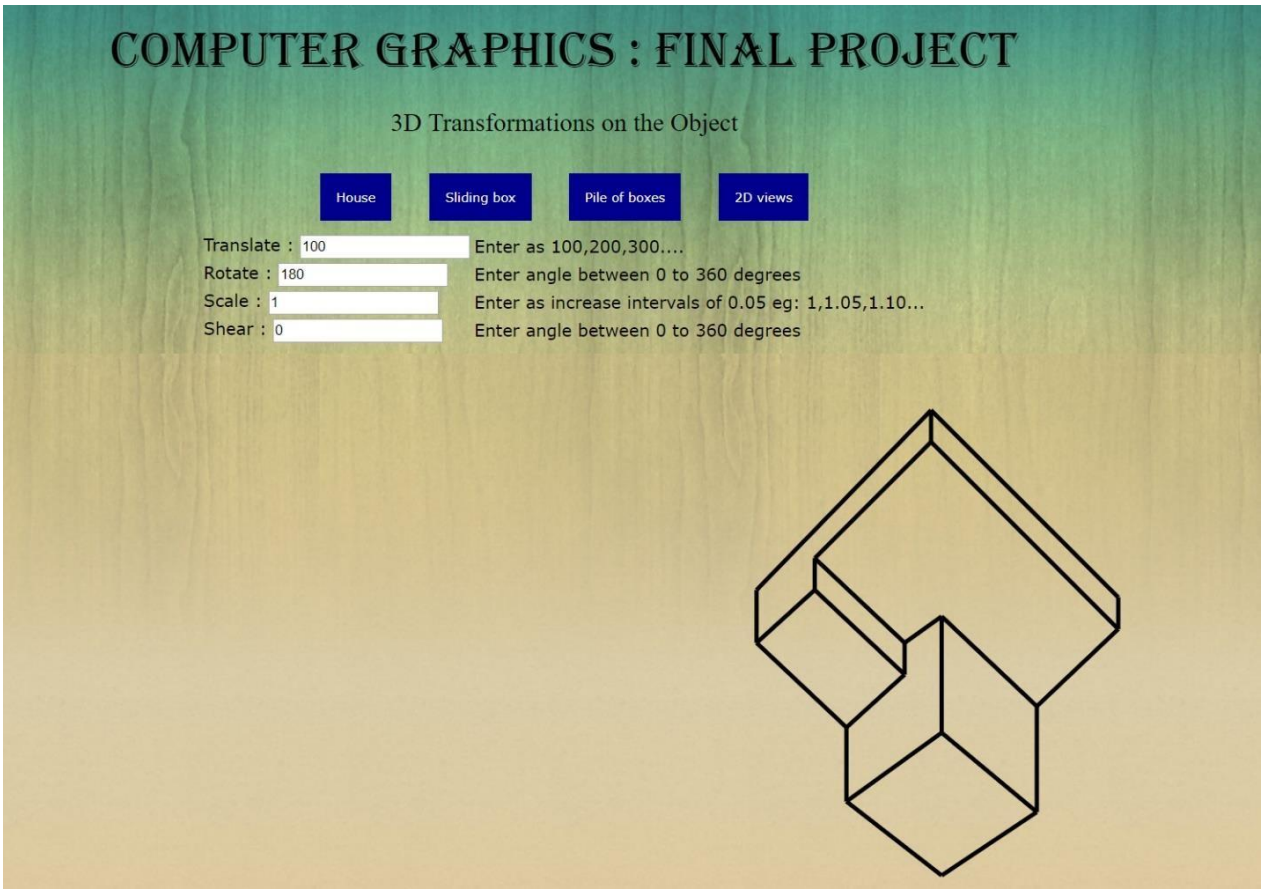
These are the outputs for one of the objects. The original image is below, and the other transformations are below.



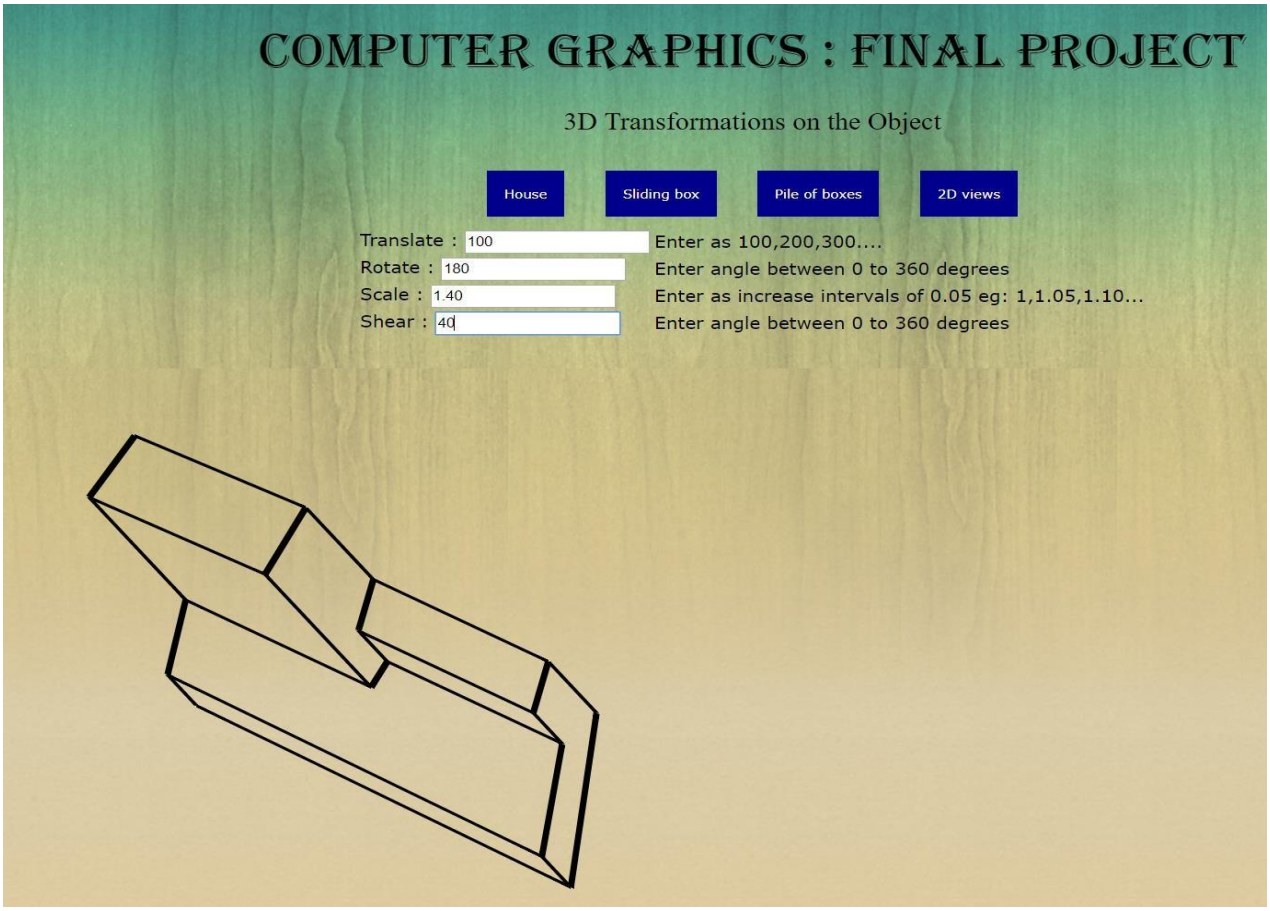
Translation:



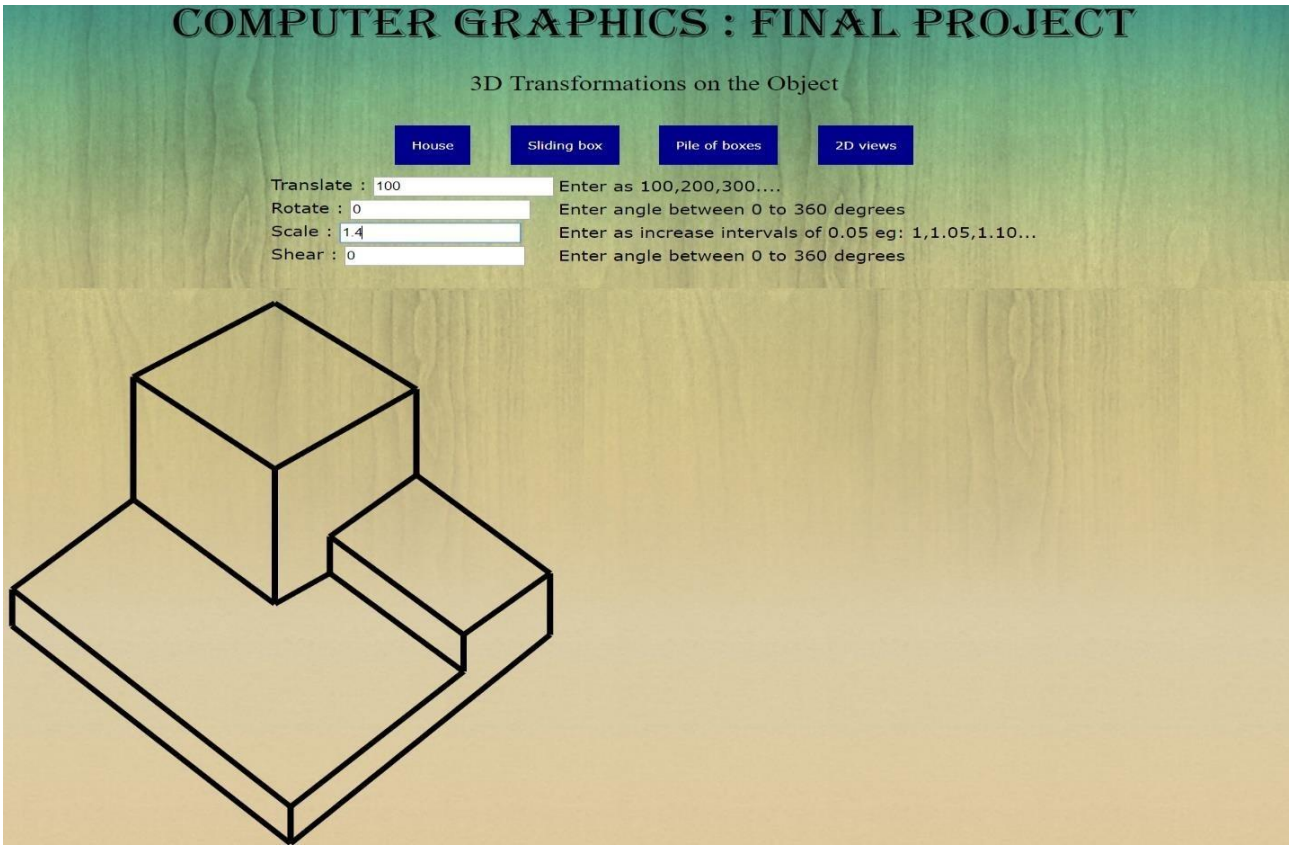

Rotation:



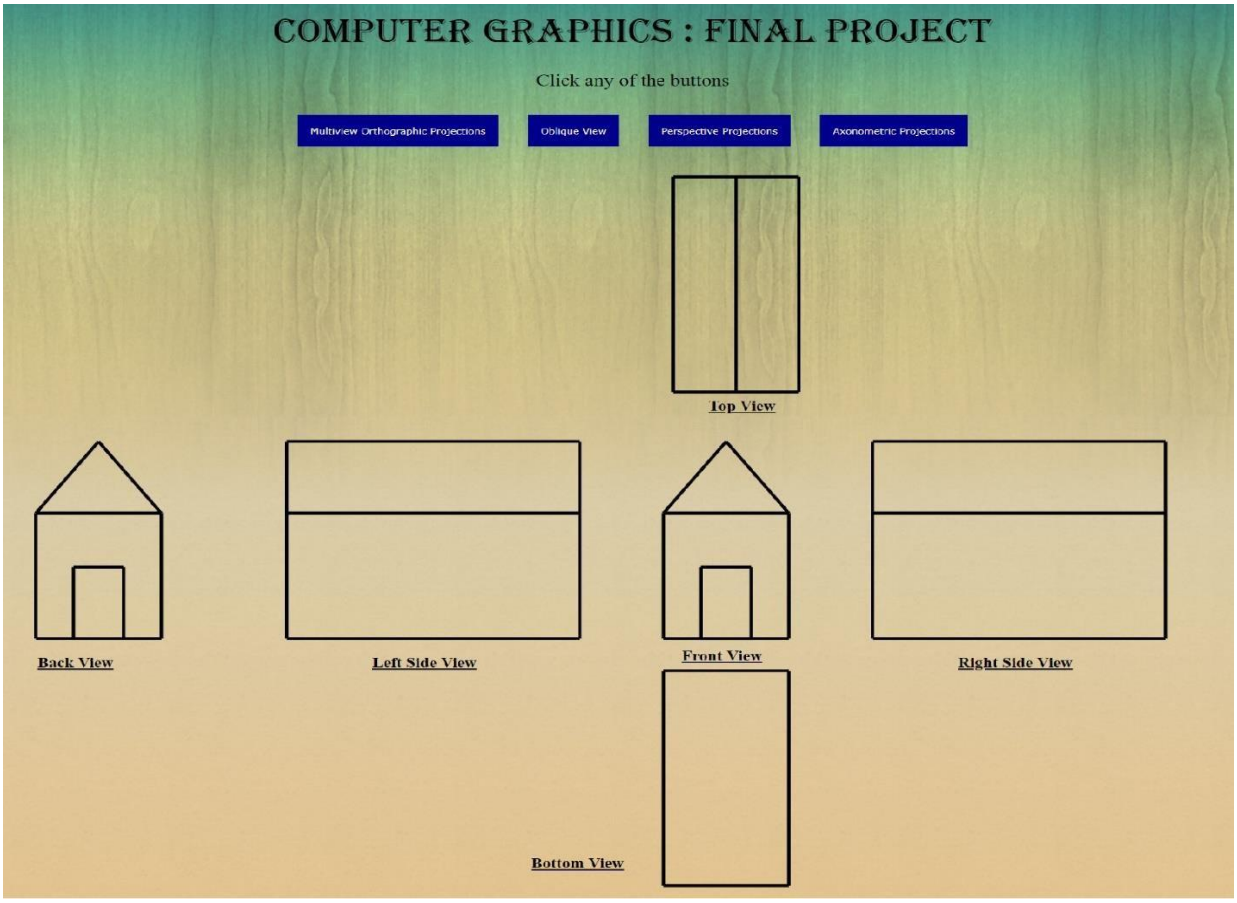
Shearing:



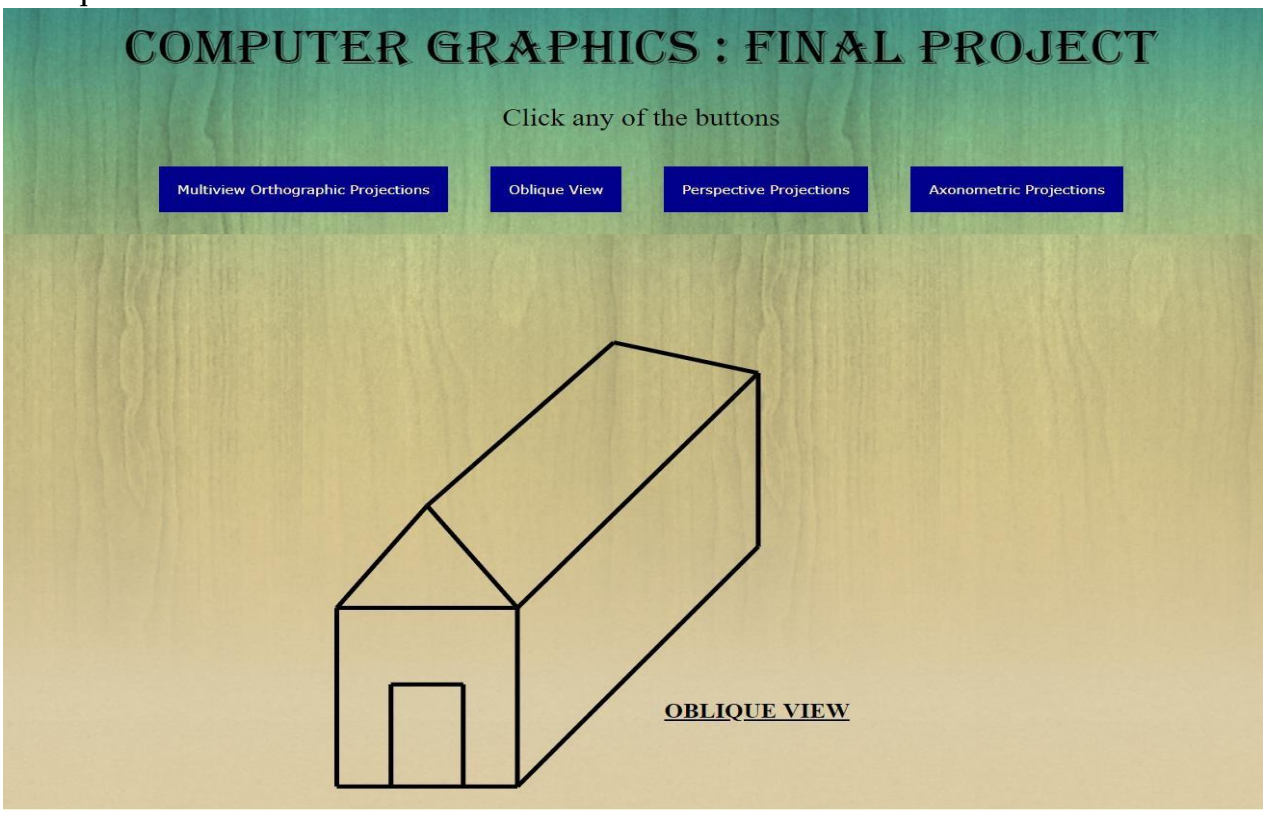

**Scaling:**



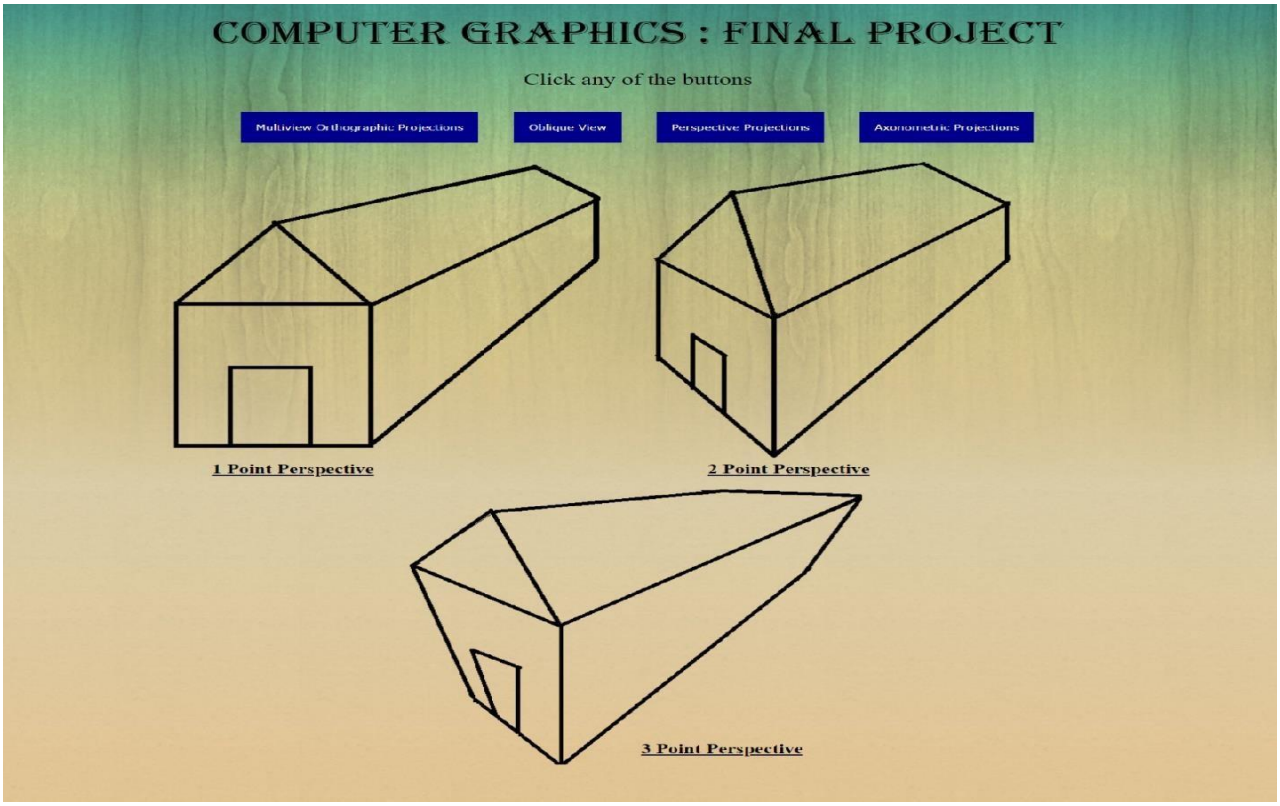
**Part 3:** Multiview Orthographic Projection



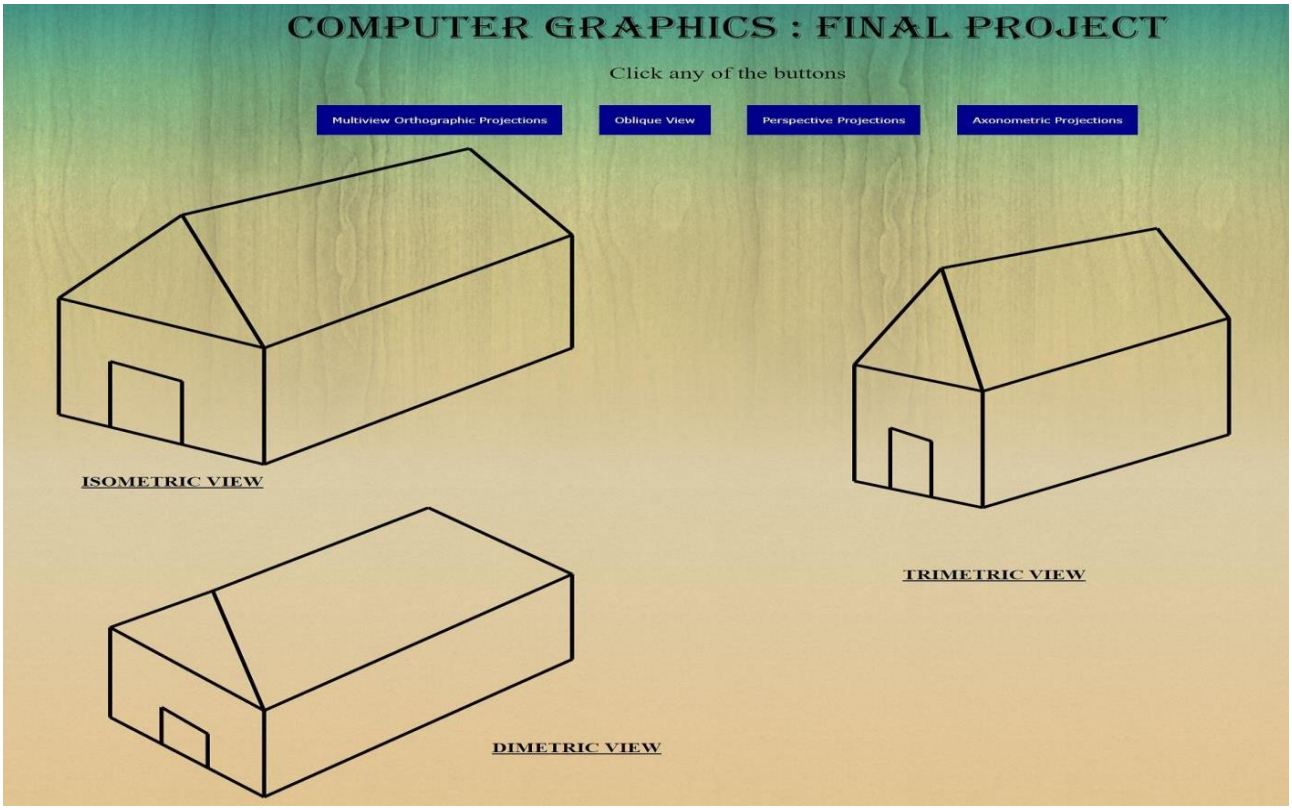

Oblique View:



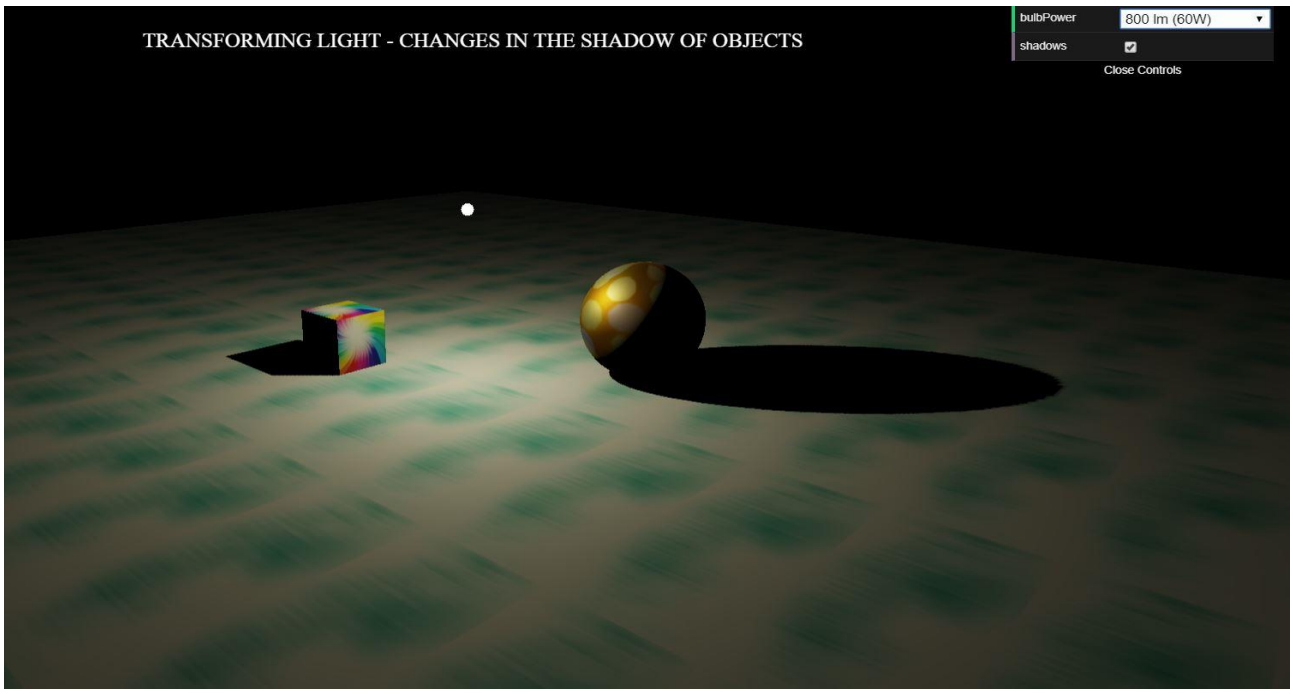
Perspective Projections



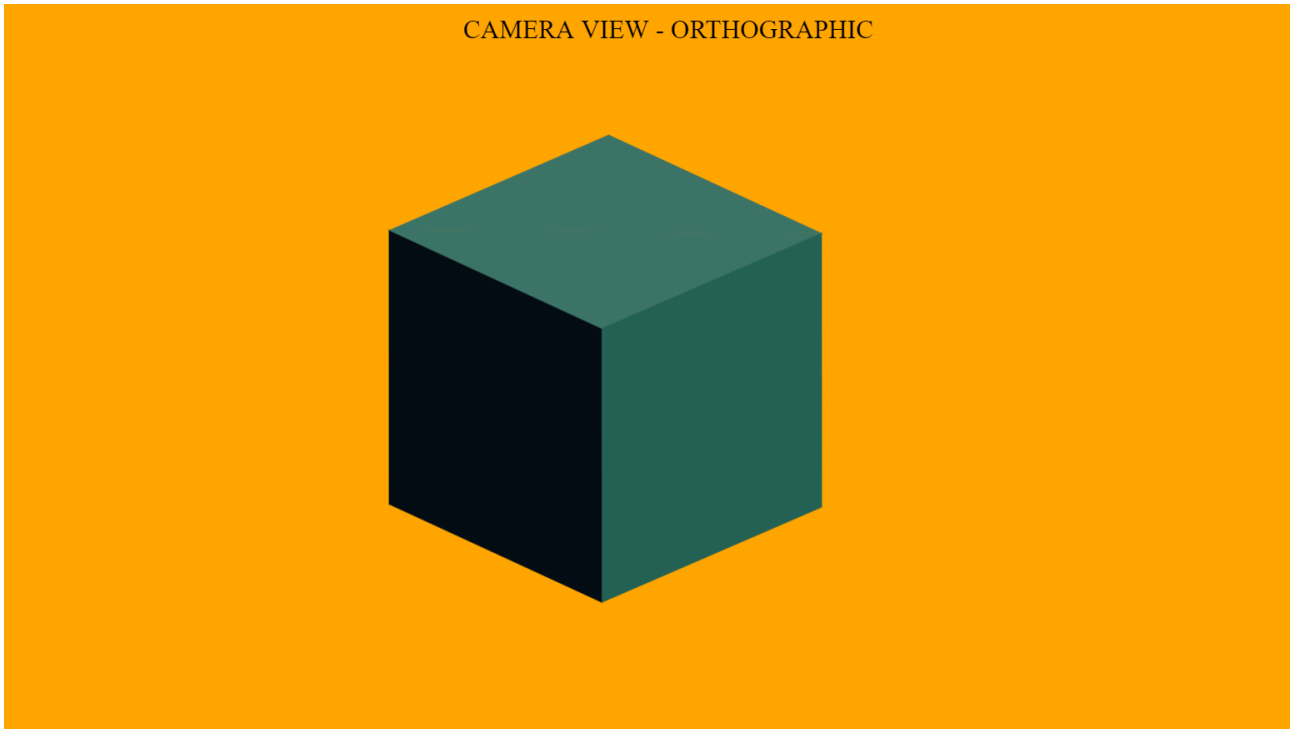

Axonometric Projections:



**Part-4:**
Light View




Camera View:




**REFERENCES:**

1.https://www.w3schools.com/html/
2.http://stackoverflow.com/
3.https://study.com/academy/lesson/what-is-an-isometric-drawing-definition-examples.html
4. 4.https://github.com/mrdoob/three.js/