Project Report

Computer Graphics I

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Abstract

This project aims to create a 3D object by drawing three 2D "elevations". The project implements many features like: modeling, transform object by applying 3D (Translate/Rotate/Scale/SHear) transformations to the created object, viewing the created object from multiple views and generating different projections of the objects.

Introduction

The project will employ the use of WebGL which is a JavaScript API for rendering interactive 2D and 3D graphics within any compatible web browser without the use of plug-ins. WebGL is integrated completely into all the web standards of the browser, allowing GPU-accelerated usage of physics and image processing and effects as part of the web page canvas. WebGL elements can be mixed with other HTML elements and composited with other parts of the page or page background. Due to this reason I am choosing to work with it. The project will be able to render user defined images in 3D and also provide the ability to
Transform the object
V_i_e_w_ _t_h_e_ _o_b_j_e_c_t_ _f_r_o_m_ _m_u_l_t_i_p_l_e_ _v_i_e_w_s

Transform the lighting of the object

Generate different projection of the object

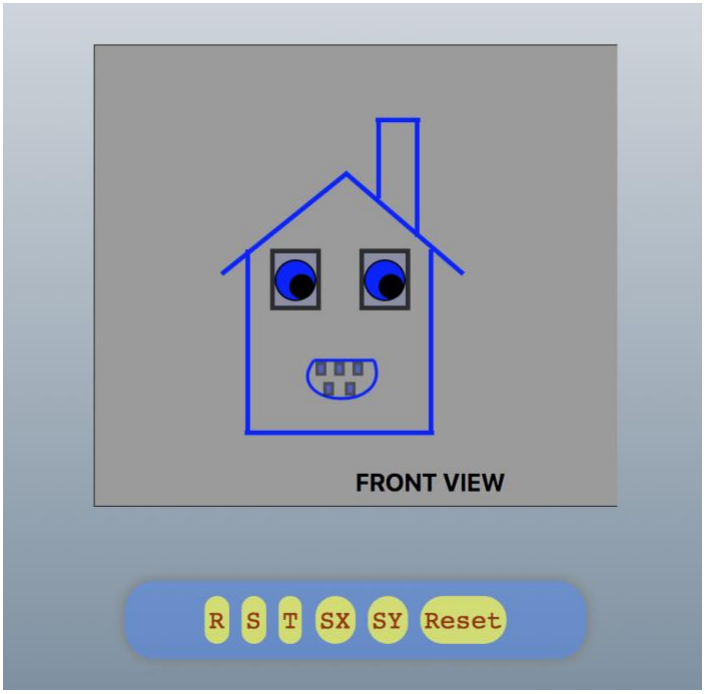
Change the perspective projection vanishing points

Create texture/bump/environmental mappings of the object

Analysis and Design

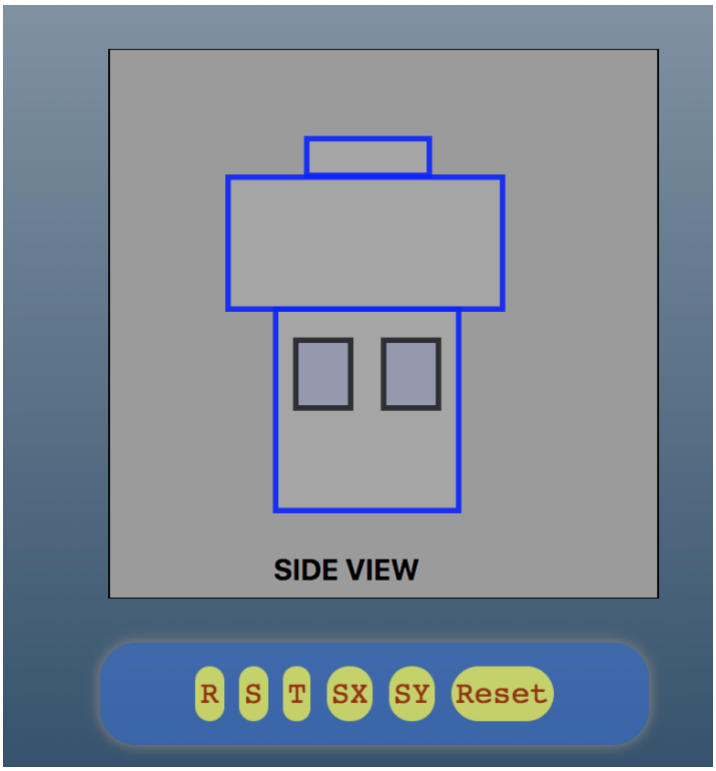
Week 1: Please refer:
http://www.cs.uml.edu/~asharma/427546s2018/finalProject/finalProject_v1/finalProject.html
I created the full working model of front and side view of my dream house.

Front View:



Select R to rotate the view; S for scaling, T for translation; SX for Skewing X-axis; SY for Y-axis Skew and Reset to enter the state representing the natural state.

Side View: Select R to rotate the view; S for scaling, T for translation; SX for Skewing X-axis; SY for Y-axis Skew and Reset to enter the state representing the natural state.

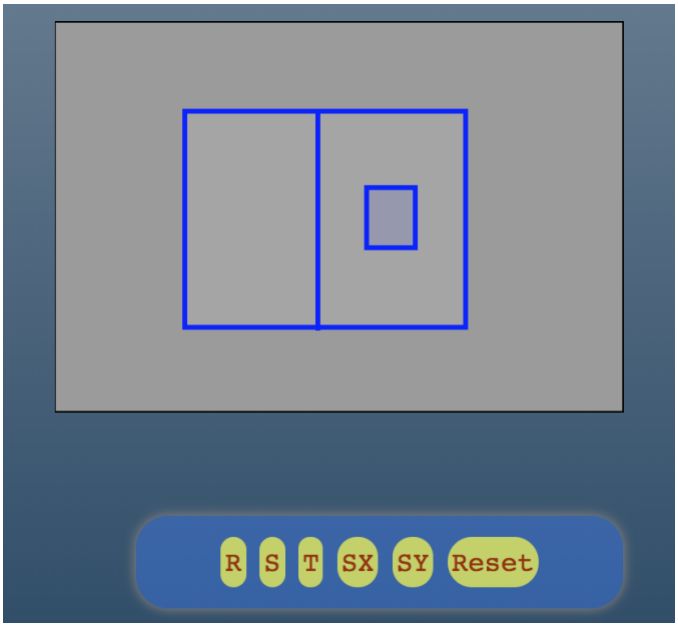


I have svgs in html for the front view of my dream house and rear view of my dream house. I have some global parameters to perform translation, rotation, scaling, and shearing. Everytime the function is called, it uses to jqery and the css function is used to display the effects. I also have a reset option.

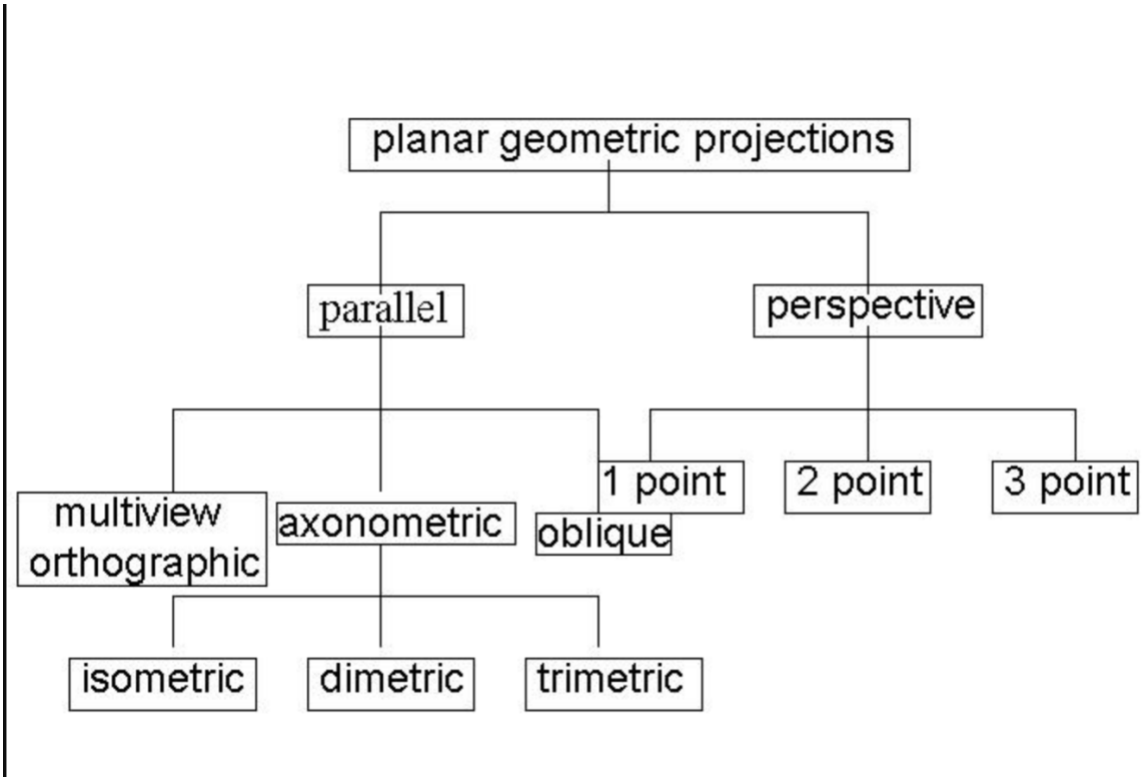
For Javascript, I used the jQuery library. And for CSS styling, I used some bootstrap. With jQuery helped me to change the website color and also helped to merge multiple mouse events and functions with ease.

Week 2:
Please refer:
http://www.cs.uml.edu/~asharma/427546s2018/finalProject/finalProject_v2/2dTransformations.html
I created the full working model of top view of my dream house. Select R to rotate the view; S for scaling, T for translation; SX for Skewing X-axis; SY for Y-axis Skew and Reset to enter the state representing the natural state.

Top View:



I also added a html page to display various planar geometric projections for a cube which we studied in class. In order to view, please refer:
http://www.cs.uml.edu/~asharma/427546s2018/finalProject/finalProject_v2/projections.html



I added the top view of my dream house and the various projections of a cube. 2dTransformations.html deals with all the 2 Dimensional Transformations of dream house and Projections.html has the various Geometric Projections of cube.

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