Report

The project is a Vite App and is made up of 4 main files:

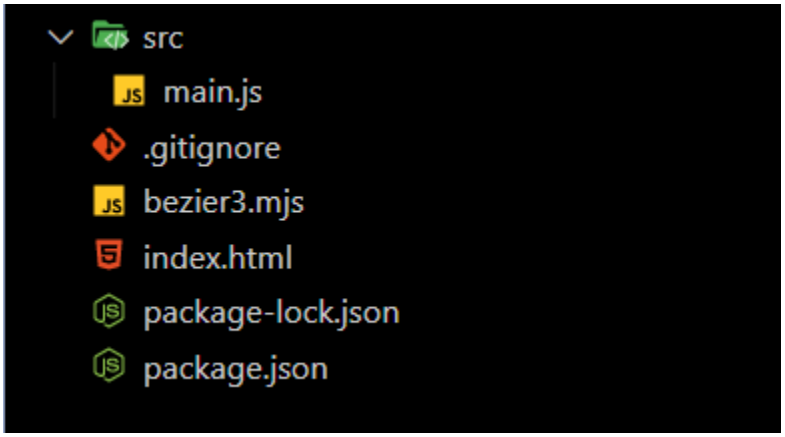
- index.html
- main.js
- bezier3.mjs
- package.json

1. In the HTML file,
    - There are inline CSS styles
    - There are two divs named info and coordinates that are manipulated from the javascript.
    - There is a canvas in which the scene is rendered and also there is an import of the main.js.

   Also, instructions are written on how to run the project.
2. In **main.js**
    - I have imported the threejs dependencies using CDNs.
    - I also import the mjs file here.
    - Various variables that are going to be used are also declared.
    - Camera and Scene are initialized
    - Various Geometry and materials are initialized.
    - Axes are drawn from the origin in the desired color and direction.
    - A checkered board/plane is also added to the screen.
    - An invisible plane is added that allows the user freedom of movement.
    - Lights are added: one directional light and one ambient light.
    - The scene renderer is initialized with the correct aspect ratio of the user screen.
    - Event listeners are added to listen for:
        i. Pointer Movement
        ii. Keydown
        iii. Keyup
        iv. Scroll action
        v. Window resize
        vi. Load
    - Event handlers are defined:
        i. **Load:** Places the 4 balls on the board after the page has loaded.
        ii. **Window Resize:** Updates the camera and renderer when/if the window size is changed
        iii. **Pointer Move:** Highlights the point under the pointer with a green mat. It also console logs the current square coordinates when the pointer moves.
        iv. **KeyUp:** Redraws the perpendicular lines when the height or location of any of the balls is changed.
        v. **KeyDown:** Adds the functionality to different key presses according to the instructions given.
        vi. **X pressed:** Created an object of the required type and calls the bezier3 function in a loop with incrementing values of t. After that the generated points are converted into new curve and then used to draw a tube mesh of random color on the scene passes the coordinates of those points to it.
        vii. **Backspace pressed:** Resets the scene when Backspace is pressed.
        viii. **Scroll action:** Changes the FOV of the camera according to the scroll direction.
    - LineDraw function is defined that draws the perpendicular lines.
    - RandomColorinHex function is defined that returns a random color hex code everytime its called.
    - Render function is defined.

    - Animate function is defined and then called. It adds orbit controls to the scene so that can pan freely. It also calls the render function every frame.
3. In **bezier3.mjs** there is a single function called bezier3 which takes an object containing the 4 control points and value of t. The algorithm then returns the desired coordinates in the form of a Vector3. This function is then exported.
4. In package.json different dependencies are noted and scripts are given to install and run the application.

Directory tree:



Deployment