

System and Unit Test Template

Product: MAT3D

Team Name: Matrix Masters

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Sprint 1 User Stories:

1. As a matrix calculator developer, I want a working github repository and have everybody acquainted with Github so that we can share code more easily.

Scenario:

1. Log in to GitHub on github.com
 2. Check that you are a collaborator to the MAT3D repository
2. As a matrix calculator user, I want a 3D viewport to be implemented so that I can view any 3d models I import into the calculator.

Scenario:

1. Load the webpage
 2. Check that the 3D canvas is loaded beneath the matrix definition area with a cube.
3. As a matrix calculator developer, I want a user input parser so that the user can provide complex matrix calculations.

Scenario:

1. Load the webpage
2. Type in expressions on the top bar with these formats:
 - a. <Basic Mathematical Expression (no variables)>
 - b. <Scalar Function>(<Basic Mathematical Expression (no variables)>)
 - c. <Math Expression with matrices (using variables)>
 - d. <Matrix Function>(Math Expression with matrices (using variables)>
 - e. ([a,b,c, or d])
 - f. Any compositions of the above
 - g. Any expression with undefined items, weird spacing, or invalid operator use.
3. User should see an alert has appeared on screen or that the correct answer is in the answer variable.

4. As a matrix calculator user, I want to be able to move the camera within the 3d viewport so that I can see my 3D model at different angles.

Scenario:

1. Open the website.
2. Users should see a 3D canvas at the bottom of the page. By interacting with the canvas:
 - Right Click: Rotates the scene
 - Left Click: Pans the scene
 - Scroll wheel: Zooms in and out of the scene
5. As a matrix calculator developer, I want a matrix cell parser so that a user can define scalars such as complex numbers, trig functions within their matrices.

Scenario:

1. Load the webpage
2. Type in expressions within a matrix cell with these formats:
 - a. <Basic Mathematical Expression (no variables)>
 - b. <Scalar Function>(<Basic Mathematical Expression (no variables)>)
 - c. <Math Expression with matrices (using variables)>
 - d. <Matrix Function>(Math Expression with matrices (using variables)>
 - e. ([a,b,c, or d])
 - f. Any compositions of the above
 - g. Any expression with undefined items, weird spacing, or invalid operator use.
3. User should see an alert has appeared on screen or nothing at all.
6. As a matrix calculator developer, I want a sidebar so that we can put matrix variable items on that sidebar.

Scenario:

1. Load the webpage.
2. User hits the add matrix button.
3. User should be able to define the matrix's name and dimensions.

Sprint 2 User Stories:

1. As a matrix calculator user, I want to be able to define matrices and apply them to 3D objects so that I can see a 3D transformation of those matrices.

Scenario:

1. Load the webpage.
 2. Define a matrix from the sidebar.
 3. User hits the apply matrix button in the 3D area. The transformation shows in the 3D area of the currently displayed matrix.
 4. If a user did not use a 3x3 or 4x4 matrix in the transformation, an alert will show up.
2. As a matrix calculator user, I want to be able to use both the matrix calculator and viewing area on the same page so that I have access to both functionalities while using MAT3D.

Scenario:

1. Load the webpage. Both the matrix calculator and 3D areas should be on the same page.
 2. Define a matrix from the sidebar. The matrix will be saved in the sidebar according to its name and dimensions.
 3. Enter values in the newly defined matrix and hit the submit button.
 4. If the values are not numbers, then an alert will pop up.
 5. User can hit any of the buttons on the website to perform matrix calculations. The function should show up in the input bar.
 6. User inputs the name of their matrix in the input bar and closes the function with a).
 7. User will see the result below the input and see a saved matrix called "ans" on the sidebar with the same values.
 8. If a user adds another matrix with the same name, an alert will show up.
 9. If a user adds another matrix with the name "ans", an alert will show up.
 10. User can also hit other function buttons on the website, such as trig functions or common calculator functions such as natural log or square root. The function should show up in the input bar.
 11. User inputs a number in the input bar and closes the function with a).
 12. User will see the result below the input.
 13. User hits the apply matrix button in the 3D area. The transformation shows in the 3D area of the currently displayed matrix.
 14. If a user did not use a 3x3 or 4x4 matrix in the transformation, an alert will show up.
3. As a matrix calculator user, I want to be able to compute matrices/scalars so that I can take advantage of mathematical expressions while interacting with the calculator.

Scenario:

1. Load the webpage
2. Type in expressions on the top bar with these formats:
 - a. <Basic Mathematical Expression (no variables)>
 - b. <Scalar Function>(<Basic Mathematical Expression (no variables)>)
 - c. <Math Expression with matrices (using variables)>
 - d. <Matrix Function>(Math Expression with matrices (using variables)>
 - e. ([a,b,c, or d])
 - f. Any compositions of the above
 - g. Any expression with undefined items, weird spacing, or invalid operator use.
4. As a matrix calculator developer, I want to be able to improve on the calculator UI so that there is more overall functionality for the user.

Scenario:

1. Load the webpage. Both the matrix calculator and 3D areas should be on the same page.
 2. Define a matrix from the sidebar. The matrix will be saved in the sidebar according to its name and dimensions.
 3. Enter values in the newly defined matrix and hit the submit button.
 4. If the values are not numbers, then an alert will pop up.
 5. User can hit any of the buttons on the website to perform matrix calculations. The function should show up in the input bar.
 6. User inputs the name of their matrix in the input bar and closes the function with a).
 7. User will see the result below the input and see a saved matrix called "ans" on the sidebar with the same values.
 8. If a user adds another matrix with the same name, an alert will show up.
 9. If a user adds another matrix with the name "ans", an alert will show up.
 10. User can also hit other function buttons on the website, such as trig functions or common calculator functions such as natural log or square root. The function should show up in the input bar.
 11. User inputs a number in the input bar and closes the function with a).
 12. User will see the result below the input.
 13. If a user has entered more than one matrix, they can click on a specific matrix in the sidebar and the name and matrix cell values will appear on screen.
 14. If the user hits the trash button beside a matrix saved in the sidebar, the matrix will be deleted from the sidebar, and if it is currently being displayed, will disappear from the screen.
5. As a matrix calculator developer, I want to be familiar with HTML, CSS, and Vue.js so that the whole team can help with the UI during the 3rd Sprint.

Scenario:

1. Watch Derek Banas video on HTML.
2. Everyone has to correctly answer these questions:
 - a. What are some things that can go into the head, body, and footer tags?
 - b. What is a class and an id? What is the difference between them?
 - c. What are the tags div, form, input and button used for?
3. Watch Derek Banas video on CSS.
4. Everyone has to correctly answer these questions:
 - a. What are some CSS attributes? What can they do?
 - b. For CSS functions, how do you specify if it is for a class? For an id?
 - c. How do you specify a CSS file to use in your HTML file?
 - d. Is it possible to put CSS directly in an HTML file? If so, what are the different ways that you can do this?
 - e. Which has more precedence: using CSS directly in an HTML file or calling the CSS from a CSS file?
5. Read up on vue.js documentation on vue's official website.
6. Everyone has to correctly answer these questions:
 - a. How do you specify a vue.js file to use in your HTML file?
 - b. What are some vue commands used in an HTML file? What can they do?
 - c. In your vue.js file, where do you declare vue functions and variables?
 - d. How do you specify vue functions and variables in the vue.js file itself? In other javascript files?

Sprint 3 User Stories:

1. As a matrix calculator user, I want to be able to interact with both the matrix and 3D functionality so that my computed matrices can affect my loaded 3D model.

Scenario:

1. Load the webpage
 2. Create a matrix variable on the sidebar
 3. Define the matrix in the matrix definition area and save it
 4. Hit the "Apply Matrix" button in the 3D area.
 5. The user should see the matrix applied onto the 3D model in the area or an alert pop up if it is not a 3x3 or 4x4 matrix.
2. As a matrix calculator developer, I want the UI to look nice and professional-looking so that the users can easily interact with it.

Scenario:

1. Load the webpage.
2. The user should see and be able to interact with a nice and understandable UI that contains both matrix calculator and 3D functionalities.
3. Define a matrix from the sidebar. The matrix will be saved in the sidebar according to its name and dimensions.
4. Enter values in the newly defined matrix and hit the submit button.
5. If the values are not numbers, then an alert will pop up.
6. User can hit any of the buttons on the website to perform matrix calculations. The function should show up in the input bar.
7. User inputs the name of their matrix in the input bar and closes the function with a).
8. User will see the result below the input and see a saved matrix called "ans" on the sidebar with the same values.
9. If a user adds another matrix with the same name, an alert will show up.
10. If a user adds another matrix with the name "ans", an alert will show up.
11. User can also hit other function buttons on the website, such as trig functions or common calculator functions such as natural log or square root. The function should show up in the input bar.
12. User inputs a number in the input bar and closes the function with a).
13. User will see the result below the input.
14. User hits the apply matrix button in the 3D area. The transformation shows in the 3D area of the currently displayed matrix.
15. If a user did not use a 3x3 or 4x4 matrix in the transformation, an alert will show up.
16. The user can interact with the 3D GUI and change the type of object, color of background lighting, transformations (translate, scale, shear, rotate), and grid color/text color/opacity/size of coordinate planes, as well as apply the

transformation in the calculator's currently displayed matrix and reset the object back to its initial position/transformation.