

# System Design Document

Team NoStruggle

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# CRC Cards

<b>Class Name:</b> App	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> StudyTimer, SignUp, SignIn, Profile	
<b>Responsibilities:</b> Contains all of the application	<b>Collaborators:</b>

<b>Class Name:</b> StudyTimer	
<b>Parent Class (if any):</b> App <b>Subclasses (if any):</b>	
<b>Responsibilities:</b> Track elapsed time for a specified task, alternate between timer and stopwatch modes	<b>Collaborators:</b>

<b>Class Name:</b> TodoList	
<b>Parent Class (if any):</b> Scheduler, App <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Display the list of tasks to do, filter the tasks based on attributes	<b>Collaborators:</b> AddNewTask

<b>Class Name:</b> AddNewTask	
<b>Parent Class (if any):</b> Scheduler, App <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> User input for creating a new task, validation and toggling between being open and closed	<b>Collaborators:</b> TodoList

<b>Class Name:</b> User	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Store account details, such as username and password	<b>Collaborators:</b>

<b>Class Name:</b> SignUp	
<b>Parent Class (if any):</b> App <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Allow new users to register a new account by saving them to the database.	<b>Collaborators:</b> User

<b>Class Name:</b> SignIn	
<b>Parent Class (if any):</b> App <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Allow users to access their account and redirect them to the home page by finding them in the database.	<b>Collaborators:</b> User

<b>Class Name:</b> Profile	
<b>Parent Class (if any):</b> App <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Display account details, which users can edit.	<b>Collaborators:</b> User

<b>Class Name:</b> Validate	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> DerivativeType	
<b>Responsibilities:</b> Ensures equation is formatted properly before being derived	<b>Collaborators:</b> DerivativeType

<b>Class Name:</b> FormatPrior	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> FindSectionDerivative	
<b>Responsibilities:</b> Removes spaces and sets equation in an easily parsable way to deal with minus signs	<b>Collaborators:</b> FindSectionDerivative

<b>Class Name:</b> StoreOperators	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> FindSectionDerivative	
<b>Responsibilities:</b> Stores operators of function into an array and returns it to be used for future access	<b>Collaborators:</b> FindSectionDerivative

<b>Class Name:</b> DerivingTerms	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> FindSectionDerivative	
<b>Responsibilities:</b> Derives each term in a group of terms given as input	<b>Collaborators:</b> FindSectionDerivative

<b>Class Name:</b> ConcatenateTerms	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> FindSectionDerivative	
<b>Responsibilities:</b> Concatenates all derived terms together	<b>Collaborators:</b> FindSectionDerivative

<b>Class Name:</b> FindSectionDerivative	
<b>Parent Class (if any):</b> FormatPrior, StoreOperators, DerivingTerms, ConcatenateTerms <b>Subclasses (if any):</b> ChainRule, DerivativeType	
<b>Responsibilities:</b> Finds the derivative of a given polynomial section	<b>Collaborators:</b> FormatPrior, StoreOperators, DerivingTerms, ConcatenateTerms, ChainRule, DerivativeType

<b>Class Name:</b> ChainRule	
<b>Parent Class (if any):</b> FindSectionDerivative <b>Subclasses (if any):</b> DerivativeType	
<b>Responsibilities:</b> Finds the derivative of a section needing the chain rule	<b>Collaborators:</b> FindSectionDerivative, DerivativeType

<b>Class Name:</b> DerivativeType	
<b>Parent Class (if any):</b> Validate, ChainRule, FindSectionDerivative <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Determines which derivation method to use with a given equation	<b>Collaborators:</b> Validate, ChainRule, FindSectionDerivative

<b>Class Name:</b> CreatePostPage	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> <ul style="list-style-type: none"> <li>Creates the page to make a new forum post</li> <li>Posts data for a forum post to mongoDB</li> </ul>	<b>Collaborators:</b> User

<b>Class Name:</b> Forum	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> <ul style="list-style-type: none"> <li>Creates the page to make a new forum post</li> <li>Posts data for a forum post to mongoDB</li> </ul>	<b>Collaborators:</b>

<b>Class Name:</b> ForumReplies	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> <ul style="list-style-type: none"> <li>Creates a page to view a post and its replies</li> <li>Fetch data from mongoDB to get data for the post and answers</li> </ul>	<b>Collaborators:</b>

<b>Class Name:</b> ForumCommentSection	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> <ul style="list-style-type: none"> <li>• Creates a comment section for a post</li> <li>• Fetch data from mongoDB to get data</li> <li>• Post replies and comments to mongoDB</li> </ul>	<b>Collaborators:</b>

<b>Class Name:</b> SortPosts	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> <ul style="list-style-type: none"> <li>• Sorts and filters posts</li> <li>• Fetch data from mongoDB to get data</li> </ul>	<b>Collaborators:</b>

<b>Class Name:</b> LinearAlgebraCalculator	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> MatrixCalculator,	
<b>Responsibilities:</b> Contains all of the linear algebra calculators	<b>Collaborators:</b>

<b>Class Name:</b> MatrixCalculator	
<b>Parent Class (if any):</b> LinearAlgebraCalculator <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Contains all functions for matrix solving	<b>Collaborators:</b>

<b>Class Name:</b> LinearTransformationMultiplier	
<b>Parent Class (if any):</b> LinearTransformationMultiplier <b>Subclasses (if any):</b> None	

<b>Responsibilities:</b> Contains all functions for matrix solving	<b>Collaborators:</b>
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<b>Class Name:</b> EigenSolver	
<b>Parent Class (if any):</b> LinearAlgebraCalculator <b>Subclasses (if any):</b> None	
<b>Responsibilities:</b> Contains all functions for matrix solving	<b>Collaborators:</b>

<b>Class Name:</b> ToolKit	
<b>Parent Class (if any):</b> None <b>Subclasses (if any):</b> LinearAlgebraCalculator, DerivativeCalculator, IntegralCalculator	
<b>Responsibilities:</b> Contains all kinds of math calculators	<b>Collaborators:</b>

## System Interaction

The current version of the project requires the latest version of NodeJS.

In order to view the api documentation, the 2800 port must be available for the app's server to be run on.

## System Decomposition and Architecture Diagram

Our system is divided into models, views and controllers. Coloured in pink, blue and green respectively in the [System Architecture Diagram](#). Alternatively, <https://i.imgur.com/VdWWD9N.png>.

Our system will check for invalid user input and notify users' by providing feedback on the correct steps they may take. Display errors such as a user trying to create a task with duplicate names, or typing a username with invalid characters, will be handled by the browser. The browser will also display custom error messages to the user for database errors such as registering with a taken username. In the case of network errors resulting from the server being offline, the user will be barred from accessing any of the website's features or making any further requests. This will be done by immediately checking for the server's status the moment the user opens up the website on their browser.