

System Design Document

Team NoStruggle

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CRC Cards

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

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

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

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

Class Name: StudyTimer	
Parent Class (if any): App Subclasses (if any):	
Responsibilities: Track elapsed time for a	Collaborators: TimerSelectTask

specified task, alternate between timer and stopwatch modes	
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Class Name: TimerSelectTask	
Parent Class (if any): App Subclasses (if any):	
Responsibilities: Allow user to select a task from list of options	Collaborators: StudyTimer, AddNewTask

Class Name: StudyTimerSummary	
Parent Class (if any): App Subclasses (if any):	
Responsibilities: Display daily summary of time spent on tasks, filter between specified dates	Collaborators: StudyTimer, TimerSelectTask

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

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

Class Name: SignIn	
Parent Class (if any): App Subclasses (if any): None	
Responsibilities: Allow users to access their	Collaborators: User

account and redirect them to the home page by finding them in the database.	
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Class Name: Profile	
Parent Class (if any): App Subclasses (if any): None	
Responsibilities: Display account details, which users can edit.	Collaborators: User

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

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

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

Class Name: DerivingTerms	
Parent Class (if any): None Subclasses (if any): FindSectionDerivative	

Responsibilities: Derives each term in a group of terms given as input	Collaborators: FindSectionDerivative
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Class Name: ConcatenateTerms	
Parent Class (if any): None Subclasses (if any): FindSectionDerivative	
Responsibilities: Concatenates all derived terms together	Collaborators: FindSectionDerivative

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

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

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

Class Name: reduceFraction	
Parent Class (if any): None Subclasses (if any): IntegrateTerms	

Responsibilities: Reduce the fractions for constant values for integration of terms	Collaborators: IntegrateTerms
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Class Name: Validate	
Parent Class (if any): None Subclasses (if any): FindIntegral	
Responsibilities: Ensures equation is formatted properly before being integrated	Collaborators: FindIntegral

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

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

Class Name: IntegrateTerms	
Parent Class (if any): None Subclasses (if any): FindIntegral	
Responsibilities: Integrates each term in a group of terms given as input	Collaborators: FindIntegral

Class Name: ConcatenateTerms	
Parent Class (if any): None Subclasses (if any): FindIntegral	

Responsibilities: Concatenates all integrated terms together	Collaborators: FindIntegral
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Class Name: FindIntegral	
Parent Class (if any): Validate, FormatPrior, StoreOperators, ConcatenateTerms, IntegrateTerms Subclasses (if any): None	
Responsibilities: Finds the integral of a given polynomial section	Collaborators: Validate, FormatPrior, StoreOperators, ConcatenateTerms, IntegrateTerms

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

Class Name: Forum	
Parent Class (if any): None Subclasses (if any): None	
Responsibilities: <ul style="list-style-type: none"> Page that lists all the forum posts Gets data for a forum post from mongoDB 	Collaborators:

Class Name: ViewPost	
Parent Class (if any): None Subclasses (if any): None	
Responsibilities:	Collaborators:

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

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

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

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

Class Name: LinearTransformationMultiplier	
Parent Class (if any): LinearTransformationMultiplier Subclasses (if any): None	
Responsibilities: Contains all functions for matrix solving	Collaborators:

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

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

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. Error messages will also be displayed if user input is missing, for example, if when making a new post, the title is missing or no tag is selected. 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.