System Design Document

Team NoStruggle

Table Of Contents

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	

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.	

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

Class Name: NavBar	
Parent Class (if any): App **Subclasses (if any):**	
Responsibilities:Display navigation links	**Collaborators:**

Class Name: ToolsBar	
Parent Class (if any): NavBar **Subclasses (if any):**	
Responsibilities: Display and control the toggles for the different timer and calculator tools	**Collaborators:**

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	**Collaborators:** FindSectionDerivative

with minus signs	

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

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	**Collaborators:** FindSectionDerivative,

section needing the chain rule	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

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	**Collaborators:** FindIntegral

into an array and returns it to be used for future access	

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

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:
  • 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:	Collaborators:
● Page that lists all the forum posts ● Gets data for a forum post from mongoDB ● Button to click on new post	- ForumCard - CreatePost

Class Name: ForumThread

Parent Class (if any): None
Subclasses (if any): None

Responsibilities:	Collaborators:
● Creates a page to view a post and its replies ● Fetch data from mongoDB to get data for the post and answers	

Class Name: ForumCard

Parent Class (if any): None
Subclasses (if any): None

Responsibilities:	Collaborators:
● UI for a card for a post in the main forum ● Redirect to a page for the post selected	

Class Name: ForumCommentSection

Parent Class (if any): None
Subclasses (if any): None

Responsibilities:	Collaborators:
● Creates a comment section for a post ● Fetch data from mongoDB to get data ● Post replies and comments to	

mongoDB	

Class Name: SortPosts

Parent Class (if any): None
Subclasses (if any): None

Responsibilities: ● 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/nhgD2yk.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.