

## Criterion B - Design

### Software Design:

*Math Helper* Exit

Log in to your account

Username:

Password:

First time user? Click [here](#) to make a new account

If username or password is incorrect, an error message will be displayed and the user will be prompted to enter their login details again.

If username already exists or password does not match the one typed in the confirmed password, an error message will be shown.

*Math Helper* Exit

Create a new account

Username:

Password:

Confirm Password:

*Math Helper* Exit

Please select the mode of service you would like to use

User selects between the two different modes

**Math Helper (Teacher Mode)** Exit

Add a problem

Problem Name:

Problem Description:

Name of Contest/Original Problem:

Multiple Choice or Short Answer:

Problem Type:

Relative Difficulty:

Does your problem contain an image?

If some of the fields have invalid input or some of the buttons have not been selected, an error message will come up and prompt the user to try inputting again.

**Math Helper (Teacher Mode)** Exit

Please enter the file path or online imgur link where you have uploaded the image

URL

File Path

To draw an accompanying image/diagram alongside the problem the image must be uploaded at a set URL or put in a set folder for the program to find it.

**Math Helper (Student Mode)** Exit

Find Singular Problems

Generate Problem Sets

Timed Multiple Choice Contests

The 3 different options available in student mode. Each of which can be selected.

Math Helper (Student Mode)

Exit

Find the problem you would like to find

Search for Problem By Name:

Filters

Contest of Origin:

Multiple Choice or Short Answer

Multiple Choice

Short Answer

Any

Difficulty

1\*

2\*

3\*

4\*

5\*

Any

Problem Type

Find Problem

If some of the fields have invalid input or some of the buttons have not been selected, an error message will come up and prompt the user to try inputting again.

Math Helper (Student Mode)

Exit

Find the problem you would like to find

Numbers of Problems:

Filters

Contest of Origin:

Multiple Choice or Short Answer

Multiple Choice

Short Answer

Any

Difficulty

1\*

2\*

3\*

4\*

5\*

Any

Problem Type

Generate Problem Set

If any of the options are not selected, the program will display an error.

Math Helper (Student Mode) Exit

Find the problem you would like to find

Numbers of Problems:

Filters

Contest of Origin:

Difficulty

1\*

2\*

3\*

4\*

5\*

Any

Problem Type

Timer for Contest

Generate Multiple Choice Test

If any of the options are not selected, the program will display an error.

Math Helper (Student Mode) Exit

Find the problem you would like to find

Search for Problem By Name:

Filters

Contest of Origin:

Multiple Choice or Short Answer

Multiple Choice

Short Answer

Any

Difficulty

1\*

2\*

3\*

4\*

5\*

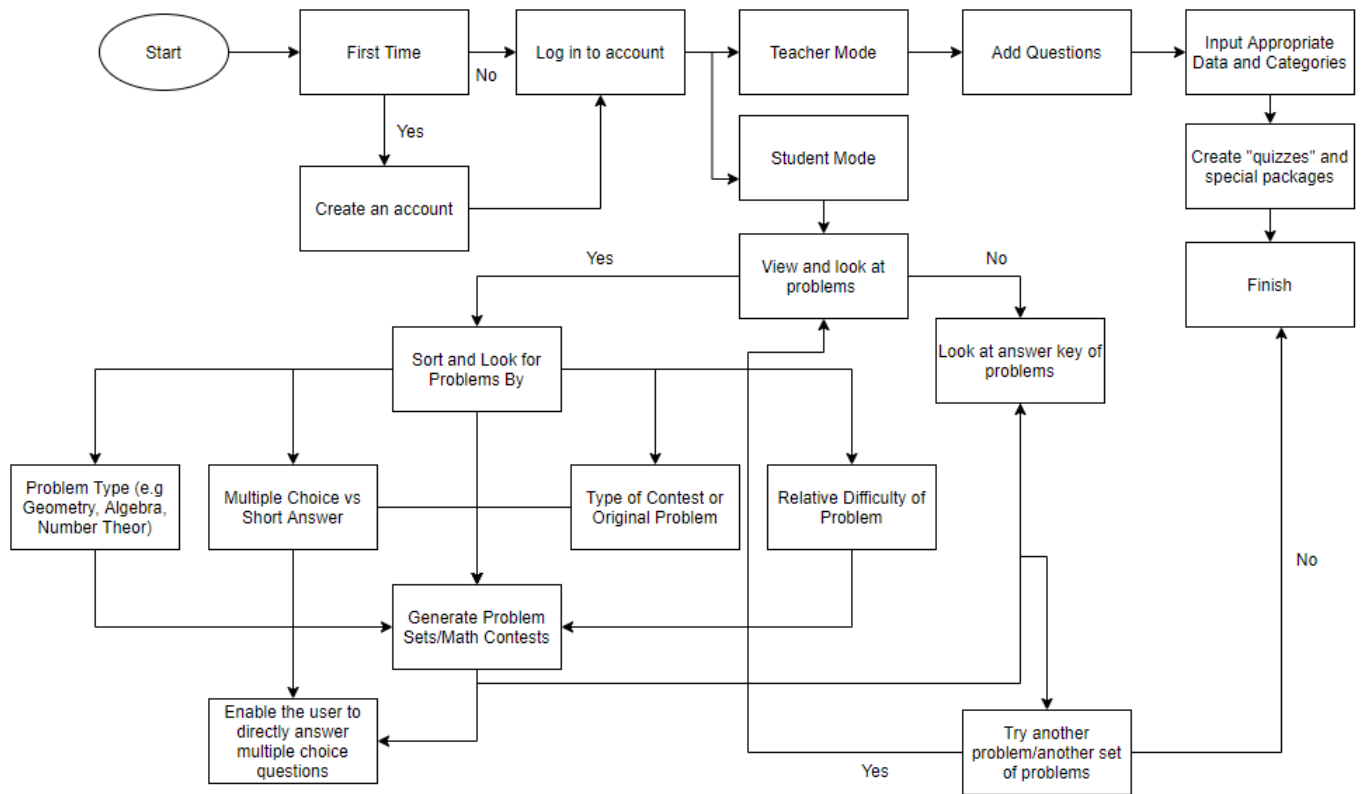
Any

Problem Type

Find Problem

If some of the fields have invalid input or some of the buttons have not been selected, an error message will come up and prompt the user to try inputting again.

## Flow Chart: Program's Working Plan:



## Input Data

Data 1: User Information	Comment
Client inputs their username and password or creates an account.	
Example:  Username: TheJollyGuy Password: Delta234%	When creating the account, the username and passwords can be stored. When the user logs in a simple search can be performed to check if the username and password combination the user enters exists.  Location: The location of the usernames and passwords of each individual can be stored in a textfile.
Data 2: Problem Details when adding a problem in teacher mode	Location: The location of the problem alongside its other key descriptors can be stored within text files. The url/file path can be stored in a separate text file.
Example:  Problem Name: "The Triangular Path"  Problem Description: "Aaron has 144 identical cubes, each with edge length 1 cm. He uses all of the cubes to construct a solid rectangular prism, which he places on a flat table. If the perimeter of the base of the prism is 20 cm, what is the sum of all possible heights of the prism?"  Name of Contest: "Fermat"  Problem Type: "Geometry"  Image URL/File Path: (No input as the problem does not contain an image)	
Data 3: Search data/filters used for finding problems	This data does not need to be permanently stored. Rather, it simply needs to be processed and applied within the search/identification process for problems.
Problem Name: "The Triangular Path"  Name of Contest: "Fermat"  Problem Type: "Geometry"	

## Product Development Plan

Function	Comment
<p>Login Menu: Username Creation Menu: Mode Selection Menu:</p> <p>1 week</p>	<p>The user has to be able to log in upon entering the correct login information</p> <p>The user also has to be able to create their own account and password.</p> <p>The user has to be able to select the mode they would like to use</p>
<p>Teacher Mode and its respective functions:</p> <p>Includes: The ability to input and store problems alongside their respective descriptors, including problems with pictures.</p> <p>1 week</p>	<p>Input Information: The data will be stored in a database and sorted.</p> <p>The GUI (Graphical User Interface) of teacher mode will be developed in unison with the functions of the mode itself.</p>
<p>Student Mode and its respective functions:</p> <p>Includes: The ability to sort and search different problems by their respective categories. The ability to generate problem sets and participate in timed multiple choice contests.</p> <p>2 weeks</p>	<p>Input Information: User/students inputs the filters they want to apply or the name of the problem they want to search for. A search for the problems can then be conducted or a contest/problem set meeting the users specifications can be made.</p> <p>The respective answer keys of each of the problems can also be accessed by the user.</p> <p>The GUI (Graphical User Interface) of student mode will be developed in unison with the functions of the mode itself.</p>

## Action Plan

What to test?	Method of Testing
Is the Graphical User Interface functional?	Check by going through and making sure all the buttons and inputs work as intended.
Does the login and creation of the account work properly?	Check by creating an account and attempting to crash the system by making duplicate usernames and passwords. Make sure that the created account is stored in the text file as intended.
Does the exit function work?	Attempt to utilize the exit function and button to make sure that it does exit the program as intended.
Does transferring between teacher and student mode work properly?	Attempt to transfer between student and teacher mode to make sure that each transition does work.
Does the addition of problems/questions in the database work?	Enter a sample problem and make sure that the problems are stored in the text file as intended. Also make sure that problems with images have the image displayed and working properly.
Does the searching of problems and filters work as intended?	Attempt to find different problems amongst the database by applying a variety of filters and search inputs in unison to make sure that the program does not malfunction.
Does the answer key link to each problem as intended?	Identify a problem and look at its answer key. Make sure that the answer key matches the problem and make sure that the answer key is not flawed.
Does the generation of problem sets work as intended?	Attempt to generate a set of problems and make sure that there are no duplicates within the set.
Does the generation and timer for practice multiple choice contests work?	Generate a multiple choice contest and change around the time allocated. Make sure



	that the time allocated by default is 3 mins per question. Also make sure that when the timer comes to an end, the contest will immediately close and provide the user with a score of how they did based on the questions they chose.
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Tony, you have a good design with a lot of details. At a later time, you will include a record of tasks.

A Record of tasks form must be used for the product proposed in criterion A. The record of tasks form addresses:

- A chronology of the key events in planning, designing, developing, testing and implementing the solution
- Any other issues that may arise that may affect the development of the solution.

The record of tasks may be presented in the form of a table.