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CSCI 240 Software Engineering

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Project Concept Document

We are the “Dastardly Hackers,” but we are not actually very dastardly at all, so it is a bit of a misnomer. We have decided to take on the “Math Games” software project. We felt that given our skills, time, and ideas, that we would be able to produce a very strong Math software that fits the needs of the client. Here is the idea:

(Disclaimer) All ideas are plans that we have that we hope to implement into the final product. There will likely be design changes, technical issues, or other factors that may cause any of the below information to change. Nothing is set in stone, but hopefully the vast majority of the below information will be accurate to the final project.

Overall Framework:

We plan to build the software in Java, as we all share knowledge of the language, and because it allows us to access higher level tools and framework that we otherwise would have to figure out a way around. We plan to create a software that is accessible from the desktop from a shortcut icon. When opened, a new window will pop up on the screen. We may leave this window at a set size to make things work smoothly, but if preferred by the client, and depending on time constraints, we may also decide to allow the window to be resized, or set to full-screen mode.

Once the window is open, a fun graphic intro will play, leading to a screen which prompts the user to select whether they are planning to use it as a teacher or as a student. Either way, a username and password selection will appear. If it is a user’s first time using the software, a “Create new Profile” button will appear. This will allow them to set both a username and a password. If they are a student, it will require them to select the teacher that they belong to. If it is a teacher, they will have the ability to drop/add students in the wrong sections, and personalize their settings.

Once an account has been made, or if it is not a user’s first time using the software, after submitting a matching username and password the user will be logged in. From here we will first describe the software from the perspective of the student, and then from the perspective of the teacher.

Students:

The students for this project are 1st to 2nd grade kids. This means that we plan to make a game that appeals to their younger minds. We plan to use a theme relating to our team name as “hackers,” but will keep it fun and, of course, the kids will be acting as good hackers whose

job it is to stop the bad hackers. Background images and overall color themes will be very colorful and bright. We want it to look fun to the kids, but even more of a priority will be readability and clarity as far as options for the user whether student or teacher. We do not want lack of clarity, or confusion to be reasons why the kids do not like using the software or learning math. We plan on making the program easy to use and follow even for these young minds.

Progression: To track their progress, each student will have a level, a completion status/target, and a set of available missions(games/problem sets). Math ideas, topics, and problem sets will be turned into some form of interactive game. These will be called missions.

Missions: Students will have a progression of missions with increasing difficulty that they will go through as they learn new topics in their classes. Each mission will have a completion status. These mean that a mission can be: Not yet attempted, failed, completed, or perfected. Teachers can set dates for when each topic must be completed, and can also choose to require students to perfect missions. Missions will be perfected when the student is able to play through it while making no mistakes. They will be completed when the student is able to complete the mission with a couple of mistakes. Missions will be failed if many mistakes are made. When missions are failed, the program will give recommendations and help on what the student may be doing wrong, and if mistakes continue to be made it will recommend they talk to their teacher about the topic.

Level: A students level indicates the amount they have practiced their math skills. Every time a mission is attempted, even if it is failed, some experience will be earned. Once enough experience is earned a player goes up in level. This is a fun way for kids to be motivated to keep practicing and reach a higher level than their friends. While levels will not be related to any requirements, we may give players access to fun bonuses like profile picture customization, or other cosmetic options for their efforts in reaching high levels. Extra experience will be earned for completed missions, first-time completions, and for perfecting missions as well.

Completion Status: Each student will have an indication on their screen of whether they have or have not met the requirements set by the teacher. If they are behind, some clear, likely red, message will appear, telling the student which missions need to be done in order for them to get caught up. If they are all caught up, there will be some green indication of this telling them that they are good. Depending on a setting from their teacher, they may/may not be allowed to work ahead.

Options: There will be an options menu which allows students to do the following: Set their profile picture, view their username and password, change their password(maybe), change volume settings, and possibly enter/exit fullscreen mode.

Teacher:

The page that the teacher will see after logging in will be slightly less colorful than the student version. This is just for readability. The teacher page will contain a list of all the students in their class, as well as an option to see all students in case one needs to be switched into their class. We will hopefully be able to make a search system to make them able to be found easily. Then, from their list of students, teachers can see any general info like completion status and profile picture and can click on any one to see more information about that student.

After clicking on a student, the teacher will be able to see that student's level, progress, and mission history. They will be able to see which missions have been completed/mastered by the student. From the mission history, the teacher can see which problems were missed, how many were missed, and more information regarding individual missions. This will allow them to see which topics each student is struggling on, and help them to determine how to best help them. The teacher will also have the ability to clear mission history, or to force a completion or perfection for a student.

Options: The Options menu for the teachers will consist of the following: An option to allow students to work ahead, or to allow them to only work up to any mission selected by the teacher. Another option will be to update a special section of the software in which the teacher can set custom problems for the students to do. In this section, the teacher will need to type out both the problems and the solutions to those problems. This section will not affect missions but will grant xp and can cause the students to have an incomplete status if they have not yet done their assigned problems.

Team Philosophy:

Our team's goal is to satisfy the customer with whatever they need. In this case, we want to give students the best chance possible of success both in class, and in preparing for state testing. The ideas above are our initial thoughts on how to best achieve this goal, however, if there is anything that we got wrong, or could do better on something, please feel free to contact us and let us know. If you have any concerns, requests, or comments, we would love to hear them so that we can create the best possible software for you and for the students.