

## **Math Game Proposal**

**Title of Project:** Nexus

**Team Members:** Ricky Zhao, Reynaldo Rodriguez, Daniel Hardcastle, Kelsey Delaney, Jocelyn Yurko

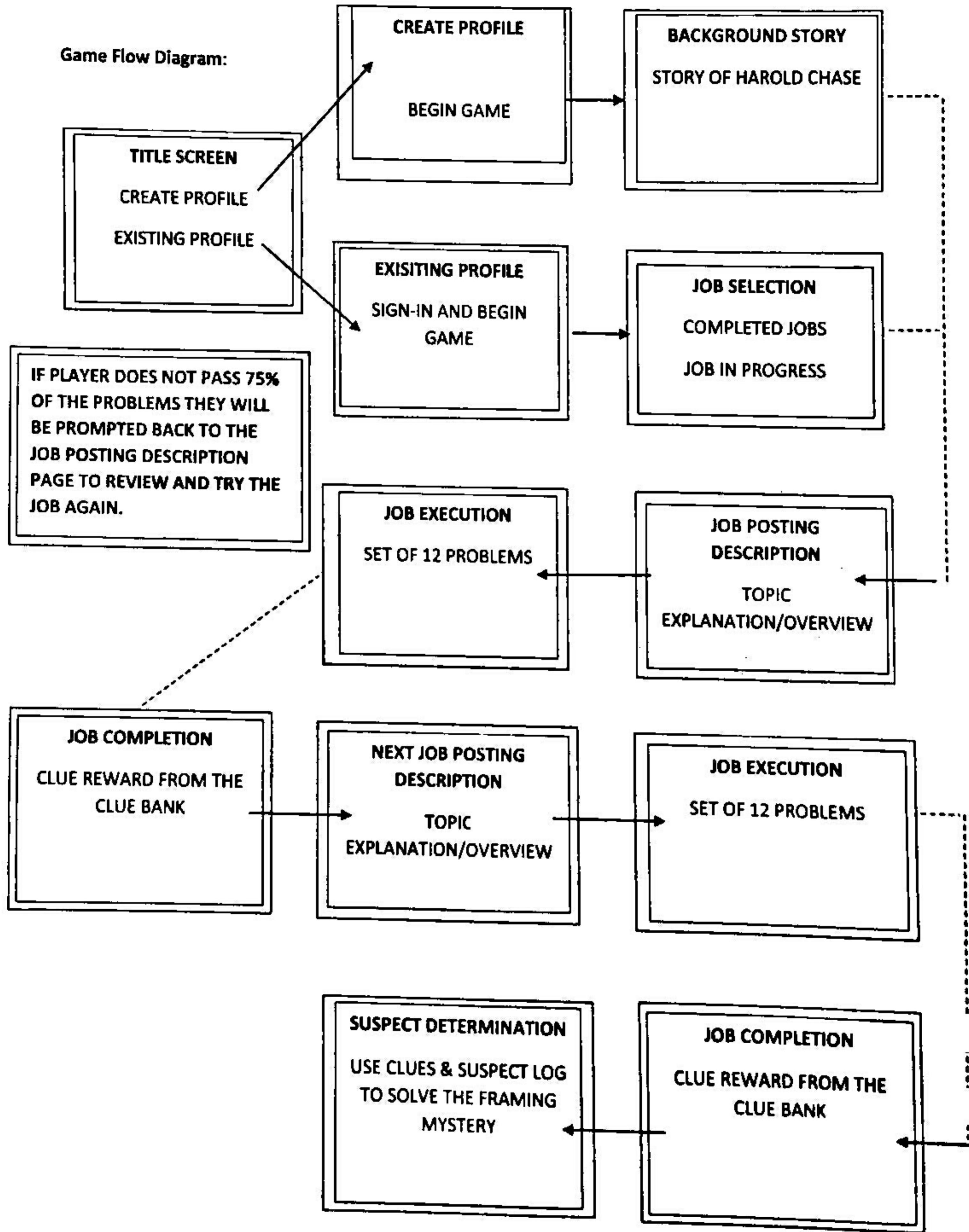
### **Game Overview:**

The game design is intended to help students learn and understand basic algebraic and trigonometric skills. The storyline follows Harold Chase, a talented cryptographer in a futuristic cyberpunk world, who is framed for stealing corporate information. With nowhere left to go, Harold turns to a BBS where he finds contracting jobs. Along the way, Harold finds clues that lead to discovering who framed him. Students will navigate through the BBS completing math problems (jobs) from various algebraic/trigonometric topics. Each time a topic is successfully mastered, a clue containing information about who framed Harold will be rewarded. Once the student completes all the math topics they will have the chance to solve the framing mystery.

### **Anticipated Game Functions:**

1. **Player Profile Creation and Saving:** Players create a profile with a username and password, which is used to access the game as the player chooses.
2. **Job Posting Description:** Presents players with a brief explanation of the topic to be mastered. Examples of how to solve problems of the chosen topic are available for players to view.
3. **Question and Answer Pool:** Questions for each topic will be pulled from an existing database and will be presented with multiple randomized answers.
4. **Score Tracker:** Keeps track of how many questions were answered correctly.
5. **Correct Answer Explanation:** When a player gets a question wrong, explanation of how to get the correct answer is given.
6. **Job Completion Reward:** After successfully completing the questions under each topic, the player is given a clue, from a clue bank, to who framed Harold Chase.
7. **Clue Bank:** Contains clues needed for the players to solve the mystery of who framed Harold Chase.
8. **Clue Keeper:** Keeps track of all the clues from past jobs. Players can access it at any time.
9. **Suspect Profile Log:** Players can access descriptions of possible suspects of the framing. One of these suspects will be the actual framer.

**Game Flow Diagram:**



**Title:** Math Royale

**Group Members:** Kyle Rindler, Kelby Chen, William Donovan, Emily Bonilla, Anthony Lee, Joseph Lee, Viktorija Fytsyk

### **Game Overview:**

Our math game is replicated off of Mortal Kombat. There will be seven characters; each representing a topic in algebra or trigonometry. The intent of the game is to teach students algebra and trigonometry skills through the use of a fun fighting game. As a user, you will fight the characters, but in order to fight, you need to answer questions. For example, if the player chooses to fight the Unit Circle Wizard, they could only win by performing combos and critical hits. In order to perform combos and critical hits, the user needs to answer questions that become harder every time they answer correctly. The user can perform basic forms of attack/defense without having to answer questions, but you still need the combos and critical hits in order to win. Consequently, the user has to answer questions either way. Each character has specific algebra or trig theorems and rules associated to them. Each combo/critical hit per character would help its players understand how their math association works. For example, the unit circle wizard could have his attacks based on certain angles of the unit circle. His basic attack could be  $\pi/6$ , 30 degrees, while a combo move could be  $2\pi$ , 360 degrees, which is the entire unit circle, helping the players to understand the radian measurements of the circle. Like Mortal Kombat, one can play by themselves, or with a friend. The game should be 2 player.

### **Anticipated Game Functions:**

- **Tutorial:** Tutorial can be loaded and re-run during level if initiated by user to help the user understand the game. Tutorial should have same type of questions as real game mode but not the exact same.
- **Randomized question and answer presentation:** the game will need to pull math questions from an existing set along with multiple choice answers, presented in random order. These questions sets will be associated with the character but will be picked randomly throughout the fight.
- **Time limit of combo move:** The user will have a limited time period to complete the math question to land a combo upon his opponent.
- **Time limit of a match:** The user will have a limited time period to defeat their opponent.
- **Timeout function:** Each user will be able to pause the game if need be.

- **Answer tracking:** The game will need to keep a count on the correct number of questions answered per player in order for the player to gain access to their super move.
- **Player Profile Creation:** Multiple people could play the game on the same device with different profiles.
- **Customization of Characters:** The game will need to allow it's users to customize their characters with different skins that they have unlocked.
- **Reward system:** The game will need to supply achievements that the players can reach with each character. These achievements come with different character customizations once achieved.
- **Leaderboard:** The game will need to keep track of a users total wins and loses. It also should compare users stats with other users.
- **Tournament level:** The game will need to allow the user to fight against all of the other game characters in a row, while regenerating the users health at the beginning of each match.

### **Game Flow:**

- **Screen 1:** Title Screen
- **Screen 2:** After title screen, choose from:
  - Tutorial
  - Quick Match
  - Tournament
  - Customize Characters
- **Screen 3:** If user selected:
  - Tutorial: the tutorial will allow the user to play as a standard character fighting against a computer program.
  - Quick Match: Online or Computer
  - Tournament: A list of all of the characters will appear. The user will be able to select one of the characters to fight as during the tournament.
  - Customize Character: A list of all of the characters will appear which they can pick from to customize.
- **Screen 4:** If user selected:
  - Tutorial: The user will be instructed on the rules of the game during the fight until they complete it or quit.
  - Quick Match:
    - Online: The two users playing together will be able to pick which character they would like to fight as and then begin the match.
    - Computer: The one user will be able to pick his character and begin the match against a computer simulation, that picked a random character.

- Tournament: The user will fight against the first of many of the characters he will face within the tournament.
- Customize Character: The user will select his character of choice, and be able to alter that character based on the skins they have unlocked.
- Screen 5: If user selected:
  - Tutorial: Once the user completes or quits from the tutorial they will be taken back to the title screen.
  - Quick Match: The matches will have begun, whether one is playing against a friend or a computer, until one user wins or the time limit runs out.
  - Tournament: If the user defeats the first opponent, they will be taken immediately to their next fight. This will continue on until the user wins the tournament or quits.
  - Customize Character: The user will customize their character as they please and can return to the previous screen if they are finished.
- Screen 6: If the user selected:
  - Quick Match: Once the fight has ended, the user can select a rematch or return to title screen.
  - Tournament: Once the tournament is finished, the user will have the option to return to the title screen or select a new character.
- Screen 7: If the user selected:
  - Quick Match:
    - Rematch: The user(s) will start their fight from the beginning with the same characters.
    - Title Screen: the user will return to the title screen if that is what they selected.
  - Tournament:
    - Select a new character: The user can pick from the group of characters and begin a new tournament with the character they have selected.
    - Title Screen: the user will return to the title screen if that is what they selected.

### Possible Character Ideas:

- Unit Circle Wizard
- Square Root Warrior
- Exponential Equation Master
- Substitution Killer
- Quadratic Formula Destroyer
- Pythagorean Theorem Man
- Captain Fraction

# Math Game Proposal

Title of Project: Run Craig Run

Team Members: Nick, Nichole, James, Prabhleen, David, Brandon

## Game Overview:

Run Craig Run has been designed to help college age students enhance their algebra and trigonometry skills via simplified and detailed explanations of math concepts. This then is reiterated with the use of practice problems and chapter summary quizzes. The story follows Craig, a college freshman recruited to the university's track team for his unbelievably talented hurdling abilities. The only problem is, Craig is a terrible math student whose grades are slipping. The coach tells Craig that he must keep his grades up in order to stay on the team. Craig decides to integrate his math class onto the track. By successfully solving problems on the track Craig is able to run faster, jump higher and win more races. Each race he wins brings him closer and closer to his ultimate goal, going to the Olympics.

The game play is set up like college track meets. You have meets against schools in your division (1 on 1) and then you have larger meets where there are many schools. The smaller meets is where students will learn the chapter concepts and the larger meets is where students will have chapter summaries. To compete in the large meets, students must pass the chapter concepts with 80% accuracy.

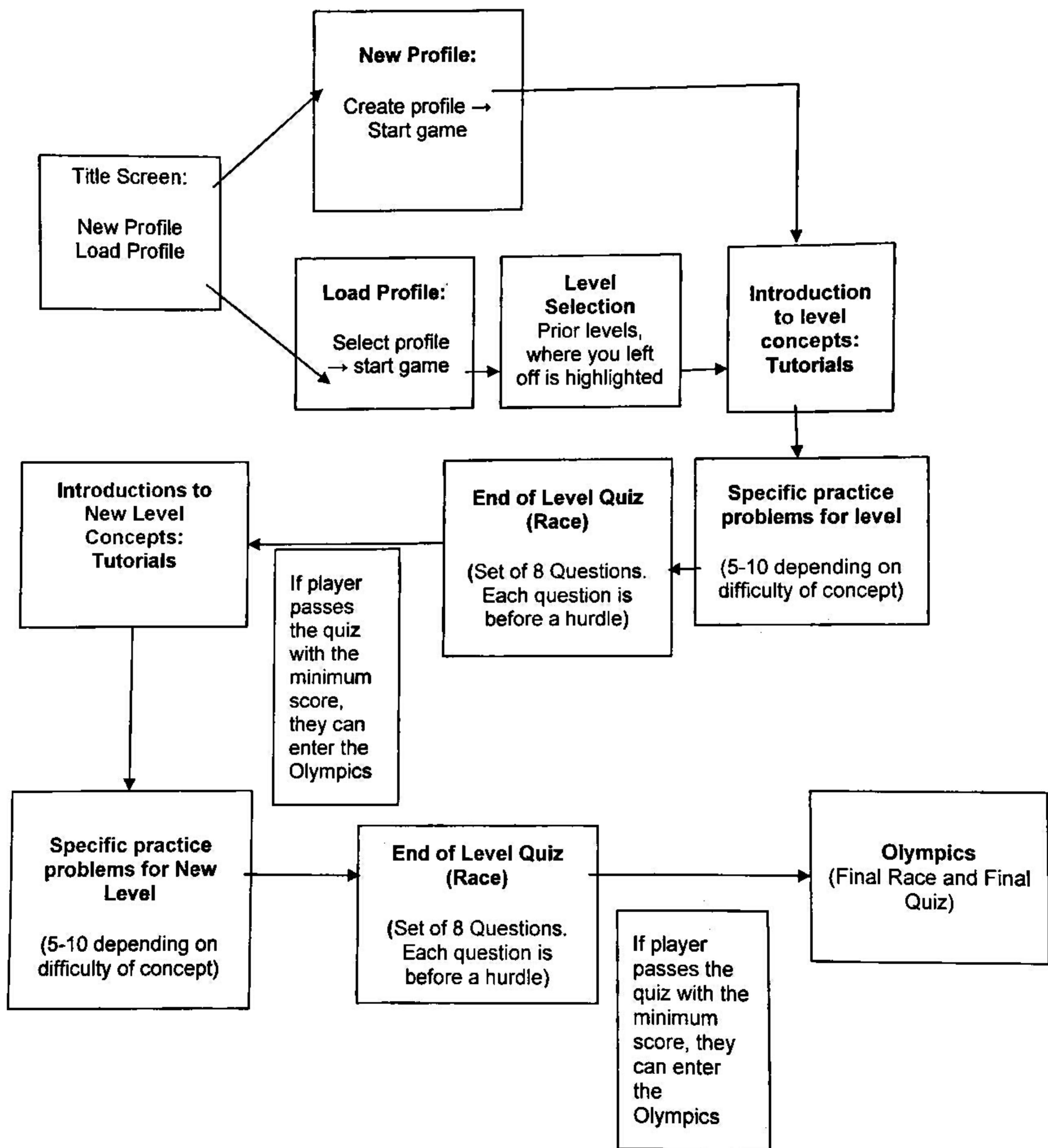
When starting the game you are able to create your own profile. The player is given the ability to change the name, gender, and overall look of the starting character. In this way we are creating more gamer freedom, and increasing gamer control and role-playing (2). This brings the player closer to the virtual world of math we are creating. The player is scored based on the number of correct answer he/she provides. The higher the score, the higher the player can rank in his/her racing career. The player challenges his/herself and creates personal goals they can reach creating another key factor in game play (1,2). This brings the player back for more play and creates a desire to be one's score. We hope to eventually add in the social aspect of gaming by allowing players around the world to work as a team compete against one another (1,2).

## Anticipated Game Function:

- 1) **Concept Presentation/Tutorial:** The game gives a tutorial on how to solve the problems for the first level of math questions.
- 2) **Randomized questions and answers presentation:** The game starts off with the runner at the starting line. He is given math problems along the way, which he has to solve for.

- 3) **Answer scoring and tracking:** Each time he gets a correct answer, he runs faster and gets closer to the finish line. If he gets 5 correct in a row, you press the spacebar to get a boost. If he gets an incorrect answer, He will not be able to jump the hurdle. The number of correct answers he has compared to other depends on whether or not he gets a medal; if he does get a medal, he gets closer to getting into the Olympics.
- 4) **Timed quizzes:** Right before the finish line of every level of every race, the player is given 1 minute to answer 5-10 problem-solving equations or multiple choice questions. The player must get a 80% or better before he can cross the finish line in level 1. However, as each level increases, their score to achieve increases; level 2: must get 85% or above, level 3: must get 90% or above, level 4: must get 95% or above, and level 5: must get 100% or they fail.
- 5) **Player profile creation:** Friends/students can play together by making their own profile. They can get the runner to look like themselves.
- 6) **Game Progress Save:** The player may save his/her game after every level that he completes; However, he may not be able to pause or stop and save the game, while he/she is in the middle of a race.
- 7) **Level of Unlock and Selection:** After every completed level, the player may go on to the next level or decided to play a minigame, which will enhance the players comprehension of the math problems as well as give the player a chance to win some boosts to use during the race.
- 8) **Minigames:** These games allow the player to work on previous math problems that were taught. If the player does well in the minigames, he has a chance to win boosts that he may then use during his actual races in the game.

## Game Flow Diagram:



## **Math Game Proposal**

**Title of Project: Math Life**

**Team Members:** Anthony Guckin, Mike Morrell, Haoxin Wang, Eric Liang, Gipsell Segura, Nick Worrell

### **Game Summary**

The game will be a multiplayer, social-interactive, short mini-games using avatars to complete tasks. When completed by the player, the tasks will award you with in-game currency that you can use to buy items at the shop. The game will feature leaderboards, possibly for each class, school, local area, and international scores. It will also focus on emphasizing the rules of higher-level math and performing a quizlet-style study session.

The objective of the game is to perform mini-game type jobs and obtain in-game currency to enjoy in social-interactive game with their avatars, while learning algebra concepts.

Each mini-game would all be similar to popular mobile games.

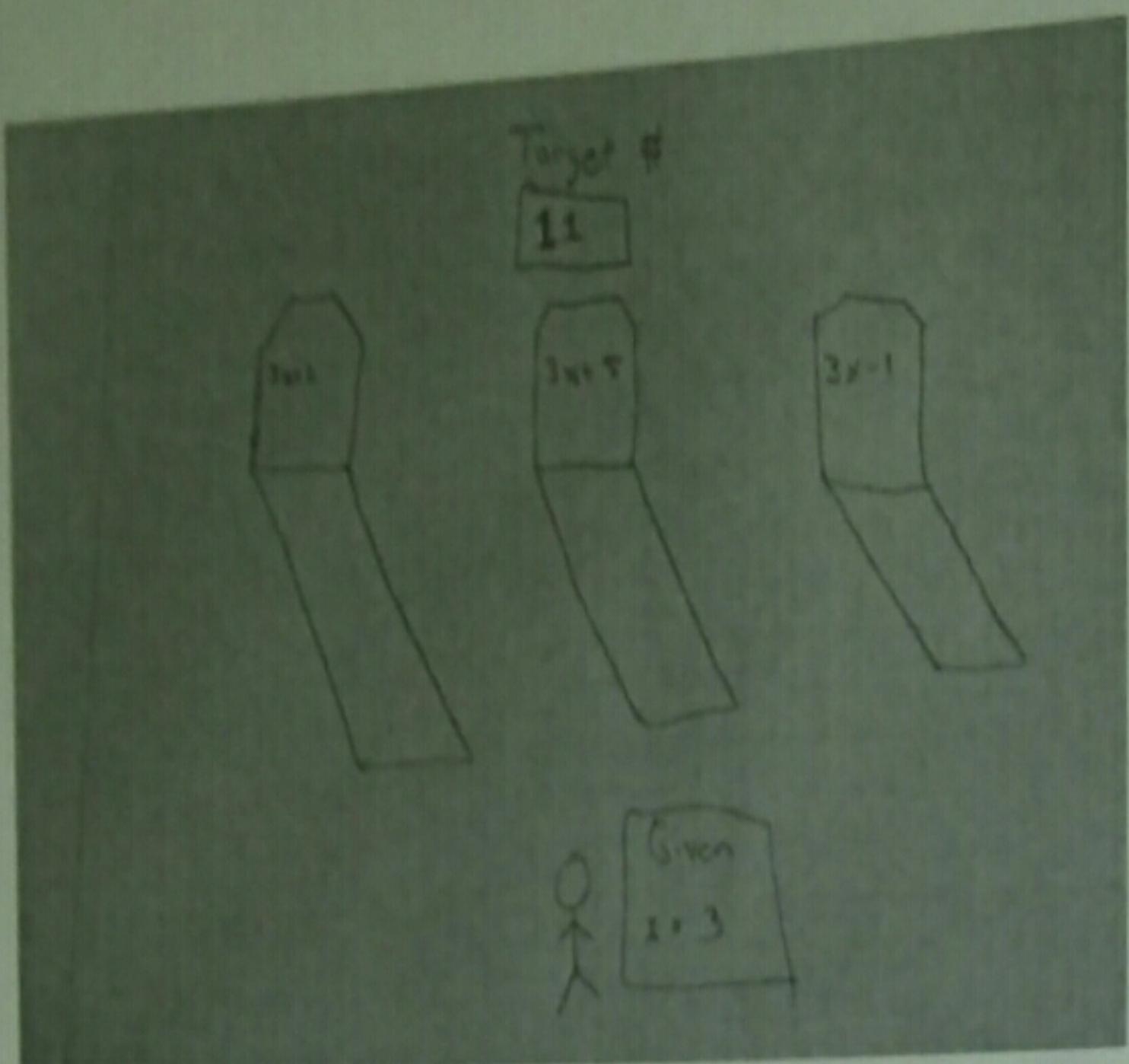
### **The following functions will be necessary for the game:**

1. Minigame: the major function of the game. Present information about specific math concept as a minigame to player. The minigame ideas will be show at bottom.
2. Rank system: increase the desire of play.
3. Multiplayer: able to share the knowledge with your friend.
4. Time quizzes and problems will be release by teacher or your friends
5. Player profile (almost same )
6. Game progress save
7. Answer key and watch step by step solution

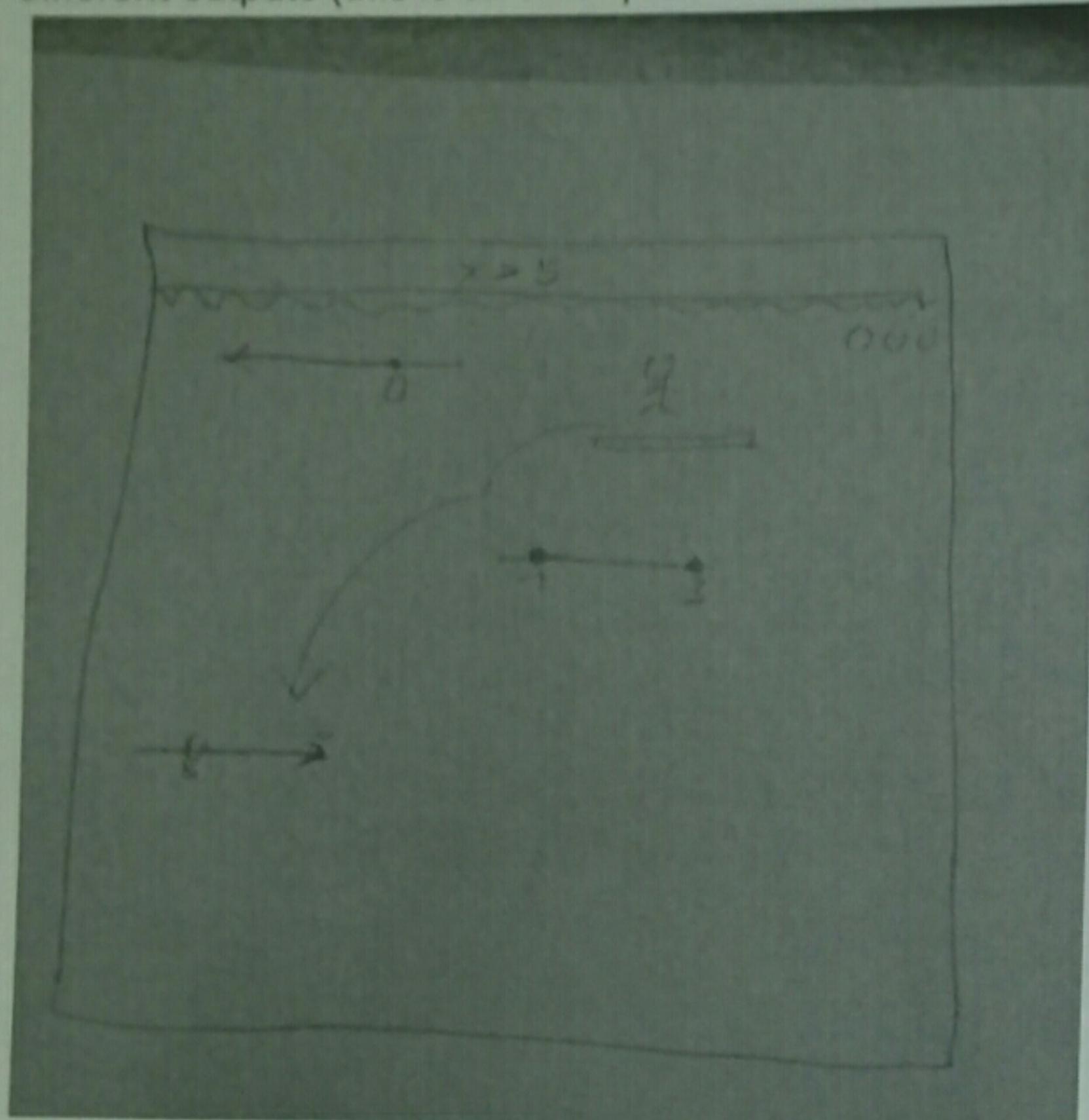
### **MINIGAME IDEAS:**

- “2048” style “matching” with a grid, includes variables, exponents, multiplying, dividing
- A factory mini-game where you put equations or fragments of equations onto different conveyor belts (based on how math functions work) to get the desired output through different machines
- “To Hell with John” math adaptation: the player will jump between “math lines”. If the player stands on the wrong platform, he will take 1 damage from his health pool. If the player lands on the right platform, the equation at the top will be changed to another one.
- “Plane War”: An equation is at the top of the screen and you control a jet that will shoot math operators at the equation to make them correct.

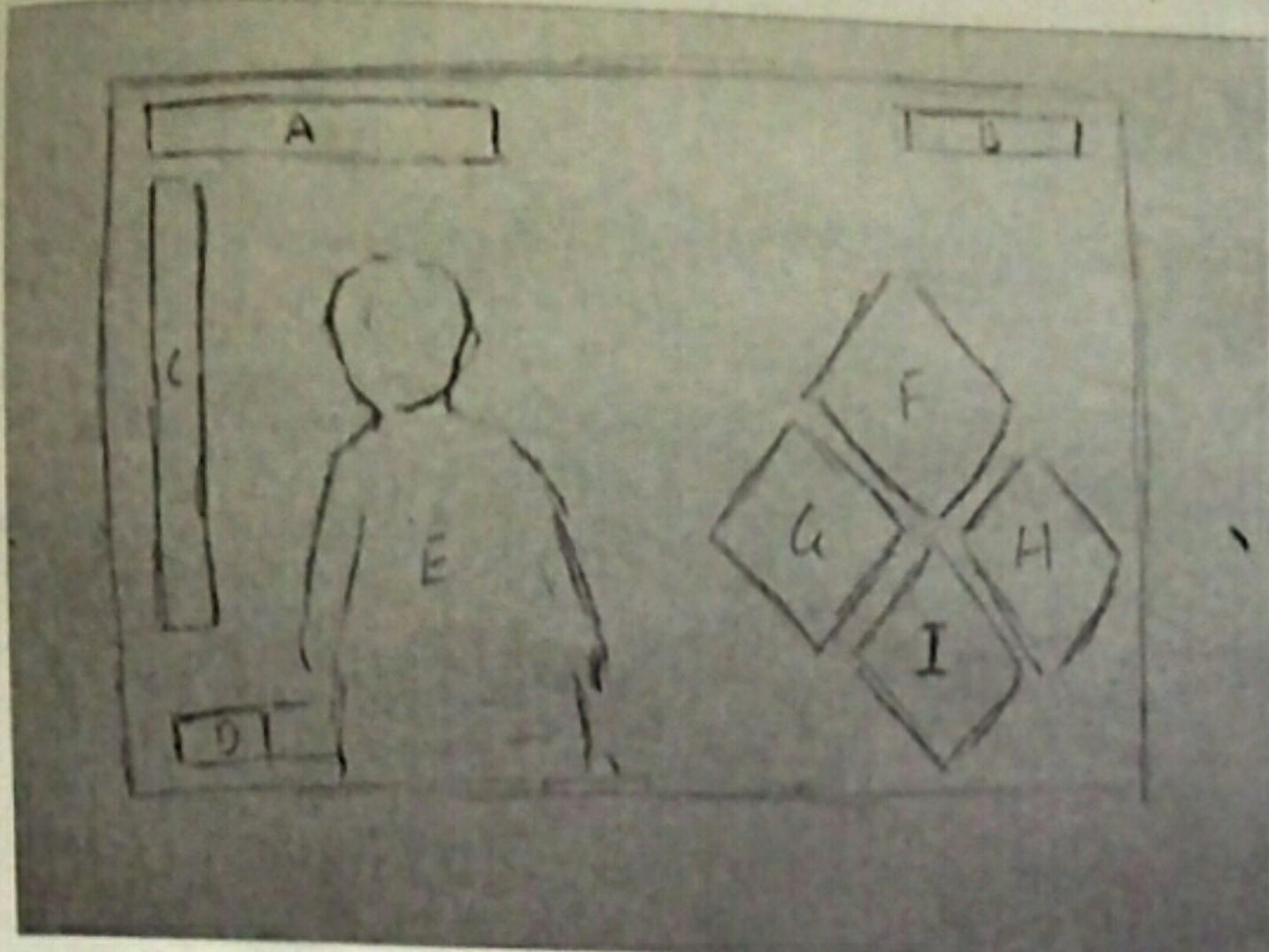
### **MINIGAME IDEAS**



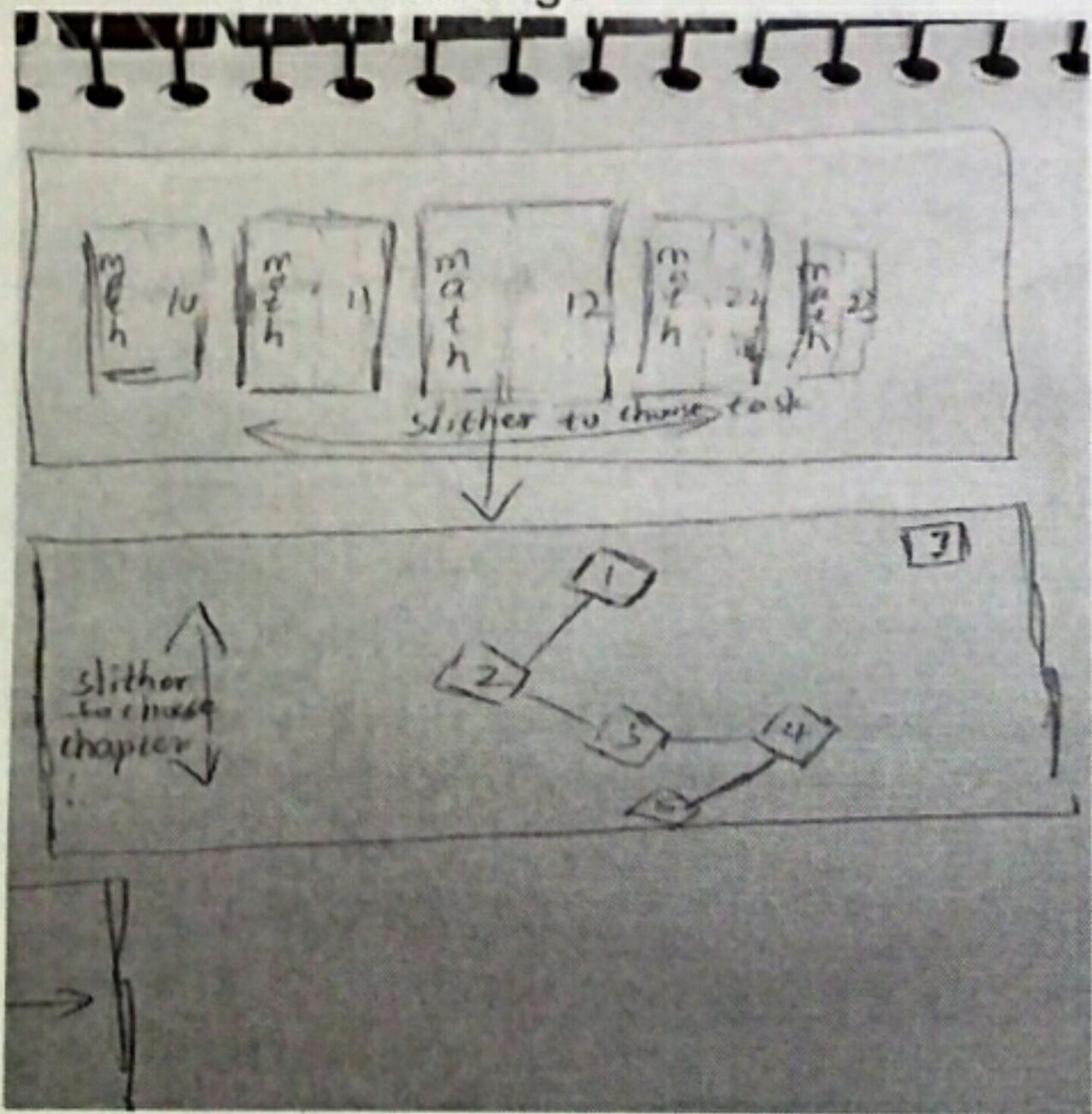
This is a simple example of the factory minigame idea, conveyor belts that flow into the machines that will produce different outputs (this is an example of a function in math)



This is a simple example of how the platforming mini game may look.

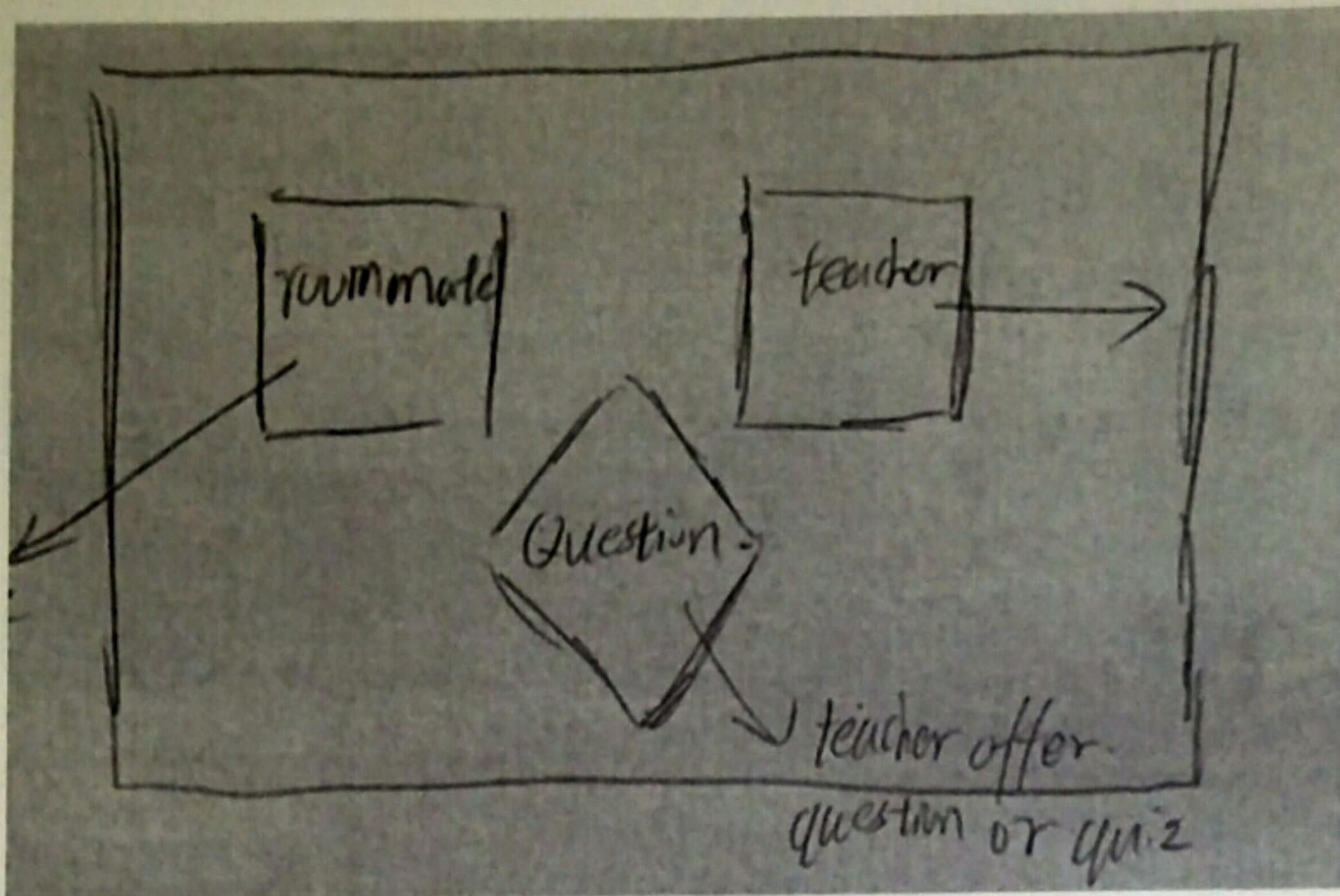


- A. Player profile - shows the level and base information of the player. When the player clicks on the profile, the rank system, the math level of the player, playtime, and achievements will show.
- B. Money - how much money player has earned.
- C. Teacher emails, settings, friends, daily events, announcements, and feedback.
- D. World chat - optional ability to talk with other players and teachers online.
- E. 3D Modeling of player him/herself. When the player starts a new game, it will ask him/her to customize his/her character. (perhaps this character could be a famous mathematician instead of customized character: progression would unlock more mathematician characters)
- F. The start of minigame.
- G. The home of player.
- H. Shop - items can purchased, such as customized clothing, hints, accessories for house etc.
- I. Check rankings.



#### Expansion of F

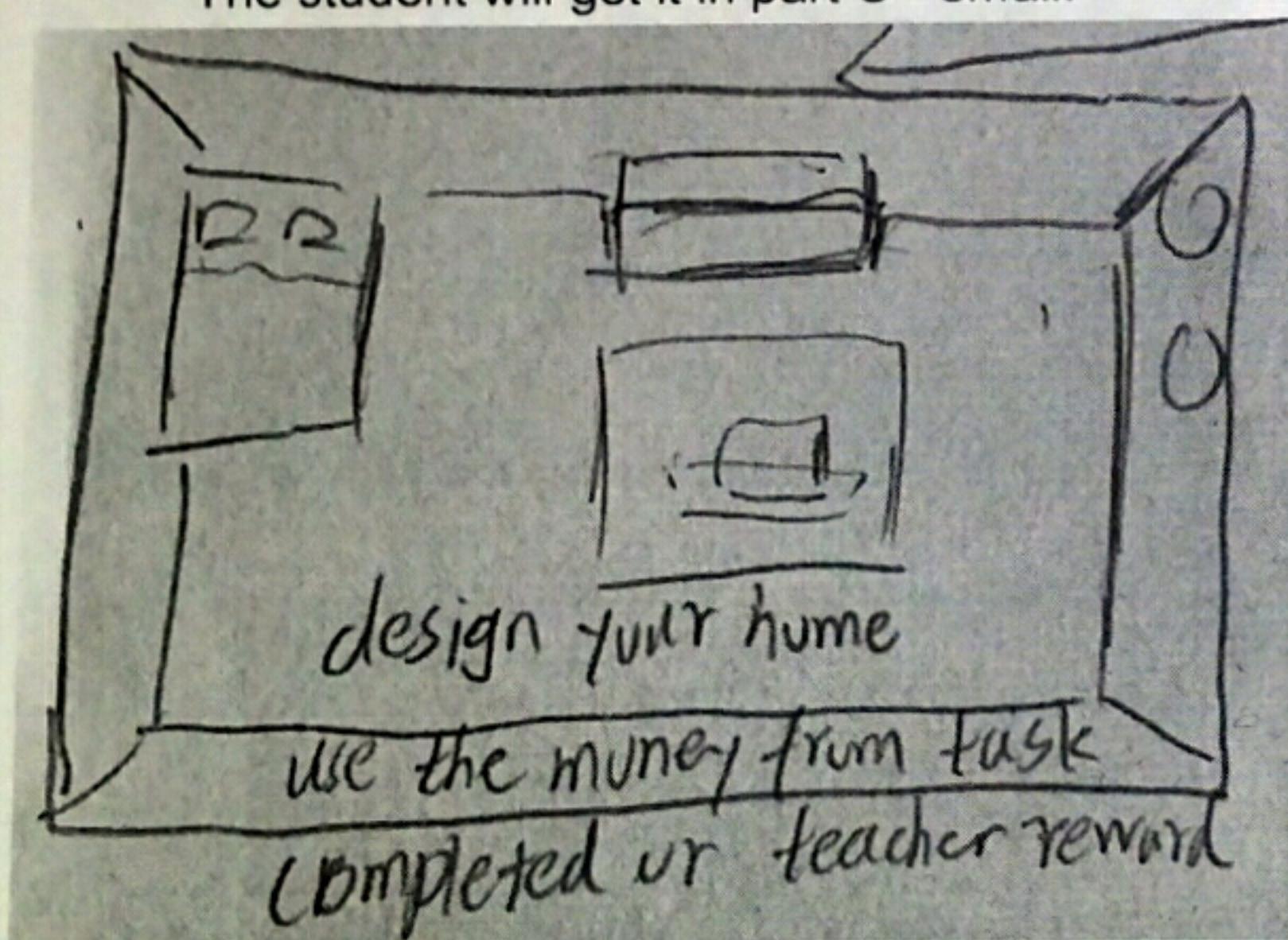
- After player touches "start". He will see the first image, which shows math10 to math Infinite(if you want).
- After player choose the math task. It will shows the second image, which is the chapter of this math. And in side will be the minigames of this chapter. Player needs to finish it to win the reward like money.



Expansion of I:

Inside the function "class". It needs to have 3 function like roommate, teacher, question.

- Roommate: give you ability to chat with your roommate, view their information like rank level, home.
- Teacher: give you ability to ask questions to your teacher.
- Question: the teacher will offer questions or timed quiz to the class. Also, I see many teachers teach same two classes in the same time. So maybe can have a battle between two classes. Which class answer most questions wins. And teacher feel free to send email to everyone in this class. The student will get it in part C - email.



Design of the house of the player. His friends and classmates have the ability to view his house.

# Math Game Proposal

**Title of Project: Algebra Pirates**

**Team Members:** Andrew Pieri, Jimmy Hopf, Roman Feltsan, Albi Cuka, Haosen Weng

**Game Overview:** This game is designed to teach basic algebraic principles through initial instruction and reinforcement through our pirate game. You are a pirate in search of hidden treasure that's located on different islands all shrouded in mysterious treasure map coordinates. To get to these islands you have to solve different sets of algebraic concepts which lead you along a path on that specific island and eventually reach a treasure chest. You essentially find maps, decode them by solving algebra problems, then follow them to find more islands and chests. While the first island will only have one chest, later islands can have multiple. The purpose is to find them and solve the combination of sets in order to gain coordinates to the next island which will progressively have harder concepts that need to be solved.

**Platform:** Primarily for iOS and Android

**Objective:** To find all the treasure chests on the islands of Algebra in order to deck out your ship, find the best pirate gear, and become the richest pirate of all.

## Anticipated Game Functions:

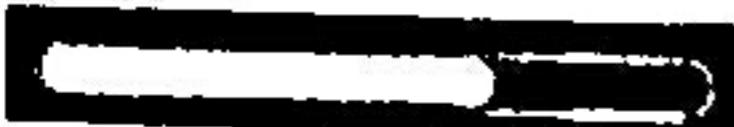
### 1. Progression:

- You start with a canoe and land at a starter island with one map. You will have to solve the simplest algebra problems (10 problems on each island) and progress through the island until you find your first treasure chest containing coordinates. On the earlier levels, players will still be rewarded with the coordinates if they miss 1 or 2 problems, but in the later levels the player will only be rewarded with the correct coordinates once they answer all 10 problems correctly.
- Once the player has finished all 10 problems, they will be prompted with three options:
  - Go to the shop and spend the money received from completing the level.
  - Redo the previous level.
  - Advance to the next level.
- Selecting to go the shop will bring up marketplace where players can buy new clothes for their character, buy more hints for use in the game, and cosmetic ship upgrades.
- Advancing to the next level will present the user with a lesson on the new topics in the next level.

### 2. Interface:

- The main menu will give the user three options: to create a new save, load a previous save, or to go into the options menu.
- The options menu will include a brightness scale, color blind mode, and volume.

- When you arrive on an island at the beginning of a level, you will be able to move forward and backwards. Every problem will be represented by finding more treasure on the land. Every piece of treasure the player finds will be a problem, and they will have to solve the problem to get it.
- Selecting the player will open up the inventory, where you will be able to see what items you have.
- In the top right area of the screen there will be a progress bar, and it will fill up as players solve problems. Similar to the example below:



### 3. Solving Problems:

- The player will have two ways of solving answers, depending on what mode they select in the beginning:
  - Manual input mode: the user will have to type in all answers.
  - Multiple choice mode: the user will be presented with 4 answers.

### 4. Challenge Levels:

- Every other level will feature a bonus challenge level for the algebraic concept of that level.
- The challenge level will present the user with 5 problems to solve (all multiple choice) and they will have 60 seconds to solve them all.
- If the player selects the wrong answer, they will have a second chance at the end to solve the problem before the 60 seconds are up.

### 5. Other Possibilities and Ideas:

- Islands can possibly have themes, such as having an island divided by a river (for a level that is based on fractions). Each level's shape could incorporate the concept of said island.
- Added a gambling aspect to the game. You could gamble your earnings after you find a chest/beat a level. The gambler could be Davy Jones, who can be summoned to appear as a ghost. The player could have the chance to double their winnings by solving one "challenge" problem.
- Hiding chests around the island that include in game currency, or cosmetic upgrades for the player/ship.

## Game Flow Diagram:

