

Project Proposal

The purpose of our system will be to help users, i.e. children following a 3rd grade curriculum, practice math skills in a fun environment. The scope of this project involves designing a game prototype mimicking the mechanics of a “catch the beat” game, akin to *osu!catch*. Our game will reward fast thinking, as users will have to solve problems quickly in order to catch the correct answer before it falls off the screen. It will be easy for users to practice multiple types of math such as geometry, basic algebra, and basic arithmetic. It is designed to be intuitive and easy to play, such that users will think more about the game’s math problems than the game’s mechanics.

As described above, this game will use a system of mechanics similar to those in *osu!catch*. In *osu!catch*, the player has control of an object, a bucket, which moves along a horizontal axis located near the bottom of their screen. Various objects fall from the top of the screen towards the bottom of the screen. The player can move their bucket left and right to try and catch falling objects. If an object falls off the bottom of the screen, it is not caught.

Our game will display a math problem near the top of the player’s screen. After some small amount of time has passed, multiple objects, i.e. potential answers to that math problem, will fall at an even pace from the top of the screen. One of the falling answers will be a correct answer to the math problem displayed. The player must move their bucket left or right, using keyboard inputs, to catch the correct falling answer. The player’s bucket will be big enough to catch objects larger than the falling answers so that bucket placement need not be perfect; and, the player’s bucket will move at an even pace. Additionally, for the player to catch an answer, their bucket must be below the falling answer as it reaches the bucket's vertical height on the screen.

All members of our design team have played games similar to *osu!catch*, which is why we have decided to take influence from it. Some members also have experience developing games of a similar style and understand the requirements that go into making it. We believe the fast paced nature of rhythm games like *osu!catch* will be valuable when applied to an educational game, as it forces players to hone whatever skills they are currently practicing. For some clarification, the mathematical expressions will be randomly generated such that every expression will be different enough to keep players thinking. Random generation of integers for multiplication, division, addition, and subtraction will not produce values outside of the realm of 3rd grade teaching standards. Integers will stay within the confines of a multiplication table, i.e. zero through twelve.

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We intend on using the Godot game engine throughout this project's development cycle. The Godot engine will export and compile our code such that it can be executed in multiple environments. The final product of compilation will be an executable file.