1D Project - Game Description
10.014 - Computational Thinking for Design

Cohort Class 05 - Team 5A

Our game's name is **'Mathematical Massacre'**. The objective of our game is to shoot [sort] the numbers that appear appropriately.

- **Target Audience & Purpose of the Game**:
  - Target Audience: for Mathematics enthusiasts that love to play games that requires precision.
  - Main Purpose: help people to memorize the various categorized types of numbers. This game can be played in your free time or challenged with your friends. It also aims to make people more interested in Mathematics within the modern method of learning Mathematics.

- **Game Description**:
  - Every time, a number will come down the screen, prompting the user to shoot it. Each shot is registered into different key inputs. There are three stages: [in our game]
    - The 'Primary' stage objective is to sort Positive and Negative numbers. Number '1' represents Positive numbers; number '2' constitutes for Negative numbers.
    - The 'Secondary' stage objective is to sort Even, Odd, and Complex numbers. Even numbers would be registered to number '1'; Odd number would be registered to number '2' and Complex number would be registered to number '3'.
    - The 'Tertiary' stage objective requires the user to sort an additional type of number that has not been mentioned previously, called the Prime numbers. The key bindings would be as follows: number '1' is Even numbers; number '2' is Odd numbers; number '3' is Complex numbers and number '4' is Prime numbers.
  - Every digit corresponds to an individual sprinting along the track. When the user targets a number, the individual linked to that number will be eliminated. As the user eliminates more individuals, a streak counter will rise. Once a specific number of eliminations [streak] is reached, an audio signal will be triggered, alerting the user that a particular killing streak has been achieved.

- In case the user makes an error by attempting to shoot numbers with incorrect ammunition, a penalty will be imposed by deducting 1 life [HP]. This mistake can also reset the kill streak. Moreover, if the sprinting individual makes contact with the red line located at the most bottom, a penalty of 1 life will be incurred. The user begins with a total of 3 lives. When the user's life count reaches 0, the game concludes, and a restart of the game would be selected.

- **Used Algorithm**:
  - The 'Sieve of Eratosthenes' serves to produce Prime numbers within a specified limit. We optimized the algorithm's time complexity from $\mathbf{O}(\mathbf{n} * \mathbf{log}(\mathbf{log}(\mathbf{n})))$ to $\mathbf{O}(\mathbf{n})$, recognizing that this adjustment results in increased memory usage. Given this trade-off, we prioritize runtime over memory considerations.