

# F01 Team 1D - Impossible Maze

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## Description

**Target Audience:** Teenagers (Secondary School: 13 - 16 years old)

### **Detailed Description:**

The main objective of this game is for the player to complete the maze. The player will be the one to decide the path to take to solve the maze. However, in order to move, they will have to play a series of mini-games. These mini-games are designed to develop various different aspects of the students. The player can choose the difficulties for each mini-game, and the level of difficulties corresponds to the number of steps it will take each time. This caters to a wider range of players, whose abilities may vary based on their backgrounds. For example, a player that struggles with Math can choose the lowest difficulty and choose the highest difficulty at something he or she is good at.

The 4 mini-games are as follows:

- Typing Game (**Class typinggame:**)
  - With the increasing trend of digitalization, more and more school-related materials and activities are shifting towards computer-based. Things such as reports, online tests, coding etc require long hours of typing. Thus, this game provides a platform to practice typing fast and accurately. This in turn will increase their productivity as they move on to their next phase of education (Eg. Polytechnic, University).
- Quick Math Game (**def math\_minigame(diff)**)
  - From secondary school and above, most students will be using their calculators when they are solving math problems, as the questions usually dealt with are more complex and tedious in nature. Due to that, students tend to rely heavily on their calculators, even for simple calculations. Thus, this game serves as a practice for them on simple math problems. This can also potentially save them some time during the examination, as they will be confident enough with their mental calculation for simple calculation and skip the usage of a calculator.

- Number Pattern Game (**def pattern\_minigame(difficulty)**)
  - The ability to spot patterns/trends has always been beneficial as it allows us to predict the next possible outcomes by coming up with a mathematical function/model. As they proceed to secondary school, there is little opportunity for them to get exposure to it. This game provides them with a platform to practice identifying patterns/trends via number patterns. This can be as simple as geometric and arithmetic sequences, or uncommon patterns such as figurate number patterns.

The diagram shows the equation  $a_n = a_1 * r^{n-1}$  on a green grid background. Labels with arrows point to the components: 'General Term' points to  $a_n$ , 'First Term' points to  $a_1$ , 'Common Ratio' points to  $r$ , and 'Same General Term' points to the entire equation. A logo 'GG' is in the top right corner.

Fig 2.1: Geometric Sequence General Term Equation  
<https://www.geeksforgeeks.org/geometric-progression/>

The diagram shows the equation  $a_n = a_1 + (n-1)d$  on a green grid background. Labels with arrows point to the components: 'term position' points to  $n$  in  $a_n$ , ' $n^{\text{th}}$  term' points to  $a_n$ , 'first term' points to  $a_1$ , and 'common difference' points to  $d$ . A logo 'GG' is in the top right corner.

Fig 2.2: Arithmetic Sequence General Term Equation  
<https://www.geeksforgeeks.org/arithmetic-progression/>

$$T_n = \sum_{k=1}^n k = 1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2} = \binom{n+1}{2},$$

Fig 2.4: Triangular Number General Term Equation  
[https://en.wikipedia.org/wiki/Fibonacci\\_number](https://en.wikipedia.org/wiki/Fibonacci_number)

- General Knowledge (Geography - Countries) (**class geography**)

- The curriculum in secondary school is generally content-heavy and requires a lot of memorisation. This is especially so for some of the subjects, such as biology, geography and history. This game is designed for 2 purposes. The first is to provoke their curiosity. They may need to search up for their answer, which allows them to learn something new. This may intrigue them and make them dive deeper. The other purpose is to test how much memory is. Since it involves the naming of countries, students will need to remember how to spell them and remember their existences.

This game doesn't have to be about geography, but in our case, to keep things simple, we chose that.

The mini-games are designed to be modular, as depending on the class's need, different mini-games can be designed and implemented into the maze itself.

Maze algorithm: <https://www.youtube.com/watch?v=MSBJQXxcLeA>