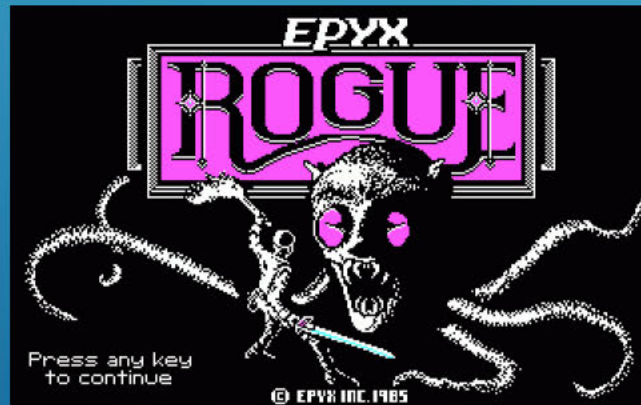# PROCEDURALLY GENERATED ROGUELIKE

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PROJECT AIM

- The aim of this project was to create a Roguelike game, that used procedural generation to create random appealing content that provided a different experience to the player, each time the player ran the game.

USEFUL RESEARCH

- After researching various algorithms centred around procedural generation principles, Cellular Automata was chosen as the algorithm the majority of procedural generation would be centred around.

- Research into A* Algorithms was done for the enemy pathfinding.

- Researching and playing various Roguelikes such as The Binding of Isaac, Dungeons of Dredmor, and FTL was crucial for considering ways to design the game itself.

TECHNIQUES USED

- Cellular Automata was used to create the game world that the player moves in.

- A* Algorithm did not implement correctly, and a new algorithm was developed for enemy pathfinding.

- This functioned by checking if the player was in range of the enemy. It checked if the enemy could then see the player, by using a linecast. If the player was in range and visible, the enemy was moved towards the player. This movement was constrained to 1 step in either the x or y direction.
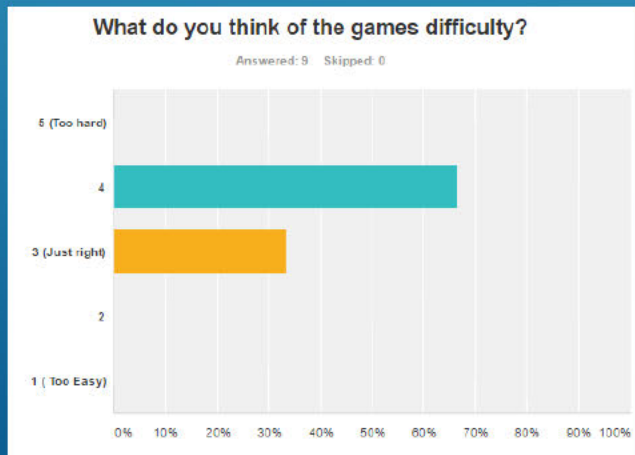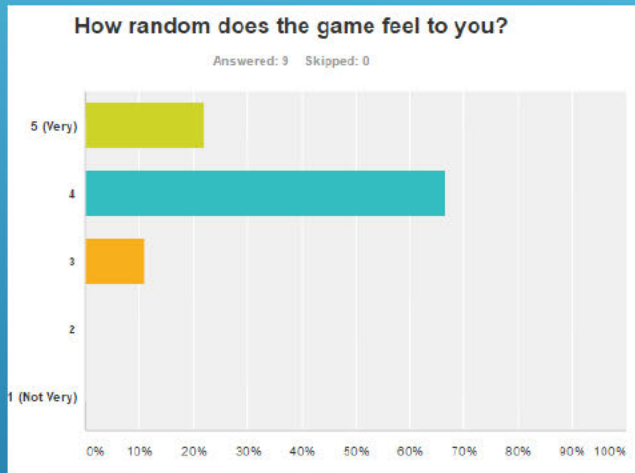
```
if (distance between enemy and player < detection range)
{
    check player is visible to enemy;

    if (player is not visible)
    {
        do nothing;
    }

    if (player is visible)
    {
        save enemy current location to temp position;
        move enemy towards player;
        find enemy greater movement in x or y direction;
        reset enemy position to temp position;
        move enemy 1 step in x or y direction depending on which was greater;

        if (enemy moves into wall || If enemy moves into other enemy || if enemy moves into player)
        {
        reset enemy position to temp position;
        }
    }
}
```

SURVEY RESULTS

How random does the game feel to you?
Answered: 9   Skipped: 0

What do you think of the games difficulty?
Answered: 9   Skipped: 0

▶ The results from the survey indicated that the majority of users felt the game was very random each time they played through. This indicates that the procedural generation created elegant, fresh feeling levels every time.

▶ The majority of users felt that the game was slightly too hard, with around 40% finding the game to be just right.

▶ As Roguelikes are supposed to be quite difficult, these finding indicate the game has been designed to the correct level of difficulty.

CONCLUSIONS

- The Cellular Automata method of generating content was very successful for generating random maps for the player to play on, that created different feeling experiences every time.

- The Faux-Grid Constrained Movement could be improved with the addition of extra features such as random AI movement whilst Idle, and heading towards the last know position of the player if line of sight lost.

- Many different methods and algorithms should be researched early during development, so there are always backups plans if a specific method does not work exactly as the developer wishes.