# COMP6411 ~ Security ~ Gowtham Ravikumar

## Concept

When figuring out what to do I was inspired by a Case Comp that my society was running where a goal included spreading technology too hard to reach communities. I liked this concept and I decided to try and create a game where kids could be taught different security concepts in a fun and engaging way.

My aim was for this game to introduce basic security concepts in a natural manner making the kids more likely to incorporate the lessons learnt into their daily life. Helping raise the next generation of kids with a security focussed mindset is paramount towards helping keep everyone protected in today's digital world.

During the initial stages of brainstorming, I simply jotted down some dot points on ideas on where I could take the game:
- Escape the room style game where each level has a different security concept it's demonstrating
- You the person are trapped on /insert some setting/ and you need to escape before the /something scary/ gets you
- 2D game with NPC's and puzzles something Zelda esque
- Maybe 5 levels? Depends on how much time it takes to make

Over the course of actually learning how to create games and figuring out the design and style of the game I settled on an isometric top down 2d pixel game, similar to RPGs and Zelda. This allowed me a simpler goal and meant that there were plenty of resources for me to use while developing my game.

## Level Ideas

- 4 NPC's with differing personalities that when quizzed will give you the password to unlock the door in the room
- Crack the cipher to progress to the next room
- A series of puzzles where you have to move something to successfully prevent something from entering the room
- A computer terminal where you interact with it and solve a mini CTF to get the access code for the next room
- Pretend to imitate a person in a middle person attack thing to get the password from an NPC

Each level is meant to be a simple game where kids are intuitively taught a security concept. The final game features three levels in which kids learn about:
- Ciphers for hiding passwords
- Critically analysing which statement is false
- Identifying patterns in images and reasoning skills

## Game engine possibilities

When attempting to figure out which game engine I wanted to use I did some research while keeping an eye out for an engine that met my requirements. Since this was a limited time project, I was primarily looking for engines that were beginner friendly and geared towards 2D games so that I could learn the necessary skills quickly without having to worry about extraneous features.

My research combined sources such as short YouTube tutorials so I could experience what it was like to use the engine and reviews from people who had more experience developing games

Godot VS Unity

Came to these two as general choices because they were widely supported great for beginners and had a lot of features. Plus, these options are free unlike GameMaker studio which was another big option I came across. Unreal while a technically amazing engine, was perhaps a bit too advanced for my needs and therefore I choose not to use it.

Research for picking them came mainly from googling tutorials and finding comparison articles between the two.
 https://medium.com/rock-milk/why-godot-engine-e0d4736d6eb0
https://www.quora.com/Which-is-better-for-2D-games-Unity-or-Godot

Godot:
–       More 2d focussed
–       Simpler for beginners
–       Open source & Free
–       A useful visual scripting language

Unity:
–       More resources
–       Better community support but Godot is still pretty good
–       Much more features and in depth but more so for intermediate - advanced developers
–       more 3d focussed than Godot

In the end I've decided to go with Godot for now. The engine seems simpler and more in tune with the scope of my project. The tile mapping feature is really easy to use and simplifies a lot of the positioning issues that Unity has since its system is based on 3D games. Furthermore, Godot has more 2D specific tutorials since that is its primary focus.

## Challenges during the project
1. Figuring out the interactions between the objects and the player

This was actually more challenging than expected because the tutorials that covered this particular interaction were not applicable to the way I had designed my levels. All the tutorials focussed on static objects linked to sprites but I had used a tile map for all my important objects.

Therefore, I tried playing around with stacking layers on top of each other and ended up stacking static objects on top of the tile map so that they would allow the player to interact with them. Furthermore, I had to read the documentation for Dialogic (the add on that allowed me to write interactive textual elements) and figure out how to link an interaction of a player and an object with running a specific script.

2. Understanding how to progress to the next stage
Learning about signals in Godot was fairly complicated because I wasn't aware that they existed. Therefore, I spent a lot of time googling the wrong keywords for the problem I was trying to solve. More than the actual difficulty of moving to another level, this challenged my research skills and taught me how to reword my queries to get what I wanted.

This is a very versatile skill and one of the most important things I will take away from this project.

3. Designing the levels and incorporating elements of security into it
My initial estimation of the difficulty of this project was accurate overall however, I significantly misjudged which parts would be the most difficult. Designing the game levels actually took the most of my time, especially with figuring out the art style and finding resources that allowed me to create a custom level environment.

Additionally, I did not expect there to be difficulties in layering and ensuring that the player interacted in a logical way with each object. Here my skills in photoshop proved to be very useful as the layering system was very similar. By the end of the project, I had grown very comfortable having layers for each element of the level design.

Adding useful security concepts without complicating the game design out of my skill was a delicate balance. I was also conscious that I was aiming this game at younger audiences and so I couldn't give them walls of text to simply explain the concepts. Therefore, I attempted to weave concepts such as ciphers and detecting fakes into the gameplay with each level focussing on a different concept.

## Things I could have done differently
I definitely would have given myself more time to deliver on this project. I think underestimating the time required to actually learn the game engine along with designing the levels were some of the biggest contributors to the extra time taken to complete the project.

I quite liked this new app called Agenda that I used to type all my notes and thoughts up during the process of creating this project. It made typing the final report made up of the blog posts incredibly easy as I essentially copy pasted large sections of my notes for the report. It also had a chronological view that helped me keep track of all the resources for the project and made sure I could come back to any ideas I had and expand on them. Going forward I would definitely use the same system but also combine it with a to do list so that I would have more accountability and a better idea of the smaller tasks required to complete the assignment on time.

I would have loved to design all the sprites myself from scratch but my lack of any artistic skill coupled with the time limitations made that not possible. In future projects I would love to work with an artist or up-skill myself for more customised aesthetics and sprites.

At the start of this project, I really wanted to use Unity or Unreal because they had far greater flexibility and I was quite enamoured with grand ideas of creating my own indie game. However, realistically those engines would have been far too complex and taken too long to learn. Doing this again I would love to learn more about unity and perhaps explore more 3D options.

## Things I learnt from this project!
When trying to figure out what security concept to base each level on, I found that I struggled to figure out how to communicate these concepts. A lot of the time as university students we are comfortable with information just being dumped on us but in a real world environment when targeting different groups it's important to change the messaging style to suit them. Therefore, I spent a bit of time researching how games communicate ideas and even looking at some games that I enjoy and trying to take some ideas from them. Breath of the Wild was a particular game I looked at as it so effectively communicates ideas without dumping information in text blocks. The game presents a wide-open world with interesting looking objects that when the player explores teaches them about the world. Similarly, I tried emulating this concept and having signs next to objects of interest and not too much guiding information otherwise. Also, most levels have clearly laid out paths that guide them; however, to reach some of the key objectives they must stray from the path and explore.

I also learnt a lot about how level design impacts the feel of a game and the experience when playing it. The aforementioned guided paths vs free exploration and the general aesthetics of the environment play a huge factor in the enjoyment of the game. Additionally, the actual designing of

the game was one of the hardest parts of creating the game overall as it depended on the aim of the game and the what I wanted the player to do.

Resources

Godot:
https://www.youtube.com/watch?v=4jEXTwTsVI&ab_channel=AndrewHoffman
https://www.youtube.com/watch?v=QEHOiORnXIk&ab_channel=JonTopielski
https://www.youtube.com/watch?v=EgHIpayakUA&ab_channel=DevNugget
Unity:
https://www.youtube.com/watch?v=b8YUfee_pzc&ab_channel=Epitome
https://www.youtube.com/watch?v=7iYWpzL9GkM&ab_channel=Chris%27Tutorials

Godot:
Dialog boxes:
https://www.youtube.com/watch?v=QXm0LQSXoQ&ab_channel=Gamefromscratch
Pixel art packs:
https://blackspirestudio.itch.io/medieval-pixel-art-asset-free
https://dreamypixelart.itch.io/pixel-art-interiors
https://clowddev.itch.io/naturepixels-top-down-pixel-art-asset-pack
https://cainos.itch.io/pixel-art-platformer-village-props?download
https://cainos.itch.io/pixel-art-top-down-basic
https://opengameart.org/content/the-field-of-the-floating-islands
Tile maps:
https://www.youtube.com/watch?v=V9OoaOlXc_4&ab_channel=GDQuest)
Camera controls:
https://www.youtube.com/watch?v=rQ6ijsXz3Vo&ab_channel=Chris%27Tutorials
Collisions:
https://www.youtube.com/watch?v=S9Jd6Ss8tU0&ab_channel=Artindi
https://www.youtube.com/watch?v=R9yWvGRj0c&ab_channel=IvanSkodje
Logic puzzle: https://puzzling.stackexchange.com/questions/14749/logic-puzzle-3-suspects