



Process Journal

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This is my project and process journal entry. There are elements of both in some entries. I have headed different parts as 'PROCESS' where I think content relates to research, brainstorming and development. I have headed other parts as 'PROJECT' where I think content relates our group interactions and decisions that impact on the progress of the project itself.

MANY SEMESTERS AGO...

Process

In my very first semester at uni, I took Games Design Studio 1 (FIT2073) and for the final assignment, we had to make a paper prototype of a game level. I created a storyline about how the Grim Reaper being busy with the over-populated world decides to get a pet cat whom he appoints as the *Animal Reaper* (Grim Reaper for animals). He gifts him a magical scythe for his birthday which allows him to transform into any animal which he reaps. Based on this basic storyline, I made a game on paper and then upgraded it into a board game with the help of a 3D printer (at uni).

Ever since, I've strongly wanted to turn the board game into an actual video game. I just didn't want to stop at the board game. But when I proposed the idea to my assigned team the next semester for Games Design Studio 2, they didn't seem all that keen on it and I didn't want to take on the project with people who didn't share my same vision.

I was still searching for a team, or even a mate to work with, on my game.

Inspiration

I, personally, dislike cats. In my eyes, they always seemed like chaos seeking creatures, always looking for and lurking around trouble. It's an unpleasant thought and I knew I was wrong about it. But to be fair, I knew it wasn't just me. Cats are generally symbolized and associated with evil, bad luck, black magic, the list goes on. So, I wanted to make something that would change how people (such as I) saw them, portrayed from the cat's point of view itself.

As I am a gamer myself, the first thing I came up with was obviously turning this thought into some kind of game. When a person plays a game, be it board game or video game, their minds immerse into it and they see the character as themselves (eventually). The person forms a special connection, a bond with the game, which makes it interesting and fun. Keeping a cat as the protagonist of my game, the player would eventually connect with it and may change the way they look at cats.

WEEK 1

Week 1 Project

In Week 1 of FIT 3039, when the unit was introduced to us for the first time, we were made to sit at a table and come up with different genres we were interested in and why. That's where I met Liem and Andrew, two guys who had almost the exact same interests as me. So I shared my idea of **Grim CATastrophe** with them to see what they think of it and to my surprise, they liked it more than I imagined they would and proposed to team up and work on it.

Initially, my plan was to make it a 3D open-world game, but upon further discussion with my team, I realized it was more practical to start small as none of us had much experience making full-fledged video games. So we decided to go with a 2D game.

Week 1 Process

I didn't exactly know how to begin, so I started with a warm-up for some inspiration – I played Super Mario.

Through the games, I noticed things I never really paid much attention to earlier. I like how characters though the game has animations for the smallest things, such as falling down after a jump or various facial expressions just from the eyes.

Using this as some basic inspo, I decided to attempt on drawing/making my protagonist character, the Grim Cat. Like Super Mario, I vision this game to have pixel art so I opened up photoshop and started working on drawing the cat. I wanted a feline skull for the head with a body and cat tail. For clothing, I wanted it to have a hooded cape or robe, like that of a Grim reaper. Although, as a programmer I wasn't very experienced on the design side, so my cat ended up not doing any justice to the one in my head, but I decided to move and fix that later so I can continue with the programming to learn more about 2D side scrolling.

WEEK 2

Week 2 Project

Liem, Andrew & I brainstorm into a google doc our ideas for the game, its design and the mechanics. After coming across some great ideas, we filtered, discarded, altered and in the end, finalized a list of game ideas and put them in a priority list to know what aspects are more important and which ones would be most challenging to execute.

We then pitched these ideas to our tutor to have it critically reviewed. We got a fair bit of information which is why we decided to focus on the puzzle element of the game and discard the fighting mechanics, i.e. to use the environment to the player's advantage rather than sheer brute force. Since the thinking side of the game appealed to the three of us more than the fighting side, and given we had only less than 12 weeks to complete the project, we knew we had to focus on either one of those aspects which is why we chose to discard the fighting mechanics.

Week 2 Process

During the week, I picked up where I left off, which was working on my cat character. I watched many YouTube video's but the one that was most useful and informative was a Game developer/Professor named CasanisPlays^[1] who had a complete playlist for making a 2D Side scroller game including animations and code. However, I was interested only in the animation videos. Watching his tutorials helped me understand how 2D animation works, which was quite different to my understanding of animation in general. 2D animation is done frame by frame, in something artists call a *Sprite sheet*. Knowing about how animation works as a programmer helps me to show attributes to the artists in the editor through code and hiding the irrelevant ones for the same. By the end of the week, I had a simple **idle** animation for my character using a 4 frame Sprite sheet, using aspects in the animator as well as knowing how to reference the same in a script if needed.

Here's a picture of what my design looked like:



Here is a link to the video I found useful to learn basic animation for 2D Games:

https://www.youtube.com/watch?v=U7sJ0_VlCk&list=PL2cNFAQAw_ndyKRiobQ2WqVBBBSbAYBobf&index=6

WEEK 3

Week 3 Project

This week was all about giving and receiving feedback for our game proposals. Our team received mostly positive feedbacks about our game and the only one we found useful was to include a basic fighting mechanic for our game to avoid repeatability. We considered to add this provided we finished our initial plan as an upgrade to the 'completed' game.

One out of the other groups had an idea to do a top down stealth game with a day and night system. However, from their pitch, it did not seem like the day system served any purpose to the game. So I suggested the use of the day system to infiltrate the enemy base in order to discover certain features/hints which would make the gameplay easier in the night.

After this discussion we worked on our games. Liam worked on animating the character he had made for our game, Andrew worked on some game mechanics to incorporate a save/load/checkpoint system and I worked on creating a script to be able to transform/morph into different characters as a cat.

Week 3 Process

I continued where I had left off in class with the character swapping script and decided to fine tune it to make it more efficient and smoother. I began by inserting a game object and adding a tag in unity called bird to test out this script. The reason I use the tag rather than finding the game object by the name is because that way the designer could easily swap out the 'bird' character whenever needed and just add the tag without worrying about maintaining the object name as much. It was one of the most helpful tips I learnt from unity documentation.

Here is a short screen cap of how my code works with comments to explain its functionality:

```
if (Input.GetKeyDown(KeyCode.K) && Time.realtimeSinceStartup > cooldownTimer) //if k is pressed and the transform is not in cooldown, transform into a bird
{
    cooldownTimer = Time.realtimeSinceStartup + cooldown; //set a new cooldown point
    if (characterName == "Cat") //if the player is a cat,
    {
        bird.GetComponent<Rigidbody2D>().velocity = new Vector2(cat.GetComponent<Rigidbody2D>().velocity.x, cat.GetComponent<Rigidbody2D>().velocity.y);
        bird.transform.position = cat.transform.position; // set the velocity of the bird to be the same as the cat and set the positions of the bird to match the cat.
    }
    characterName = "Bird"; //this string is used to reference which is our current character if needed
    cat.SetActive(false); //disable cat game object
    bird.SetActive(true); //enable bird game object
}
```

WEEK 4

Week 4 Project

To start off this week, Andrew proposed that we begin this week by clearly defining our project plan and set clear deadlines for what needed to be done by when because it's very easy to lose track of time without it. So, we decided to finish the finalized version of the game mechanics to begin sorting out clear roles and tasks. This is where I proposed we should make the levels before each boss level derivative of the boss's move set itself as this provides players an opportunity to familiarise themselves with the moves and inspire ideas to deal with the boss itself. This is what moved us to creating the boss levels first and proceed with the minion/smaller levels after this for our workflow. We made it a point to list out how the boss mechanics would work before the end of the session. We had a clear idea of how the first boss, the fish, would be so we quickly jotted down the level idea in our google doc with the mechanics. However, the bird boss mechanics being undecided gave us quite a few issues when it came to logic as we had to balance the level to be harder than the fish boss but also feasible for us to program and design on time.

Week 4 Process

The processes became much more simpler during the week due to the project plan which we wrote out having clearly stated goals for the end of each week. Having work done this way also made me feel like our workflow would become faster than leaving it to do what we wanted each week. The task for me this week was to finish the morphing script which I had previously done last week, fine tuning all the bugs and errors. Having already done so, I decided to further investigate a smoother way to handle the swapping which is where I stumbled upon unity documentation again. It clearly stated the difference between a `FixedUpdate`^[3] and the normal `Update`^[4] function, where the `FixedUpdate` is called every physics cycle loop and the `Update` is called every frame. This also allowed me to have a better understanding for the base of the character code involving physics such as movement and gravity in different terrains.

WEEK 5

Week 5 Project

Due to a stomach bug which infected me, we did not meet as a group this week. However, the project plan was made for such instances. We decided to carry on our tasks as in the project plan. Also deciding on how to split up the project plan document deliverable due at the end of the week we split it up as two sections per person, so each person would contribute equally.

Week 5 Process

To begin the project plan, we each did our agreed part, of which I was to do the project overview and objectives *and* the roles and responsibilities. As this was my idea to begin with, I took up the role of project manager to ensure things get done on time and we move as scheduled. However, Liam and Andrew are both lovely teammates so there isn't really much guidance I need to do to push them to do the work. For our game, this week I was to work on completion of the character code. I managed to clean up the movement which we acquired from Casanis's tutorials^[1] and add collision detection and ensure proper commenting of code to make life easier for all of us. To begin collision detection, Unity's documentation on BoxCollider2D^[5] informed me about pre-written overridable functions for checking collision with other colliders, so I decided to use that to handle the cat's collision.

```
void OnCollisionEnter2D(Collision2D other)
{
    if(other.gameObject.CompareTag("Projectile")) //if hit by projectile, lose a life
    {
        DamagePlayer(1);
        Destroy(other.gameObject);
    }
}
```

I also decided to move all of the characters movement code made earlier into FixedUpdate to ensure clean movement.

```
// Update is called once per frame, Fixed update is called once every physics engine loop
void Update()
{
}

void FixedUpdate () {
    // check if we are grounded; draws a circle, checks if it is intersecting with anything - if no, then we are falling
    checkGrounded = Physics2D.OverlapCircle(groundCheck.position, groundCheckRadius, groundLayer);
    myAnim.SetBool("isGrounded", checkGrounded);

    myAnim.SetFloat("verticalSpeed", myRB.velocity.y);

    float move = Input.GetAxis("Horizontal"); // Gets the input from Unity pane "horizontal" ie. A/D or left/right arrow keys
    transform.Translate(move * Time.deltaTime * moveSpeed, 0, 0);
    myAnim.SetFloat("speed", Mathf.Abs(move));

    if (Input.GetButton("Jump") && myRB.velocity.y < 0.001f && myRB.velocity.y > -0.001f && Time.fixedTime > jumpTimer) // Check if input from Unity "Jump" ie. space bar is pressed & make sure the
    {
        checkGrounded = false;
        myAnim.SetBool("isGrounded", checkGrounded);

        jumpTimer = Time.fixedTime + jumpCooldown; //Set the new cooldown timer point

        myRB.velocity = Vector2.zero;
        //add upward force
        myRB.AddForce(new Vector2 (0.0f, jumpSpeed));
    }

    // Flip sprite depending on which direction they're facing
    if (move > 0 && !facingRight)
    {
        flip();
    }
    else if (move < 0 && facingRight)
    {
        flip();
    }
}
```

WEEK 6

Week 6 Project

At this point, since our individual unity projects were getting more complex, we decided to collaborate all our work into one project to set as a checkpoint/milestone/base. All of us decided to use Liem's project, because as a programmer I learnt that attaching scripts to an already existing world is way easier than remaking a unity scene with design. Andrew still had some bugs to work out for the boss code and hence worked on it in class with a little help from me here and there. I worked on the bird code simultaneously as I had misread bird code as my task for this week instead of fish code. During the collaboration, I learnt more in depth how the animator works in unity from Liem to a point where I could make changes to it in code when and if I needed to. We also decided the final boss, the narwhal, should have mechanics from both previous bosses. One challenge we have to overcome at this point is to ensure the game does not feel repeated. Keeping that thought in mind, we wrote down numerous mechanics for the final boss. We also decided to change the collider of the cat to make it possible for him to grapple onto platforms with his teeth, adding more functionality to the cat movement.

Week 6 Process

I worked on the bird movement which I had worked on in the previous class. For the bird's movement, we had agreed to do a flappy bird style movement where the player would have to constantly 'Flap' his wings to stay in the air longer. We also agreed that it would be more challenging if the bird could not move sideways unless in flight. To do so was a simple task, all I had to do was use the same code I used for the cat character and make a few modifications to the check statements. For example, to make the 'flapping motion' I removed the part of the statement in the jump code which checks whether the player is moving in the y axis or not. I realised that spending all that time to make my base character code perfect helped me in the future such as now where I did not really have to recode much parts for the bird player controller.

Cat:

```
if (Input.GetButton("Jump") && myRB.velocity.y < 0.001f && myRB.velocity.y > -0.001f && Time.fixedTime > jumpTimer)
```

Bird:

```
if (Input.GetButton("Jump") && Time.fixedTime > jumpTimer)
```

WEEK 7

Week 7 Project

With the Design document date coming up, we decided to split the topics like we did for the project plan since that worked out well for all three of us. We then had a check on how each of us is doing with our goals for the week. Mostly everything was going on track so we each decided to work on our respective tasks, seeking guidance from each other when we got stuck. Thinking back to week 2, we worked like a well-oiled machine now compared to back then when we did bits and pieces without a proper plan.

Week 7 Process

My final task for this week (with one more week as a buffer week to clean up code for the first playtest we would have) was to make the final character code, the fish movement. To do so, I had to first have a good idea of how physics works in water and on land, and also how physics works in unity. I learnt that water and land has the same gravity, however due to water adding a buoyant force upward, we feel a sensation of antigravity. And to think all this time I was dumb enough to believe gravity could be different in the same part of a planet, on rethinking, I realised how foolish that sounds. I also learnt that unity's physics is basically a force of -9.81 acting downward in the Y axis on any object with a "rigid body" attached to it. This made coding the fish much simpler, as all I had to do was add a water trigger to the prefab of the water asset created by Liem and change the gravity scale if the player entered the water as a fish character. As my character swapper would swap out game objects, it would be as simple as adding a "fish" tag to the fish player game object. So most of my work was very easy due to the strong base code I created, and it had more to do with playing around with numbers to complete the code.

REFERENCES

- [1] <https://www.youtube.com/user/CasanisPlays>
- [2] <https://unity3d.com/learn/tutorials/topics/scripting/update-and-fixedupdate>
- [3] <https://docs.unity3d.com/ScriptReference/MonoBehaviour.FixedUpdate.html>
- [4] <https://docs.unity3d.com/ScriptReference/MonoBehaviour.Update.html>
- [5] <https://docs.unity3d.com/ScriptReference/BoxCollider2D.html>