

Project Title

EnviroFormer By Muhammad Zaman

Project Sponsor & Course Facilitator

Dr. Tim Maciag (ENSE 405 Professor)

Business Need/Opportunity

With the widespread of games currently out in the world, not many target their focus on doing good in the world, the majority of games nowadays, focus on maximizing attention towards the game, or looking towards increasing their profit margins.

With this game, it is intended to primarily focus on educating the younger generation on current issues for life on land, whilst also delivering an entertaining experience. There also comes the issue of current games being hardware intensive, this game plans to deliver an optimized experience to ensure minimal hardware issues. Allowing for everyone to enjoy without the need of spending thousands on new hardware.

GitHub Repository: <https://github.com/mtzamanpk/EnviroFormer>

Reflections on Project Planning

State and discuss the United Nations (UN) Sustainable Development Goals (SDGs) selected and your “why” for selecting the one(s) you did

The SDG's considered for this project were kept relatively simple, although 4 were selected, the primary SDG targeted was SDG 15, otherwise known as “Life on Land”, this SDG stood out to me in particular due to my upbringing and the nature of where I was born. I was born in Karachi, Pakistan, and during my time spent living in Pakistan, I realized litter, and pollution was very common on the streets, and in general everywhere, which is why I felt a personal connection when I saw SDG 15. Which leads me to my next SDG covered, Goal 11, Sustainable Cities and Communities. This SDG is covered passively when I selected SDG 15, due to the same practices being applied of reducing litter and pollution allowing for better air quality. Along with the other two SDG's selected, SDG 3 Good Health and Well Being, and SDG 14 Life Below Water, These two SDG's can go hand-in-hand with each other, as better water quality, allows for better quality of life due to the lack of need of filtration, allowing for more money to be saved which can then be reinvested into our health and well being.

Discuss key findings from your community research and understanding/requirements gathering (Community characteristics and technology configuration inventory)

According to my research, the UN SDG community is well developed as is, but they are in need of more recognition and tools to aid the cause in spreading the message to the world. I believe the SDGs are underrepresented in our day to day lives, although they have a massive effect on us,

they are not given the proper level of attention to be treated as such. Therefore the community is in need of more tools to help spread recognition, which is what EnviroFormer was built for, spreading the message of the SDGs to the younger generation, allowing for the message to be well spread during their upbringing.

Discuss your professional opinion of the processes and documentation used in this course for project planning. Did they help/hinder and how?

The processes and documentation used in this course have been very helpful in simulating how a real world project would develop. Although on a much smaller scale, this level of documentation and often feedback cycle allows for a recipe for success. This is because we are receiving feedback on what we can improve on, how our project is lacking, making our project unique, and if the scale of the project is currently too small or too large. All of the following allows for a very beneficial outcome due to constant improvements of our projects.

State selected north star & carryover customers. Why are these customers important to your project's golden circle (why, how, what)?

When in the initial planning phase of the project, I took some time to think of which age group would be most impacted by this project. I already had established I would be making a game, and came to the conclusion that, in the current day, kids tend to play the most video games out of any age group, second being young adults and adults. I figured if kids are playing a game, their parents would also get curious as to what their child would be playing, therefore the carryover customers being Adults/young adults. However, I did not want to limit this game just for kids, it would be beneficial for all age groups to gain knowledge on the SDGs and to take action within their lives, effectively making a change in all our lives.

Summarize assumptions made and constraints uncovered, re: drafting an emerging picture

With the current library of games made on life on land, there are many that have died due to flash player no longer being supported, therefore not leaving many options for games, that is besides desktop games, mobile games, and non flash player web games. Due to this reason, I decided to use Godot 4 as the game engine, and to design this as a desktop game which can be accessible by the majority of the world. However, the main constraint on this project would be this being my first time using Godot. Although using GDScript is very similar to Python, it would still hinder how much I would be able to accomplish in such a given time frame. Development time would also be a constraint as it is only 4 weeks, in between those 4 weeks, we have 2 scrums to receive as much feedback as possible allowing us to improve our project as much as possible.

Discuss initial & the evolution of your technology stack selection, drafted prototypes, and initial Minimum Viable Products (MVPs)

Initial Idea: During the initial stages of deciding what to use, I immediately thought of building a game, due to the fact that I had never built a game before, it would allow me to explore the realm of game development. Since I have played video games all my life, it would give me a chance to express my creativity, whilst learning something new. I began to research possible platforms, and Godot was the first game engine which sold me, some peers of mine suggested using unreal engine, but it seemed a little too complex to use for the first time making a game, which sealed my decision of using the Godot game engine for making my first game. After establishing the idea, and the platform, I then needed to decide what kind of game to make. Making something Mario like immediately came to mind, as other more passive games did not appeal to me as much, although the idea of making a passive game sounded interesting, I would

like to gauge the audience in the depth of my game, therefore I settled on making a platformer game, which will focus on educating the younger generation primarily about life on land, and possibly other SDGs.

Scrum 1: After establishing a basic game platform and character, I was able to establish a foundation. Fortunately I was documenting my progress on the game, the following youtube video will show you the state of the game during scrum 1 [here](#). As you can see, there was a platform build, along with movement and the character integrated, along with a few forces, with basic mechanics implemented.

Scrum 2: During scrum 2, the game was looking a lot more polished, along with significant progress to the game. Things such as the terrain was made, coins, garbage, double jump, spikes, etc. This was a very good leap of progress from scrum 1, producing mvp 1, and half of mvp 2 being completed, some of the key feedback given during this scrum, was to implement different coins for the SDGs to allow for more more emphasis on the education side of the game, as currently it was lacking, and to also adjust the spikes to something else which would suit the theme of the game better. The following link will show the progress to the game during scrum 2. [Scrum 2 Link](#)

Final MVP: After scrum 2, I had to plan a fair bit as to how I envisioned the implementation of the feedback given. I added 2 new coins to symbolize the other 2 SDGs that I was representing, Life underwater, and good health and wellbeing, I also made some minor adjustments to how the pop ups are interacted with in game, allowing for a smoother flow of the game, giving the user a better experience overall. The following link will show progress to the Final MVP. [Final MVP Link](#)

Reflections on Project Results

Discuss what you created. Provide key images/screenshots illustrating core functionality

Over the 4 weeks of given development time, I have created a fully functioning 2D platformer game which allows you to collect coins, garbage, and 2 SDG coins which give you practical advice, or an interesting fact about said SDG, allowing for a seamless transition back to the game. Here is a list of the features listed within the game:

1. Start game: To press the start button on the main menu to start the game.
2. Quit Game: To quit the game from the main menu.
3. Collectables: Collectables such as garbage, coins, SDG collectables for Good health and wellbeing, and life underwater, allowing for the user to get educated on the topic, or to get applicable advice for their life.
4. Character death to broken glass: Character needs to avoid hazards in the map to continue progressing in the game .
5. Jump: Basic jump mechanic to overcome broken glass, along with short jump in case you don't need the full jump.
6. Double Jump: to get to higher platforms in order to collect coins.
7. Movement forces: Various forces ranging from acceleration, friction, air resistance, gravity.

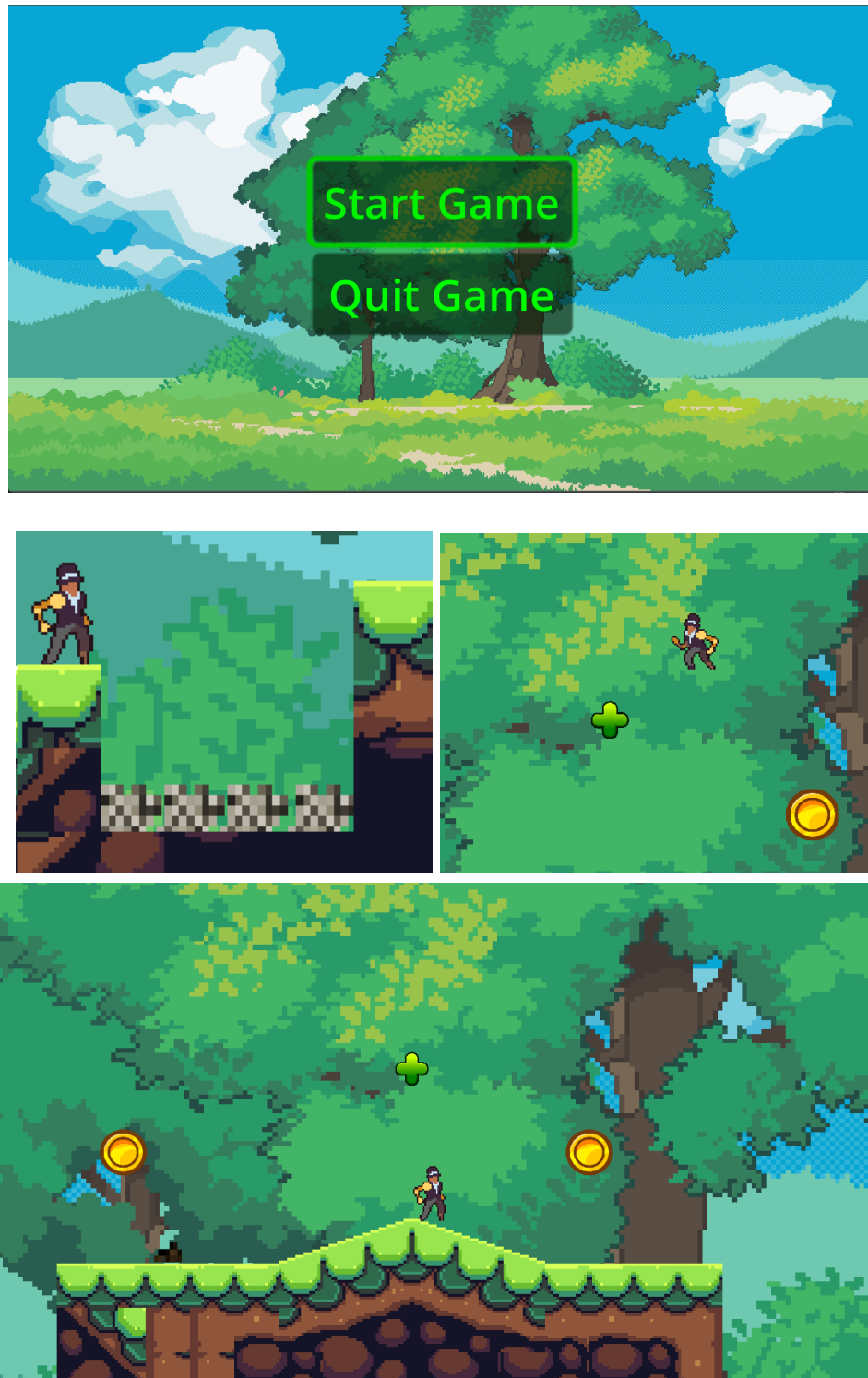
Attached below are the features listed above inside of the game or code:

Image 1: start and quit game

Image 2 and 3: broken glass hazard which can kill the player

Image 4: collectables

Image 5: The forces applies to the character




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17
18 func _physics_process(delta):
19     apply_gravity(delta)
20     handle_jump()
21     var input_axis = Input.get_axis("ui_left", "ui_right")
22     handle_acceleration(input_axis, delta)
23     handle_air_acceleration(input_axis, delta)
24     apply_friction(input_axis, delta)
25     apply_air_resistance(input_axis, delta)
26     update_animtions(input_axis)
27     var was_on_floor = is_on_floor()
28     move_and_slide()
29     var just_left_ledge = was_on_floor and not is_on_floor() and velocity.y >= 0
30     if just_left_ledge:
31         coyote_jump_timer.start()
32

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Review your initial “Planning and initialization” video created for the first deliverable. How close did you come to realizing the solution/product you initially envisioned?

I personally would say based on the initial project planning phase to full implementation, I had come extremely close to what I had imagined, the only difference would be the trash being a mob instead of a collectable, this change was made because of the psychological change it makes, when you step on trash in the game, it incentivized stepping on trash, instead it is more practical to collect the trash to then later throw in the bin, incentivizing picking up litter instead of stepping on it. Besides that change, I had accomplished everything I had set out to do, allowing for a successful project experience.

Summarize software design activities and findings. Ensure you discuss how you/your team either linked or envision links to design ideas back to topics discussed in class lectures

Business Case: For the business case, the project needs to have a use, without a use and purpose for the project, it would not be creating any meaningful impact within the society, therefore I envisioned impacting the younger generation with a game focused on education.

Community Characteristics orientation: With this I had to evaluate how established the community is for Life on Land, I came to the conclusion that they have a good base for making a difference,

but they lack exposure to the gaming industry, which is an excellent way to gain eyes on your cause, especially when people do not realize that this is affecting their lives on a daily.

Drafting an emerging picture: For this document, I had to share the vision that I saw for this project, how I imagined the outcome to be, and to see if I am either filling a gap, or creating a brand new solution. I believe that I am filling a gap, where they lack platformer games for Life on Land, which allows this game to be the first of its kind.

Stakeholder Analysis: This is one of the key documents outlining the people included within the project, starting from myself, Dr. Tim Maciag as the Mentor of the project. Then we have the Northstar and Carryover customers, Northstar being children/younger generation, then Carryover customers being Adults, as I did not want to limit this project to just kids, I would like to spread knowledge to all ages, as anyone can make a difference.

Technology Configuration Inventory: With this document it helped me gain an idea as to what is already created, and what platforms are already made, it gave me an idea for features to implement within my game, and gave me a more clear path of what I would like to integrate and what I would not like to integrate.

Lo-Fi prototype: I used the Lo-Fi prototype as a starter, just like I do with every project, I believe it is good practice to make a rough sketch of what you would like to make in order to have a clearer path to reaching a final product.

Summarize how you felt about this project (likes/dislikes), from your experiences with the technology stack selected, translating prototypes into real solutions, and the creation/realization of your MVPs

Summarize what went well during the project

I believe time management was one of my strong suits, as I was always in the green status for scrums, and worked hard towards making the deadline for the next scrum. The implementation of the collectables was also a feature that went very well once I got it working, although it was a struggle at first.

Summarize what not went well during the project

At first the integration of the collectibles was difficult due to how many components and small changes needed to be made in order for it to work, then the end game screen was also difficult to implement, making it was fairly simple, but integrating it and adding it to the flow of the game was challenging.

What would you do the same on future projects?

Manage my time just as well as this project, because I was finishing what I intended on finishing for each scrum, much before it was due, allowing me to focus on getting ahead and not falling behind.

What would you do differently on future projects?

Asking for more help, there were a few peers in this class that were also making games, asking them for help would have hastened my progress significantly as some are more experienced than me.

Discuss opportunities and design ideas for future work

I would not mind marketing and improving this game to become the face of Life on Land games.

General Reflections on the Class & Project Experience

Before taking ENSE 405, were you aware of the UN SDGs?

Before taking ENSE 405, I was somewhat aware of the UN SDGs, however, I was not actively taking any action or making any improvements to my life which would fit the UN SDGs. This is not to say that I was littering or hurting the environment, I was not actively taking action upon these known SDGs.

Typically, before taking this class, when you engineered software solutions, were you concerned with areas encompassing the UN SDGs?

Yes/No

If yes, provide some past examples and explain

If no, do you have examples of past engineered works that you (co)created that could address one or more of the UN SDGs

No, but during one of my past classes, ENSE 271, with Dr. Tim Maciag, we were tasked to design a wordpress website for the Regina Foodbank, and this project would play into SDG 2, which is “Zero Hunger”, which is a beneficial and important SDG to address, as this is referencing our local communities in Regina which are in need of food. Another project which could address some SDGs is a project that I built with my team for the Regina Engineering Competition in 2022. We named it LogistiX, the goal of the competition was to design a software solution which would take a JSON file, and import the information into the program, and would allow us to modify factors of deliveries for shipments, such as the delivery driver, the truck, and the start and end locations of the delivery itself. This project would be addressing SDG 9, “Industry, Innovation, and Infrastructure”.

Did learning about the UN SDG(s) help you understand better your role and responsibility as an engineer to society?

Yes/Neutral/No – Please elaborate

Yes, this project taught me several things about project management, time management, and our ethical responsibility as an engineer. To start, project management, starting a project from scratch and learning a new technology is difficult, but not impossible. As someone who is curious about new technology, I tend to explore different options from time to time. But when making a new project you must make the correct decisions to stay on track and not waste any extra time, which is where time management comes into play. Besides the finished product itself, and the ethics of a project, time management has to be one of the most important factors to a project. Simply due to the fact that if you are unable to meet deadlines, it will not look good in the eyes of your boss/supervisor, and it will also reflect poorly on you. Which is why we should set high expectations for ourselves, but to also be realistic to how much we can accomplish, working on a technology for the first time, you cannot expect to accomplish what an expert in that technology would hope to accomplish within the same time frame, it is do-able, but not very realistic. Hence learning to manage time is extremely important. Finally, the ethical responsibility as an engineer. As an engineer, it is important that anything we build is for the betterment and not the worse for society, we must challenge ourselves to think critically on if the product we are helping build is going towards a good or bad cause for society, which is why the SDGs have shown me that we can easily benefit society with our impact if we ethically challenge yourself to do better.

What was your experience(s) in engineering your specific software solution to address the UN SDG(s) selected?

I found my experience to be quite easy to address my SDGs into my game, my main objective

of the game was to incorporate life on land experiences into it, and I feel as though I did it successfully. I addressed the SDGs by having a life on land theme of the game, while keeping it green, and grassy, then I made pop ups from collecting the collectables to give realistic advice and facts that are implementable into our lives.

As a future engineer, what are your thoughts on the UN SDGs as a whole? Do you think they can help or hinder our work as software engineers?

The UN SDGs are a good cause for society and will only benefit us, it serves a good purpose, and strives to make a better future for everyone, which is why more people should help support them actively. They might slightly hinder our work as software engineers due to some software not being as ethical, and possibly damaging to society, which is why if we cross check the SDGs with what we are developing, it can cause an overall more ethical approach to software engineering.

Should we use the UN SDGs to guide our work or is our work dependent on customer requests, regardless of the UN SDGs?

Unfortunately, in today's day and age, customer requests are prioritized over UN SDGs and the ethical requirements of our development processes. Especially when investors are involved within the project, generally speaking investors care less for the environment than they do getting a working product for the money they put in, they would like to see results and profit back rather than a beneficial change to the environment.

Will you use your understanding of the UN SDGs in engineering solutions in the future?

Yes/No/Maybe – Please elaborate

Maybe, I say maybe for a few reasons. I firstly will use my understanding to the best of my capabilities, but higher ups in the development process may not care for any of the SDGs therefore not allowing for optimal results for both the environment and software development.

Will your experience learning about the UN SDGs inform your career path decisions in the future?

Yes/No/Maybe – Please elaborate

Maybe, I do not want to lie, when saying that money is important, I would like to make ethical decisions going through my career, and intend on keeping it. But if I am given an option for a high paying job that is slightly less ethical compared to a much lower paying job that is extremely ethical, I would still take the higher paying job, because I must provide for myself and my family, but that is not to say that I would work for weapons creation or the damaging of the environment. I will not work at places which are actively destroying the environment due to personal beliefs.