

Project Submission

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Proposal: *For my computer science project, I am currently trying to design an ecosystem simulator. It will have two different biomes a user can choose from, and what the goal is, is to create a fun, factual simulation of a real-world Ecosystem. There's an oceanic ecosystem that the user can choose to manipulate. They can set the number of animals they initially have, and traverse through their own unique habitat simulation. In some cases, there will be real life events, such as an oil spill, where the user will have to pick what species to conserve, and going one way or another, some species may survive, and some may die off, and depending on what animals die off, the ecosystem will be affected accordingly. Through this project, I plan to use the multitude of my Computer Science skills to create a fun, user-friendly simulation, that not only is a great way to learn about how different ecosystems need different things in order to thrive, but also as a fun way to experiment with all that I know. While most of the game will be a lot of cout statements asking user for inputs, the code itself is going to be slightly complex. I will need various arrays to hold numbers for many things, I'll need two separate classes with their own individual data members and methods to manipulate what is special to them, and it will require a lot of creativity, and knowledge of file IO, by inserting ASCII art to make the simulation more visually appealing. I decided to keep my biomes down to just two, because I know as I get further into this, it'll start getting a lot harder trying to manipulate so many animal counts, and scenarios at once, so I've decided to just go with what I believe I can manage in the timeframe.*

Final Outcome: The overall outcome of my Ecosystem Simulator was nothing short of wonderful. After finishing it, and seeing it in full effect, I was proud of my work efforts, and how far I was able to come with this. The idea originally started because of my love for the Environment, and conservation efforts in place today to help endangered species. I wanted this not to be just something I do for Computer Science to get a good grade on, I truly wanted to push my passions and interests into this project, and spread awareness on some of the global issues regarding the environment that are very present amongst many Ecosystems in the world.

```
Welcome to Ecosystem Simulator!  
Would you like to play Ocean or Terrain? Enter 0 for Ocean and 1 for Terrain. If  
you would like to read more information on the Ecosystem Simulator and its purp  
ose, press 2.  
2  
Ecosystem Simulator is a game driven by my passion for the Environment, and all  
the Ecosystems put in danger today due to global warming.  
I wanted to do something eco friendly, and something that would raise more aware  
ness on the different, intricate ecosystems on the Earth, and really show how by  
affecting just one animal species, an entire ecosystem of hundreds of animals c  
an collapse.  
It's a chain reaction that unfortunately, doesn't stop.  
By doing this simulation, I want to show how each animal can affect eachother wi  
thin a collective environment, and raise caution about the different destructive  
factors for these ecosystems on the Earth today.  
user@cu-cs-vm:~/Desktop/All_Assignments$
```

This picture shown here is my menu screen. It asks the user which biome they want to play, or rather if they want to know more information about the game itself. This is my information page they can get to by pressing 2. This goes into more depth about what motivated and inspired me to make this project, by combining both my love for computer science, and my love for the environment. If the user presses 0, they will then be brought to the Ocean Biome simulation, where they will set the number of animals they want, and then walk through many realistic life like scenarios.

[illegible]

The picture above is what the Ocean simulator starts off like. It displays an ASCII art image of a fish, and it asks you to set a count of animals, I started off choosing 90 for each just as an example. The number 90 gets stored into an array, as the current count of each animal, and as the scenarios go on, depending on what's happening these counts will either increase or decrease. The simulation also requires you to have a count above 30 for each animal, otherwise it will exit the game and you will need to retry. I set those boundaries because it's bad habit to have an ecosystem start off with any population in the single digits. It will be thrown off balance nearly immediately. The first scenario is a population one, and the user picks what animal they want to populate, while the other animal counts stay the same. In the next scenario, you have an oil spill, in which you need to pick an animal to conserve, while all other animals decrease in population, as demonstrated here.

```
Your ecosystem is thriving! Choose one species to populate
0. octopi
1. fish
2. sharks
3. coral
4. plankton
Pick your choice
0
octopi 120
fish 90
sharks 90
coral 90
plankton 90
An oil spill happened! Choose one species to conserve. (Note that all other species
will go down in number)
0. octopi
1. fish
2. sharks
3. coral
4. plankton
Pick your choice
1
octopi 110
fish 90
sharks 80
coral 80
plankton 80
Uh oh. Overfishing has occurred. Choose one species to deplete.
0. octopi
1. fish
2. sharks
3. coral
4. plankton
```

As shown above, when I decided to populate my octopi, the counts for the octopi changed but all others remained the same. Then, the next scenario regarding the oil spill, I decided to conserve my species, therefore the fish count stayed the same while all other counts went down by 10. The simulation is also designed to show the user the current number of animals they have at all time so they know to make decisions accordingly. There's a total of 6 stages in the game, and if at the end, you have no count of animal at 0, then you have passed the simulation, and it will give you this message.

```
Industrial Pollution seeps into ocean waters. Pick one species to conserve
0. octopi
1. fish
2. sharks
3. coral
4. plankton
Pick your choice
2
octopi 80
fish 60
sharks 80
coral 5
plankton 90
You have a thriving, healthy ecosystem! Congratulations.
```

This is when you have successfully passed the Ecosystem Simulation. However, if any of your animal counts fall to zero... then you have failed, because realistically, when any animal completely dies off, the entire ecosystem is thrown off balance, and dies with the disturbance of the extinction of one animal. So, I incorporated that into my simulation as well, as shown here.

```
Pick your choice
1
octopi 60
fish -25
sharks 20
coral 20
plankton 20
fish have been wiped out. Ecosystem thrown off balance. End of game.
```

Because the fish count was completely wiped out, the simulation, much like a real life Ecosystem ends, and the user can either re-try, or play a different biome. My Terrain Simulation is extremely similar to my Ocean simulation, it just has different animals, and different scenarios. It's still teaching awareness of the ecosystem, but focused more around land animals, and not Ocean Dwelling creatures.



Once the user presses 1, it will give you a home screen that's unique to the terrain, just like with the Ocean. You can set your animal counts for each of the animals, and play a similar round

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of the game, with real life scenarios, and intellectual choices that you must make to keep your

Ecosystem in check.

```
Pine Beetle's have invaded. Choose one species to deplete.
0. wolves
1. rabbits
2. hawks
3. field mice
4. shrubs
Pick your choice
3
wolves 60
rabbits 90
hawks 20
field mice 25
shrubs 39
Beetle Infection have caused Shrub population to become infected. Press 4.
0. wolves
1. rabbits
2. hawks
3. field mice
4. shrubs
Pick your choice
4
wolves 60
rabbits 90
hawks 20
field mice 25
shrubs 9
```

Overall, this project was immensely fun to make. I do want to thank my Cousin, Usman Saeed, for really helping me to visualize what my project could really be, and helping to guide some of my choices in how I set it up and went about it. We skyped a few times, just so I could get some help conceptualizing what my finish product would look like, and seeing how I needed to write and plan my code out. He helped me brainstorm ideas, which I then turned into this masterpiece. I'm very proud of how this turned out, and it accomplishes not only the goal of learning how far my computing skills have come, but also being able to spread awareness of a bigger, global issue that I hold dear to my heart.