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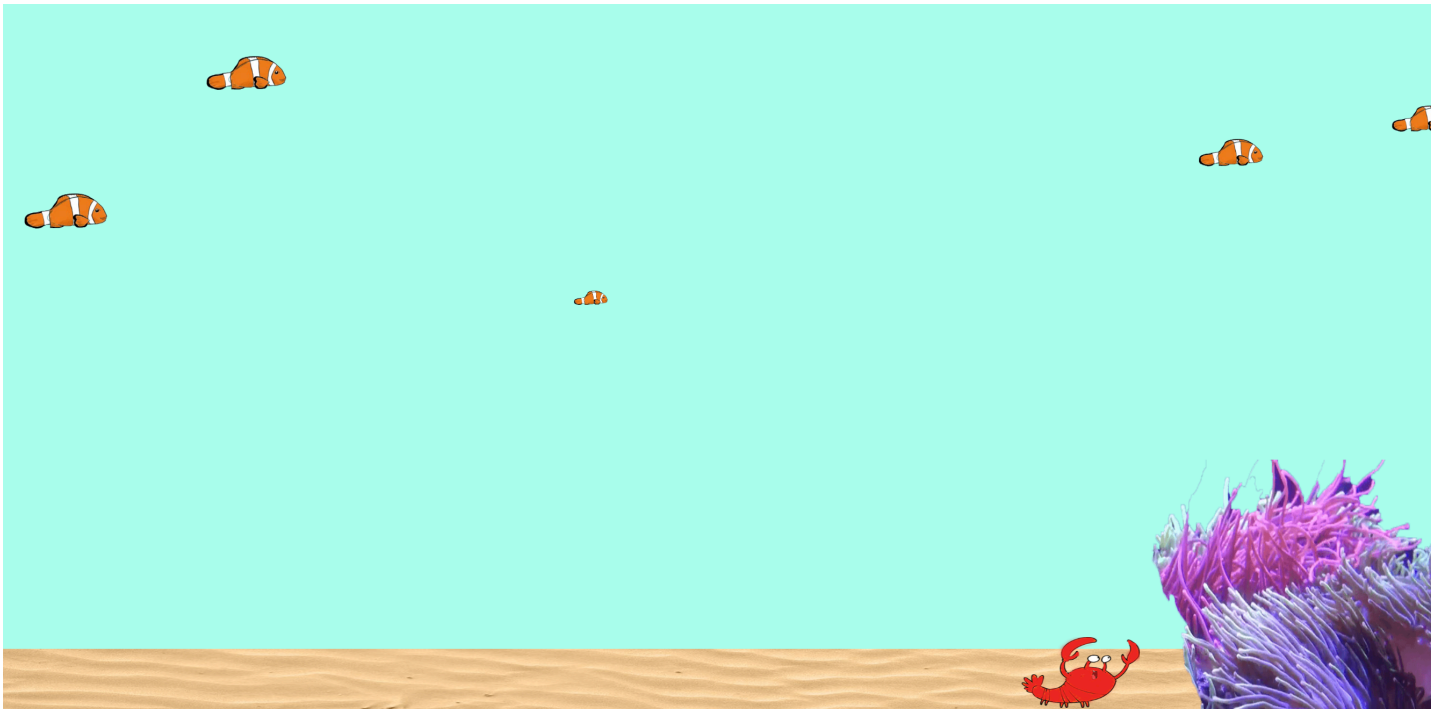
Link to GitHub repository: https://github.com/GiadaFerrari/environment

Title: Tropical Reef

The project represents a tropical reef with both flora and fauna typical of this environment.
We can identify a predator, a barracuda who menacingly scouts the environment for food. If the distance between him and one of the smaller fish is less than a certain amount the barracuda eats the fish, gets slightly bigger and moves to the position of the fish he ate.
Smaller creatures are also present such as a school of clownfishes, who are attracted to an Anemone. They have a survival instinct that kicks in whenever a predator is too close. To hide they swim into the anemone. The clownfishes get bigger as they age, and they all have a breeding age and a different lifespan. Once their ages surpasses their lifespan, the fish dies.
The anemone itself has been coded to move in a wave. Their color gets lighter as they get longer.
A similar behaviour is found in seaweeds, that are randomly disposed on the bottom.
A crab follows the mouse interactively. Jellyfishes are moved by the current, which can be changed by pressing any key.

While this project changed again and again, some of the changes I decided to apply proved particularly challenging. Coding the breeding and death of the clownfishes proved to be harder than what I originally planned. A big problem was trying to have them breed whenever they met. While I tried to make that work, comparing the vectors of all clownfishes while flooring them so that the decimals didn't make it impossible for them to breed became too hard and roundabout, which is why I instead decided to base the breeding on a time base.
Another challenge had to do with the limitation that p5 has in order of potency. While my original plan included a flow field to simulate the pattern of water in the background, I found that the particle system was too heavy in order to implement, and that the animation slowed down to 3/4 frames per second.
A similar program occurred when I added the code for the seaweed and the anemone. The more objects I drew the slower the animation became, significantly impacting the frame per second rate. I settled for a number that looks natural while not overwhelming the program.



BASIC STRUCTURE. CLOWNFISHES ONLY SWIM IN ONE DIRECTION.

CODED FAUNA HAS BEEN ADDED. GRAPHICS HAVE BEEN IMPROVED FOR BETTER UX. PREDATOR HAS BEEN ADDED, AND CLOWNFISHES CLUSTER AROUND THE ANEMONE.

FINAL VERSION. JELLYFISHES HAVE BEEN ADDED.

note: I have read too late about the need of submitting a bibliography. No code have been copied. Open sourced platforms have been consulted to solve problems, but all example code used have been changed and adapted to best fit my projects needs. These platforms mostly are:

- https://www.w3schools.com/
- https://developer.mozilla.org/en-US/
- https://stackoverflow.com/
- https://p5js.org/reference/
- The nature of code book by Daniel Shiffman
- Videos by Daniel Shiffman on https://www.youtube.com/channel/UCvjgXvBlbQiydffZU7m1_aw
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