Math 198 Documentation: Swimmer.Py

Emily Stanfield

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1 Introduction

The purpose of Swimmer.Py is to demonstrate the movements that make up swimming. My inspiration came from projects done by Gillian Smith (Bicycle Man, 2013) and Ramya Babu (Swimming Man, 2013). My goal for this project was to use the blobby man from past projects, like Gillian's, and reprogram him to swim like the Swimming Man using VPython. Since I did not know much about coding, I used code from previous projects and then change it to better suit my project. The main goal was to make the blobby man swim in a straight line. In the future, I could program more than one blobby man and have them race. A side goal of this project was to become proficient at at LaTex so I could document my project using that, and also to become proficient at html so I could document the project on my webpage.

2 Background

I wanted to model the motion of a person swimming. My RTICA was supposed to show the difference between the four main strokes, crawl stroke, backstroke, breast stroke, and butterfly stroke. I was initially interested in this because of my summer job. The past three summers I worked as a camp counselor, and every day I'd take my campers to swim for two hours. Some of my campers were better swimmers than I was.

The sport of swimming officially started in Great Britain in the 1800's, although people had of course been swimming since the Stone Age. The Olympic sport,started in the late 1800's, now has four main strokes: crawl stroke, backstroke, breast stroke, and butterfly stroke. Originally, it was all freestyle. Athletes did whatever they could to get across the pool first. Crawl stroke originated in South America and was brought to South America by an English explorer. Back stroke was brought to the Olympics in 1900. Breast stroke came soon after. In the 1940's, swimmers found they could actually swim faster if they brought their hands over their heads after each stroke. The Olympic judges disliked this and promptly outlawed it. That idea became butterfly stroke in the 1950's, which is considered by some to be the most beautiful.

3 Implementation

I used VPython, and Sarah Hovey's Workout Guy (2010) code. Because I used code that already had a blobby man created, complete with frames, I didn't have to worry about creating the geometric shapes or frames of the blobby man. The first thing I had to do was rotate the blobby man from standing up and facing the camera to laying down on its stomach. I did this by rotating the heart frame. Then I had to rotate the arms, which were slightly bent and over the blobby man's head, to the proper starting positions. I did this by using the pitch, roll, and yaw functions, already defined in my code, on the frame of the shoulders. Finally, after much trial and error, I was ready to start animating the blobby man.

I started with the crawl stroke. I set up an if statement to move the shoulders. and I used the"roll" motion on them. I also set up elbow motion for when the arm was "underwater," also with a roll function. Through trial and error I figured out when and how much the elbow should move. The last thing I did was add the kicking motion by using the pitch motion on the hip frames.

Back stroke is basically the same as crawl stroke, so I just changed the signs on a few motions and my RTICA could now do back stroke.

Rate and sleep both controlled how fast the blobby man moved. In theory, I think they should both do the same thing. However, "rate" eventually causes the motion to accelerate for some reason. I worked on it for several days and I could never get rate to stay at the same speed, although if you started with a slower speed the acceleration was less noticeable. Ultimately I went with the sleep function. It was a little slow but it stayed steady.

I ran out of time to program breast stroke and butterfly stroke, but all they would really require is changing the motion of the arms and legs slightly. Both sides move symmetrically so I wouldn't have to stagger the motion.

4 To Run the Program

To run Swimmer.py, all you should have to do it click on the file and open it. If it opens VIDLE, you can run the program from there.

The program runs without any interaction from the user. One program does backstroke and the other does crawl stroke.

5 Sources

- http://usaswimming.org/DesktopDefault.aspx?TabId=1696Alias=RainbowLang=en
- http://www.olympic.org/swimming-equipment-and-history?tab=history