Journal Report 5
9/30/19-10/4/19
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Daily Log

Detail for each day about what you researched, coded, debug, designed, created, etc. Informal style is OK.

Monday September 30

I modified my height finding method so that the height was given by the packing function when it found a place to pack an object, so the height of the pile of objects being packed didn't need to be recalculated. I also modified the selective-rotation finding method so that before the final rotation was found, it would use pixelated versions of the object that were very blocky, before using ones that were more representative of the object once a packing had been found, in order to save time.

Tuesday October 1

I programmed the method described in the previous week: where the optimal rotation of each object was found before packing it in, one at a time instead of all at once. I tested out a 10 object test case, but the code still took too long. I shortened this to five, which packed in time, and I realized that there was an error because my code was plotting every single rotation, not just the optimal one.

Thursday October 3

I began to go through my code and fix the error found previously. It turned out there was a method that I thought changed a copy of the inputted array that actually just affected the original array. I changed this, and tried packing more objects with more time to do so.

I was given a paper, which I spent the rest of class reading. The paper presented different types of one dimensional and two dimensional packing algorithms. Even though it did not focus on rotations, there are some ideas I want to incorporate in some of the algorithms.

Timeline

Date	Goal	Met
September 20th	I hope to be able to specify a column in a matrix representing a packing container and have my code place an object in the optimal position and rotation in this column	I have not made any progress on finding the optimal rotation of an object. However, I have created a working code that packs objects *given* the rotation of each object. I hope to have some sort of successive learning approach to find the best rotation for each object
September 27th	I hope to figure out a method that efficiently finds the optimal rotation of an object by initially testing out several rotations of each object and then progressively gets closer to the optimal rotation through these tests, and begin work on it	I figured out that the best method for doing this is just by finding the optimal rotation for each object as you pack it, and any specific optimization algorithms would take too long
October 3rd	I hope to finish programming the method of finding the optimal rotations for each object found in the previous week	I finished programming this method, but it was still slow when I tried test cases, although it was able to pack some small cases
October 10th	I hope to try programming several of these ”faster” algorithm approaches I have come up with, and test which one is the fastest	
October 17th	I hope to be able to speed up my algorithm to the point that I can pack a triple digit number of objects in a class period	

Reflection

This week I tried creating the packing method I came up with last week. I programmed the method, but never fully went through my code and made sure all errors were checked, so I believe there may have been some redundancies in my implementation which slow down the algorithm drastically. I did not fix these as I spent more time reading a paper about packing algorithms during the second work session.

I have some other methods of packing I want to try out, some based directly on the paper, and some I came up based on some concepts in the paper. The technique I currently want to try is to create an optimal rotations for the leftmost position in each row, and then instead of testing out each rotation for scratch for, say, placing the object directly left of the position, I want to try to use the previously found rotation of the object and modify it only slightly. This will hopefully save a lot of time. The paper was very useful because it gave me some intuition as to what sort of methods work based on other research papers. It also gave me some technical things for evaluating how good a packing algorithm is that I might want to mention in a presentation at

the end of the year.
I'm happy about this project because I think I can modify my original method to make something that might seem less obvious as a method for packing objects with rotations. The paper was extremely useful for coming up with a modification that might achieve this. In the next week, I hope to be able to modify a lot of my methods to achieve this, and completely rewrite some of them.