Journal Report 10 11/18/19-11/22/19 Oliver Hayman Computer Systems Research Lab Period 4, White

## **Daily Log**

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

## Monday November 18th

Started working on modification in which many more "rotation states" were initially checked, to create better packings of elongated objects. Initially, I found an error - because I added more states to check, there weren't enough rotations of each object being initially generated.

#### **Tuesday November 19th**

Thought of solutions for state problem. Because a lot of the code's runtime was from generating rotations of objects, modified packing so that the same number of rotations are generated but more rotations are initially checked. Had to debug some more, as many of methods relied on using 27 rotations.

### **Thursday November 21st**

Finished working on the increased initially checked rotations states modification. Produces better packings, but takes a lotttt longer.

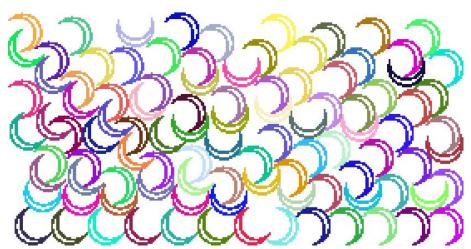
Started working on speedups. In particular, I'm working on the algorithm checking many rotations with very pixelated forms of objects, before using more finely pixelated objects when zeroing in on the best rotations. This would decrease the run time for both packing objects and generating rotations.

## **Timeline**

Date	Goal	Met
October 3rd	I hope to program the method found	I did not program any method, but
	in the previous week	came up with several that would
		pack objects quickly and would be
		plausible
October 17th	I hope to be able to pack objects cor-	I haven't accomplished this yet
	rectly and display an image of it	
November	I hope to be able to pack 10 objects in	I haven't been able to create correct
11th	a single class period	packings yet, but given the current
		run time of my code this should be
		very achievable
November	I hope to be able to pack objects cor-	I accomplished both
18th	rectly and have rotated objects be ex-	-
	actly the same size as the original ob-	
	ject	
November	I hope to be able to speed up my al-	I am able to do this
25th	gorithm to the point that I can pack	
	40 objects correctly in a class period	
December 1st	I hope to be able to speed up my algo-	
	rithm to the point that I can pack 100	
	objects correctly in a class period	
December 1st	I hope to be able to speed up my algo-	
	rithm to the point that I can pack 100	
	objects correctly within 10 minutes	

# Reflection

This week I made my first modification to my packing algorithm: changing the number of initially checked states to produce better rotations. I'm unsure whether this was actually a modification worth making, as it drastically increased the run time of my code, while I don't think it it produces significantly better packings. Two packings are shown below, where the bottom packing is one from the original algorithm and the top one is from the modified version.



Right now I actually want to focus more on run time than packing efficiency, because realistically you don't need to use a program to determine how to pack only 20 objects, so my code needs to run well under double and triple digit numbers of objects. I plan on figuring this out more next week. Right now, my latest project is to improve pixelized forms of objects when the best rotation needs to be finely selected but you know what range it's in. I can use more pixelated objects for determining what the optimal rotation is generally "around".