Joshua Ng May 6, 2021

CS313 Professor Fried

Homework #2

Question 9:

For this question, I included queue and vector. I created a plane class so I could have plane objects that take in the time of departure and name of the plane. In the plane constructor, we set the name and time, and then randomly choose a direction. I did this by using a random number generator from 0-9. This is important for later. In the main method, I initialized 4 different queues for the 4 directions the planes could travel. I decided to create 10 plane objects and inserted their name and time. Then, I created a vector to store the plane objects in so we could easily iterate through it. I created multiple conditions to be able to add each plane to the correct queue. The idea was that 70% of planes can only go north, 20% can go to the north or the east, and 10% could go east, south, or west. How I did this was, if the plane direction generator outputted from the numbers 0-6, which is 70% chance out of 0-9, then the plane would be pushed onto the northRunway queue. If it generated a 7 or 8, which is 20% chance, then it would first compare the sizes of the north and east runways, and push onto whichever runway had less elements. If the direction generated a 9, a 10% chance of happening, then it could either go to the east, south, or west, depending on which queue was shorter. Next, I had to print out each runway, so I used a loop to continuously traverse through the queues, and print out the front, then popping the front in order for it to be removed. I also needed to print out the departure schedule, and since the vector already had the planes in timely order, I traversed the vector and printed out the name of each element in it, as well as the time they would depart.

The difficulties I had with this question was mostly my understanding. Since there were free liberties with this question, my idea may be different than what was originally meant to be for this question. I assumed that we could choose a direction for the 70% of planes to strictly go, and I chose north for no particular reason. The 20% of planes that could go to one of two directions, I assumed to use north and east, and the same logic for the last 10%.