Baptiste Saliba

CS 373 Writing Assignment

Project 1 was to create a program which could simulate a Turing machine given an input file, and then simulate the transitions given a command line argument.

Basically, what this required was a three-step approach. First you had to create the read in the input file and create the Turing machine given the format of the input file. This requires that you create a node for each new node and assign transitions for all appropriate nodes. Secondly, you have to read in the input string and make all appropriate transitions. This requires reading in the command line argument, which is the input string, and storing the input string on the tape. Finally, you have to transition until you reach an accept or reject state.

For the first step, I started off by creating a Node class to simulate the nodes of a Turing machine. Each of these nodes has several transitions, which I modeled using a map, as well as a state (accept, reject, neither). This map would map the input character to a Node pointer, a character to overwrite, and which direction to move the tape. Additionally, I created a Container class to hold all the Nodes. So, when taking in the input all I had to do was create a new node if it doesn't already exist, add a transition to the Node's map, and if it's a new node then add that node to the container.

For the second step, I created a vector to simulate the tape. For this vector I initialized it with a '_' at the beginning of the tape and then pushed the input string into the vector. Then I added an '_' at the end of the vector.

For the final step, I created a transition function within my container class which would go from the first node and read in the input character from the tape, find it in the map, move to the appropriate node and move the tape head either left or right. Then when running through the input string, all I had to do was continuously run transition until I either; reach the max number of transitions, reach an accept state, or reach a reject state.

This implementation worked very well for me seeing as it worked for all of the test strings that were provided.