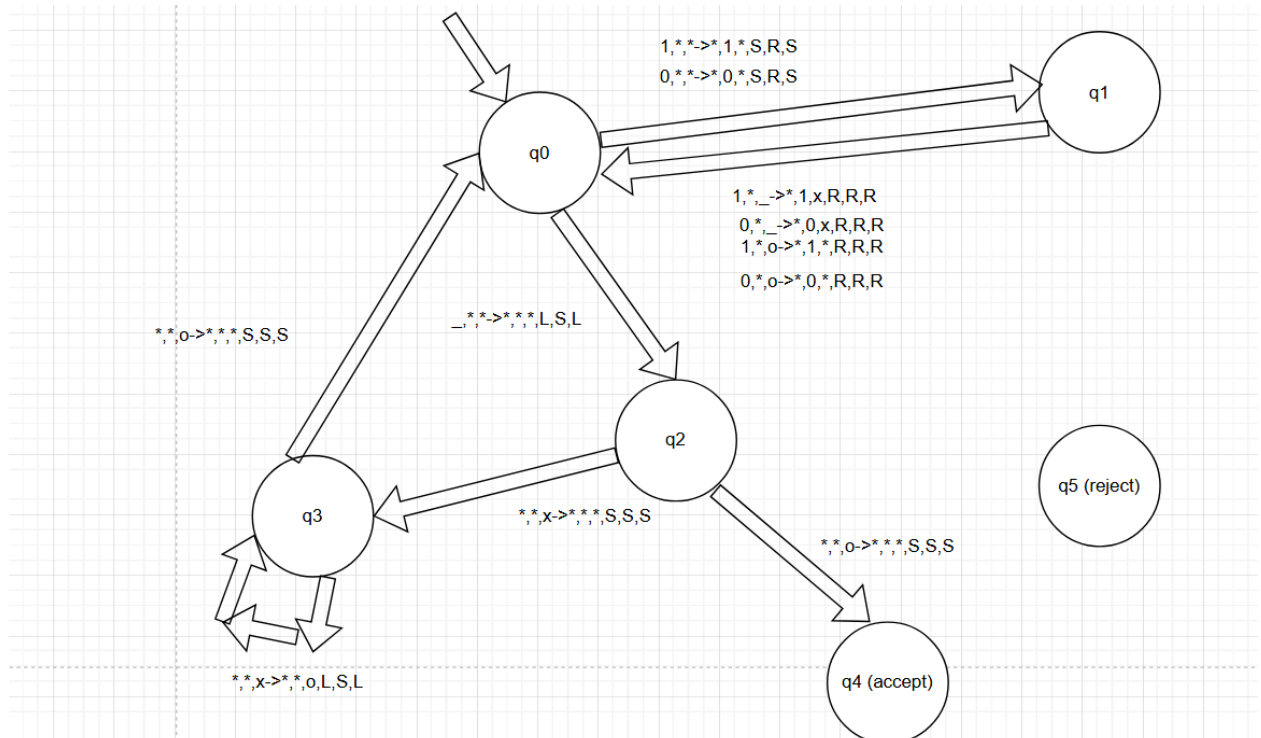Bryan Dong
TM-COPY-INPUT-TWICE-TWICE

1. This is a computation machine. It takes in an input string on its first tape, and 2 empty tapes. It copies and modifies that string on the 2nd tape, which is the important output of the problem. Tape 2 will hold a double double copy of the original string (the 2 doubles mean different things). What this means is each character of the string is repeated. This string is then repeated right next to it. This is honestly not a problem anyone would want solved but it felt justified to make the machine a little bit more interesting than a simple copy onto 2nd tape. The machine strings only has the language (0,1) because you need new rules each time to write the specific character.
2. I thought the problem up because the copying on another tape machine was too easy. But now I'm not really happy I have to draw the larger state diagram slower.
3. Starting at the start state, the first character is written on the 2nd tape twice. This is done by going through 2 states that loop until you reach a blank on the first tape. The 2nd tape is moved right twice for each time the 1st and 3rd tapes go right. The 3rd tape also writes an x over the blanks when it moves right for showing this is the first total copy to the 2nd tape. Once the first tape is at a blank, we go to another state that checks if the 3rd tape has x's or o's. If it's the first loop the 3rd tape has x's, so we go back to the left rewriting everything on the 3rd tape with o's. Now the first 2 states loop once more copying to the 2nd tape, but now using a new transition that doesn't overwrite the o's on the 3rd tape. That same state checks tape 3. It now has o's meaning it's the 2nd time so it goes to accept.

4.
5. I looked at the output of the problems. We can manually "make" the solution and compare it with the TM result to see if the TM was accurate.