

Justification:

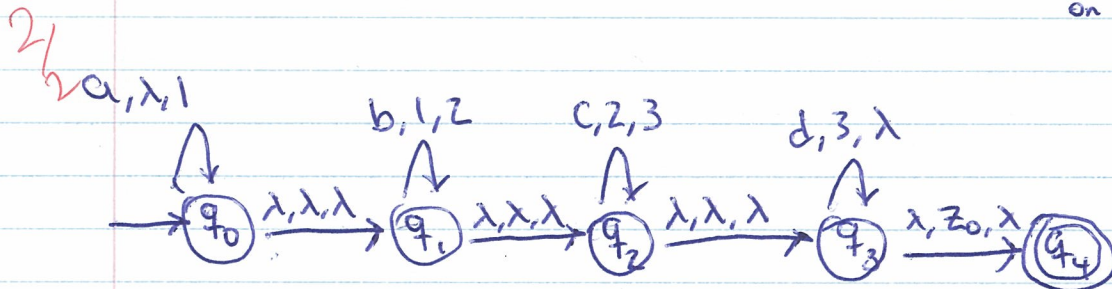
This FAB accepts $L = \{a^i b^j c^i d^j \mid i, j \geq 0\}$ because it keeps the number of a 's and b 's in check by adding and removing 1s respectively, and keeps the number of c 's and d 's in check by adding and removing 2s respectively. If both sets are in check then the bowl will be empty and the machine will go to the final state.

$$\delta(q_0, a, \lambda) = (q_0, 1)$$

$$\delta(q_0, \lambda, \lambda) = (q_1, 1, 2, 3, 4, \dots)$$

(Sorry, I was going to write the sequence) on next page.

2)



Justification:

This FAB accepts $L = \{a^i b^i c^i d^i \mid i \geq 0\}$ because it:

- adds i number of 1s for each a in the input
- exchanges all the 1s for 2s for each b in the input
- exchanges all the 2s for 3s for each c in the input
- Removes a 3 for each d in the input

If the Stack is empty there is an equal number of a, b, c, d and the final state is reached. If there are any symbols left over in the bowl then there is an unequal number of a, b, c, d .