Quiz 1

$a^2 b^{3(0)} c^0 = aa$ ✓

$a^0 b^{3(0)} c^0 = \lambda$ ✓

$a^0 b^{3(1)} c^1 = bbbc$ ✓

Question 1: **(2 points)**

1. Consider the Language $L = \{a^m b^{3n} c^n\}$, where $n, m \geq 0$. Which of the following strings are not in the language.
   a) λ b) $bbbc$ c) aa d) aac ✓

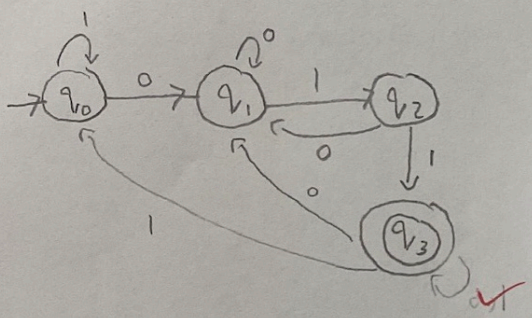
$L_2^2 = \{\lambda, aa, bb, abab\}$ $L_1 = \{\lambda, a, b, aa, ab, ba, bb\}$

2. Let $\Sigma = \{a, b\}$. Let $L_1 = \{x \in \Sigma^* : |x| \leq 2\}$. Let $L_2 = \{\lambda, a, b, ab\}$. List the elements of the following language $L = L_1 \cap (L_2)^2$.

$L = \{\lambda, aa, bb\}$ a b ✓ -0.5

Question 2:

1. Draw a DFA to accept string of 0's and 1's ending with the string 011. **(2 points)**

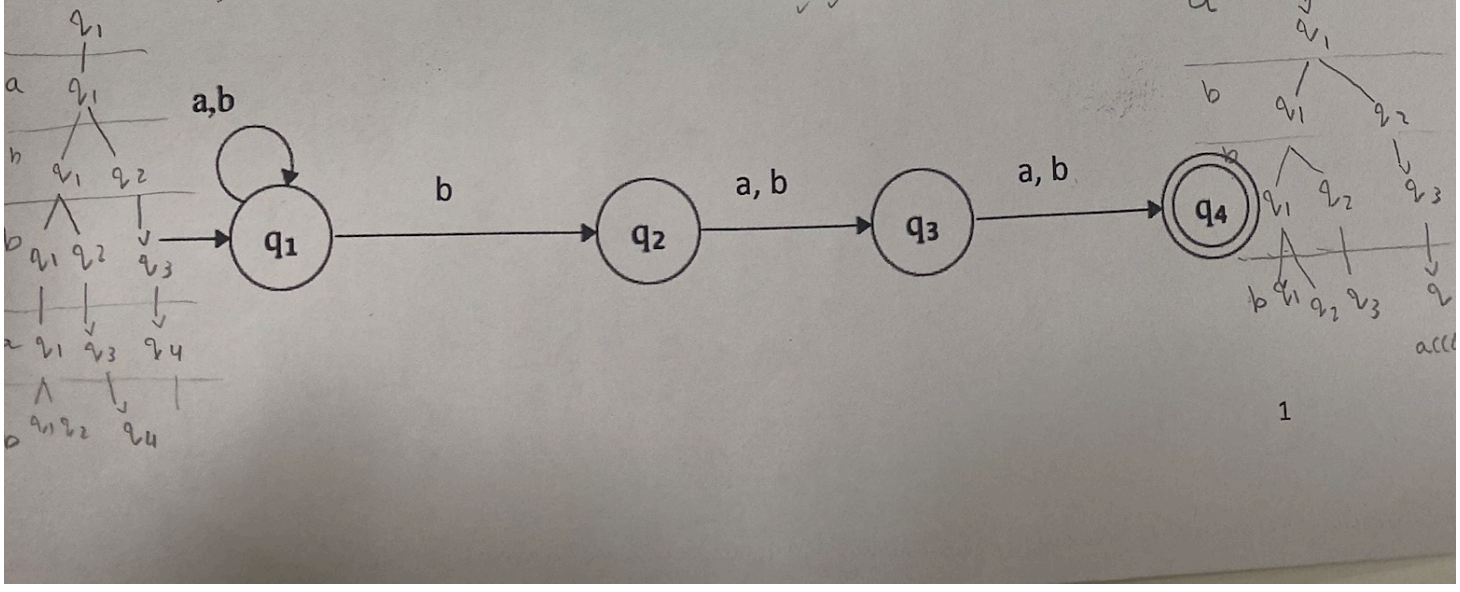


	0	1
q_0 λ	q_1	q_0
q_1 0	q_1	q_2
q_2 01	q_1	q_3
q_3 011	q_1	q_0

$\lambda.0 = 0$ $\lambda.1 = \lambda$ $0.0 = \phi 0$ $0.1 = 01$ $01.0 = \phi 0$ $01.1 = 011$ $011.0 = \phi 0$ $011.1 = \phi 1 = 1$

3. Given the following automata, answer the following questions. **(6 points)**

abbab



A. What is the alphabet? $\Sigma = \{a, b\}$

B. Is the automata a DFA or NFA? NFA

C. $\delta^*(q_1, abbb)$ is? $\{q_1, q_2, q_3, q_4\}$ accepting

D. Does the machine accept the string **abbab**? yes

E. The language recognized by the FA?

a) $L = \{w \mid w \in \Sigma^*\}$ $\{a, b\}$ no not accepting

b) $L = \{w \mid w \text{ contains } b\}$ yes accepting -1 a and b

c) $L = \{w \mid w \text{ contains } b \text{ as 3rd char from the end}\}$ yes accepting

d) $L = \{w \mid w \text{ contains } b\} \cup \lambda$ no not accepting

F. For the previous FA, to accept L={w| w starts with b} we need to change the following transitions:

a) Add $\delta(q_4, a) = \delta(q_4, b) = \{q_4\}$

b) Delete $\delta(q_1, a) = \delta(q_1, b) = \{q_1\}$

c) a and b

d) None