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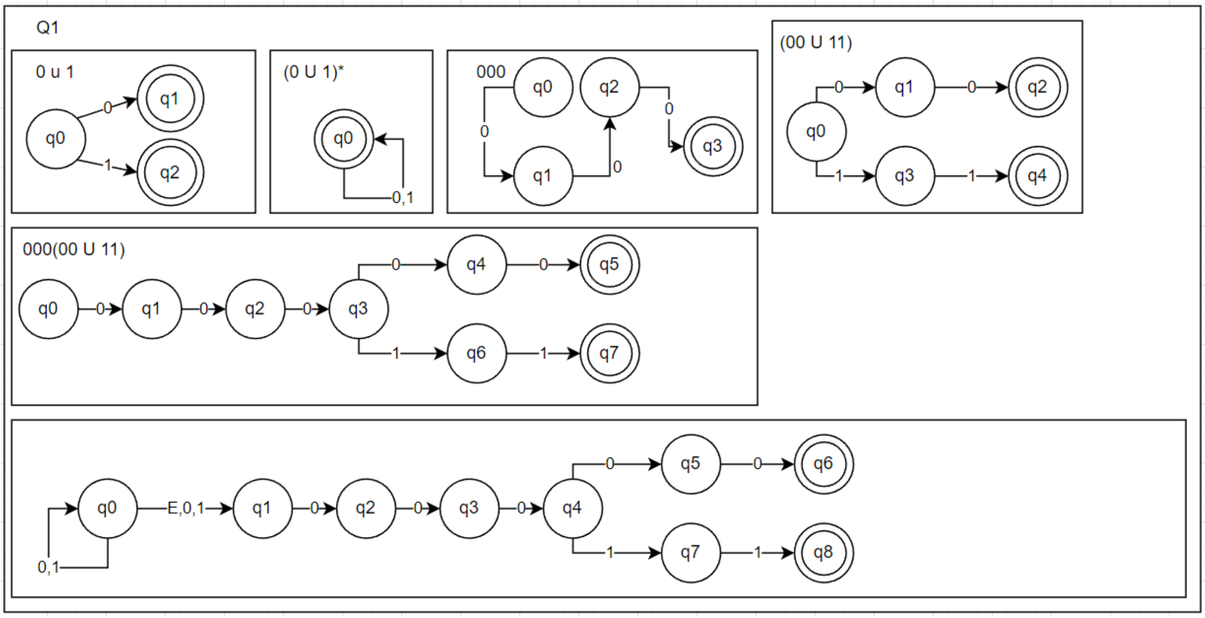
COS 210

Worksheet 5

Question 1



Question 2

$$L_r = \bigcup_{a \in \Sigma} a \cdot L_{\delta(r,a)} \text{ if } r \notin F$$

$$L_r = \epsilon \cup \left(\bigcup_{a \in \Sigma} a \cdot L_{\delta(r,a)} \right) \text{ if } r \in F$$

We have the following functions

	a	b
q0	q0	q0

And:

Lq0 = a.Lq0 U b.Lq0

This is equivalent to:

Lq0 = (a U b).Lq0

Using Lemma:

Lq0 = (a U b)*

Question 3

Since the DFA does not accept any strings using the language {a,b}, the regular expression for this is the empty set.

L(M) = Ø

Question 4

$$L_r = \bigcup_{a \in \Sigma} a \cdot L_{\delta(r,a)} \text{ if } r \notin F$$

$$L_r = \epsilon \cup \left(\bigcup_{a \in \Sigma} a \cdot L_{\delta(r,a)} \right) \text{ if } r \in F$$

	a	b
q	q	r
r	r	r

And:

Lq = a.Lq U b.Lr

Lr = a.Lr U b.Lr

This is equivalent to:

Lr = (a U b).Lr

Using Lemma:

Lr = (a U b)*

Substituting into Lq:

Lq = a.Lq U b(a U b)*

Using Lemma:

L(M) = a* b (a U b)*