Introduction to the Theory of Computation
Homework #3
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$\boxed{1}$

(a) 0^*1^*

(d) $(0 \cup 1) \cup (0 \cup 1) \cup (0 \cup 1)0$

(i) $(10)^* \cup (11)^*$

(l) $(0^2)^* \cup 0^*(11)0^*$

(m) $\emptyset$

(n) $((0^*1^*)^*(1^*0^*)^*)^+$

$\boxed{2}$

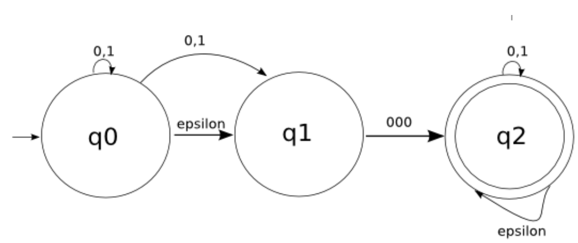
$\epsilon \cup 001(0-1)^* \cup (0-1)^*11$

$\boxed{3}$

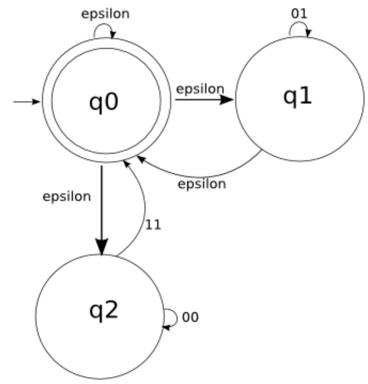
$(b^* \cup aaa \cup aa \cup a)b^*aaaab^*(b^* \cup aaa \cup aa \cup a)$

$\boxed{4}$

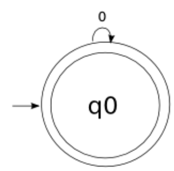
(a)



(b)



(c)



$\boxed{5}$ `Proof: By Structural Induction`

- Observe $x\epsilon\Sigma^*, L = L(R)$
- Assume R is over Σ

  $x\epsilon\Sigma^*$

  $L(R) = x$

□

$\boxed{6}$ `Proof: By Mathematical Induction`

- Observe $n\epsilon\mathcal{N}, L \subset \Sigma^*$
- Suppose $|L| = n$

  $L(R) = x$

  $|L(R)| = 1$

  $|L(R)| = |L|$

  There fore R exists such that L(R) = L

□