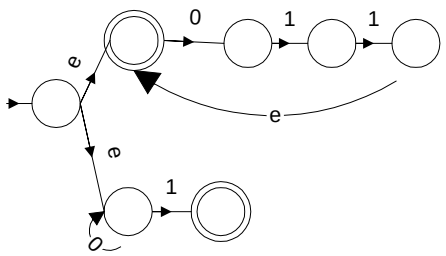
Section B, quiz 1 solutions

1.Write a regular expression over Σ={a,b} that generates the following language

L={w|w has exactly 2 occurrences of a}

b*ab*ab*

2.Give the state diagram of an NFA that recognizes language M described by regular expression $(0\cdot1\cdot1)^* \cup ((0)^* \cdot 1)$



3. Show that L is not regular.

$L=\{a^n b a^{2n} | n\geq 0\}$

If L is regular, the pumping lemma holds.

Let p be the pumping length.

Let $s=a^p b a^{2p}$

$s=xyz$, $|xy|\leq p$, $|y|>0$

So $y=a^k$, $k\leq p$

For i=0, $xy^iz=xz=a^{p-k}ba^{2p}$ not in L, since $2(p-k)\neq 2p$

So L is not regular

4.L is the language of question 1. Is the following statement true?

L* is a regular language: TRUE

5.Give the state diagram of a DFA recognizing the following language over alphabet {0,1}: {w|w starts with 0 or has odd length}

0
1
0
1
0,1
0,1