Automata, Computability, and Complexity

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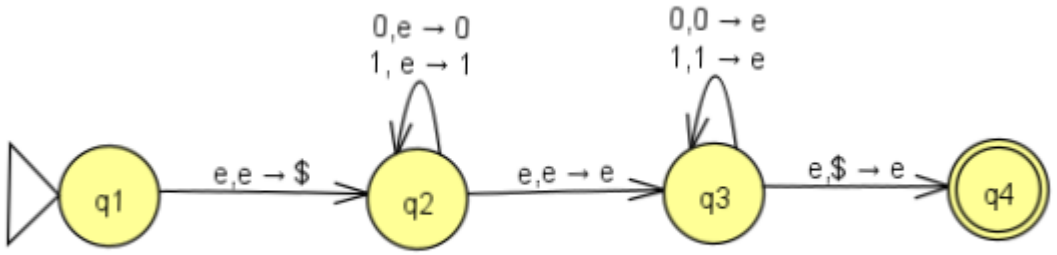
SHEET #5:

Exercise 1 :

a)

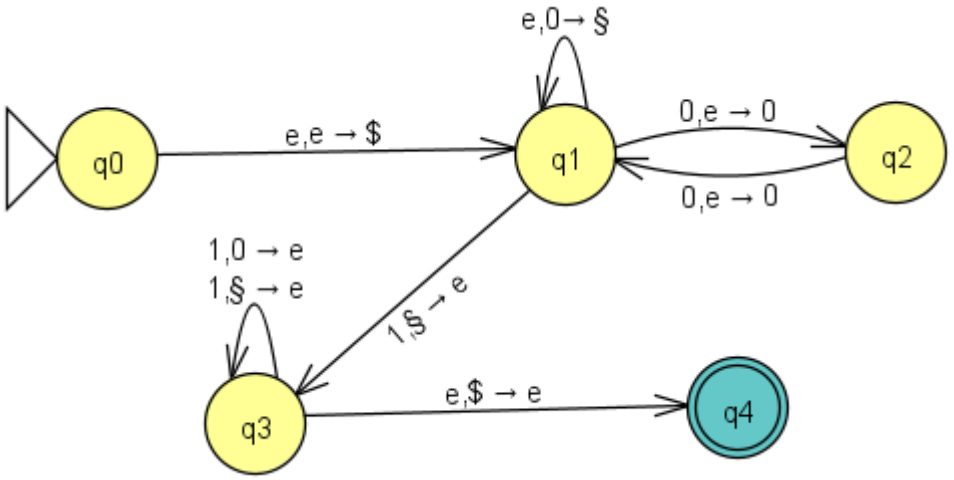
M = ({q1, q2, q3, q4}, {0, 1}, {0, 1, $}, δ, q1, {q1, q4})

The STD:



b)

M = ({q0, q1, q2, q3}, {0, 1}, {0, 1, $, §}, δ, q0, {q4})



Exercise 2:

a)The language described by M1 is:

with $\Sigma = \{a, b, c\}$ $L1 = \{a^x b^y c^z$ with $x+y=z$ and $x, y, z \in N\}$

b)The language described by M2 is:

with $\Sigma = \{0, 1\}$ L1 = {w | w is either the empty string or a string that start with 0 and has as many 0 as 1 with at no time more 1s than 0s}

Exercise 3:

a)We find from the mPDA M that:

$S \rightarrow TT \mid e$

$T \rightarrow 1T0 \mid e$

b)

$S \Rightarrow TT$

$S \Rightarrow (1T0)(1T0)$

$S \Rightarrow (1(1T0)0)(1(1T0)0)$

$S \Rightarrow (11(e)00)(11(1T0)00)$

$S \Rightarrow (1100)(11(1(e)0)00)$

$S \Rightarrow 1100111000$

Exercise 4:

a)Mahdi Ouchrahou