

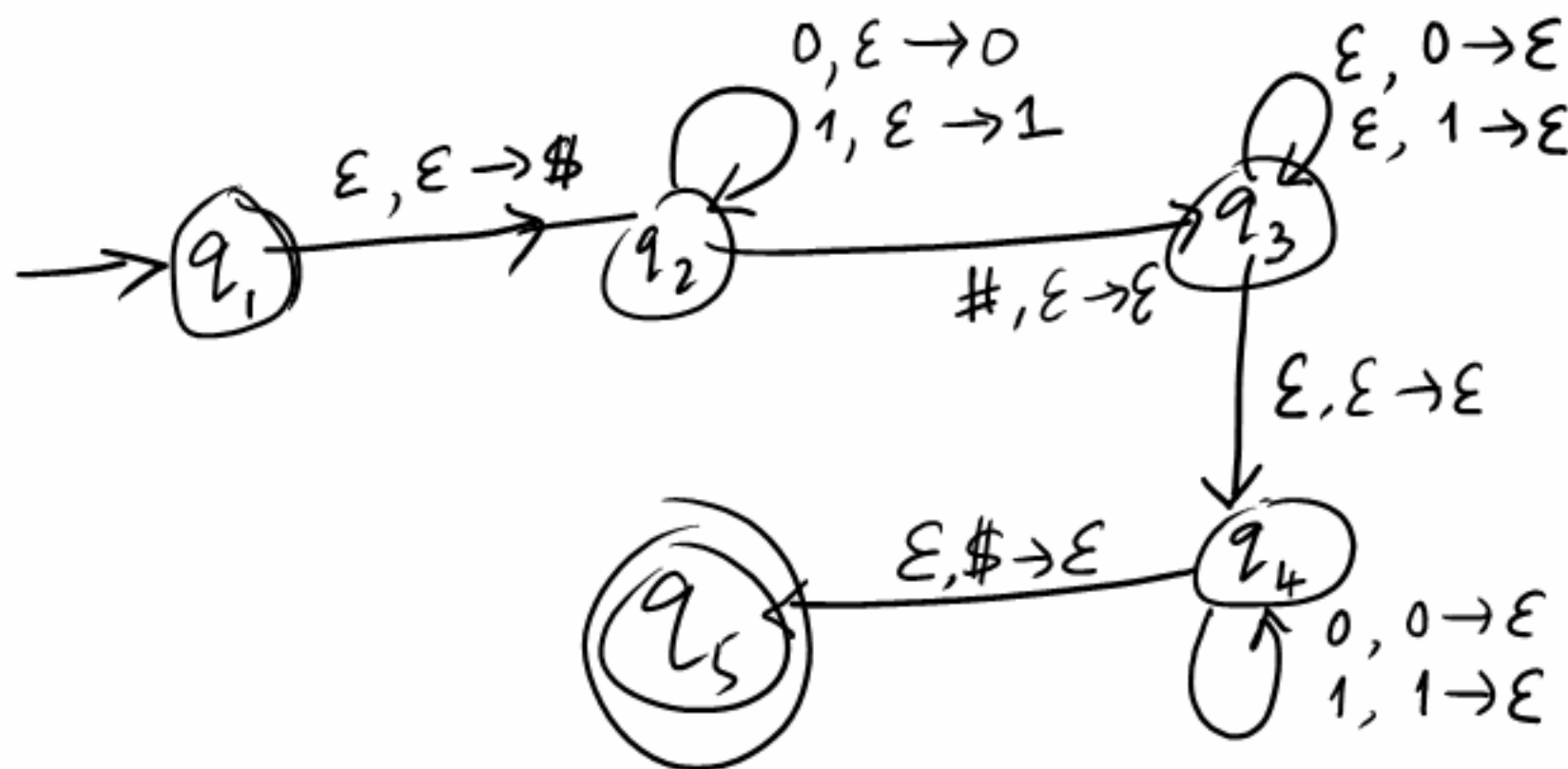
Midterm II : Problem 4.

Note Title

11/13/2006

$$\Sigma = \{0, 1\}$$

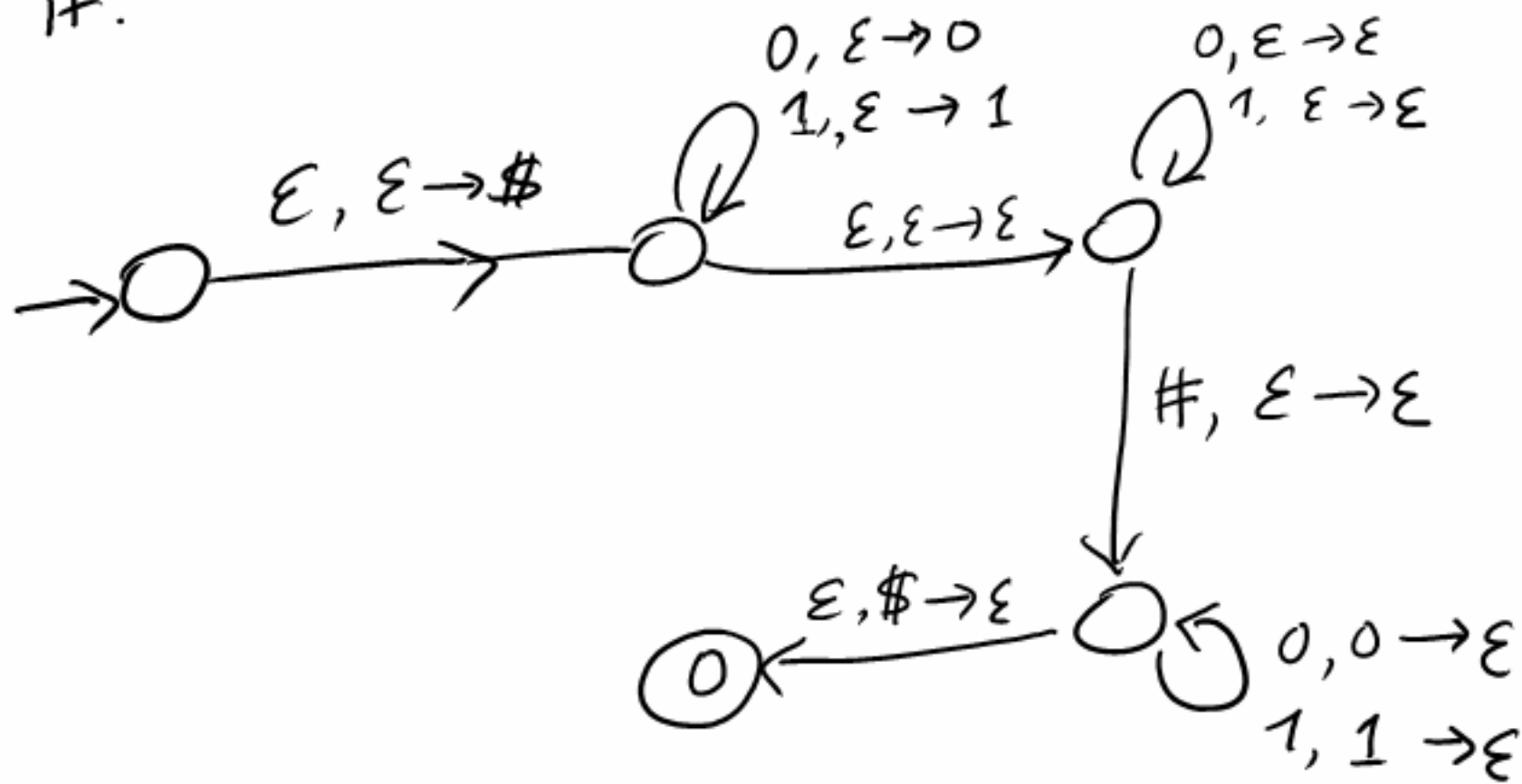
To design PDA for $L = \{x \# y^R \mid x, y \in \Sigma^*, y \text{ prefix of } x\}$



Intuitively:

- Move from q_1 to q_2 and push in $\$$ initially.
- In q_2 , read x and push it onto stack.
- Go to q_3 on reading separator $\#$
- In q_3 , pop arbitrary number of elements $0, 1$ from stack, and move to state q_4
- In q_4 , match elements of y^R with the elements of x remaining on stack
- If input is fully read and stack is empty (i.e. we can pop $\$$), then accept.

An alternative scheme will be to only push a prefix of x and check y against it:



Also, it is important to check the PDA on examples.

1) $0100\#10 \in L$

$$q_1, \epsilon \xrightarrow{\epsilon} q_2, \$ \xrightarrow{0} q_2, 0\$ \xrightarrow{1} q_2, 01\$$$

$$q_2, 010\$ \xrightarrow{0} q_2, 0010\$ \xrightarrow{\#} q_3, 0010\# \xrightarrow{\epsilon} q_3, 010\#$$

$$q_3, 10\# \xrightarrow{\epsilon} q_4, 10\# \xrightarrow{1} q_4, 0\# \xrightarrow{0} q_4, \$$$

$$\downarrow \epsilon$$

$$q_5, \epsilon$$

Try on similar examples & examples not in L to make sure your automaton works correctly.