INT201 Decision, Computation and Language

Tutorial 4

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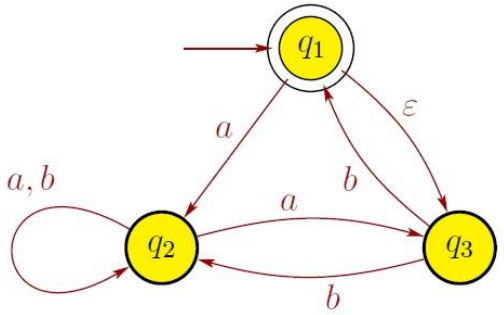
1. Let $\Sigma = \{a, b\}$, and define $L = \{w \in \Sigma^* \mid w \text{ ends in bba}\}$. Design a DFA for L.

2. Let N be the following NFA with $\Sigma = \{a, b\}$



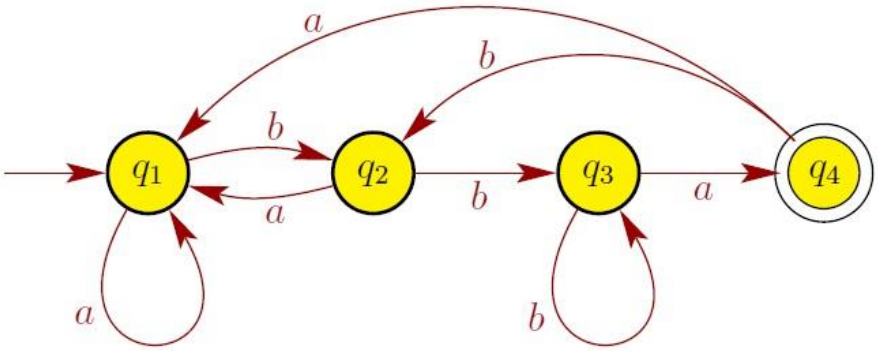
Convert this NFA to DFA.

3. PDA for language $\{ww^R \mid w \in \{0, 1\}^*\}$

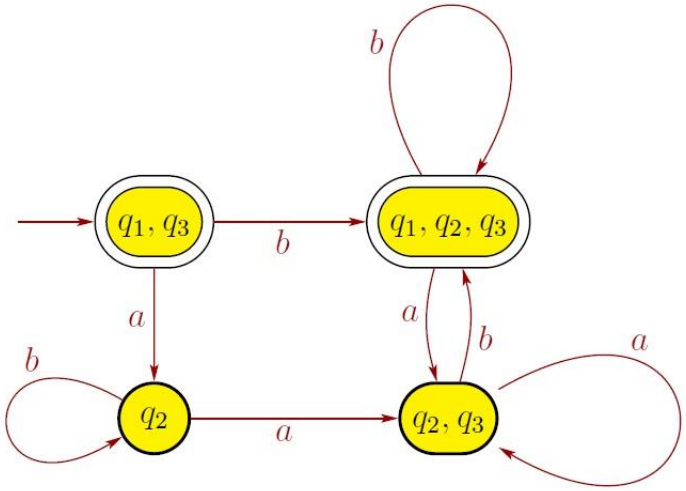
4. PDA for language $\{ a^i b^j c^k \mid i, j, k \geq 0 \text{ and } i = j \text{ or } i = k \}$

Solution

1.

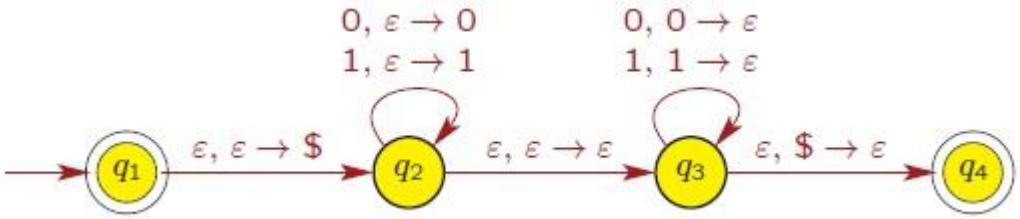


2.



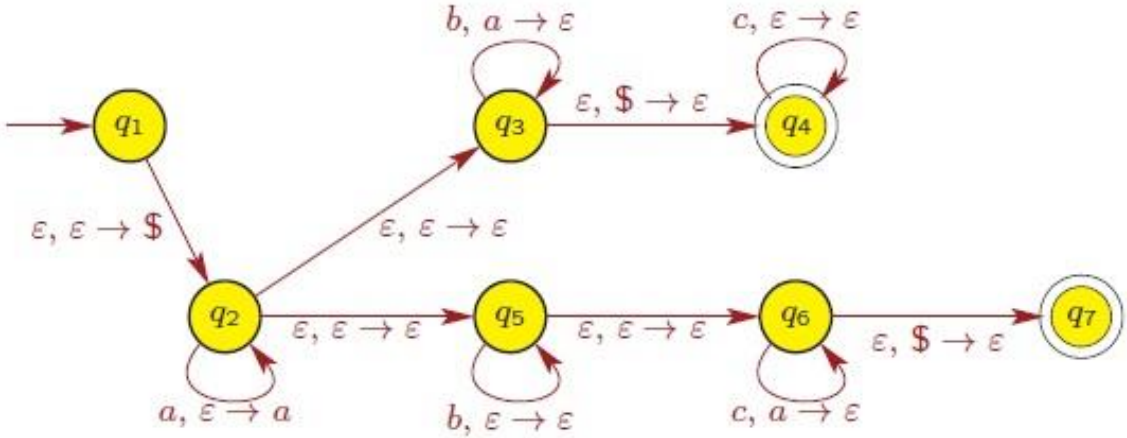
Solution

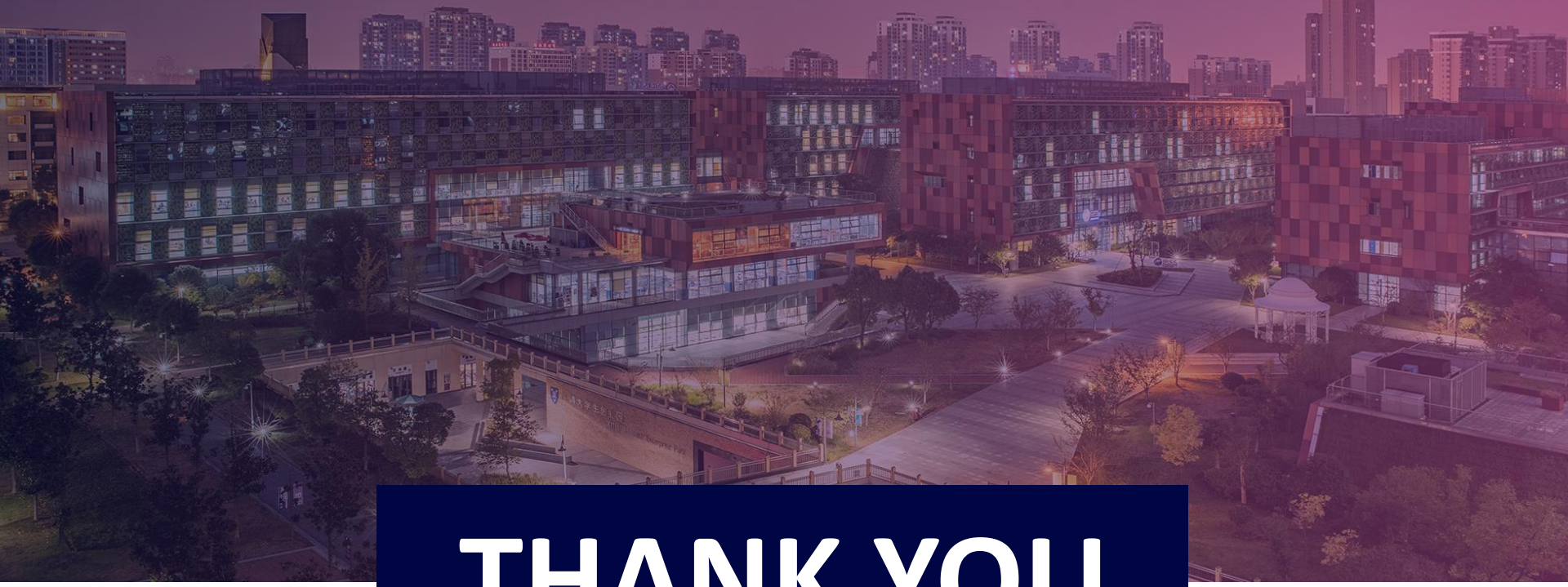
3.



- $q_1 \to q_2$: First pushes \$ on stack to mark bottom
- $q_2 \to q_2$: Reads in first half w of string, pushing it onto stack
- $q_2 \to q_3$: Guesses that it has reached middle of string
- $q_3 \to q_3$: Reads second half $w^{\mathcal{R}}$ of string, matching symbols from first half in reverse order (recall: stack LIFO)
- $q_3 \to q_4$: Makes sure that no more input symbols on stack

4.





THANK YOU

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