INT201 Decision, Computation and Language

Tutorial 3
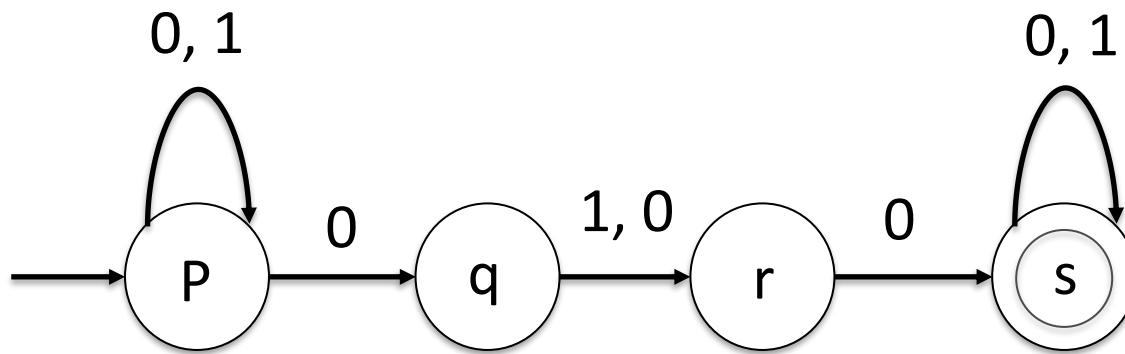
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1. An NFA over alphabet $A = \{0, 1\}$ is given by the diagram below. Convert it to the equivalent DFA by filling the entries of the table and pointing out the accepting states.

	0	1
{p}		
{p, q}		
{p, r}		
{p, q, r}		
{p, q, s}		
{p, q, r, s}		
{p, r, s}		
{p, s}		

2. Give NFAs with the specified number of states recognizing each of the following languages. In all cases, the alphabet is $\Sigma = \{0, 1\}$.

(a) The language $\{ w \in \Sigma^* \mid w$ ends with $00 \}$ with three states.

(b) The language $\{ w \in \Sigma^* \mid w$ contains the substring 0101, i.e., $w = x0101y$ for some $x, y \in \Sigma^* \}$ with five states.

(c) The language $0^*1^*0^*0$ with three states.

Solutions

1.

|	0	1
{p}	{p, q}	{p}
{p, q}	{p, q, r}	{p, r}
{p, r}	{p, q, s}	{p}
{p, q, r}	{p, q, r, s}	{p, r}
{p, q, s}	{p, q, r, s}	{p, r, s}
{p, q, r, s}	{p, q, r, s}	{p, r, s}
{p, r, s}	{p, q, s}	{p, s}
{p, s}	{p, q, s}	{p, s}
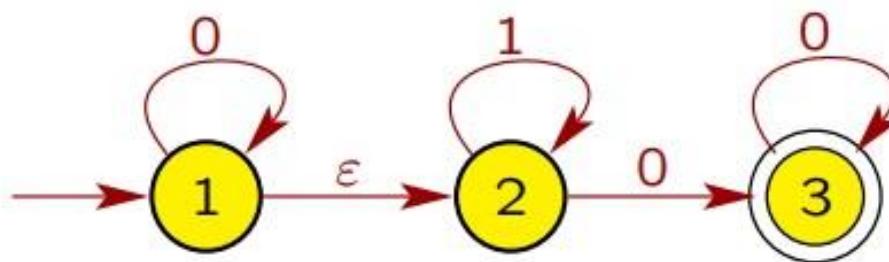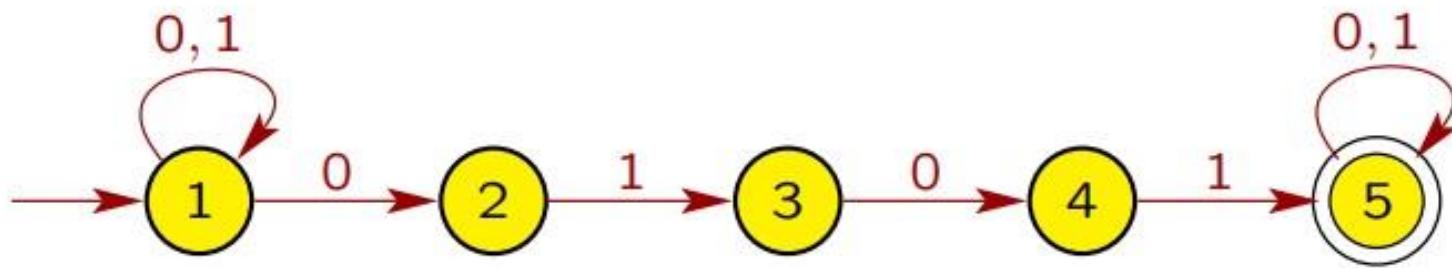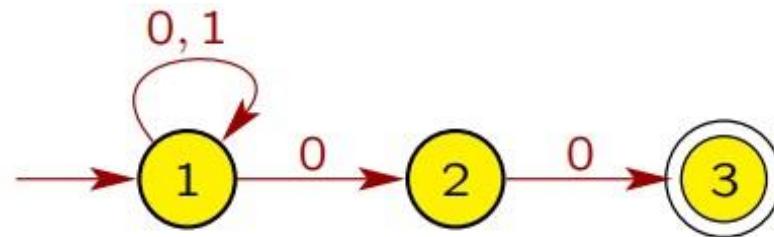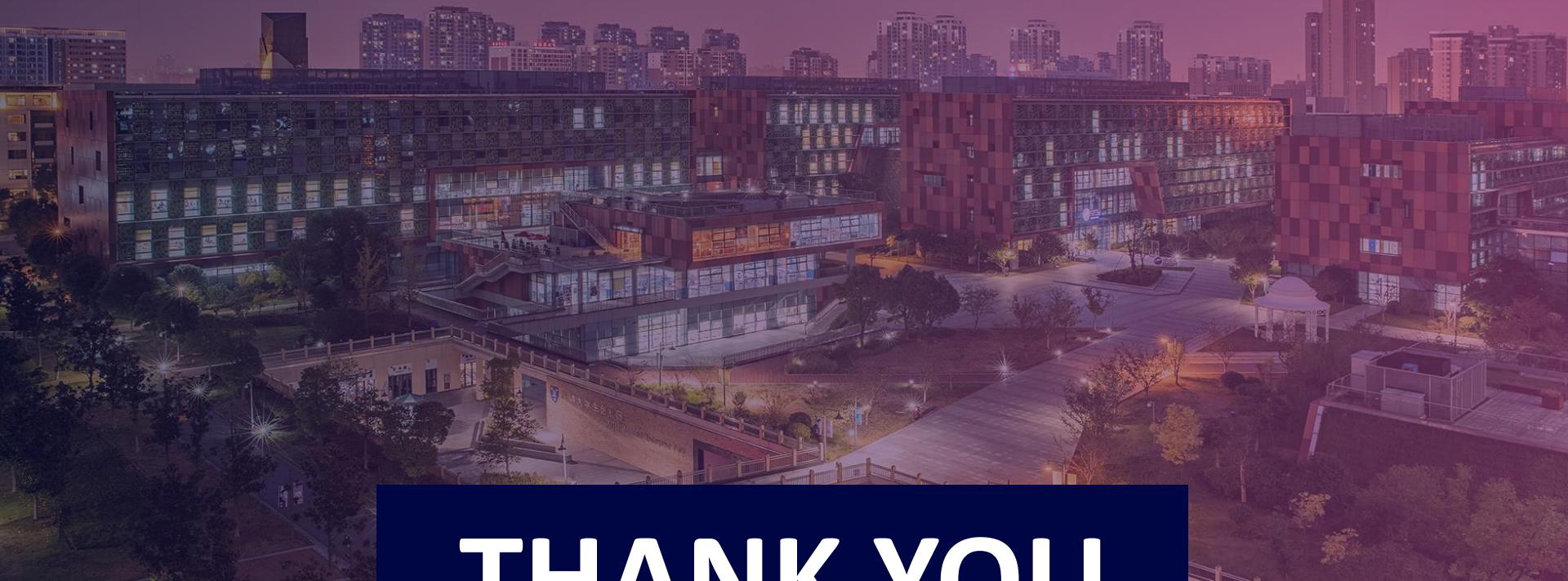
initial state: {p}
accepting states: {p, q, s}, {p, s}, {p, q, r, s}, {p, r, s}
The language accepted by the NFA consists of strings containing 010 or 000.

2.

THANK YOU

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