Tutorial 5

COMP 355: Introduction to Theoretical Computer Science

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Outline

1. RegEx to CFG
2. NFA to CFG
3. Regular Grammar to NFA

Contents of the section

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RegEx to CFG

Example 1

Build a CFG G for the RegEx $(0+1)^*111$

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Example 2

Convert the following NFA to a CFG.

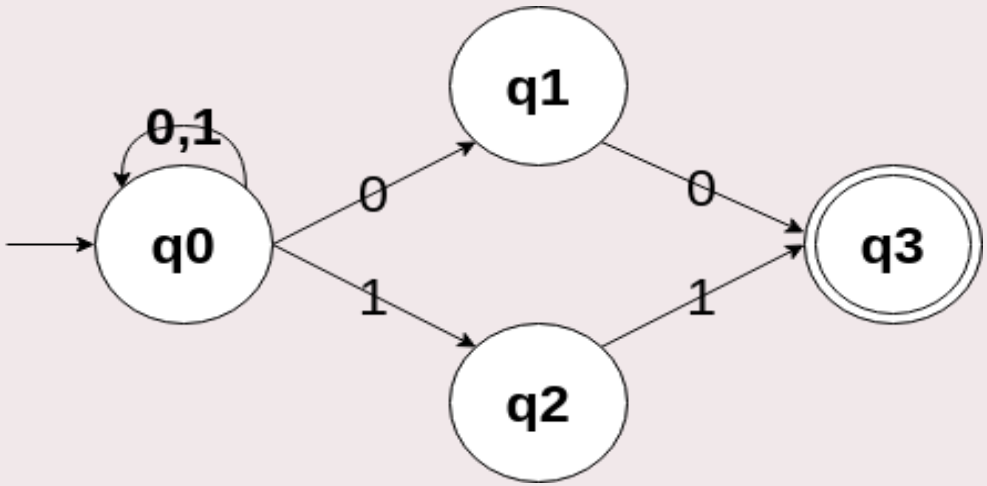

Figure: NFA to a CFG

NFA to CFG

Example 3

Convert the following NFA to a CFG.

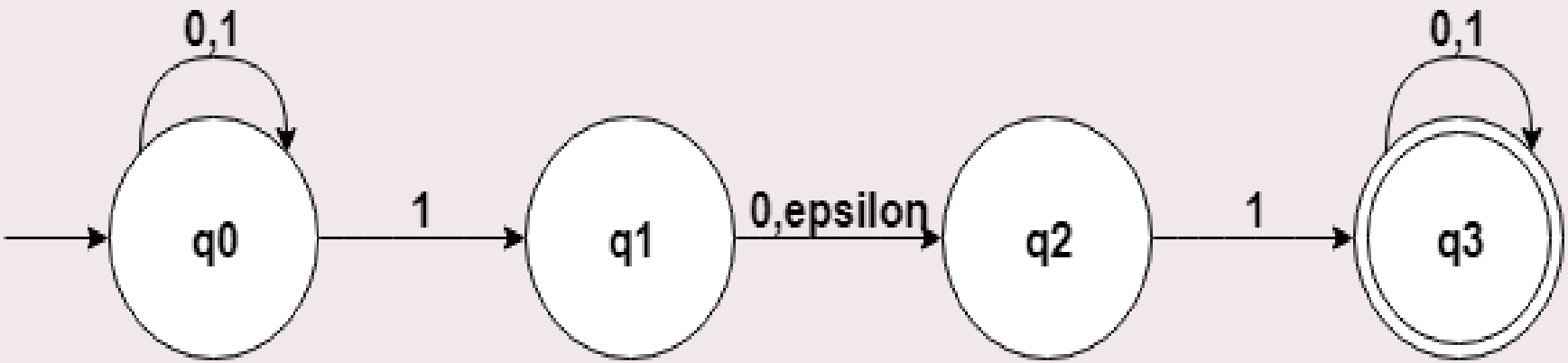

Figure: NFA to a CFG

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RG to NFA

Example 4

Convert the following RG to NFA:

$$S \rightarrow aS \quad (1)$$
$$S \rightarrow aA \quad (2)$$
$$A \rightarrow cB \quad (3)$$
$$B \rightarrow aB \quad (4)$$
$$B \rightarrow bB \quad (5)$$
$$B \rightarrow \lambda \quad (6)$$

RG to NFA

Example 5

Convert the following RG to NFA:

$$S \rightarrow abS|bX|\lambda \quad (1)$$

$$X \rightarrow aS|bX|b \quad (2)$$