

# Computer Mathematics

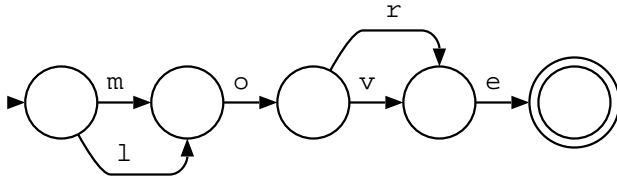
## Week 14 Examples

1. Write the grammars corresponding to the following FSMs. In each case, try to use only rules of the form

$non-term \rightarrow term\ non-term,$  or

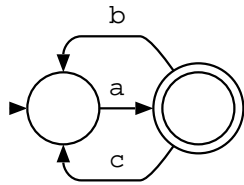
$non-term \rightarrow term$

a)



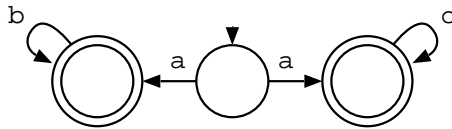
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b)



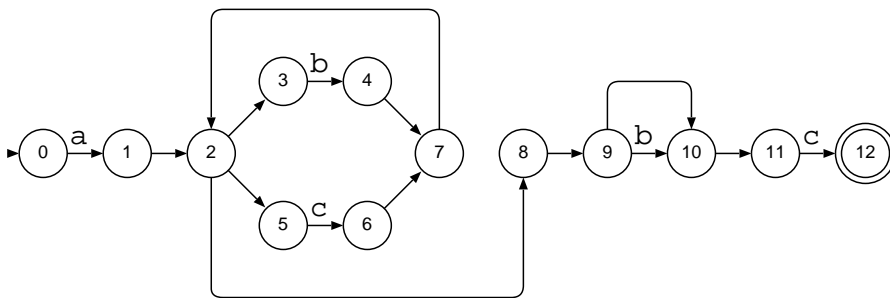
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c)



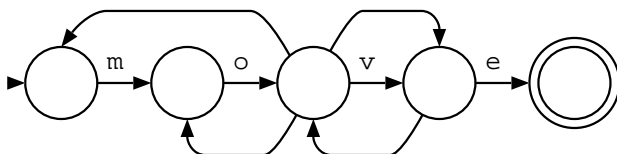
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d)



\_\_\_\_\_

e)



\_\_\_\_\_

2. Convert the following grammars into equivalent FSMs and regular expressions.

$$\begin{aligned} \mathbf{A} &\rightarrow a \mathbf{A} \mid b \mathbf{A} \mid c \mathbf{B} \\ \mathbf{B} &\rightarrow a \mathbf{B} \mid b \mathbf{B} \mid c \end{aligned}$$

FSM: \_\_\_\_\_ RE: \_\_\_\_\_

$$\begin{aligned} \mathbf{A} &\rightarrow a \mathbf{B} \\ \mathbf{B} &\rightarrow b \mathbf{C} \\ \mathbf{C} &\rightarrow a \mathbf{B} \mid c \mathbf{D} \\ \mathbf{D} &\rightarrow c \mathbf{C} \mid c \end{aligned}$$

FSM: \_\_\_\_\_ RE: \_\_\_\_\_

3. Convert the following regular expressions into equivalent regular grammars (RG). For any that are not obvious, convert them first into a FSM (check your examples from Week 12).

a)  $abc$                       RG:

b)  $a^*b^*c$                       RG:

c)  $a|b|c$                       RG:

d)  $((a|bc)^*cd?) + e|f$                       RG: