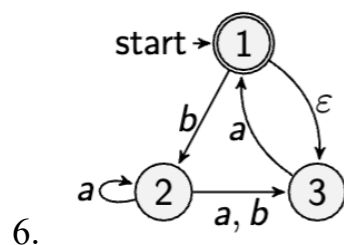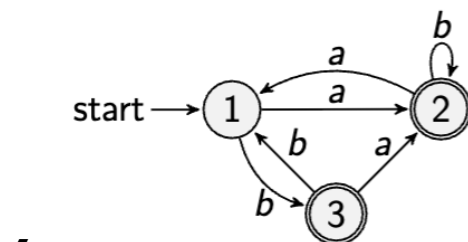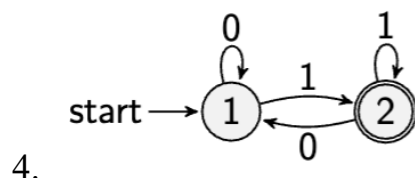# Chapter 2.2 Practice

For each language below, construct a CFG generating it.

1. The strings with either all 1s or all 0s.
2. The strings with a substring of 0s followed by a substring of 1s.
3. The strings with 0 or more 1's and 0's.

Convert the following NFAs to CFGs.

4.

5.

6.

Convert the following CFGs to Chomsky Normal Form.

7. $S \rightarrow aSa \mid bY \mid Ya$
   $Y \rightarrow bY \mid aY \mid \varepsilon$

8. $R \rightarrow S \mid T$
   $S \rightarrow aSb \mid ab$

$T \rightarrow aTbb \mid abb$

9. $P \rightarrow 0P \mid 1Q \mid \varepsilon$
    $Q \rightarrow 0Q \mid 1P$

10. $A \rightarrow BAB \mid B \mid \varepsilon$
    $B \rightarrow 00 \mid \varepsilon$