

CS 331 Programming Languages, Spring 2026  
**In-Class Worksheet 1: Grammars, DFAs**

*For this page's solutions, see the January 14 lecture slides, slides 11–14.*

6. Based on Grammar D, write a derivation for  $xy$ .

7. Write a grammar that generates the following language:

$\{ ab, abb, abbb, abbbb, abbbbbb, abbbbbbb, \dots \}$

8. How could we change the grammar from Exercise 7 so that the language it generates also contains the string "a"?

*For this page's solutions, see the January 14 lecture slides, slides 35–36.*

1. What language is recognized by the DFA whose diagram is shown?

2. Draw the diagram of a DFA that recognizes the language consisting of all strings of 0s and 1s that contain at least one character.