University of California, Santa Barbara

CMPSC 138 SUMMER 2018

Homework I: Due Wednesday, August 8, during the discussion session.

1. Do Problem 2, Section 1.1 of the text.
2. Do Problem 3, Section 1.1 of the text.
3. Do Problem 7, Section 1.1 of the text.
4. Do Problem 15, Section 1.1 of the text.
5. Do Problem 3, Section 1.2 of the text.
6. Do Problem 5, Section 1.2 of the text.
7. Do Problem 12, Section 1.2 of the text.
8. Suppose the alphabet is $\Sigma = \{a, b\}$. Taking λ as the first word, construct the 129-th word in
   (a) lexicographic (dictionary) order,
   (b) canonical order (also called *proper order*, see p. 279).
9. Show that $|u^2| = 2|u|$ for any string u by using induction on the length of u (see Example 1.8).
10. Using Definitions 1.1, 1.2 and Example 1.11, prove by induction that the grammar $G = (\{S\}, \{a, b\}, S, P)$ with P given by

$$S \to aaSb$$
$$S \to \lambda$$

generates the language $\mathcal{L}(G) = \{a^{2n}b^n \mid n \geq 0\}$.