ICS 6D—Winter 2024 (Dillencourt)
Homework 1

1. Let $S = \{a, b, c\}$. Mark each of the following statements as true or false.

    (a) $\emptyset \in P(S)$

    (b) $\emptyset \subseteq P(S)$

    (c) $\{a\} \in S$

    (d) $\{a\} \in P(S)$

    (e) $a \in S$

    (f) $a \in P(S)$

    (g) $\{a\} \subseteq S$

    (h) $\{a\} \subseteq P(S)$

    (i) $a \subseteq S$

    (j) $a \subseteq P(S)$

2. Let $X = \{1, 2, 3, 4, 5\}$. Write out the following set in roster notation:

$$\{A : A \in P(X) \text{ and } |A| = 3\}.$$

3. zyBook Exercise 3.6.1

4. zyBook Exercise 3.6.5

5. zyBook Exercise 3.6.7 parts (a), (c), (e), (g)

6. Express the following sets using the roster method. (Express the elements as strings, not as n-tuples.)

    (a) $\{1x1 : x \in \{0, 1\}^2\}$

    (b) $\{0, 1\}^2 \cup \{0, 1\}$

    (c) $\{xy : x \in \{1\} \cup \{1\}^2 \text{ and } y \in \{a, b\}^2\}$

7. zyBook Exercise 4.1.1

8. zyBook Exercise 4.1.3

9. zyBook Exercise 4.2.2

10. zyBook Exercise 4.2.3

11. zyBook Exercise 4.3.1 parts (a), (c), (e)