1 Exercises

Exercise 1. Consider inserting the following key-value pairs into a sequential search symbol table \( st \), an object of type \( \text{LinearSearchST} \).

| key: SYMBOL TABLE EXAMPLE | value: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 |

a. What is the state of the linked list \( \text{first} \)?
b. What is the value returned by \( st.size() \)?
c. What is the value returned by \( st.get("B") \)?
d. What is the state of the linked list \( \text{first} \) after the call \( st.delete("E") \)?

Exercise 2. Consider inserting the following key-value pairs into a binary search (ordered) symbol table \( st \), an object of type \( \text{BinarySearchST} \).

| key: SYMBOL TABLE EXAMPLE | value: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 |

a. What is the state of the keys and values arrays?
b. What is the value returned by \( st.floor("G") \)?
c. What is the value returned by \( st.ceiling("G") \)?
d. What is the value returned by \( st.rank("G") \)?
e. What is the value returned by \( st.select(5) \)?
f. What is the state of the keys and values arrays after the call \( st.delete("E") \)?

2 Solutions to Exercises

Solution 1.

a. \( (P, 16) \) -> \( (X, 13) \) -> \( (E, 18) \) -> \( (A, 14) \) -> \( (T, 7) \) -> \( (O, 5) \) -> \( (B, 9) \) -> \( (M, 15) \) -> \( (Y, 2) \) -> \( (S, 1) \) -> null

b. 11

c. 9

d. \( (P, 16) \) -> \( (X, 13) \) -> \( (A, 14) \) -> \( (T, 7) \) -> \( (O, 5) \) -> \( (B, 9) \) -> \( (M, 15) \) -> \( (Y, 2) \) -> \( (S, 1) \) -> null

Solution 2.

a.

| keys: A B E L M O P S T X Y |
| values: 14 9 18 17 15 5 16 1 7 13 2 |

b. E

c. L

d. 3

e. 0

f.

| keys: A B L M O P S T X Y |
| values: 14 9 17 15 5 16 1 7 13 2 |