

Critical Thinking Question

1. Explain the similarities between an array and a stack.

The similarities between an array and a stack is that they both are:

- Linear data structures
- Store elements in adjacent memory locations

3. What output is generated by the following statements if s is a Stack object?

Output = 8,13,8,12

First line prints- x=8(earlier pop), y=13(last pop before print)

Second line print - x=8(top after popping 12), y=12(pop before second print)

4. Consider the “hot plate” problem: In a busy restaurant, fresh salad plates are brought out and added to the existing pile of plates. This means that, even though there may be plates that were washed long ago, the customer is frequently stuck with a warm plate for salad. Explain how this is analogous to a stack.

- New hot plates are placed on the top(using PUSH operation)
- Servers will take the plates from the top(using POP operation)
- The oldest plates will remain at the bottom
- Top plates are the only ones accessible

5. What output is generated by the following statements if q is a Queue object?

Output = 5855

6. Explain the difference between a FIFO and a LIFO data structure.

FIFO: First in, First Out-first elements are added first then to be removed.

LIFO: Last in, First out-Last elements are added first then first is to be removed.

7. List two real-world situations that could be represented as a queue structure other than those listed in the chapter.

- Patients waiting in emergency rooms
- People waiting for the roller coaster ride