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Exercises: Stacks and Queues

To specify an array or sequence of values in an answer, you must separate the values by a single space character (with no punctuation and with no leading or trailing whitespace). For example, if the question asks for the first ten powers of two (starting at 1), the only accepted answer is:

```
1 2 4 8 16 32 64 128 256 512
```

If you wish to discuss a particular question and answer in the forums, please post the entire question and answer, including the seed (which is used by the course staff to uniquely identify the question) and the explanation (which contains the correct answer).

Question 1

```
(seed = 558400)
```

Suppose that an intermixed sequence of push and pop operations are performed on a LIFO stack. The pushes push the letters A through J in order; the pops print out the return value. Which of the following output sequence(s) could occur?



```
C B A D E F G H I J
```



```
A E G H F D J C I B
```



```
A B C D J I H G F E
```



```
B E D F H C J I G A
```



```
C D E F J I H G B A
```

Question 2

```
(seed = 640064)
```

Suppose that an intermixed sequence of enqueue and dequeue operations are performed on a FIFO queue. The enqueues add the letters A through J in order; the dequeues print out the return value. Which of the following output sequence(s) could occur?



```
B G F C E H A I J D
```



```
F B E I A H G C D J
```

Quiz



A E D H I C B G J F



A B C D E F G H I J



J B A C G I D E H F

Question 3

`(seed = 492032)`

Consider an object of type `GenericMysteryBox<Boolean>` that stores N items of type `Boolean`.

```
public class GenericMysteryBox<Item> {
    private Node first;

    private class Node {
        private Item item;
        private Node next;
    }

    ...
}
```

Using the 64-bit memory cost model from lecture, how many bytes does it use as a function of N ?

Include all memory referenced by the object and use tilde notation to simplify your answer.

For example, enter $\sim 1N$ if the number of bytes is $1N + 32$.

Hint: An object of type `Boolean` uses 24 bytes.

☐ In accordance with the Honor Code, I certify that my answers here are my own work.