A **stack** has two operations, **push** and **pop**. Pushing adds an element to the **top** of the stack, and **pop** removes the **top** element and returns it.

```
Stack<Integer> s = new ALStack<>();
s.push(4);
s.push(10);
s.push(13);
Integer i1 = s.pop()
s.push(5);
Integer i2 = s.pop();
```

What number is stored in i?

A: 4 B: 10 C: 13 D: 5 E: Something else

What number is stored in i2?

A: 4 B: 10 C: 13 D: 5 E: Something else

What is the contents of the stack? (starting at the **top**)

A. 5, 13, 10, 4
B. 10, 4
C. 5, 13
D. 13, 10, 4
E. other

A **queue** has two operations, **enqueue** and **dequeue**. Pushing adds an element to the **back** of the queue, and **dequeue** removes the **front** element and returns it.

```
Queue<Integer> q = new ALQueue<>();
q.enqueue(4);
q.enqueue(10);
q.enqueue(13);
Integer i = q.dequeue();
q.enqueue(5);
Integer i2 = q.dequeue();
```

What number is stored in i?

A: 4 B: 10 C: 13 D: 5 E: Something else

What number is stored in i2?

A: 4 B: 10 C: 13 D: 5 E: Something else

What is the contents of the queue? (starting at the **front**)

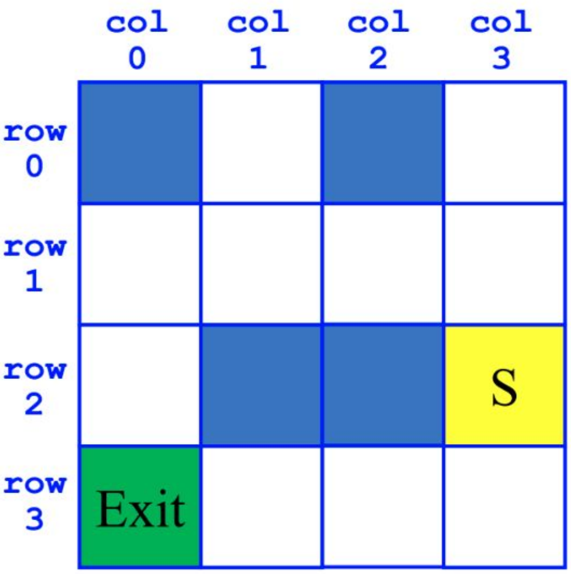
A. 4, 10, 13, 5
B. 10, 13, 5
C. 5, 10
D. 13, 5
E. other

```
import java.util.ArrayList;

public interface Stack<E> {
  void push(E element);
  E pop();
  int size();
}
// IDEA: Use array lists to implement both
class ALStack<E> implements Stack<E> {

}
```

```
import java.util.ArrayList;

public interface Queue<E> {
  void enqueue(E element);
  E dequeue();
  int size();
}

class ALQueue<E> implements Queue<E> {

}
```

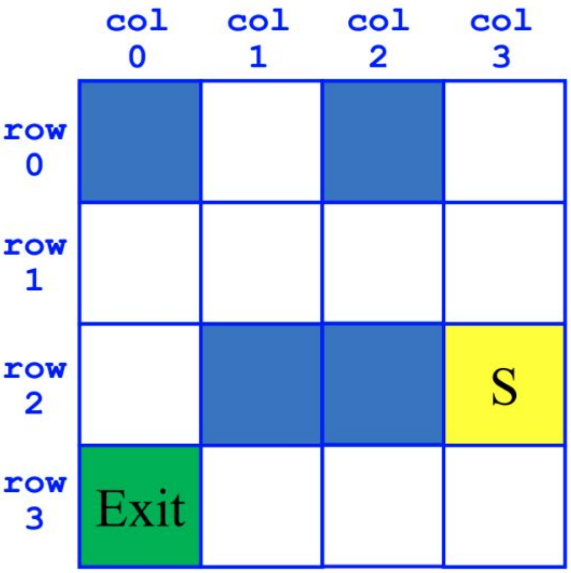
Class ArrayList<E>

void	add (int index, E element)	Inserts the specified element at the specified position.
E	remove (int index)	Removes the element at the specified position in this list.
int	size()	Returns the number of elements in this list.
E	set (int index, E element)	Replaces the element at the specified position in this list with the specified element.
int	indexOf (Object o)	Returns the index of the first occurrence of the specified element in this list, or -1 if this list does not contain the element.



	col 0	col 1	col 2	col 3
row 0	🟦		🟦	
row 1				
row 2		🟦	🟦	S
row 3	Exit			

```
SearchForTheExit

Initialize a Stack to hold Squares as we search
Mark starting square as visited
Put starting square on task list
While Stack is not empty
    Pop square sq from Stack
    Mark sq as visited
    If sq is the Exit, we're done!
    For each of square's unseen neighbors (S, W, N, E):
        Set neighbor's previous to sq
        Push neighbor to Stack
```



	col 0	col 1	col 2	col 3
row 0	🟦		🟦	
row 1				
row 2		🟦	🟦	S
row 3	Exit			

```
SearchForTheExit

Initialize a Queue to hold Squares as we search
Mark starting square as visited
Put starting square on task list
While Queue is not empty
    Dequeue square sq from Queue
    Mark sq as visited
    If sq is the Exit, we're done!
    For each of square's unseen neighbors (S, W, N, E):
        Set neighbor's previous to sq
        Enqueue neighbor to Queue
```