Peer Instruction 4

Data Structures
What is the contents of the ArrayList after the following code executes?

```java
ArrayList<String> list = new ArrayList<>();
list.add("Stack");
list.add(1, "Queue");
list.add("Queue");
list.add("LinkedList");
list.add(2, "ArrayList");
list.remove("Queue");
list.remove(3);
```

A. [Stack, Queue, ArrayList, Queue]  
B. [Stack, ArrayList, Queue]  
C. [Stack, LinkedList, ArrayList, Queue]  
D. [Stack, ArrayList, Queue, Queue]

Correct answer is B, 5 adds and 2 removes means 3 elements.
What is the contents of the Stack after the following code executes?

Stack<Integer> stack = new Stack<>();
for (int i = 0; i <= 4; i++)
    stack.push(i * 12);
stack.peek();
stack.push(60);
stack.pop();
stack.push(72);
stack.pop();
stack.peek();

A. [0, 12, 24, 36]
B. [0, 12, 24, 36, 48]
C. [0, 12, 24, 36, 48, 60]
D. [0, 12, 24, 36, 72]
E. [0, 12, 24]

Correct answer is A, 7 pushes and 2 pops means 5 elements, peeks do nothing.
What is the contents of the Queue after the following code executes?

```java
Queue<Character> queue = new LinkedList<Character>();
for (char c = 'A'; c <= 'G'; c++)
    queue.offer(c);
queue.poll();
queue.add('H');
queue.remove();
queue.add('I');
System.out.println(queue);
```

A. [A, B, C, D, E, F, G, H, I]
B. [A, B, C, D, E, F, H, I]
C. [A, B, C, D, E, F, G]
D. [C, D, E, F, G, H, I]
E. [C, D, E, F, G]

What is the order of the ArrayList after the following code executes?

```java
public class ModuloComp implements Comparator<Integer> {
    public int compare(Integer first, Integer second) {
        return (first % 10) - (second % 10);
    }
}

// Use comparator to sort
ArrayList<Integer> list =
    new ArrayList<>(Arrays.asList(17, 44, 36, 29, 91, 82));
Collections.sort(list, new ModuloComp());
```

Apologize for this crowded slide with a difficult question!
Which of the following methods belongs to the Collection interface?

1. void add(int index, E element);
2. void add(E element);
3. E remove(int index);
4. boolean remove(Object o);
5. int indexOf(Object o);
6. boolean contains(Object o)

A. 1, 2, 3, 4, 5, 6
B. 1, 3, 5
C. 2, 4, 6
D. 1, 2, 3
E. 4, 5, 6

Correct answer is C), no indices in Collection, includes unordered containers such as sets.
Which of the following methods belongs to the List interface?

1. void add(int index, E element);
2. void add(E element);
3. E remove(int index);
4. boolean remove(Object o)
5. int indexOf(Object o);
6. boolean contains(Object o)

Correct answer is B), anything with an index, rest are collections.
Which of the following methods belongs to the Collections class?

A. public static void copy(List<?> dest, List<?> src);
B. public static void shuffle(List<?> list);
C. public static void sort(List<?> list);
D. public static void reverse(List<?> list)
E. All of the above

Correct answer is E) all are in the Collections concrete class, all are useful, be careful with copy!
Which is the best data structure to use for a Queue, as described below?

Please select the single correct answer.

A. Array: static sizing makes them faster than other Collections.
B. ArrayList: can grow dynamically as items are added to queue.
C. LinkedList: supports fast insertion and deletion at head and tail.
D. Vector: very similar to ArrayList, but adds synchronization.
E. Stack: like a queue, easy to change ordering from FILO to FIFO.

Correct answer is C), no actual Queue concrete class, layered instead on LinkedList.
Which of the following is an incorrect statement about Java Collections?

Please select the single incorrect answer.

A. Collections provides data structures that are highly useful.
B. Collections uses inheritance to share code and behavior.
C. Collections has interfaces, abstract classes, and concrete classes.
D. Collections provide reliability with reasonable performance.
E. None of the above are incorrect.

Correct answer is E), all make perfect sense to me!