Practice Set for Unit 7 Assessment

1. Consider the following code segment.

```
List<String> animals = new ArrayList<String>();

animals.add("dog");
animals.add("cat");
animals.add("snake");
animals.set(2, "lizard");
animals.add(1, "fish");
animals.remove(3);
System.out.println(animals);
```

What is printed as a result of executing the code segment?

(A) [dog, fish, cat]
(B) [dog, fish, lizard]
(C) [dog, lizard, fish]
(D) [fish, dog, cat]
(E) The code throws an ArrayIndexOutOfBoundsException exception.

2. Consider the following method.

```
public ArrayList<Integer> mystery(int n)
{
  ArrayList<Integer> seq = new ArrayList<Integer>();

  for (int k = 1; k <= n; k++)
    seq.add(new Integer(k * k + 3));

  return seq;
}
```

Which of the following is printed as a result of executing the following statement?
System.out.println(mystery (6)) ;

(A) [3, 4, 7, 12, 19, 28]
(B) [3, 4, 7, 12, 19, 28, 39]
(C) [4, 7, 12, 19, 28, 39]
(D) [39, 28, 19, 12, 7, 4]
(E) [39, 28, 19, 12, 7, 4, 3]

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3. Consider the following data field and method.

```
private ArrayList list;

public void mystery(int n)

{

  for (int k = 0; k < n; k++)

  {

    Object obj = list.remove(0);

    list.add(obj);

  }

}
```

Assume that list has been initialized with the following Integer objects.

[12, 9, 7, 8, 4, 3, 6, 11, 1]

Which of the following represents the list as a result of a call to mystery(3)?

(A) [12, 9, 8, 4, 3, 6, 11, 1, 7]

(B) [12, 9, 7, 8, 4, 6, 11, 1, 3]

(C) [12, 9, 7, 4, 3, 6, 11, 1, 8]

(D) [8, 4, 3, 6, 11, 1, 12, 9, 7]

(E) [1, 11, 6, 12, 9, 7, 8, 4, 3]

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4. Consider the following correct implementation of the insertion sort algorithm.

```
public static void insertionSort(int[] elements)
{
     for (int j = 1; j < elements.length; j++)
     {
         int temp = elements[j];
         int possibleIndex = j;

         {
            elements[possibleIndex] = elements[possibleIndex - 1];
            possibleIndex--;    // Line 10
         }
         elements[possibleIndex] = temp;
     }
}
```

The following declaration and method call appear in a method in the same class as `insertionSort`.

```
int[] arr = {4, 12, 4, 7, 19, 6};
insertionSort(arr);
```

How many times is the statement `possibleIndex--;` in line 10 of the method executed as a result of the call to `insertionSort` ?

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

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5. Consider the following correct implementation of the selection sort algorithm.

```
public static void selectionSort(int[] elements)
{
     for (int j = 0; j < elements.length - 1; j++)
     {
         int minIndex = j;
         for (int k = j + 1; k < elements.length; k++)
         {
            if (elements[k] < elements[minIndex])
            {
           minIndex = k;    // Line 11
            }
         }
         if (j != minIndex)
         {
            int temp = elements[j];
            elements[j] = elements[minIndex];
            elements[minIndex] = temp;
         }
     }
}
```

The following declaration and method call appear in the same class as `selectionSort`.

```
int[] vals = {5, 10, 2, 1, 12};
selectionSort(vals);
```

How many times is the statement `minIndex = k;` in line 11 of the method executed as a result of the call to `selectionSort` ?

(A) 0

(B) 1

(C) 2

(D) 3

(E) 4

6. Consider the following two data structures for storing several million words.

I. An array of words, not in any particular order

II. An array of words, sorted in alphabetical order

Which of the following statements most accurately describes the time needed for operations on these data structures?

(A) Inserting a word is faster in II than in I.
(B) Finding a given word is faster in I than in II.
(C) Finding a given word is faster in II than in I.
(D) Finding the longest word is faster in II than in I.
(E) Finding the first word in alphabetical order is faster in I than in II.

7. The following question refer to the following information.

Consider the following data field and method. The method removeDups is intended to remove all adjacent duplicate numbers from myData, but does not work as intended.

```
private ArrayList myData;

public void removeDups ()

{

  int k = 1;

  while (k < myData.size())

  {

    if (myData.get(k).equals(myData.get(k - 1)))

    {

      myData.remove(k);

    }

    k++;

  }

}
```

For example, if myData has the values 3 3 4 4 4 8 7 7 7, after calling removeDups, myData should have the values 3 4 8 7.

Assume that myData has the following values.

2 7 5 5 5 5 6 6 3 3 3

Which of the following represents myData after the incorrect removeDups is executed?

(A) 2 7 5 6 3
(B) 2 7 5 6 3 3
(C) 2 7 5 5 6 3 3
(D) 2 7 5 5 5 6 3 3
(E) 2 7 5 5 5 5 6 6 3 3

8. The following question refer to the following information.

Consider the following data field and method. The method removeDups is intended to remove all adjacent duplicate numbers from myData, but does not work as intended.

```
private ArrayList myData;

public void removeDups ()

{

  int k = 1;

  while (k < myData.size())

  {

    if (myData.get(k).equals(myData.get(k - 1)))

    {

      myData.remove(k);

    }

    k++;

  }

}
```

For example, if myData has the values 3 3 4 4 4 8 7 7 7, after calling removeDups, myData should have the values 3 4 8 7.

Which of the following best describes how to fix the error so that removeDups works as intended?

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(A) k should be initialized to 0 at the beginning of the method.
(B) The while condition should be (k < myData.size() - 1).
(C) The if test should be (myData.get(k).equals(myData.get(k + 1))).
(D) The body of the if statement should be: myData.remove(k - 1);
(E) There should be an else before the statement k++;

9. Consider the following class declaration.

```
public class StudentInfo
{
  private String major;
  private int age;

  public String getMajor()
  {  return major;  }

  public int getAge()
  {  return age;  }

  // There may be instance variables, constructors, and methods that are not shown.
}
```

The following instance variable and method appear in another class.

```
private List<StudentInfo> students;

/** @return the average age of students with the given major;
 *          -1.0 if no such students exist
 */
public double averageAgeInMajor(String theMajor)
{
  double sum = 0.0;
  int count = 0;
  for (StudentInfo k : students)
  {
    /* missing code */
  }

  if (count > 0)
  {
    return sum / count;
  }
  else
  {
    return -1.0;
  }
}
```

Which of the following could be used to replace /* *missing code* */ so that averageAgeInMajor will compile without error?

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(A)
```
if (theMajor.equals(k.major))
{
  sum += k.age;
  count++;
}
```

(B)
```
if (theMajor.equals(k.getMajor()))
{
  sum += k.getAge();
  count++;
}
```

(C)
```
if (theMajor.equals(k.major))
{
  sum += k.getAge();
  count++;
}
```

(D)
```
if (theMajor.equals(students[k].getMajor()))
{
  sum += students[k].getAge();
  count++;
}
```

(E)
```
if (theMajor.equals(getMajor(k)))
{
  sum += getAge(k);
  count++;
}
```

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10. Consider the following interface and class declarations.

```
public interface Vehicle
{
  /** @return the mileage traveled by this Vehicle
   */
  double getMileage();
}


public class Fleet
{
  private ArrayList<Vehicle> myVehicles;

  /** @return the mileage traveled by all vehicles in this Fleet
   */
  public double getTotalMileage()
  {
    double sum = 0.0;

    for (Vehicle v : myVehicles)
    {
      sum += /* expression */ ;
    }

    return sum;
  }

  // There may be instance variables, constructors, and methods that are not shown.
}
```

Which of the following can be used to replace /* expression */ so that getTotalMileage returns the total of the miles traveled for all vehicles in the fleet?

(A) getMileage (v)

(B) myVehicles [v] .getMileage ()

(C) Vehicle.get (v) .getMileage ()

(D) myVehicles.get (v) .getMileage ()

(E) v.getMileage ()