Homework

The following homework is designed to cover the course objectives for this unit.

Homework Exercise 3.1:

- Compile a list of all the API of ArrayList.
- Explain the differences between regular array and ArrayList.
- Submit your written answers in a Word document to your instructor at the beginning of Unit 4.

Homework Exercise 3.2:

Submit your written answers to the following 20 questions to your instructor at the beginning of Unit 4.

1. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    System.out.println(m(2));
  }

  public static int m(int num) {
    return num;
  }

  public static void m(int num) {
    System.out.println(num);
  }
}
```

What will be the output when the code is executed?

a. The program runs and prints 2 twice.
b. The program runs and prints 2 once.
c. The program has a syntax error because the two methods have the same signature.
d. The program has a syntax error because the second m method is defined but not invoked in the main method.

2. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    int[] x = {1, 2, 3, 4};
    int[] y = x;

    x = new int[2];

    for (int i = 0; i < y.length; i++)
      System.out.print(y[i] + " ");
  }
}
```

What will be the output when the code is executed?

a. The program displays 0 0 0 0.
b. The program displays 0 0.
c. The program displays 1 2 3 4.
d. The program displays 0 0 3 4.

3. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    int[] x = new int[5];
    int i;
    for (i = 0; i < x.length; i++)
      x[i] = i;
    System.out.println(x[i]);
  }
}
```

What will be the output when the code is executed?

a. The program has a syntax error because i is not defined in the last statement in the main method.
b. The program displays 4.
c. The program has a runtime error because the last statement in the main method causes an ArrayIndexOutOfBoundsException.
d. The program displays 0 1 2 3 4.

4. Suppose a method p has the following heading:

   public static int[][] p()

   What return statement may be used in p()?

   a. return new int[]{1, 2, 3};
   b. return 1;
   c. return int[]{1, 2, 3};
   d. return {1, 2, 3};
   e. return new int[][]{{1, 2, 3}, {2, 4, 5}};

5. Assuming double[][][] x = new double[4][5][6], what are x.length, x[2].length, and x[0][0].length?

   a. 6, 5, and 4
   b. 4, 5, and 4
   c. 4, 5, and 6
   d. 5, 5, and 5

6. When you pass an array to a method, the method receives _____.

   a. a copy of the first element
   b. the length of the array
   c. the reference of the array
   d. a copy of the array

7. In the following code, what is the printout for list1?

```
class Test {
  public static void main(String[] args) {
    int[] list1 = {1, 2, 3};
    int[] list2 = {1, 2, 3};
    list2 = list1;
    list1[0] = 0; list1[1] = 1; list2[2] = 2;

    for (int i = 0; i < list1.length; i++)
      System.out.print(list1[i] + " ");
  }
}
```

   a. 0 1 3
   b. 1 2 3
   c. 0 1 2
   d. 1 1 1

8. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    int[] x = {1, 2, 3, 4};
    int[] y = x;

    x = new int[2];

    for (int i = 0; i < x.length; i++)
      System.out.print(x[i] + " ");
  }
}
```

What will be the output when the code is executed?

a. The program displays 0 0.
b. The program displays 0 0 0 0.
c. The program displays 1 2 3 4.
d. The program displays 0 0 3 4.

9. Assume int[] t = {1, 2, 3, 4}. What is t.length?

a. 4
b. 3
c. 5
d. 0

10. What will be the output of the following code?

```
public class Test {
  public static void main(String[] args) {
    int[] x = {1, 2, 3, 4, 5};
    increase(x);

    int[] y = {1, 2, 3, 4, 5};
    increase(y[0]);

    System.out.println(x[0] + " " + y[0]);
  }

  public static void increase(int[] x) {
    for (int i = 0; i < x.length; i++)
      x[i]++;
  }

  public static void increase(int y) {
    y++;
  }
}
```

a. 2 2
b. 2 1
c. 0 0
d. 1 1
e. 1 2

11. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    int[] a = new int[4];
    a[1] = 1;
    a = new int[2];
    System.out.println("a[1] is " + a[1]);
  }
}
```

What will be the output when the code is executed?

a. The program displays a[1] is 0.
b. The program has a syntax error because new int[2] is assigned to a.
c. The program has a runtime error because a[1] is not initialized.
d. The program displays a[1] is 1.

12. In the following code, what is the printout for list2?

```
class Test {
  public static void main(String[] args) {
    int[] list1 = {1, 2, 3};
    int[] list2 = {1, 2, 3};
    list2 = list1;
    list1[0] = 0; list1[1] = 1; list2[2] = 2;

    for (int i = 0; i < list2.length; i++)
      System.out.print(list2[i] + " ");
  }
}
```

a. 0 1 2
b. 1 1 1
c. 1 2 3
d. 0 1 3

13. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    int[] oldList = {1, 2, 3, 4, 5};
    reverse(oldList);
    for (int i = 0; i < oldList.length; i++)
      System.out.print(oldList[i] + " ");
  }

  public static void reverse(int[] list) {
    int[] newList = new int[list.length];

    for (int i = 0; i < list.length; i++)
      newList[i] = list[list.length - 1 - i];

    list = newList;
  }
}
```

What will be the output when the code is executed?

a. The program displays 5 4 3 2 1 and then raises an ArrayIndexOutOfBoundsException.
b. The program displays 1 2 3 4 5 and then raises an ArrayIndexOutOfBoundsException.
c. The program displays 1 2 3 4 6.
d. The program displays 5 4 3 2 1.

14. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    final int[] x = {1, 2, 3, 4};
    int[] y = x;

    x = new int[2];

    for (int i = 0; i < y.length; i++)
      System.out.print(y[i] + " ");
  }
}
```

What will be the output when the code is executed?

a. The program displays 1 2 3 4.
b. The elements in the array x cannot be changed because x is final.
c. The program displays 0 0.
d. The program has a syntax error on the statement x = new int[2] because x is final and cannot be changed.

15. Which of the following statements is correct?

a. char[][] charArray = {{'a', 'b'}, {'c', 'd'}};
b. char[2][2] charArray = {{'a', 'b'}, {'c', 'd'}};
c. char[2][] charArray = {{'a', 'b'}, {'c', 'd'}};
d. char[][] charArray = {'a', 'b'};

16. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    boolean[][] x = new boolean[3][];
    x[0] = new boolean[1]; x[1] = new boolean[2];
    x[2] = new boolean[3];

    System.out.println("x[2][2] is " + x[2][2]);
  }
}
```

What will be the output when the code is executed?

a. The program has a runtime error because x[2][2] is null.
b. The program runs and displays x[2][2] is false.
c. The program has a syntax error because new boolean[3][] is wrong.
d. The program runs and displays x[2][2] is true.
e. The program runs and displays x[2][2] is null.

17. Suppose a method p has the following heading:

```
public static int[] p()
```

What return statement may be used in p()?

a. return {1, 2, 3};
b. return int[]{1, 2, 3};
c. return new int[]{1, 2, 3};
d. return 1;

18. Assuming int[] scores = {1, 20, 30, 40, 50}, what value does java.util.Arrays.binarySearch(scores, 30) return?

a. 1
b. 2
c. 0
d. -1
e. -2

19. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    int[] x = {1, 2, 3, 4};
    int[] y = x;

    x = new int[2];

    for (int i = 0; i < x.length; i++)
      System.out.print(x[i] + " ");
  }
}
```

What will be the output when the code is executed?

a. The program displays 0 0 0 0.
b. The program displays 1 2 3 4.
c. The program displays 0 0.
d. The program displays 0 0 3 4.

20. Analyze the following code.

```
public class Test {
  public static void main(String[] args) {
    int[] x = new int[3];
    System.out.println("x[0] is " + x[0]);
  }
}
```

What will be the output when the code is executed?

a. The program has a runtime error because the array element x[0] is not defined.
b. The program has a runtime error because the array elements are not initialized.
c. The program has a syntax error because the size of the array was not specified when declaring the array.
d. The program runs fine and displays x[0] is 0.