COMP 248 - Tutorial #11 - Solution

Arrays

Question 1: What will be the output of the following code?

A)

```
class Parray1{
   public static void main(String[] args)
   {
      int i;
      int a[] = {5, 2, 3, 1, 1, 0, 2, 1, 0, 1};
      for (i = 0; (i < 10); i++)
      {
            if (a[i] == 0)
               break;
            if (i % 3 == 0)
               continue;
            System.out.println("a[" + i + "]:" + a[i]);
      }
   }
}
```

Answer

```
a[1]:2
a[2]:3
a[4]:1
```

B)

```
class Parray2{
   public static void main(String[] args)
   {
       int[] data = {1,3,5,8,11,15};
       int sum = 0;
       for(int i = 1; i < data.length; ++i) {
          sum = sum + data[i] - data[i-1];
          System.out.println("sum = " + sum);
       }
   }
}
```

Answer

```
sum = 2
sum = 4
sum = 7
sum = 10
sum = 14
```

C)

```
class Parray3 {

  static int sumIf (int[] a, boolean[] b) {
    int sum = 0;
    for (int i = 0; i < a.length; ++i)
      if(b[i])
         sum = sum + a[i];
    return sum;
  }

  public static void main(String[] args)
  {
    int[] data = {1, 2, 3, 4, 5, 6, 7};
    boolean[] filter = {true, false, true, true, false, true, true};
    System.out.println("data:" + sumIf(data, filter));
    for(int i = 0; i < filter.length; ++i)
       filter[i] =  !filter[i];
    System.out.println("data:" + sumIf(data, filter));
  }
}
```

Answer

```
data:21
data:7
```

Question 2: Write a method called `clearArray` that has one parameter which is an array of `int` values. When it is called it will set all the elements of the array to zero.

Answer

```
public static void clearArray(int [] arr){
    for (int i = 0; i < arr.length ; i++){
            arr[i] = 0;
    }
  }
```

Question 3: Write a method called `sum2` that has two parameters called `row` and `n`. `row` is an array of floating-point numbers; `n` is an integer which will be greater than or equal to 0. The method will return the sum of the first `n` elements of the array `row`.

Answer

```
public static double sum2 (double [] row, int n){
    if (n > row.length ) {
          n = row.length ; // to avoid to access the array Index Out Of Bounds
    }
    double sum = 0;
    for (int i = 0; i < n ; i++){
            sum += row[i];
    }
    return sum;
 }
```

Question 4: Assume the following class:

```
public class Airplane {
      private int nbOfPassengers;
      private double weight;
      private int maxSpeed;

      public double getWeight() {
        return weight;
      }
      public int getMaxSpeed() {
        return maxSpeed;
      }
}
```

A) Write a static method called `getAverageWeight`() that takes an array of Airplanes as parameter and computes and returns the average weight of the airplanes in the array.

Answer

```
public static double getAverageWeight(Airplane[] a) {
    double sum = 0;
    for (int i = 0; i < a.length; ++i)
         sum += a[i].getWeight();
    if (a.length != 0)
        return (sum/a.length);
    else
        return 0;
}
```

B) Write a static method called `findFasterAirplane`() that takes an array of Airplanes as parameter and returns the fastest airplane in the array. If several airplanes have the same maximum speed, return null.

Answer

```
public static Airplane findFasterAirplane(Airplane[] a) {
    if (a == null)
        return null;
    Airplane fastestSoFar = a[0];
    for (int i = 1; i < a.length; ++i) {
         if (a[i].getMaxSpeed() > fastestSoFar.getMaxSpeed())
            fastestSoFar = a[i];
         if (a[i].getMaxSpeed() == fastestSoFar.getMaxSpeed())
            return null;
    }
    return fastestSoFar;
}
```

Question 5: Write a main method to display a histogram for the marks of students in a class of 20 students. The marks of a student will be store in an array called `marks` and each element of this array will be an integer between 0 and 9 (inclusively).

The histogram will consist of a series of stars for each possible value of a mark. The number of stars for each mark depends on how many students received this mark.

For example, if the array `marks` contains:

0	5	5	7	8	7	8	9	9	6	8	6	9	7	7	9	4	7	8	8

Your program must display the following histogram:

```
0: *
1:
2:
3:
4: *
5: **
6: **
7: *****
8: *****
9: ****
```

Answer

```
public static void main(String[] args)
{
    int [] marks = {0,5,5,7,8,7,8,9,9,6,8,6,9,7,7,9,4,7,8,8};
    int [] frequency = new int[10];

    //initialize the array frequency to 0
    for (int i = 0; i < frequency.length ; i++){
            frequency[i] = 0;
    }

    //count how many students got each mark
    for (int i = 0; i < marks.length ; i++){
            frequency[marks[i]]++;
    }

    //print the histogram
    for (int i = 0; i < frequency.length ; i++){
            System.out.print(i + ": ");
            for (int j = 0; j < frequency[i] ; j++){
                    System.out.print("*");
            }
            System.out.println();
    }
  }
```