### Test 2

1. **(10 Points)** What is the output of the following code:

```java
class Question1 {
    public static void main(String[] args) {
        int s = 1;
        int t = 1;
        for (int i = 1; i < 21; i += 2) {
            s = s + i;
            for (int j = i; j > 0; j -= 3) {
                t = t + (i - j);
            }
            s = s + t;
            System.out.println("s = " + s);
        }
    }
}
```

### Test 2

2. **(20 Points)** Given the following classes, show the output from running the Test class and give an explanation:

```java
public class Vehicle {
    private String name = new String("No Vehicle Name");

    public Vehicle() {
        System.out.println("New Vehicle: "+ name);
    }

    public Vehicle(String name) {
        this.name = new String(name);
        System.out.println("New Vehicle: " + name);
    }

    public void drive() {
        System.out.println("Vehicle drive: " + name);
    }
}

public class Car extends Vehicle {
    private String name = new String("No Car Name");

    public Car() {
        super("No Car Name");
        System.out.println("New Car: " + name);
    }

    public Car(String name) {
        super();
        this.name = new String(name);
        System.out.println("New Car: " + name);
    }

    public void drive() {
        System.out.println("Car drive: " + name);
    }
}

public class SportsCar extends Car {
    private String name = new String("No Sports Car Name");

    public SportsCar() {
        super("No Sports Car Name");
        System.out.println("New SportsCar: " + name);
    }

    public SportsCar(String name) {
        super();
        this.name = new String(name);
        System.out.println("New Vehicle: " + name);
    }

    public void drive() {
        System.out.println("Sports Car drive: " + name);
    }
}

public class Question2 {
    public static void main(String args[]) {
        Vehicle v, v1, v2;
        Car c, c1, c2;
        SportsCar sc, sc1, sc2;
        v1 = new Vehicle("Veronica");
        v2 = new Vehicle();
        c1 = new Car("Carlos");
        c2 = new Car();
        sc1 = new SportsCar("Sport");
        sc2 = new SportsCar();
        v1.drive();
        v2.drive();
        c1.drive();
        c2.drive();
        sc1.drive();
        sc2.drive();
        v = c1;
        v.drive();
        c = sc1;
        c.drive();
    }
}
```
3. (30 Points) Given an array of String. Each element in the array contains a String object. Example:

| “Sameh” | “Eliot” | “Sarah” | “Dalia” | “Nidal” |

Write a method with the following signature:

```
public static String combine(String[] strings)
```

Which combines the Strings to form one String that would contain the last letters of each String, starting with the last name, followed by the second to last letter from each string again starting with the last name, etc.... You may assume that all Strings have the same length, but you may not assume that the array only has 5 entries. The above array would return the following String:

```
“lahthaiaoedrimialalaNDSES”
```

4. (10 Points) Write a for loop to compute the sum $1^1 + 2^2 + 3^3 + 4^4 + 5^5 + \ldots + n^n$. Assume that $n$ is a variable that has already been defined.

5. (10 Points) Show the output from running the Test class:

```java
public class Question5 {
    public static void main(String args[]) {
        String s1 = new String("josue");
        String s2 = new String("joseph");
        String s3 = new String("Jose");
        String s4 = s2;

        if (s1.substring(0,3).equals(s3.substring(0,3))) {
            System.out.println("Test1 Is A Success");
        } else {
            System.out.println("Test1 Is A Failure");
        }

        if (s2.substring(1,4).equals(s3.substring(1,4))) {
            System.out.println("Test2 Is A Success");
        } else {
            System.out.println("Test2 Is A Failure");
        }

        if (s2 == s4) {
            System.out.println("Test3 Is A Success");
        } else {
            System.out.println("Test3 Is A Failure");
        }

        if (s3.toLowerCase().substring(0,3).equals(s1.substring(0,3))) {
            System.out.println("Test4 Is A Success");
        } else {
            System.out.println("Test4 Is A Failure");
        }
    }
}
```
6. (40 Points) Write a complete Java class named `MyClass` that has the following `private` attributes:

   a. `myInts`, an array of `int`'s that has a maximum capacity of 100.
   b. `numInts`, an `int` variable that keeps track of the number of elements in `myInts`.

And the following methods:

   a. `public MyClass()` – Constructor that initializes `myInts` and `numInts`.
   b. `public int addInt(int i)` – Adds `i` to `myInts` and updates `numInts`. Returns the index where `i` was added. If there is no room in the array, expand the array by adding another 100 spaces.
   c. `public int findFirst(int i)` – Find the first occurrence of `i` in `myInts` and return its index, return -1 if not found.
   d. `public int findLast(int i)` – Find the last occurrence of `i` in `myInts` and return its index, return -1 if not found.
   e. `public int getInt(int i)` – Return the integer at index `i` if it exists, return -9999 otherwise.
   f. `public boolean isFull()` – Returns true if `myInts` is full, false otherwise.
   g. `public boolean isEmpty()` – Returns true if `myInts` is empty, false otherwise.