1. What is the output of the following code:

```java
int s = 0;
int t = 1;
for (int i = 0 ; i < 10 ; i++) {
    s = s + i;
    for (int j = i ; j > 0 ; j-- ) {
        t = t * (j - i);
    }
    s = s * t;
    System.out.println("t = " + t);
}
System.out.println("s = " + s);
```

2. 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:

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

Which combines the Strings to form one String that would contain the first letters of each String, followed by the second letter from each string, 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:

```
"SESNalaaimirldeoaihthal"
```

3. Given the following classes, show the output from running the Test class and give an explanation:

```java
public class Vehicle {
    public Vehicle() {
        System.out.println("New Vehicle");
    }
    public void drive() {
        System.out.println("Vehicle: drive");
    }
}

public class Car extends Vehicle {
    public Car() {
        System.out.println("New Car");
    }
    public void drive() {
        System.out.println("Car: drive");
    }
}

public class SportsCar extends Car {
    public SportsCar() {
        System.out.println("New SportsCar");
    }
    public void drive() {
        System.out.println("Sports Car: drive fast");
    }
}

public class Test {
    public static void main(String args[]) {
        Vehicle v = new Vehicle();
        Car c = new Car();
        SportsCar sc = new SportsCar();
        v.drive();
        c.drive();
        sc.drive();
        v = c;
        v.drive();
        c = sc;
        c.drive();
        v = sc;
        v.drive();
    }
}
```
4. Write a for loop to compute the sum $1^2 + 2^2 + 3^2 + 4^2 + 5^2 + \ldots + n^2$. Assume that $n$ is a variable that has already been defined.

5. Show the output from running the Test class:

   ```java
   public class Test {
       public static void main(String args[]) {
           Integer i1 = new Integer(9);
           Integer i2 = new Integer(9);

           if (i1 == i2)
               System.out.println("Test1");
           if (i1.equals(i2))
               System.out.println("Test2");
           if (i1.equals(new Integer(9)))
               System.out.println("Test3");
       }
   }
   ```

6. Write a complete Java class named `MyClass` that has the following `private` attributes:

   a. `myInts`, an array of integers 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 to add `i` to `myInts`, return -1.
   c. `public int find(int i)` – Find the first occurrence of `i` in `myInts` and return its index, return -1 if not found.
   d. `public int getInt(int i)` – Return the integer at index `i` if it exists, return -9999 otherwise.
   e. `public boolean isFull()` – Returns true if `myInts` is full, false otherwise.
   f. `public boolean isEmpty()` – Returns true if `myInts` is empty, false otherwise.