1. Determine the output of the following Java program. Assume that the user enters the numbers 5 3 9 7 0 on a single line, followed by return.

```java
// Problem1.java
import java.util.Scanner;
class Problem1{
    public static void main( String[] args )
    {
        Scanner sc = new Scanner(System.in);
        int i, x, y, a, c=0, s=0;
        i = sc.nextInt();
        x = y = i;
        while( i!=0 )
        {
            if( i<x ) x = i;
            if( i>y ) y = i;
            s += i;
            c++;
            i = sc.nextInt();
        }
        a = s/c;
        System.out.println(x);
        System.out.println(y);
        System.out.println(a);
    }
}
```

2. Write a complete syntactically correct java program that prompts the user for two double values x and y, then prints out the value of the expression $\sqrt{x} + \sqrt{y}$. Include all necessary import statements, a class definition and main() function. You may give the class any valid name. Specify the name of the file that contains your program in a one-line comment at the beginning of the program.

3. The following Java program contains 3 syntax errors. (a) Circle each of the three errors and indicate how to correct them. (b) Determine the output of the program after the errors are corrected. (c) Re-write the corrected program by changing the while loop to a for loop.

```java
// Problem3.java
class Problem3{
    public static void main( String[] args){
        int i = 1, p = 1;
        while( i<=5 )
        {
            p *= i;
            i++;
        }
        System.out.println(p);
    }
}
```
4. Determine the output of the following Java program.

```java
// Problem4.java

class Problem4{

    public static void main( String[] args ){
        int a=2, b=5, c;
        double x=2.5, y=3.5, z;
        c = f(a, b);
        z = g(x, c);
        a = h(y, z, x);
        x = f( (int)z, b);
        System.out.println(a + " " + b + " " + c);
        System.out.println(x + " " + y + " " + z);
    }

    static int f(int n, int m){
        int k = n + m;
        k *= 2;
        return k;
    }

    static double g(double s, int n){
        return n*s;
    }

    static int h(double r, double s, double t){
        int m = (int)(r + s + t);
        return f(m, 1);
    }

}
```
5. Complete the following Java program by filling in the bodies of functions `sum()`, `avg()` and `ord()`. A call to `sum(n)` should return the sum of all the integers from 1 to n, while `avg(n)` returns the average of the same set of numbers. A call to the boolean function `ord(x, y, z)` returns true if \( x < y < z \) and false otherwise. Function `main()` should produce the following output:

```
6.5
true
false
```

// Problem5.java
class Problem5{
    // sum(): return 1+2+3+..+n
    static int sum(int n){
    }
    // avg(): return average of \{1, 2, ..., n\}
    static double avg(int n){
    }
    // ord(): return true if and only if x<y<z
    static boolean ord(double x, double y, double z){
    }

    public static void main(String[] args){
        System.out.println(avg(12));
        System.out.println(ord(1.2, 3.4, 5.6));
        System.out.println(ord(3.4, 1.2, 5.6));
    }
}
6. Trace the following Java program and place the output on the lines below *exactly* as it would appear on the screen. Assume that the user enters 1 3 5 at the first prompt, and 1.5 2.0 2.5 at the second prompt. (More lines printed below than are actually needed.)

```java
// Problem6.java
import java.util.Scanner;
class problem2{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int a, b, c;
        double x, y, z;
        System.out.print("Enter three integers: ");
        a = sc.nextInt();
        b = sc.nextInt();
        c = sc.nextInt();
        System.out.print("Enter three doubles: ");
        x = sc.nextDouble();
        y = sc.nextDouble();
        z = sc.nextDouble();
        a = (++c) - (b++);
        x += (z - y);
        b *= b;
        y = c * z;
        c = (int)(b - x);
        System.out.println("a=" + a + ", b=" + b + ", c=" + c);
        System.out.println("x=" + x + ", y=" + y + ", z=" + z);
        System.out.println("c/a=" + c/a);
        System.out.println("c%a=" + c%a);
    }
}
```

7. Determine the output of the following Java program

```java
// Problem7.java
import java.util.Scanner;

class Problem7{
    public static void main( String[] args ){
        Scanner sc = new Scanner(System.in);
        int a = 0;
        double x=0, y=0, z=0;

        while( a<30 ){
            while(true){
                while( !sc.hasNextDouble() ){
                    sc.next();
                }

                if( a<10 ){
                    x = sc.nextDouble();
                    if( x>0 ) break;
                }else if( a<20 ){
                    y = sc.nextDouble();
                    if( y<0 ) break;
                }else{
                    z = sc.nextDouble();
                    if( z>0 ) break;
                }
            }
            a += 10;
        }
        System.out.println("x = "+x+", y = "+y+", z = "+z);
    }
}
```

8. Write a Java program that reads 5 integers entered by the user, and prints them out in increasing order. Hint: emulate the examples Sort3.java and Sort4.java found on the class webpage.