TOPIC 5 EXERCISES

Tracing Exercises

1. Show what is printed by the following program, which calls a method func() two times.

```java
public class prob5_1 {
    public static void main(String[] args) {
        int a, b, c, d;
        a = 5; b = 4; c = 2;
        d = func(a, b, c);
        System.out.println(a + " " + b + " " + c + " gives an answer of " + d);
        a = func(b, c, d);
        System.out.println(b + " " + c + " " + d + " gives an answer of " + a);
    }

    public static int func(int x, int y, int z) {
        int w;
        w = x + y;
        if (y < z + 1)
            w++;
        return w;
    }
}
```
2. Show what is printed by the following program, which calls a method powers(). Describe in words what the method powers() does. Why is the answer returned by the method given the data type double rather than int?

```java
class prob5_2 {
    public static void main(String[] args) {
        int e;
        double f;

        e = 3;
        f = powers(e);
        System.out.println(e + " terms give a sum of " + f);
        e = 5;
        f = powers(e);
        System.out.println(e + " terms give a sum of " + f);
        e = 7;
        f = powers(e);
        System.out.println(e + " terms give a sum of " + f);
    }

    public static double powers(int n) {
        int i;
        double sum;

        sum = 0;
        for (i = 1; i <= n; i++)
            sum += i*i*i*i;
        return sum;
    }
}
```
3. Show what is printed by the following program, which calls a method `eq2()`. Describe in words what the method `eq2()` does.

```java
public class prob5_3 {
    public static void main(String[] args) {
        int p = 4, q = 5, r = 7;

        if (eq2(p, q, r))
            System.out.println(p + " " + q + " " + r + " gives a true answer");
        else
            System.out.println(p + " " + q + " " + r + " gives a false answer");
        System.out.print((p+3) + " " + (q-1) + " " + r);
        if (eq2(p+3, q-1, r))
            System.out.println(" returns true");
        else
            System.out.println(" returns false");
        System.out.print(p + " " + 4 + " " + (q-1));
        System.out.println(" gives an answer of " + eq2(p, 4, q-1));
    }

    public static boolean eq2(int a, int b, int c) {
        boolean ans = false;

        if (a == b)
            ans = true;
        if (a == c)
            ans = true;
        if (b == c)
            ans = true;
        return ans;
    }
}
```
4. Describe what is printed by this program.

```java
public class prob5_4 {
    public static void main(String[] args) {
        double sum50, sum100;

        sum50 = harmonic(50);
        sum100 = harmonic(100);
        System.out.println("sum of 50 terms " + sum50);
        System.out.println("sum of 100 terms " + sum100);
    }

    public static double harmonic(int n) {
        double sum = 0;

        for (int i = 1; i <= n; i++)
            sum = sum + 1.0 / i;
        return sum;
    }
}
```

5. Show what is printed by the following program.

```java
public class prob5_5 {
    public static void main(String[] args) {
        int num = 5;

        printlines(num);
        num = 3;
        printlines(num);
    }

    public static void printlines(int k) {
        for (int i = 0; i < k; i++)
            System.out.println("hello");
    }
}
```
6. Show what is printed by the following program.

```java
public class prob5_6 {
    public static void main(String[] args) {
        int a = 4, b = 10;
        printeach(a, b);
    }

    public static void printeach(int x, int y) {
        System.out.println("here is a list of the numbers in between " + x + " and " + y);
        for (int i = x; i <= y; i++)
            System.out.println(i);
    }
}
```

Show what is printed when a is initialized to 4 and b to 3.

7. (a) Give the header for a method named method1() that receives one parameter of type int and computes and returns an answer of type int.

(b) Give the header for a method named method2() that receives one parameter of type double computes and returns an answer of type char.