

TOPIC 5 EXERCISES

Tracing Exercises

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

```
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**?

```
public 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.

```
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.

```
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.

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

        printlns(num);
        num = 3;
        printlns(num);
    }

    public static void printlns(int k)
    {
        for (int i = 0; i < k; i++)
            System.out.println("hello");
    }
}
```

6. Show what is printed by the following program.

```
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.