Procedural Programming in Java

Q 1: Answer each of the following questions:

i) What are the primitive data types in Java?

ii) What are the differences between primitive data types in Java and primitive data types in C/C++?

iii) What is the size of each primitive data types in Java?

Q2: What is the output from each of the following programs?

class Q2_1 {
    public static void main(String[] args) {
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 2; j++) {
                if (i == j) continue outer;
                System.out.println("i=", i, "j=", j);
            }
        }
    }
}

class Q2_2 {
    public static void main(String[] args) {
        System.out.println("" + (5 >> 2));
        System.out.println("" + (-5 >> 2));
        System.out.println("" + (0xffffffffL >>> 30));
        System.out.println("" + (2 & 5));
        System.out.println("" + (2 > 5 ? "bt" : "lt"));
    }
}

class Q2_3 {
    public static void main(String[] args) {
        int s = 0;
        int i = 7;

        for (;;) {
            s += i;
            if (i <= 5) break;
            i--;
        }
        System.out.println("s=", s);
    }
}
class Q2_4 {
    public static void main(String[] args) {
        Point p = new Point();
        int a[] = {1, 2};

        p.x = 1; p.y = 2;
        f(p, a);

        System.out.println("p.x=\" + p.x);
        System.out.println("p.y=\" + p.y);
        System.out.println("a[0]=\" + a[0]);
        System.out.println("a[1]=\" + a[1]);
    }

    static void f(Point p, int[] a) {
        p.x = 3; p.y = 4;
        a[0] = 3; a[1] = 4;
    }
}

class Point {
    int x, y;
}
Q3: Write each of the following functions as static methods in Java.

1. static int gcd(int x, int y): Return the greatest common divisor of x and y.

2. static int sumEven(int[] a): Return the sum of the even integers in array a.

3. static boolean sorted(int[] a): Test if array a is sorted in ascending order.

4. static int[] copy(int[] a): Return a copy of array a.

5. static int[] eliminateDuplicates(int[] a): Return a copy of array a without duplicates. For example, for a = [1, 2, 1, 2, 2, 3], the returned array is [1, 2, 3].

6. static char tic_tac_teo(char[][] grid): Given a 3x3 grid configuration represented as a two-dimensional array, where each entry is 'X' or 'O', return 'X' if the configuration is a win for 'X', 'O' if the configuration is a win for 'O', and 'D' if the configuration is a draw.

7. static long bin_str_to_int(String binStr): Convert an unsigned binary string to a decimal integer. For example, for binStr = “11010”, the returned integer is 26.