

**Question 1 (10 pts) Tracing.**

What is the **exact** output of the following Java program?

**Output**

```
public class Tracing01
{
    public static void main(String [ ] args)
    {
        int one = 2, two = 0, three = 29327;
        int pail = 7, bucket = 2, waterBottle = 11, tricycle = 3;

        if(three % one <= 1)
        {
            System.out.println("Obi-wan and Chewbacca");
            if(waterBottle % pail >= bucket + tricycle)
                System.out.println("took a millennium falcon");
            else
                System.out.println("went up a hill");
        }
        else if(waterBottle / one <= 1)
        {
            System.out.println("Jack and Jill");
            if(waterBottle % pail <= bucket + tricycle)
                System.out.println("took a millennium falcon");
            else
                System.out.println("went up a hill");
        }
        else
            System.out.println("Mary and Mike");

        if(three < one || one != three)
        {
            if(waterBottle/pail >= bucket + tricycle)
            {
                System.out.println("to fetch a pail of water");
            }
            else
            {
                System.out.println("to get some chocolate milk");
            }
        }
        System.out.println('a');
        if(bucket < 7)
            System.out.println(tricycle + " wheeled Millennium Falcon");

        if(bucket >= 7)
            System.out.println(tricycle);

        System.out.println("ran over them and they did not ");

        if(one + two + three == 6)
            System.out.println("even get hurt.");
        else
            System.out.println("live happily ever after.");
    }
}
```

**Question 2 (10 pts) Tracing.**

What is the **exact** output of the following Java program?

**Output**

```
public class Tracing02
{
    public static void main(String[] args)
    {
        int a = 1, b = 5, c = 3;

        while (a < b)
        {
            c = c * 2;
            System.out.println(c);
            a++;
        }

        a = 1;
        c = 2;
        for (b = 9; b > 4; b = b - 2)
        {
            c = c + b;
            a++;

            System.out.println("b = " + b);
            a = 2;
        }

        System.out.println("c = " + c);
    }
}
```

**Memory**

**Question 3 (10 pts) Tracing.**

What is the **exact** output of the following Java program?

**Output**

```
public class Tracing03
{
    public static void main(String[] args)
    {
        int q = 4, r = 5, s = 10;
        double rate = 1.25;
        boolean bonus = false;
        if(r % 2 == 0)
            System.out.print("final ");
        System.out.println("exam");

        if(!bonus)
            System.out.println("bonu" + s);
        else
            System.out.println("no bonu" + s);

        if(r / q == rate)
            System.out.print("cat ");
        if(q + s / 2 > r + 3)
            System.out.print("dog ");

        System.out.println();
        if(bonus || rate < 1 || q + r > s)
            System.out.println("clouds");
        else if(s % r == q / r)
            System.out.println("flower");
        else if(s == s)
            System.out.println("meadow");

        if(true && true || true && false)
        {
            System.out.println("sun");
            if(s - r - q > rate)
                System.out.println("desk");
            if(!(!bonus))
                System.out.println("chair");
        }
        else if(s > q + r)
        {
            System.out.println("moon");
            if(r > q && s > r)
                System.out.println("AAA");
            else
                System.out.println("BBB");
        }
        else if(bonus || !bonus)
        {
            System.out.println("stars");
            if(q + r + 1 != s)
                System.out.println("almost ");
        }
        else
            System.out.println("done!");
    }
}
```

**Memory**

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