

## 1 Question 1

Go through the program and trace the execution. What is the output after the program runs?

```
public class Autobots extends Transformers {
    public drive() {
        optimus(2001);
    }
    private void optimus(int y) {
        int x = y / 1000;
        int z = (x + y);
        x = bumblebee(z, y);
        System.out.println("bumblebee: s = " + x + ", y = " + y + ", z = " + z);
    }
    private int bumblebee(int x, int y) {
        int z = jazz(x + y, y);
        y = y / z;
        System.out.println("bumblebee: x = " + x + ", y = " + y + ", z = " + z);
        return z;
    }
    private int jazz(int x, int y) {
        y = x (x System.out.println("jazz: x = " + x + ", y = " + y);
        return y;
    }
}
```

## 2 Question 2

```
public static boolean method1(int[] array, int target) {
    for (int i=0; i<array.length;i++) {
        if (array[i] == target) return true;
        else if (array[i] > target) return false;
    }
    return false;
}

public static boolean method2(int[] array, int target) {
    int low = 0;
    int high = array.length - 1;
    while (low <= high) {
        int mid = (low+ high) / 2;
        if (array[mid] == target) return true;
        else if (array[mid] < target) low = mid + 1;
        else high = mid - 1;
    }
    return false;
}

int[] a = { 2, 5, 11, 14, 15, 27, 31};
```

What does method1(a, 5) return?

What does method2(a, 20) return?

Explain what each of these methods do.

### 3 Question 3

What is the value of `x[0][0]` after the following lines are executed?

```
public class Chocolate {  
    public static void main(String[] args) {  
        int[] y = {2, 5, 9};  
        int[] [] x = {{5, 12, 10}, {8, 3, 2}, {7, 2, 1}};  
        x[0] = y;  
        y[1] = x[1][0];  
        y[0] = x[0][1];  
        x[0][0] = y[1];  
        x[1] = y; int[] [] z = new int[3][];  
        z[0] = x[0];  
        z[1] = x[1];  
        z[0][0] = -z[0][0];  
        z[0][0] = x[1][1];  
    }  
}
```