

1 Logical Operators:

a. Write a Java program that checks whether a given number is both even and divisible by 5. Use logical AND operator.

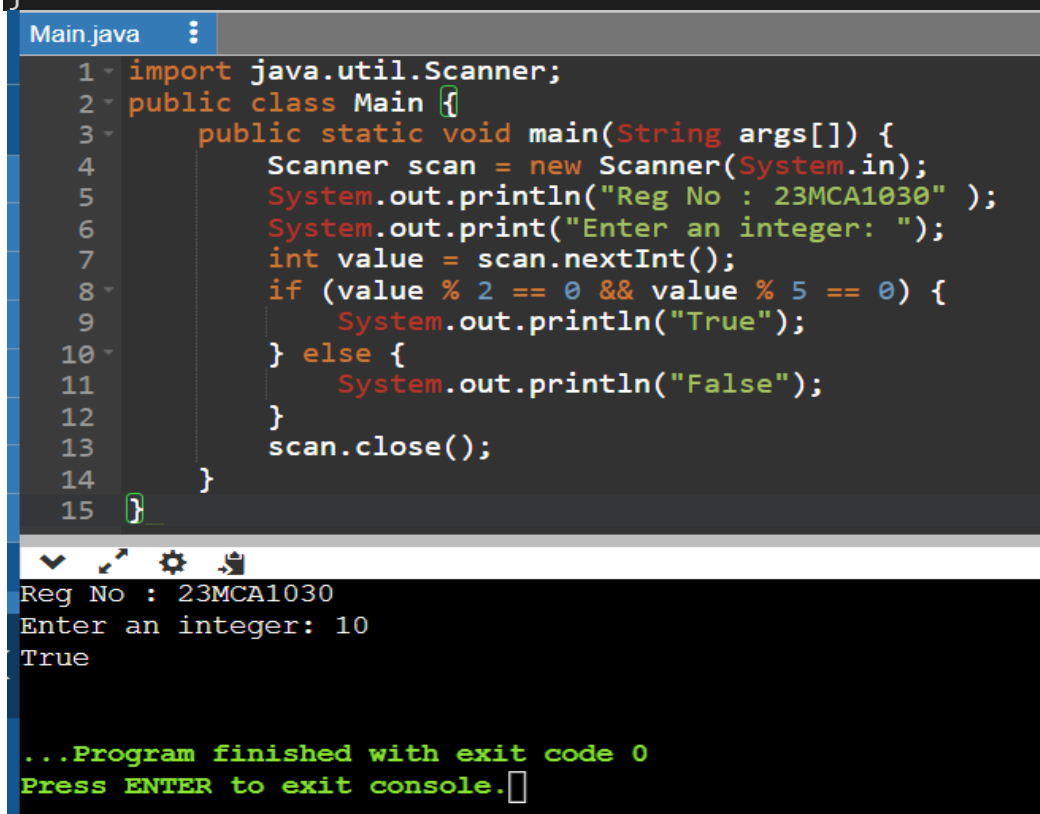
Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String args[]) {

        Scanner scan = new Scanner(System.in);
        System.out.println("Reg No : 23MCA1030" );
        System.out.print("Enter an integer: ");
        int value = scan.nextInt();
        if (value % 2 == 0 && value % 5 == 0) {
            System.out.println("True");
        } else {
            System.out.println("False");
        }
        scan.close();
    }
}
```



The screenshot shows an IDE window titled 'Main.java' containing the same Java code as above. Below the code editor, the console output is visible, showing the program's execution. The output indicates that the program printed the registration number, prompted for an integer, and correctly identified the input '10' as 'True' because it is both even and divisible by 5. The program finished with exit code 0.

```
Main.java :
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String args[]) {
4         Scanner scan = new Scanner(System.in);
5         System.out.println("Reg No : 23MCA1030" );
6         System.out.print("Enter an integer: ");
7         int value = scan.nextInt();
8         if (value % 2 == 0 && value % 5 == 0) {
9             System.out.println("True");
10        } else {
11            System.out.println("False");
12        }
13        scan.close();
14    }
15 }

Reg No : 23MCA1030
Enter an integer: 10
True

...Program finished with exit code 0
Press ENTER to exit console.
```

b. Create a program that determines whether a year is a leap year. A leap year is divisible by 4, but not by 100 unless it is divisible by 400. Use logical AND, OR operators.

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String args[]) {

        Scanner scan = new Scanner(System.in);

        System.out.println("Reg No: 23MCA1030");

        System.out.print("Enter Year : ");

        int year = scan.nextInt();

        if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {

            System.out.println("True");

        } else {

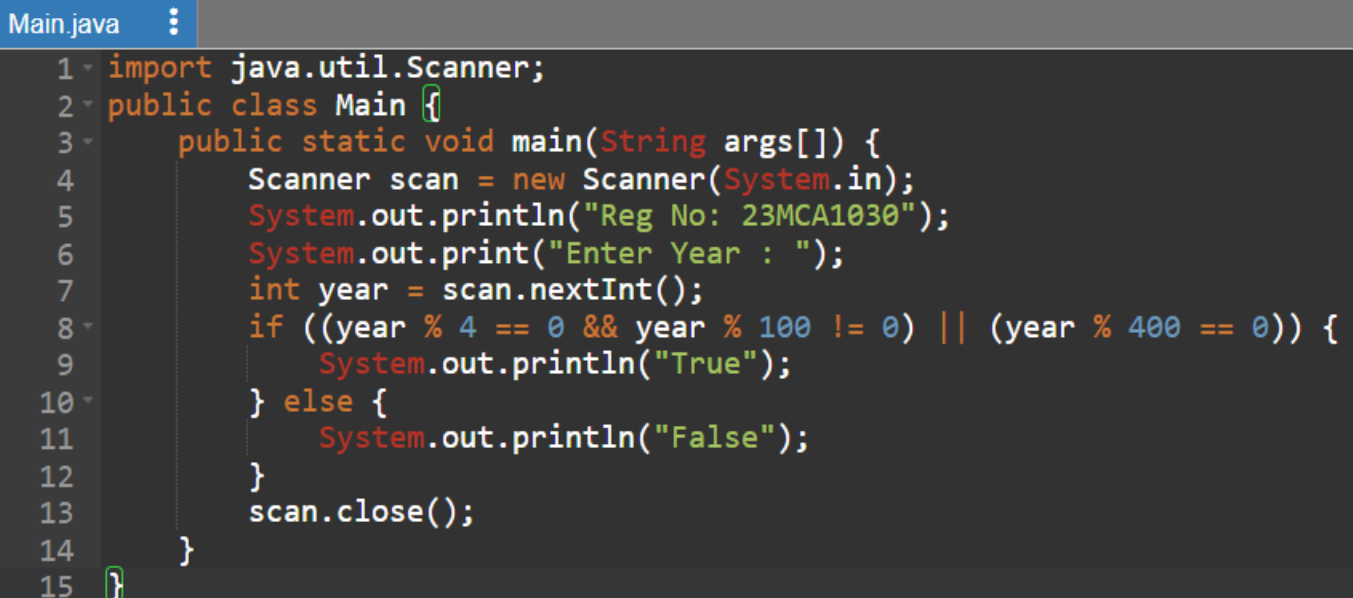
            System.out.println("False");

        }

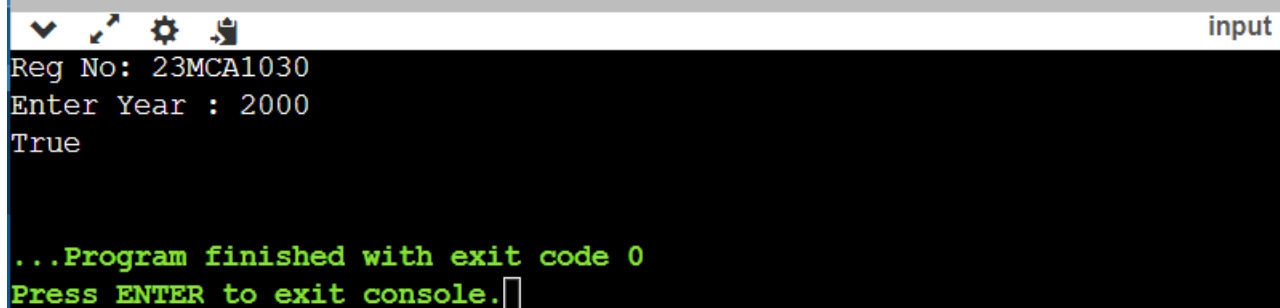
        scan.close();

    }

}
```



```
Main.java
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String args[]) {
4         Scanner scan = new Scanner(System.in);
5         System.out.println("Reg No: 23MCA1030");
6         System.out.print("Enter Year : ");
7         int year = scan.nextInt();
8         if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {
9             System.out.println("True");
10        } else {
11            System.out.println("False");
12        }
13        scan.close();
14    }
15 }
```



```
input
Reg No: 23MCA1030
Enter Year : 2000
True

...Program finished with exit code 0
Press ENTER to exit console.
```

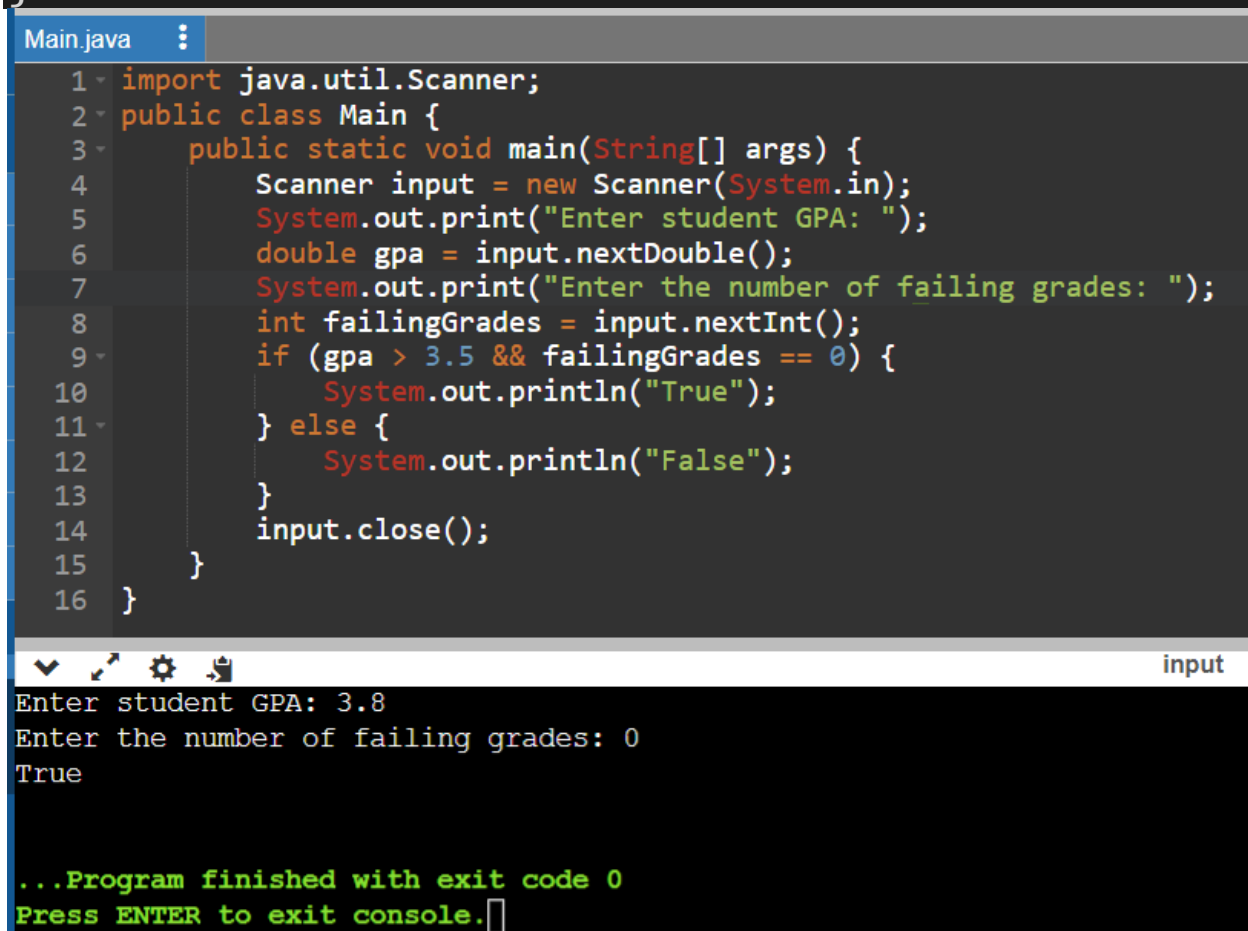
c. Write a Java program that checks if a student is eligible for a scholarship. To be eligible, the student must have a GPA greater than 3.5 and must not have any failing grades. Use logical AND and NOT operators.

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter student GPA: ");
        double gpa = input.nextDouble();
        System.out.print("Enter the number of failing grades: ");
        int failingGrades = input.nextInt();
        if (gpa > 3.5 && failingGrades == 0) {
            System.out.println("True");
        } else {
            System.out.println("False");
        }
        input.close();
    }
}
```



The screenshot shows an IDE window titled 'Main.java' containing the same Java code as above. Below the code editor, the console output is visible, showing the program's execution with user input. The output indicates that the student is eligible for the scholarship because their GPA is 3.8 and they have 0 failing grades.

```
Main.java :
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner input = new Scanner(System.in);
5         System.out.print("Enter student GPA: ");
6         double gpa = input.nextDouble();
7         System.out.print("Enter the number of failing grades: ");
8         int failingGrades = input.nextInt();
9         if (gpa > 3.5 && failingGrades == 0) {
10             System.out.println("True");
11         } else {
12             System.out.println("False");
13         }
14         input.close();
15     }
16 }

input
Enter student GPA: 3.8
Enter the number of failing grades: 0
True

...Program finished with exit code 0
Press ENTER to exit console.
```

2. Ternary Operator:

a. Implement a program to find the maximum of two numbers using the ternary operator.

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("23MCA1030");

        System.out.print("Enter num1: ");

        int num1 = input.nextInt();

        System.out.print("Enter num2: ");

        int num2 = input.nextInt();

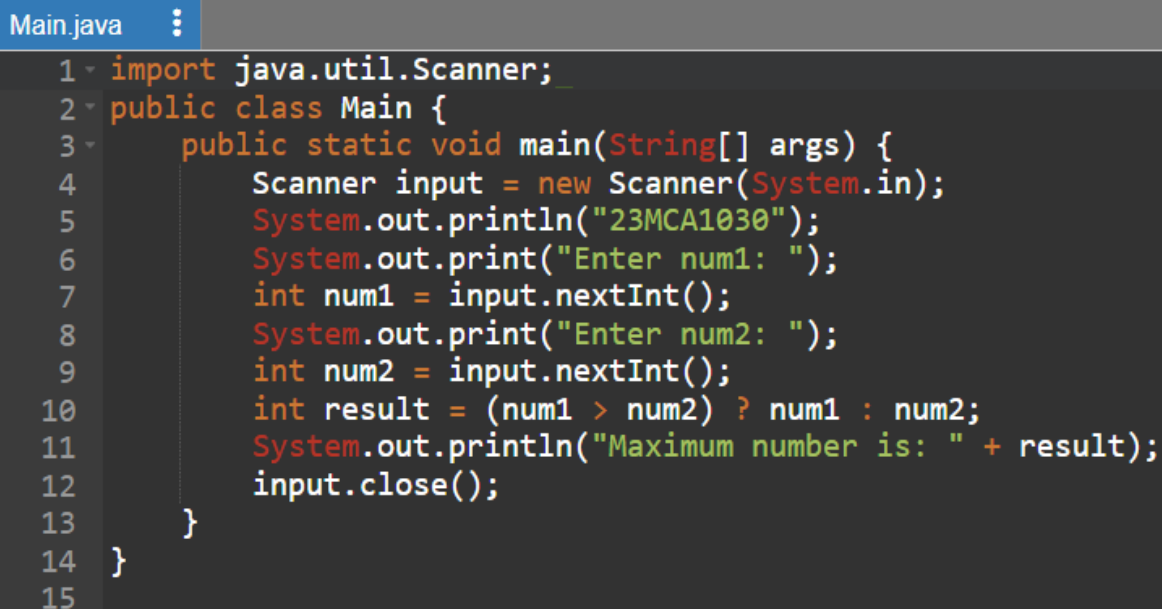
        int result = (num1 > num2) ? num1 : num2;

        System.out.println("Maximum number is: " + result);

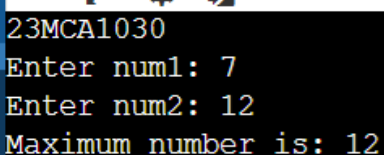
        input.close();

    }

}
```



```
Main.java
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner input = new Scanner(System.in);
5         System.out.println("23MCA1030");
6         System.out.print("Enter num1: ");
7         int num1 = input.nextInt();
8         System.out.print("Enter num2: ");
9         int num2 = input.nextInt();
10        int result = (num1 > num2) ? num1 : num2;
11        System.out.println("Maximum number is: " + result);
12        input.close();
13    }
14 }
15
```



```
23MCA1030
Enter num1: 7
Enter num2: 12
Maximum number is: 12
```

```
...Program finished with exit code 0
Press ENTER to exit console.
```

b. Write a Java program to determine if a given number is positive, negative, or zero using the ternary operator.

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("23MCA1030");

        System.out.print("Enter a number: ");

        int num = input.nextInt();

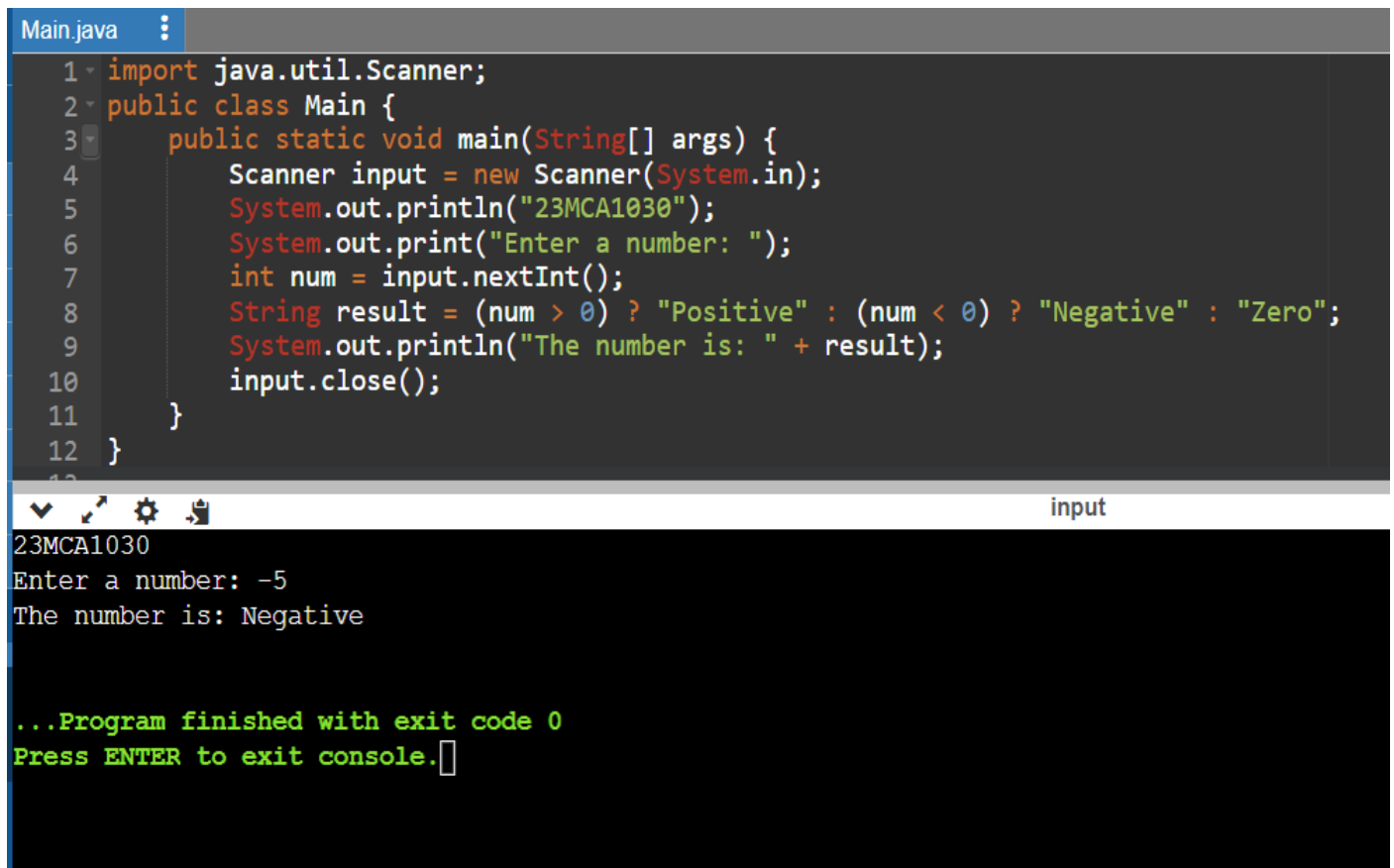
        String result = (num > 0) ? "Positive" : (num < 0) ? "Negative" : "Zero";

        System.out.println("The number is: " + result);

        input.close();

    }

}
```



The screenshot shows an IDE window titled 'Main.java' containing the same Java code as the previous block. Below the code editor, the console output is visible. It shows the program's execution flow: it prints '23MCA1030', prompts for a number, receives '-5', and outputs 'The number is: Negative'. The program then finishes with exit code 0, and the console prompts the user to press ENTER to exit.

```
Main.java :
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner input = new Scanner(System.in);
5         System.out.println("23MCA1030");
6         System.out.print("Enter a number: ");
7         int num = input.nextInt();
8         String result = (num > 0) ? "Positive" : (num < 0) ? "Negative" : "Zero";
9         System.out.println("The number is: " + result);
10        input.close();
11    }
12 }

input
23MCA1030
Enter a number: -5
The number is: Negative

...Program finished with exit code 0
Press ENTER to exit console.
```

c. Create a program that compares three numbers and prints the largest one using the ternary operator.

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("23MCA1030");

        System.out.print("Enter the first number value of x: ");

        int x = input.nextInt();

        System.out.print("Enter the second number value of y: ");

        int y = input.nextInt();

        System.out.print("Enter the third number value of z: ");

        int z = input.nextInt();

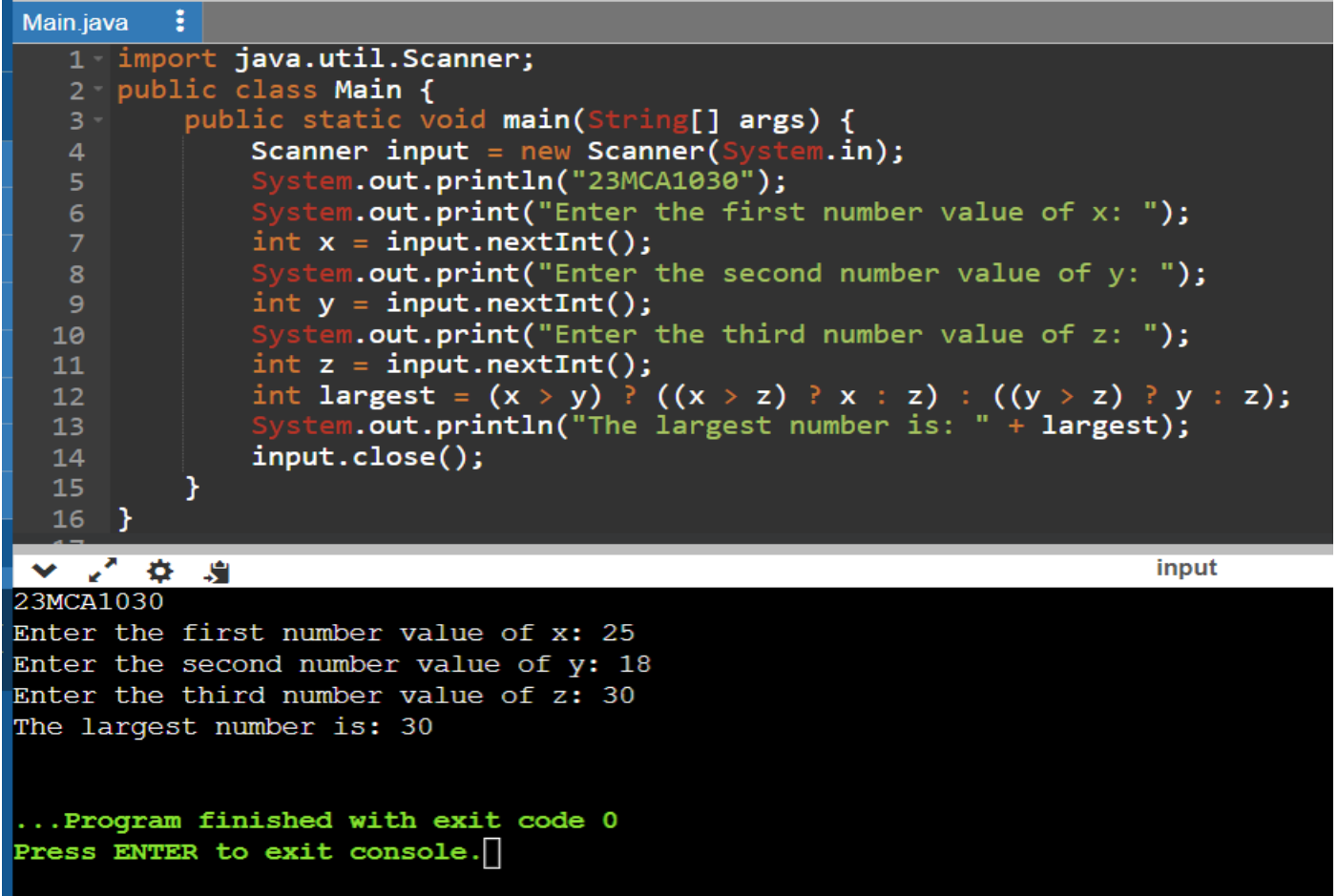
        int largest = (x > y) ? ((x > z) ? x : z) : ((y > z) ? y : z);

        System.out.println("The largest number is: " + largest);

        input.close();

    }

}
```

The image shows a screenshot of a Java IDE. The top part displays the source code for 'Main.java', which is a Java program to find the largest of three numbers using the ternary operator. The code is as follows:

```
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner input = new Scanner(System.in);
5         System.out.println("23MCA1030");
6         System.out.print("Enter the first number value of x: ");
7         int x = input.nextInt();
8         System.out.print("Enter the second number value of y: ");
9         int y = input.nextInt();
10        System.out.print("Enter the third number value of z: ");
11        int z = input.nextInt();
12        int largest = (x > y) ? ((x > z) ? x : z) : ((y > z) ? y : z);
13        System.out.println("The largest number is: " + largest);
14        input.close();
15    }
16 }
```

The bottom part of the screenshot shows the console output of the program. It starts with the program ID '23MCA1030', followed by prompts for three numbers. The user has entered 25 for x, 18 for y, and 30 for z. The program then outputs 'The largest number is: 30'. At the bottom, it says '...Program finished with exit code 0' and 'Press ENTER to exit console.' with a cursor.

3. Combining Logical and Ternary Operators:

a. Develop a program that checks whether a person is eligible to vote. The eligibility age is 18. Use the ternary operator to display "Eligible" or "Not Eligible."

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("23MCA1030");

        System.out.print("Enter your age: ");

        int age = input.nextInt();

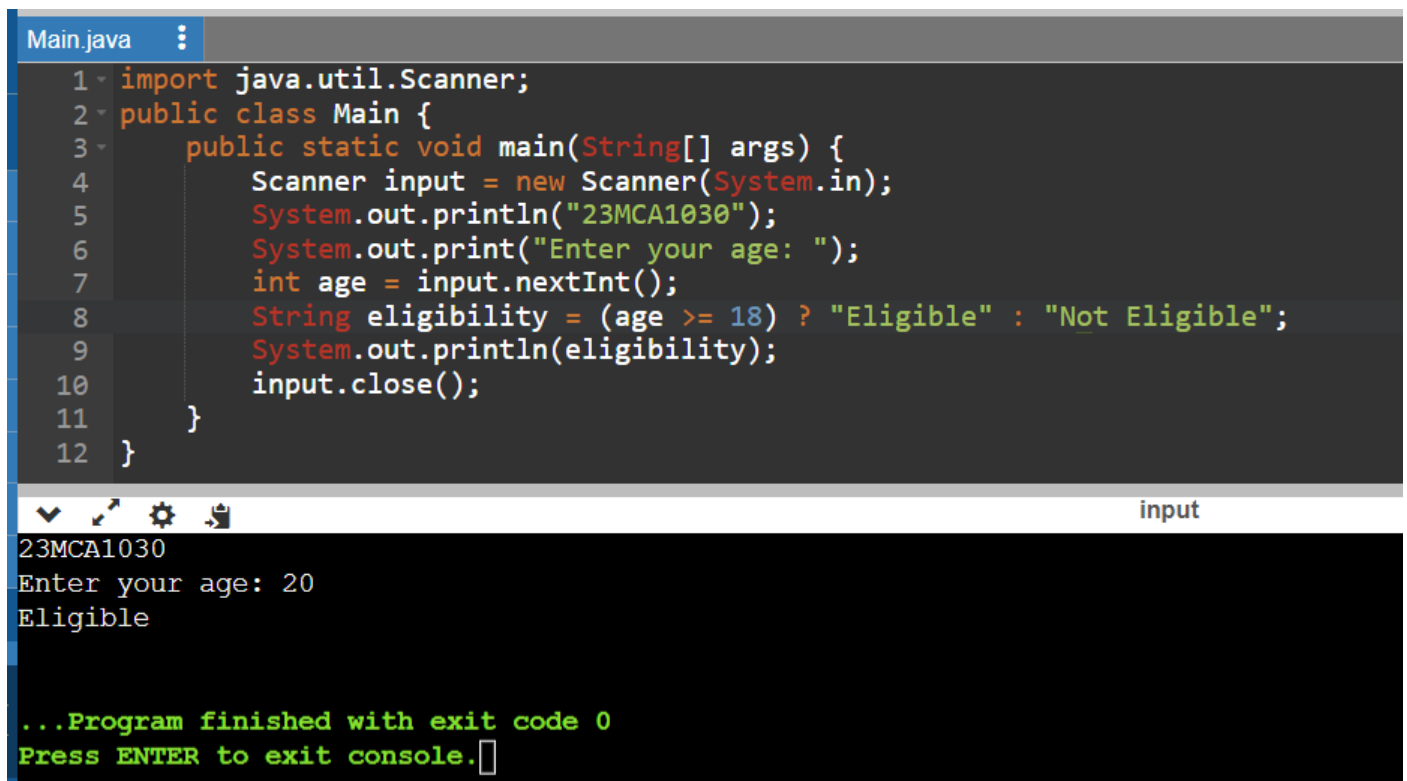
        String eligibility = (age >= 18) ? "Eligible" : "Not Eligible";

        System.out.println(eligibility);

        input.close();

    }

}
```



The screenshot shows an IDE window titled 'Main.java' containing the same Java code as the previous block. Below the code editor, the console output is visible. The program prints '23MCA1030' and prompts 'Enter your age: '. The user enters '20', and the program outputs 'Eligible'. At the bottom, a message states '...Program finished with exit code 0' and 'Press ENTER to exit console.'.

```
Main.java :
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner input = new Scanner(System.in);
5         System.out.println("23MCA1030");
6         System.out.print("Enter your age: ");
7         int age = input.nextInt();
8         String eligibility = (age >= 18) ? "Eligible" : "Not Eligible";
9         System.out.println(eligibility);
10        input.close();
11    }
12 }
```

input

23MCA1030
Enter your age: 20
Eligible

...Program finished with exit code 0
Press ENTER to exit console.

b. Write a Java program that determines whether a given character is a vowel or a consonant. Use the ternary operator to print "Vowel" or "Consonant."

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("23MCA1030");

        System.out.print("Enter character: ");

        char ch = input.next().charAt(0);

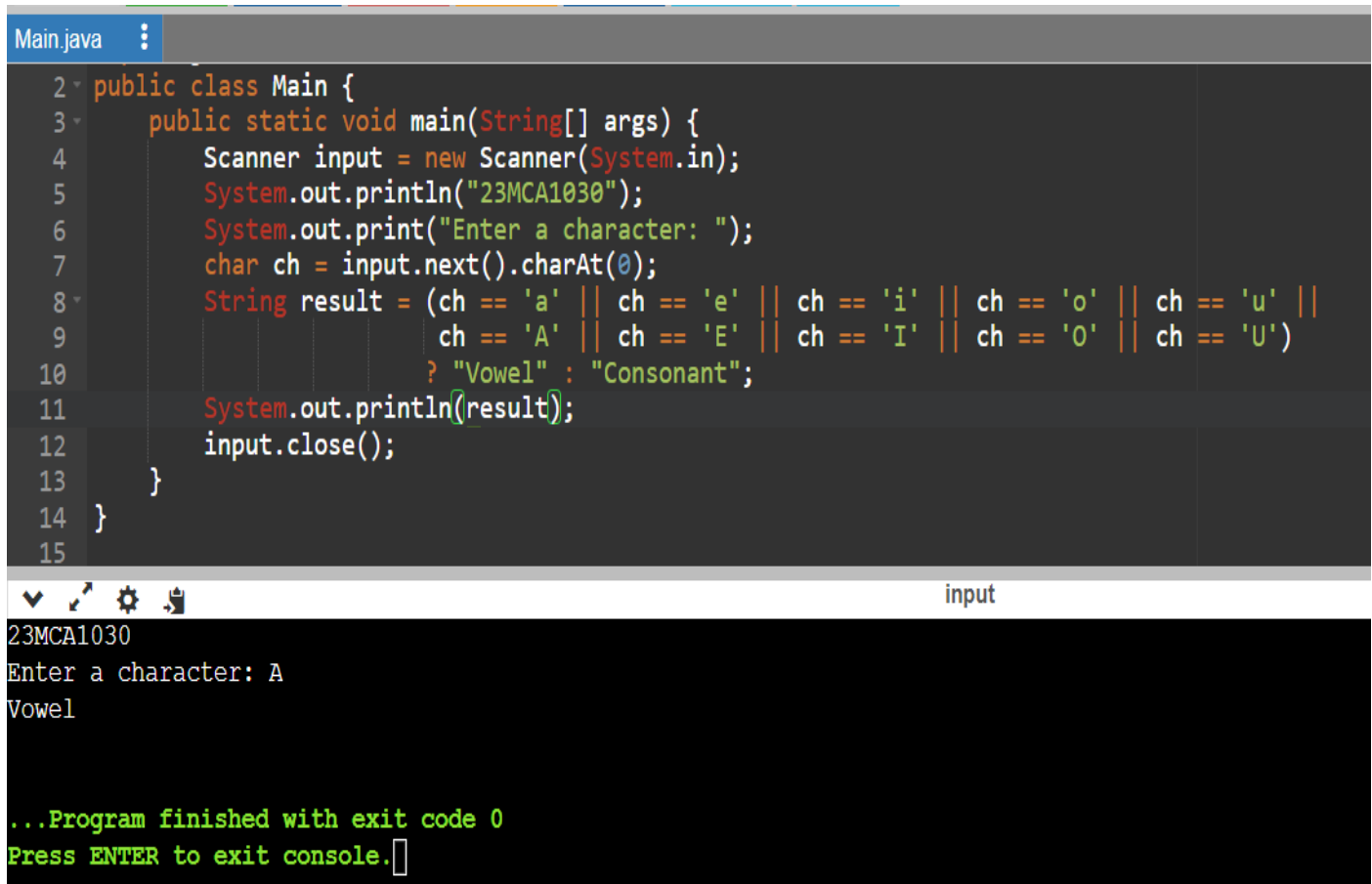
        String result = (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' || ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U') ? "Vowel" : "Consonant";

        System.out.println(result);

        input.close();

    }

}
```



The screenshot shows an IDE window titled 'Main.java' containing the same Java code as the previous block. Below the code editor, the console output is visible. It shows the program's execution flow: it prints '23MCA1030', prompts for a character, receives 'A', and outputs 'Vowel'. The console also shows the program finished with exit code 0 and a prompt to press ENTER to exit.

```
Main.java
2 public class Main {
3     public static void main(String[] args) {
4         Scanner input = new Scanner(System.in);
5         System.out.println("23MCA1030");
6         System.out.print("Enter a character: ");
7         char ch = input.next().charAt(0);
8         String result = (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' ||
9                         ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U')
10                        ? "Vowel" : "Consonant";
11         System.out.println(result);
12         input.close();
13     }
14 }
15

input
23MCA1030
Enter a character: A
Vowel

...Program finished with exit code 0
Press ENTER to exit console.
```


c. Create a program that checks if a given year is a leap year and prints the result using the ternary operator.

Code:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("23MCA1030");

        System.out.print("Enter a year: ");

        int year = input.nextInt();

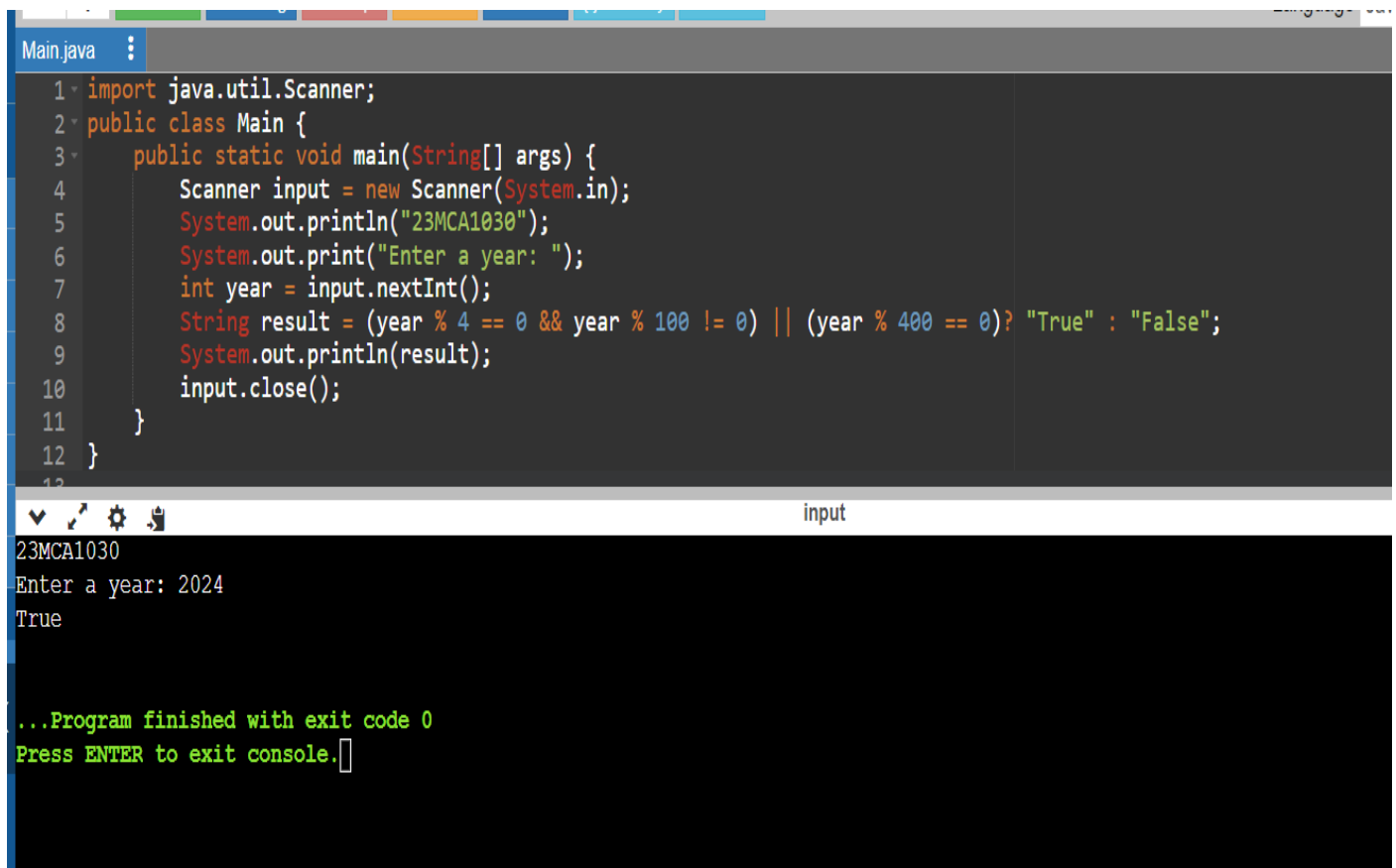
        String result = (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)?
"True" : "False";

        System.out.println(result);

        input.close();

    }

}
```



The screenshot shows an IDE window titled 'Main.java' containing the same Java code as above. Below the code editor, the console output is visible. It shows the program printing '23MCA1030', then 'Enter a year: 2024'. The user has entered '2024', and the program outputs 'True'. At the bottom, a message states '...Program finished with exit code 0' and 'Press ENTER to exit console.'

```
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner input = new Scanner(System.in);
5         System.out.println("23MCA1030");
6         System.out.print("Enter a year: ");
7         int year = input.nextInt();
8         String result = (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)? "True" : "False";
9         System.out.println(result);
10        input.close();
11    }
12 }
```

input

23MCA1030
Enter a year: 2024
True

...Program finished with exit code 0
Press ENTER to exit console.