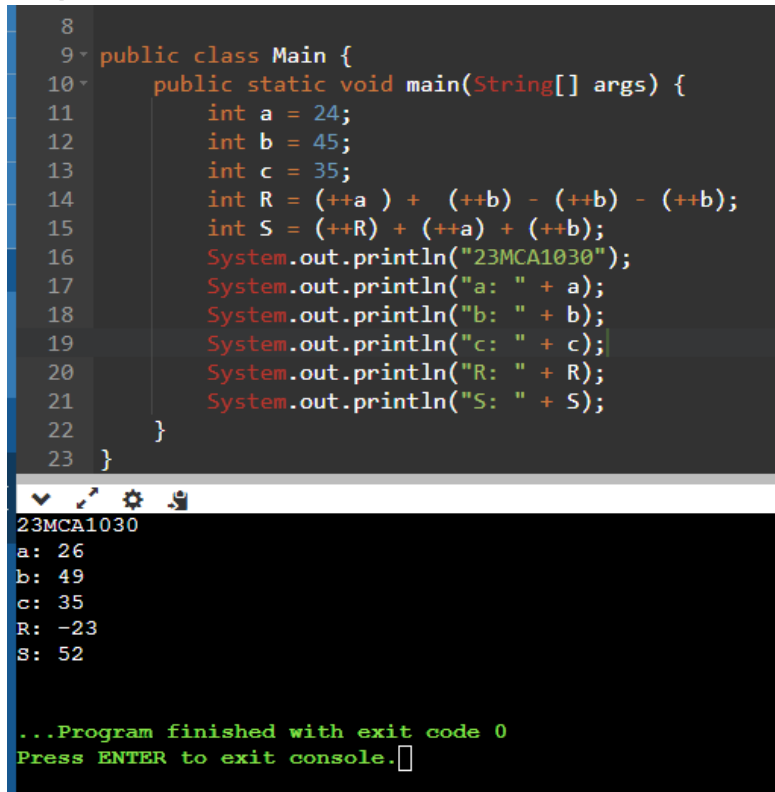


1. Write a java Program to implement the following operations
- a.

```
int a=24
int b=45
int c=35
int R= (++a ) + (++b) - (++b) - (++b)
int S =(++R) + (++a) + (++b)
Print the value of a,b,c,R,and S
```

Code:

```
public class Main {
    public static void main(String[] args) {
        int a = 24;
        int b = 45;
        int c = 35;
        int R = (++a ) + (++b) - (++b) - (++b);
        int S = (++R) + (++a) + (++b);
        System.out.println("23MCA1030");
        System.out.println("a: " + a);
        System.out.println("b: " + b);
        System.out.println("c: " + c);
        System.out.println("R: " + R);
        System.out.println("S: " + S);
    }
}
```

Output:

The screenshot shows a Java IDE with a dark theme. The top pane displays the Java code for the 'Main' class, which implements the operations specified in the problem. The bottom pane shows the output of the program, which includes the student ID '23MCA1030' and the final values of variables a, b, c, R, and S. The output also shows the program finished with exit code 0 and a prompt to press ENTER to exit the console.

```
8
9 public class Main {
10     public static void main(String[] args) {
11         int a = 24;
12         int b = 45;
13         int c = 35;
14         int R = (++a ) + (++b) - (++b) - (++b);
15         int S = (++R) + (++a) + (++b);
16         System.out.println("23MCA1030");
17         System.out.println("a: " + a);
18         System.out.println("b: " + b);
19         System.out.println("c: " + c);
20         System.out.println("R: " + R);
21         System.out.println("S: " + S);
22     }
23 }
```

23MCA1030
a: 26
b: 49
c: 35
R: -23
S: 52

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

b. Int a=24
Int b=45
Int c=35
Int R= (--a) + (--b) - (--b) - (--b)
Int S =(--R) + (--a) + (--b)
Print the value of a,b,c,R,and S

Code:

```
public class Main {  
    public static void main(String[] args) {  
        int a = 24;  
        int b = 45;  
        int c = 35;  
        int R = (--a ) + (--b) - (--b) - (--b);  
        int S = (--R) + (--a) + (--b);  
        System.out.println("23MCA1030");  
        System.out.println("a: " + a);  
        System.out.println("b: " + b);  
        System.out.println("c: " + c);  
        System.out.println("R: " + R);  
        System.out.println("S: " + S);  
    }  
}
```

Output:

```
8  
9 public class Main {  
10     public static void main(String[] args) {  
11         int a = 24;  
12         int b = 45;  
13         int c = 35;  
14         int R = (--a ) + (--b) - (--b) - (--b);  
15         int S = (--R) + (--a) + (--b);  
16         System.out.println("23MCA1030");  
17         System.out.println("a: " + a);  
18         System.out.println("b: " + b);  
19         System.out.println("c: " + c);  
20         System.out.println("R: " + R);  
21         System.out.println("S: " + S);  
22     }  
23 }
```

23MCA1030
a: 22
b: 41
c: 35
R: -19
S: 44

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

c.

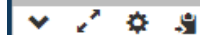
```
int a=24
Int b=45
Int c=35
Int R= (++a) + (--b) - (++b) - (--b)
Int S =(++R) + (--a) + (++b)
Print the value of a,b,c,R,and S
```

Code:

```
public class Main {
    public static void main(String[] args) {
        int a = 24;
        int b = 45;
        int c = 35;
        int R = (++a) + (--b) - (++b) - (--b);
        int S = (++R) + (--a) + (++b);
        System.out.println("23MCA1030");
        System.out.println("a: " + a);
        System.out.println("b: " + b);
        System.out.println("c: " + c);
        System.out.println("R: " + R);
        System.out.println("S: " + S);
    }
}
```

Output:

```
8
9 public class Main {
10     public static void main(String[] args) {
11         int a = 24;
12         int b = 45;
13         int c = 35;
14         int R = (++a) + (--b) - (++b) - (--b);
15         int S = (++R) + (--a) + (++b);
16         System.out.println("23MCA1030");
17         System.out.println("a: " + a);
18         System.out.println("b: " + b);
19         System.out.println("c: " + c);
20         System.out.println("R: " + R);
21         System.out.println("S: " + S);
22     }
23 }
```



23MCA1030

```
a: 24
b: 45
c: 35
R: -19
S: 50
```

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

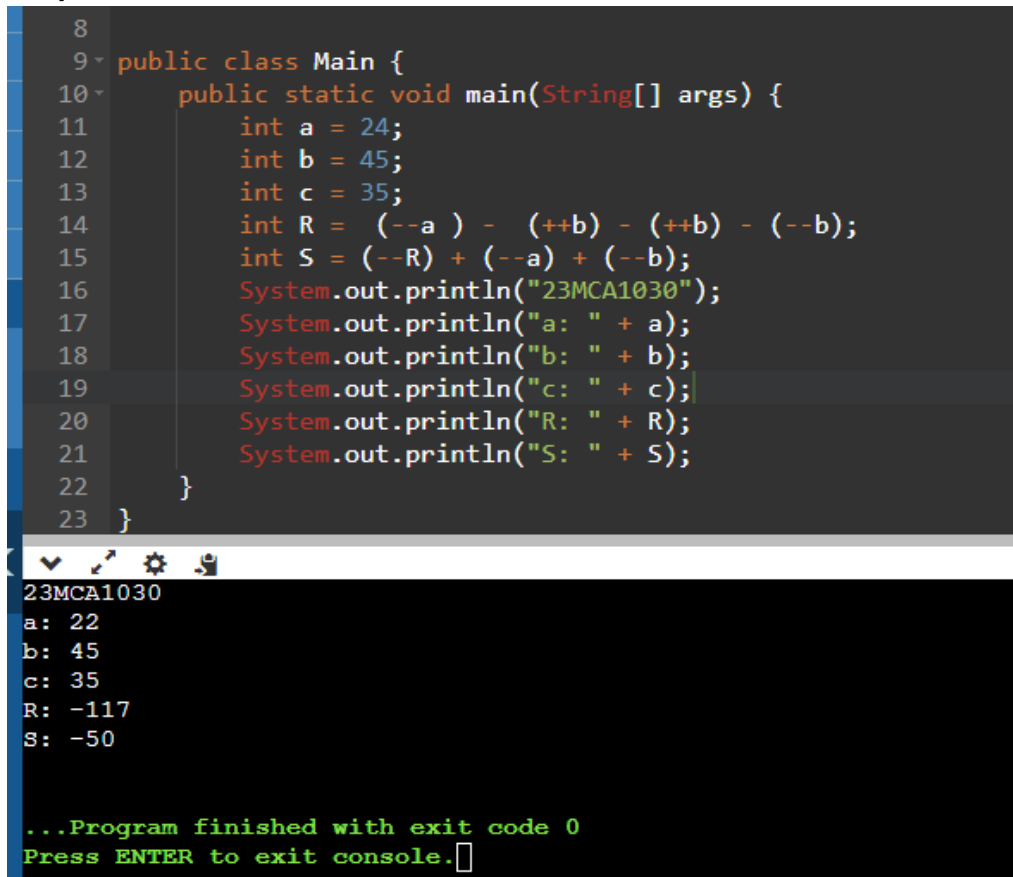
d.

```
int a=24
int b=45
int c=35
int R = (--a) - (++b) - (++b) - (--b)
int S = (--R) + (--a) + (--b)
Print the value of a,b,c,R,and S
```

Code:

```
public class Main {
    public static void main(String[] args) {
        int a = 24;
        int b = 45;
        int c = 35;
        int R = (--a) - (++b) - (++b) - (--b);
        int S = (--R) + (--a) + (--b);
        System.out.println("23MCA1030");
        System.out.println("a: " + a);
        System.out.println("b: " + b);
        System.out.println("c: " + c);
        System.out.println("R: " + R);
        System.out.println("S: " + S);
    }
}
```

Output:

A screenshot of a Java IDE. The top pane shows the source code for a class named Main. The code initializes variables a, b, and c, then calculates R and S using pre-decrement and post-increment operators. It then prints the string "23MCA1030" and the values of a, b, c, R, and S. The bottom pane shows the output of the program, which matches the code's output statements. The output shows the string "23MCA1030" followed by the values of a (22), b (45), c (35), R (-117), and S (-50). The program finishes with exit code 0.

```
8
9 public class Main {
10     public static void main(String[] args) {
11         int a = 24;
12         int b = 45;
13         int c = 35;
14         int R = (--a) - (++b) - (++b) - (--b);
15         int S = (--R) + (--a) + (--b);
16         System.out.println("23MCA1030");
17         System.out.println("a: " + a);
18         System.out.println("b: " + b);
19         System.out.println("c: " + c);
20         System.out.println("R: " + R);
21         System.out.println("S: " + S);
22     }
23 }
```

```
23MCA1030
a: 22
b: 45
c: 35
R: -117
S: -50

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

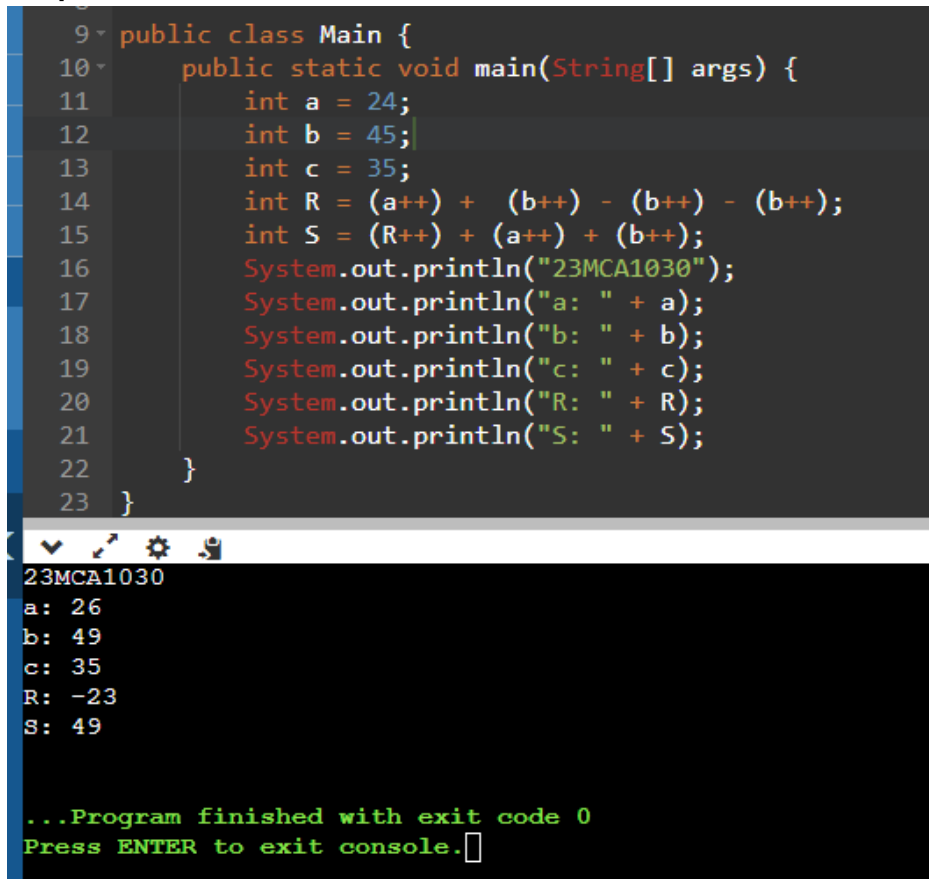
e.

```
int a=24
Int b=45
Int c=35
Int R= (a++) + (b++) - (b++) - (b++)
Int S =(R++) + (a++) + (b++)
Print the value of a,b,c,R,and S
```

Code:

```
public class Main {
    public static void main(String[] args) {
        int a = 24;
        int b = 45;
        int c = 35;
        int R = (a++) + (b++) - (b++) - (b++);
        int S = (R++) + (a++) + (b++);
        System.out.println("23MCA1030");
        System.out.println("a: " + a);
        System.out.println("b: " + b);
        System.out.println("c: " + c);
        System.out.println("R: " + R);
        System.out.println("S: " + S);
    }
}
```

Output:

A screenshot of a Java IDE. The top pane shows the source code for a class named Main. The code initializes variables a, b, and c, then calculates R and S using post-increment operators. It prints the string "23MCA1030" and the values of a, b, c, R, and S. The bottom pane shows the output of the program, which matches the code's output. The output is displayed on a black background with green text.

```
9 public class Main {
10     public static void main(String[] args) {
11         int a = 24;
12         int b = 45;
13         int c = 35;
14         int R = (a++) + (b++) - (b++) - (b++);
15         int S = (R++) + (a++) + (b++);
16         System.out.println("23MCA1030");
17         System.out.println("a: " + a);
18         System.out.println("b: " + b);
19         System.out.println("c: " + c);
20         System.out.println("R: " + R);
21         System.out.println("S: " + S);
22     }
23 }
```

```
23MCA1030
a: 26
b: 49
c: 35
R: -23
S: 49

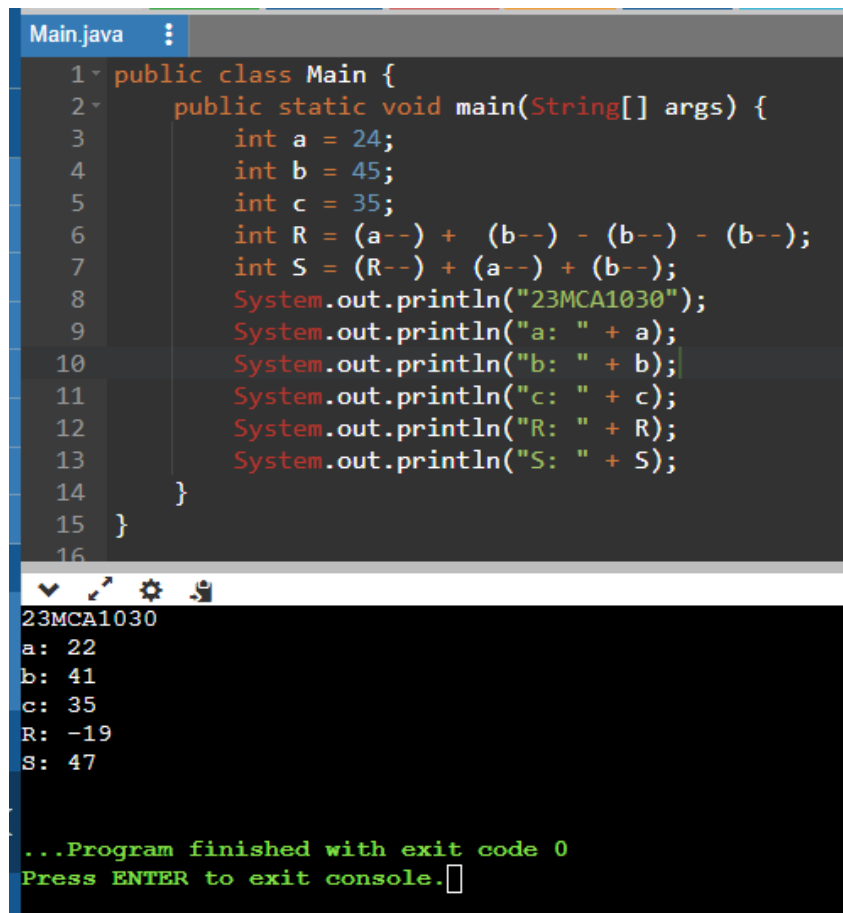
...Program finished with exit code 0
Press ENTER to exit console.
```

f. int a=24
 int b=45
 int c=35
 int R = (a--) + (b--) - (b - -) - (b - -)
 int S =(R- -) + (a - -) + (b - -)
 Print the value of a,b,c,R,and S

Code:

```
public class Main {  
    public static void main(String[] args) {  
        int a = 24;  
        int b = 45;  
        int c = 35;  
        int R = (a--) + (b--) - (b--) - (b--);  
        int S = (R--) + (a--) + (b--);  
        System.out.println("23MCA1030");  
        System.out.println("a: " + a);  
        System.out.println("b: " + b);  
        System.out.println("c: " + c);  
        System.out.println("R: " + R);  
        System.out.println("S: " + S);  
    }  
}
```

Output:



The screenshot shows a Java IDE with a file named 'Main.java'. The code is as follows:

```
1 public class Main {  
2     public static void main(String[] args) {  
3         int a = 24;  
4         int b = 45;  
5         int c = 35;  
6         int R = (a--) + (b--) - (b--) - (b--);  
7         int S = (R--) + (a--) + (b--);  
8         System.out.println("23MCA1030");  
9         System.out.println("a: " + a);  
10        System.out.println("b: " + b);  
11        System.out.println("c: " + c);  
12        System.out.println("R: " + R);  
13        System.out.println("S: " + S);  
14    }  
15 }  
16
```

The output of the program is displayed in the console:

```
23MCA1030  
a: 22  
b: 41  
c: 35  
R: -19  
S: 47  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

g.

Int a=24

Int b=45

Int c=35

Int R= (a--) + (b++) - (--b) - (b - -)

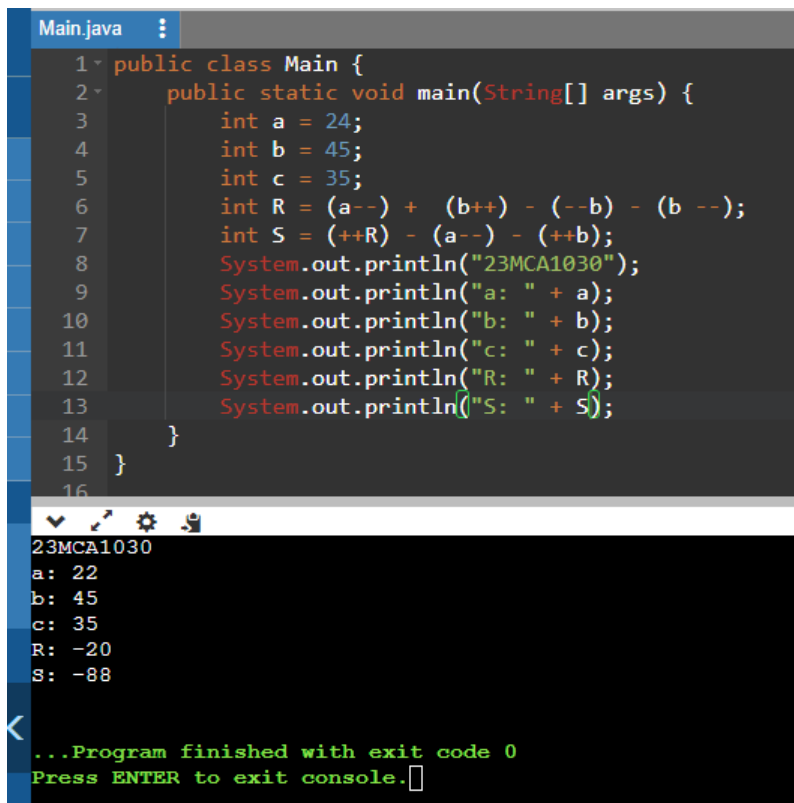
Int S =(++R) - (a - -) - (++b)

Print the value of a,b,c,R,and S

Code:

```
public class Main {  
    public static void main(String[] args) {  
        int a = 24;  
        int b = 45;  
        int c = 35;  
        int R = (a--) + (b++) - (--b) - (b --);  
        int S = (++R) - (a--) - (++b);  
        System.out.println("23MCA1030");  
        System.out.println("a: " + a);  
        System.out.println("b: " + b);  
        System.out.println("c: " + c);  
        System.out.println("R: " + R);  
        System.out.println("S: " + S);  
    }  
}
```

Output:



The screenshot shows a Java IDE with a file named 'Main.java'. The code is as follows:

```
1 public class Main {  
2     public static void main(String[] args) {  
3         int a = 24;  
4         int b = 45;  
5         int c = 35;  
6         int R = (a--) + (b++) - (--b) - (b --);  
7         int S = (++R) - (a--) - (++b);  
8         System.out.println("23MCA1030");  
9         System.out.println("a: " + a);  
10        System.out.println("b: " + b);  
11        System.out.println("c: " + c);  
12        System.out.println("R: " + R);  
13        System.out.println("S: " + S);  
14    }  
15 }  
16
```

The output of the program is displayed in the console:

```
23MCA1030  
a: 22  
b: 45  
c: 35  
R: -20  
S: -88  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

2. Write a Java program that demonstrates the use of increment and decrement operators. Declare an integer variable (x) and perform the following operations:

Initialize the variable with a value 25.

- Post-increment the variable and print the result.
- Pre-increment the variable and print the result.
- Post-decrement the variable and print the result.
- Pre-decrement the variable and print the result.

Note: Use functions and Scanner class

Code:

```
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println ("23MCA1030");
        System.out.println ("Enter the value of x");
        int x =scanner.nextInt ();
        scanner.nextLine ();
        // Post-increment
        System.out.println("Post-increment: " + (x++));
        // Pre-increment
        System.out.println("Pre-increment: " + (++x));
        // Post-decrement
        System.out.println("Post-decrement: " + (x--));
        // Pre-decrement
        System.out.println("Pre-decrement: " + (--x));
    }
}
```


Output:

```
Main.java  ⋮
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner scanner = new Scanner(System.in);
5         System.out.println("23MCA1030");
6         System.out.println("Enter the value of x");
7         int x = scanner.nextInt ();
8         scanner.nextLine ();
9         // Post-increment
10        System.out.println("Post-increment: " + (x++));
11        // Pre-increment
12        System.out.println("Pre-increment: " + (++x));
13        // Post-decrement
14        System.out.println("Post-decrement: " + (x--));
15        // Pre-decrement
16        System.out.println("Pre-decrement: " + (--x));
17    }
18 }
19
```

```
✓ ↗ ⚙ 📄
23MCA1030
Enter the value of x
25
Post-increment: 25
Pre-increment: 27
Post-decrement: 27
Pre-decrement: 25

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

3. Write a Java program that demonstrates the use of combined increment operations. Declare two integer variables, `a` and `b`, and perform the following operations:

- Initialize both variables with values.
- Use pre-increment on `a` and post-increment on `b`.
- Add the results of the increment operations and store the result in a third variable, `sum`.
- Print the values of `a`, `b`, and `sum`.

Note: Use functions and Scanner class

Code:

```
import java.util.Scanner;
public class Main
{
    public static void main (String[]args)
    {
        Scanner scanner = new Scanner (System.in);
        System.out.println ("23MCA1030");
        System.out.println ("Enter the value of a");
        int a =scanner.nextInt ();
        scanner.nextLine ();
        System.out.println ("Enter the value of b");
        int b =scanner.nextInt ();
        scanner.nextLine ();
        // Pre-increment
        System.out.println ("Pre-increment: " + (++a));
        // Post-decrement
        System.out.println ("Post-decrement: " + (b--));
        // sum of increments
        System.out.println ("Sum: " + (a + b));

    }
}
```

Main.java

```
1 import java.util.Scanner;
2 public class Main
3 {
4     public static void main (String[]args)
5     {
6         Scanner scanner = new Scanner (System.in);
7         System.out.println ("23MCA1030");
8         System.out.println ("Enter the value of a");
9         int a =scanner.nextInt ();
10        scanner.nextLine ();
11        System.out.println ("Enter the value of b");
12        int b =scanner.nextInt ();
13        scanner.nextLine ();
14        // Pre-increment
15        System.out.println ("Pre-increment: " + (++a));
16        // Post-decrement
17        System.out.println ("Post-decrement: " + (b--));
18        // sum of increments
19        System.out.println ("Sum: " + (a + b));
20
21    }
22 }
```

```
< 23MCA1030
Enter the value of a
10
Enter the value of b
5
Pre-increment: 11
Post-decrement: 5
Sum: 15

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

4. Write a Java program that uses compound assignment operators to perform the following operations:

- Initialize an integer variable with a value.
- Use pre-increment to increase the variable by 1.
- Use post-increment to increase the variable by 1.
- Use compound assignment to multiply the variable by 3.
- Print the result after each operation.

Code:

```
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        // Initialize an integer variable with a value
        int a = 5;
        System.out.println ("23MCA1030");
        // pre-increment to increase the variable by 1
        System.out.println("Pre-increment: " + (++a));
        // post-increment to increase the variable by 1
        System.out.println("Post-increment: " + (a++));
        // compound assignment to multiply the variable by 3
        a =a*3;
        System.out.println("Multiply the value of a" + a);
    }
}
```

Output:

```
Main.java
1 import java.util.Scanner;
2 public class Main {
3     public static void main(String[] args) {
4         Scanner scanner = new Scanner(System.in);
5         // Initialize an integer variable with a value
6         int a = 5;
7         System.out.println("23MCA1030");
8         // pre-increment to increase the variable by 1
9         System.out.println("Pre-increment: " + (++a));
10        // post-increment to increase the variable by 1
11        System.out.println("Post-increment: " + (a++));
12        // compound assignment to multiply the variable by 3
13        a = a*3;
14        System.out.println("Multiply the value of a" + a);
15    }
16 }
```

23MCA1030
Pre-increment: 6
Post-increment: 6
Multiply the value of a21

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

5. Create a Java method that takes an integer parameter and performs the following operations:

- Print the parameter.
- Use post-increment to increment the parameter.
- Print the parameter again.
- Use pre-increment to increment the parameter.
- Print the parameter once more.

Call this method with an initial value and observe the output.

Code:

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

    public static void incrementOperations(int num) {
        // Print the number
        System.out.println("23MCA1030");
        System.out.println("number: " + num);

        // Use post-increment to increment the number
        num++;
        System.out.println("Post-increment: " + num);

        // Print the number again
        System.out.println("number: " + num);

        // Use pre-increment to increment the number
        ++num;
        System.out.println("Pre-increment: " + num);

        // Print the number once more
        System.out.println("number: " + num);
    }
}
```

Output:

```
Main.java
1 public class Main {
2     public static void main(String[] args) {
3         int num = 5;
4         incrementOperations(num);
5     }
6
7     public static void incrementOperations(int num) {
8         // Print the number
9         System.out.println("23MCA1030");
10        System.out.println("number: " + num);
11
12        // Use post-increment to increment the number
13        num++;
14        System.out.println("Post-increment: " + num);
15
16        // Print the number again
17        System.out.println("number: " + num);
18
19        // Use pre-increment to increment the number
20        ++num;
21        System.out.println("Pre-increment: " + num);
22
23        // Print the number once more
24        System.out.println("number: " + num);
25    }
26 }
```

23MCA1030
number: 5
Post-increment: 6
number: 6
Pre-increment: 7
number: 7

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

6. Write a Java program that demonstrates side effects of increment operators. Declare two variables, `a` and `b`, and initialize them with the same value. Use pre-increment on `a` and post-increment on `b`. Print both variables after each operation and observe the difference.

Code:

```
public class Main {  
    public static void main(String[] args) {  
        int a = 10;  
        int b = 10;  
        System.out.println("23MCA1030");  
        // Using pre-increment on a and post-increment on b  
        System.out.println("a: " + (++a));  
        System.out.println("b: " + (b++));  
  
        // Printing both variables after each operation  
        System.out.println("a: " + a);  
        System.out.println("b: " + b);  
    }  
}
```

Output:

Main.java

```
1 public class Main {  
2     public static void main(String[] args) {  
3         int a = 10;  
4         int b = 10;  
5         System.out.println("23MCA1030");  
6         // Using pre-increment on a and post-increment on b  
7         System.out.println("a: " + (++a));  
8         System.out.println("b: " + (b++));  
9  
10        // Printing both variables after each operation  
11        System.out.println("a: " + a);  
12        System.out.println("b: " + b);  
13    }  
14 }  
15  
16
```

input

23MCA1030

a: 11

b: 10

a: 11

b: 11

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

7. Declare three integer variables x , y , and z and initialize them with different values. Use increment operators to perform the following operations:

1. Pre-increment x and post-increment y .
2. Multiply the result of step 1 by z .
3. Print the values of x , y , z , and the final result.

Note: use functions and scanner class

Code:

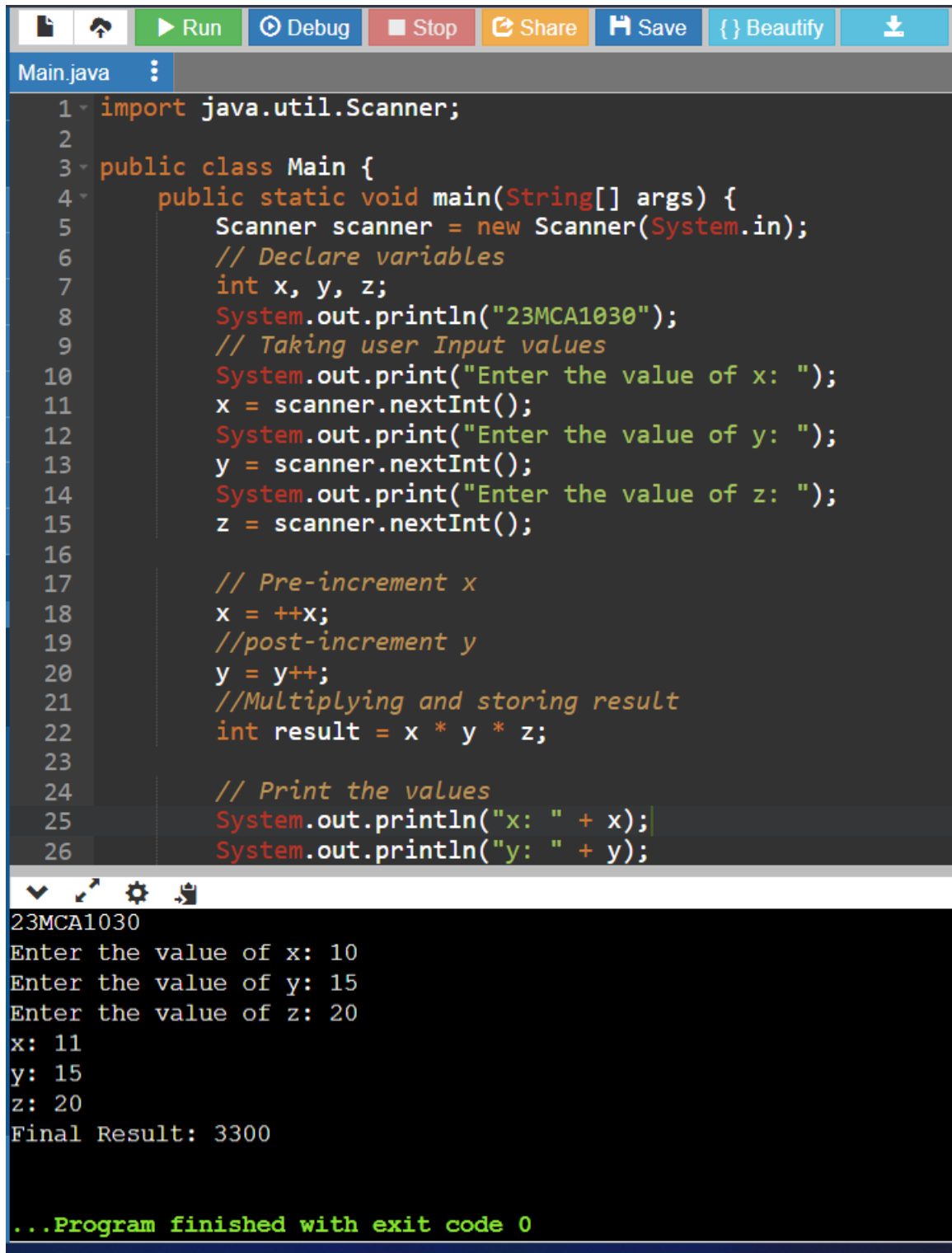
```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        // Declare variables
        int x, y, z;
        System.out.println("23MCA1030");
        // Taking user Input values
        System.out.print("Enter the value of x: ");
        x = scanner.nextInt();
        System.out.print("Enter the value of y: ");
        y = scanner.nextInt();
        System.out.print("Enter the value of z: ");
        z = scanner.nextInt();

        // Pre-increment x
        x = ++x;
        //post-increment y
        y = y++;
        //Multiplying and storing result
        int result = x * y * z;

        // Print the values
        System.out.println("x: " + x);
        System.out.println("y: " + y);
        System.out.println("z: " + z);
        System.out.println("Final Result: " + result);
    }
}
```

Output:



The image shows a screenshot of a Java IDE. The top toolbar contains icons for Run, Debug, Stop, Share, Save, Beautify, and a download icon. The file name 'Main.java' is visible. The code is as follows:

```
1 import java.util.Scanner;
2
3 public class Main {
4     public static void main(String[] args) {
5         Scanner scanner = new Scanner(System.in);
6         // Declare variables
7         int x, y, z;
8         System.out.println("23MCA1030");
9         // Taking user Input values
10        System.out.print("Enter the value of x: ");
11        x = scanner.nextInt();
12        System.out.print("Enter the value of y: ");
13        y = scanner.nextInt();
14        System.out.print("Enter the value of z: ");
15        z = scanner.nextInt();
16
17        // Pre-increment x
18        x = ++x;
19        //post-increment y
20        y = y++;
21        //Multiplying and storing result
22        int result = x * y * z;
23
24        // Print the values
25        System.out.println("x: " + x);
26        System.out.println("y: " + y);
```

The output window shows the following text:

```
23MCA1030
Enter the value of x: 10
Enter the value of y: 15
Enter the value of z: 20
x: 11
y: 15
z: 20
Final Result: 3300

...Program finished with exit code 0
```