Reg No: 23MCA1030 **Name:** Vinayak Kumar Singh **Subject**: Java Programming Lab

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:

```
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:

```
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);
    }
}
```

```
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:

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:

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


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

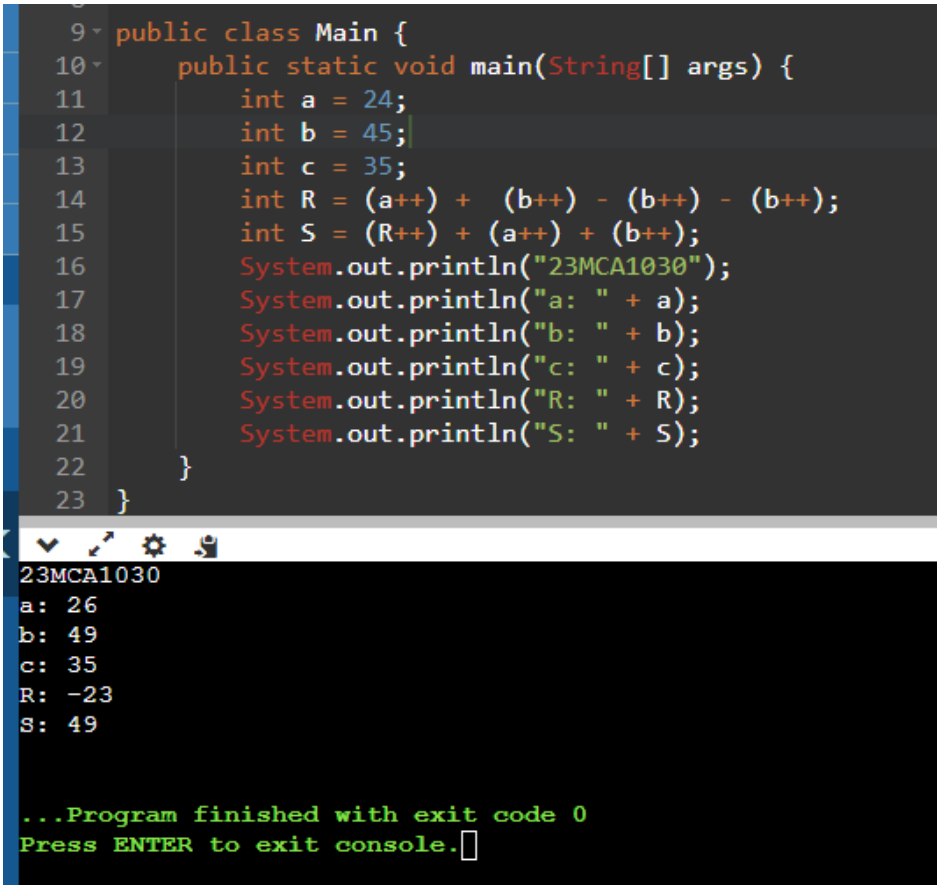
e.

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:

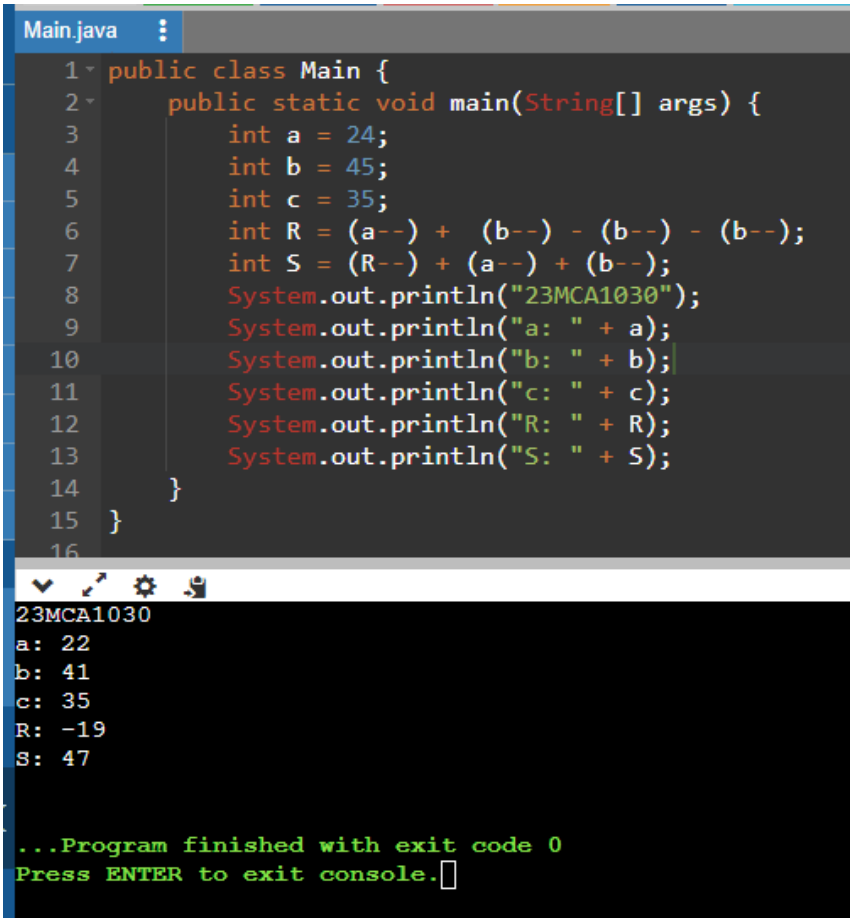


f. int a=24
Int b=45
int c=35
Int R= (a--) + (b--) - (b- -) - (b - -)
Int S =(R- -) + (a - -) + (b - -)
Print the value of a,b,c,R,and S

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:



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:

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

```java
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));
    }
}
```

```
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

```java
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));

  }
}
```

```
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

```java
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);
    }
}
```

```
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

```java
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);
    }
}
```

```
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

```java
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);
    }
}
```

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:

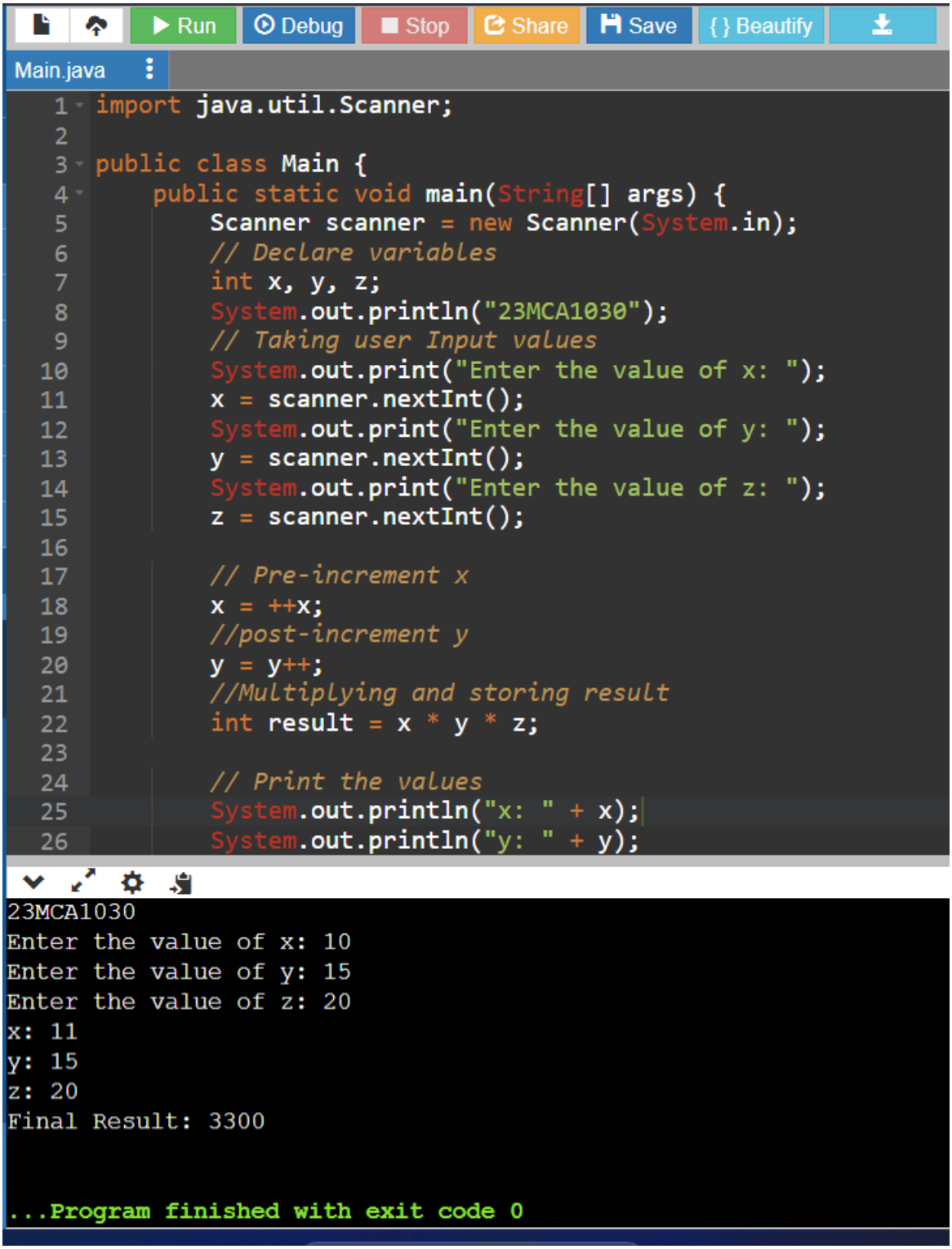
```
import java.util.Scanner;

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:


Run
Debug
Stop
Share
Save
{ } Beautify
Main.java
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);
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