COP-2210
Computer Programming I

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Text: Big Java: Early Objects, Interactive Edition, 6th Edition

Iteration Statements

19. increment/decrement and compound assignment operators

Operators in Java: increment, decrement operators

Priority	Type	Symbol	Associativity
16		( ) [ ]	Left to right
16	Unary	var++ var--	Right to left
15	Unary	++var --var	Left to right
14	Unary	~ ! -var +var	Right to left
15	Casting	casting	”
12	Arithmetic	* / %	Left to right
11	Arithmetic	+ -	”
10	Shift	<< >> >>>	”
9	Relational	instanceof < <= > >=	”
8	Relational	== !=	”
7	Bitwise	&	”
6	Bitwise	^	”
5	Bitwise	|	”
4	Logical	&&	”
3	Logical	||	”
2	Conditional	?:	Right to left
1	Assignment	= *= /= %= += -= <<= >>= >>>= &= ^= |=	Right to left

Other Operators in Java

Operators	Example
++	i++; ++j;
--	k--; --l;

+=, -=, *=, /=, %=, …	a += 2;
	b *= c;
	d *= e + 5;

Other Operators: *Try it yourself*

```
public class Prog19_01
{
   public static void main(String[] args)
   {
      int a = 0, b = 2, c = 3, d = 4, e = 6;

      a += 2;
      b *= c;
      d *= e + 5;

      System.out.println("a = " + a);
      System.out.println("b = " + b);
      System.out.println("d = " + d + "\n");
```

Other Operators: *Try it yourself*

```
        int i = 1, j = 2, k = 3, l = 4;

        System.out.println("i++ = " + i++);
        System.out.println("i = " + i);
        System.out.println("++j = " + ++j);
        System.out.println("j = " + j);
        System.out.println("k-- = " + k--);
        System.out.println("k = " + k);
        System.out.println("--l = " + --l);
        System.out.println("l = " + l);
    }
}
```

Output

```
int i = 1, j = 2, k = 3, l = 4;

System.out.println("i++ = " + i++);
System.out.println("i = " + i);
System.out.println("++j = " + ++j);
System.out.println("j = " + j);
System.out.println("k-- = " + k--);
System.out.println("k = " + k);
System.out.println("--l = " + --l);
System.out.println("l = " + l);
```

```
i++ = 1
i = 2
++j = 3
j = 3
k-- = 3
k = 2
--l = 3
l = 3
```

```
int a = 0, b = 2, c = 3, d = 4, e = 6;

a += 2;
b *= c;
d *= e + 5;
```

```
a = 2
b = 6
d = 44
```

Iteration Statements

20. *for* Loop

The *for* loop

The *for* loop:

for (*initial condition*; *stopping condition*; *expression***)**

Example

```
// write "hello world" 50 times
int i;
for (i  =  0;  i  <  50;  ++i)
{
    System.out.println ( "Hello world" );
}
```

Basic *for* Loop: *Try it yourself*

```
// Prog20_01 : basic for loop

public class Prog20_01
{
    public static void main(String args[])
    {
        int counter;

        for (counter = 0; counter < 10; counter++)
        {
            System.out.println("counter = " + counter);
        }

    }
}
```

Basic *for* Loop: *Try it yourself*

```
// Prog20_02 : basic for loop

public class Prog20_02
{
    public static void main(String args[])
    {

        for (int counter = 10; counter > 0; counter--)
        {
            System.out.println("counter = " + counter);
        }

    }
}
```

PRACTICE

Program 20_03:

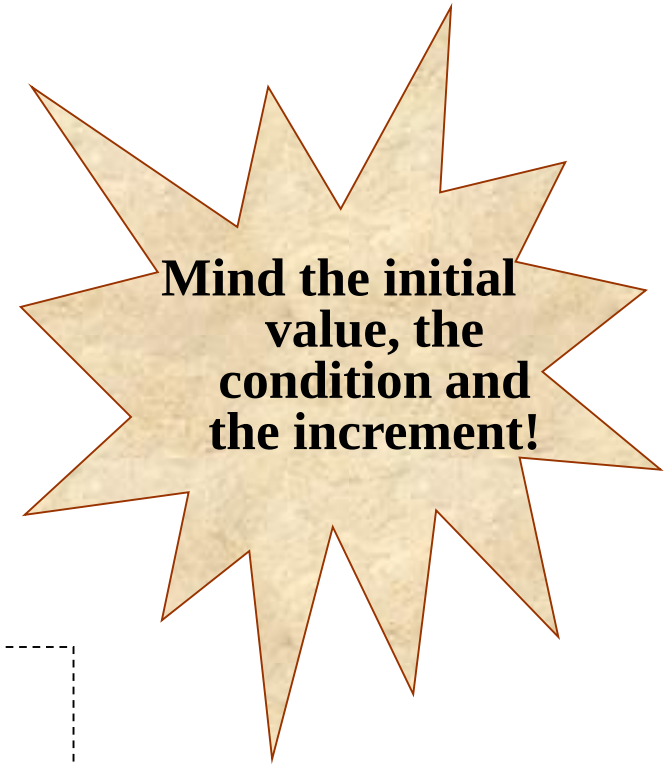
Write a Java program that outputs a table of numbers from 1 to 10, with their squares and cubes.

(use a **for** loop)

for *loop*: *Try it yourself*

```
int t;

for ( t = 0;  t < 0;  ++t )
{
    System.out.println(  “This will not work ” );
}
```




```
int j = 1, i = 1;

for ( j = 1;  j < 10;  ++i )
{
     System.out.println( “This is an infinite loop” );
}
```

for *loop*: *Try it yourself*

```
public class Prog20_04 {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter the number of times you want to run the FOR loop: ");
        int total = in.nextInt();

        for (int i = 0; i < total; i++) {
            System.out.print("Enter a number: ");
            int number = in.nextInt();

            if (number > 0)
                System.out.println("You entered a positive number");
            else
                System.out.println("You entered zero or a negative number");
        }
    }
}
```

for *loop*: *Try it yourself*

```
public class Prog20_05
{
   public static void main(String[] args)
   {
      int columns = 0;
      for (char i = 'A'; i <= 'Z'; ++i)
      {
         System.out.print(i + " ");
         columns++;
         if (columns == 10)  // insert a newline once 10 letters are displayed
         {
            System.out.println();
            columns = 0;
         }
      }
      System.out.println();
   }
}
```

PRACTICE

Program 20_06:

Write a Java program that inputs a list of 10 numbers from the user and calculates the minimum value in the list.

(use a for loop)

for loop: *Try it yourself*

```
//Adds a list of numbers
import java.util.Scanner;
public class Prog20_07
{
   public static void main(String[] args)
   {
      Scanner in = new Scanner(System.in);

      int n, sum = 0;

      for (int i=0; i<10; i++)
      {
         System.out.print("Enter a number: ");
         n = in.nextInt();

         sum += n;
      }

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

PRACTICE

Program 20_08:

Write a Java program that adds all multiples of 5 between 50 and 100 (inclusive).

(use a for loop)

PRACTICE

Program 20_09:

Write a Java program that converts Fahrenheit to Celsius temperature in **increments of 1 degree**. The **initial value** of Fahrenheit temperature and the **total number of conversions** to be made are to be requested as user input during program execution (use a **for** loop).

$$C\_temp = \frac{5}{9}(F\_temp - 32)$$

```
run:
Initial Fahrenheit temperature: 86
Total number of conversions: 3

Fahrenheit  Celsius
86.00       30.00
87.00       30.56
88.00       31.11
```