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Loop Statements

- Loop statements helps to execute a statement or a group of statements repeatedly multiple times.

ex: To print '*' 4 times

case 1

```
class Demo1
{
    p s v m (String[] args)
    {
        S.o.pln('*');
        S.o.pln('*');
        S.o.pln('*');
        S.o.pln('*');
    }
}
```

Do we have any other way to solve it?
Ans: We can use loop statements

Loop Statements in java :

1. while
2. do-while
3. for
4. for-each/ advance for / enhanced for statement

} now

} later during Collections

Tips to Design loop statements :

1. initialization : is done before execution of loop statement, and only once.
2. condition : is used to stop the execution of loop statement.
    - if condition is false : loop stops
    - if condition is true : loop continues
3. update : to be executed for each and every iteration

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1. while loop statement :

- while is a keyword, it behave like a loop statement.

Syntax:

```
while ( condition )
    statement ;

or

while ( condition )
{
    statements ;
}
```

while Block

1. Program to print * four times (one in each line)

```
class Program1
{
    p s v m(String[] args)
    {
        // initialization
        int count = 0;
        while ( count < 4 )
        {
            S.o.pln('*');
            count++;
        } // end of while
    }
}
```

count 0 1 2 3 4

0<4 - T

1<4 - T

tracing

0 1 2 3 4 stop

0, 1, 2, 3, 4

o/p

*
*
*
*

count = count + 1

0 + 1

2. WAJP to print your name 5 times.
3. WAJP to print number 1, 5 times.
4. WAJP to print numbers from 1 up to 5
5. WAJP to print numbers between 10 and 20 (inclusive)
6. WAJP to print numbers between 100 and 120 in reverse order(inclusive)
7. WAJP to print alphabets from a to g.
8. WAJP to print first 10 multiples of 5.
9. WAJP to generate 6table up to 10 multiples, (print in the given format)
   6 * 1 = 6
   6 * 2 = 12
10. WAJP to generate and print all the even numbers between 5 and 10
11. WAJP to generate and print odd numbers between 1 and 20.
12. WAJP to print alternate alphabets from 'A' up to 'Z'
13. WAJP to find sum of numbers from 1 up to 10.
14. WAJP to count even numbers between m & n. (m, n is any positive integer where n is greater than m)
15. WAJP to find summation of all alternate numbers between m & n. (m, n is any positive integer where n is greater than m)
16. WAJP to find factorial of n. (is a positive integer)
17. WAJP to print all the characters present between the ascii number 45 and 90

2. do-while loop statement :

Syntax:

```
do
    statement ;
while( condition ) ;

    or

do
{
    statements  ;
}while ( condition) ;
```

Note :

1. in do while statement, the control executes the loop block first and then it will check the condition

difference between while & do-while

while	do-while
1. condition is checked first, if it is true, loop block gets executed	1. first loop block gets executed, and then the condition checked
2.) int a = 20, b = 10 ;	2.) int a = 20, b = 10 ;

```
int a=20, b=10;
while ( a < b )
{
  S.o.pln("Hi");
}
```

20 < 10 → false

∴ in while the min iterations can be zero

```
int a=20, b=10;
do
{
  S.o.pln("Hi");
}
while (a < b);
```

20 < 10 – False

// Hi

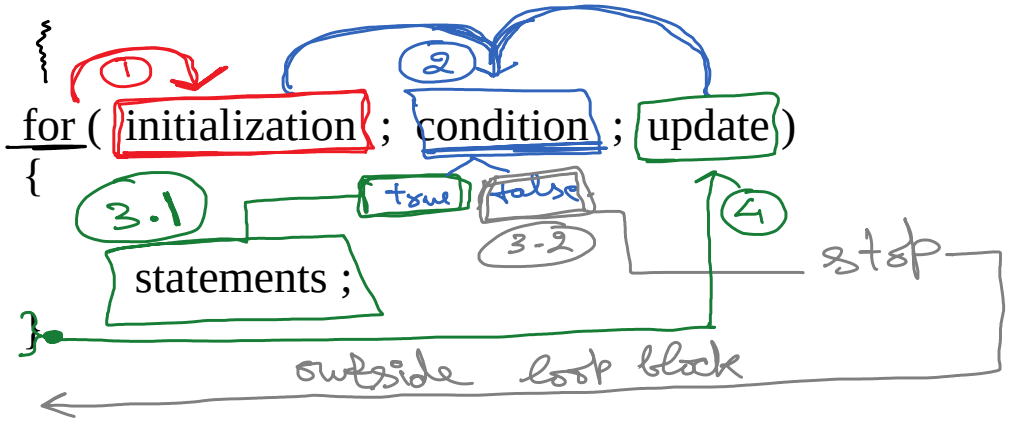
∴ in do-while the min iteration is 1

3. for loop statement :

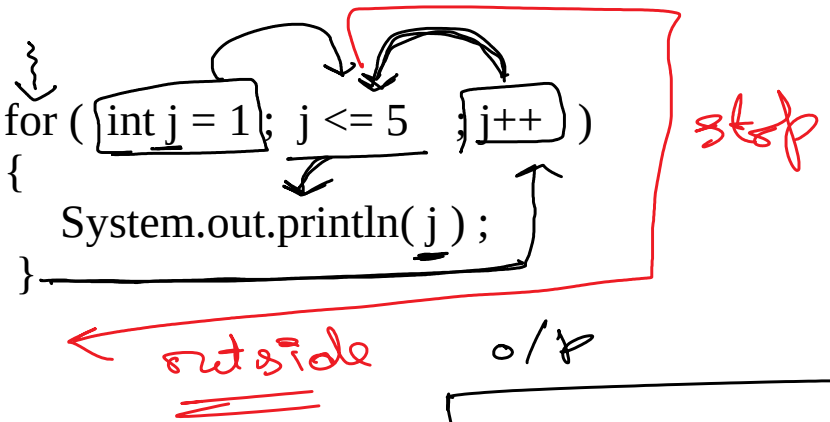
syntax:

```
for ( initialization ; condition ; update )
{
        statements ;
}
```

flow :



example1: to print numbers from 1 till 5



j 1 2 3 4 5 6

1 <= 5 - T
2 <= 5 - T
3 <= 5 - T
4 <= 5 - T
5 <= 5 - T
6 <= 5 - F

o/p

1
2
3
4
5

Nested Loop Statements :

Task1 :

WAJP to print numbers up to n in one line separated by a comma

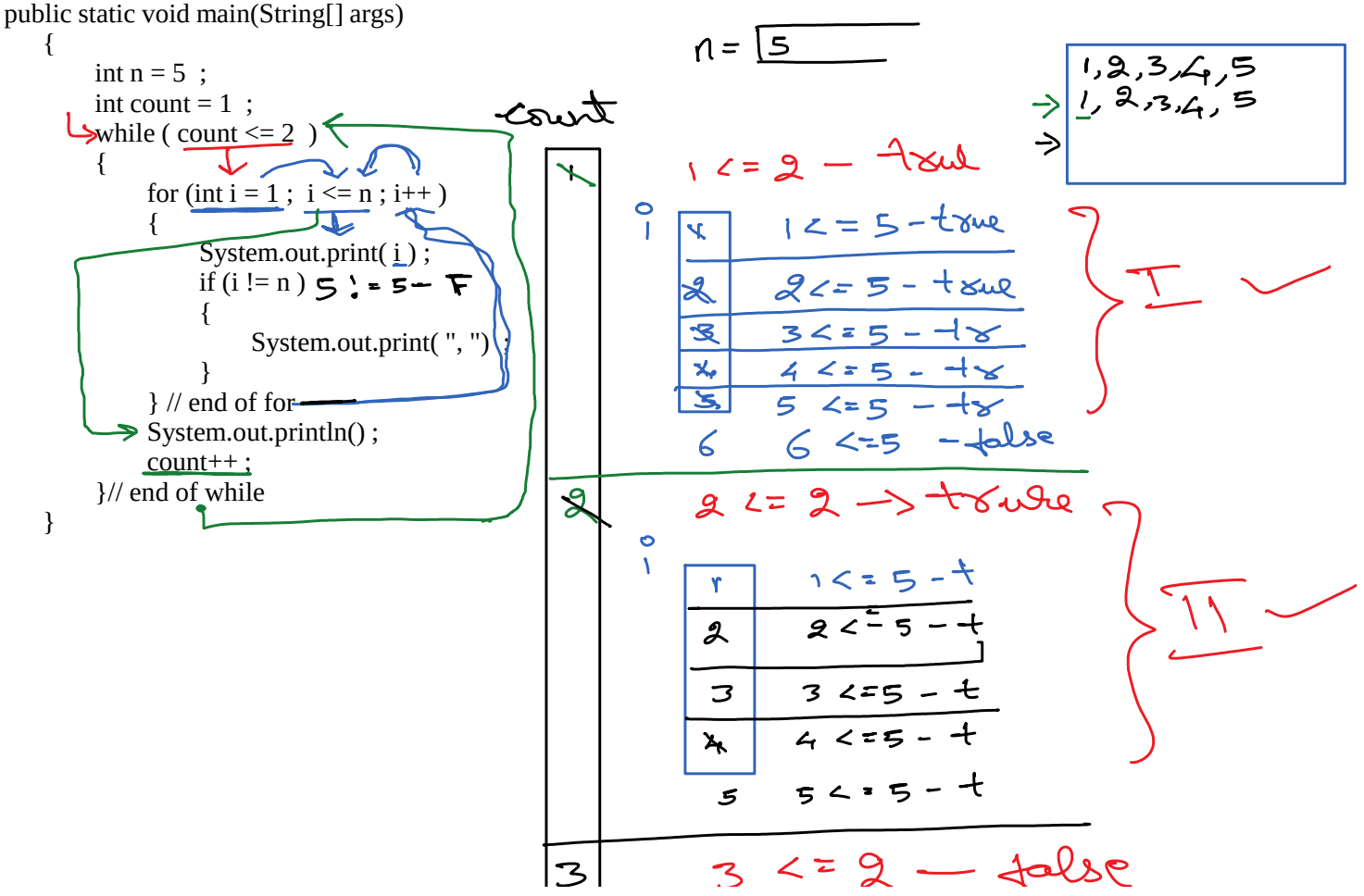
i/p : n = 5

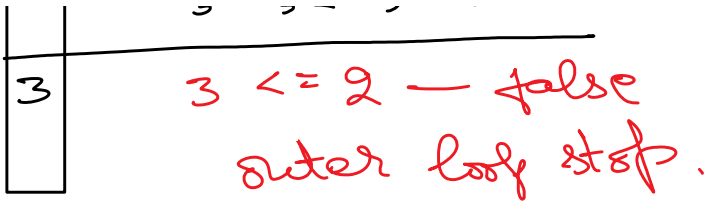
o/p : 1, 2, 3, 4, 5 → 1 — 2 times

1, 2, 3, 4, 5 → 2

Def: Writing a loop statement inside another loop statement is known as nested loop.

```
public static void main(String[] args)
    {
        int n = 5  ;
        int count = 1  ;
        while ( count <= 2  )
        {
            for (int i = 1 ;  i <= n ; i++ )
            {
                System.out.print( i ) ;
                if (i != n )
                {
                    System.out.print( ", ") ;
                }
            } // end of for
            System.out.println() ;
            count++ ;
        }// end of while
    }
```





Note :

1. The inner loop block gets executed completely for each and every cycle(iteration) of the outer loop.

Pg6

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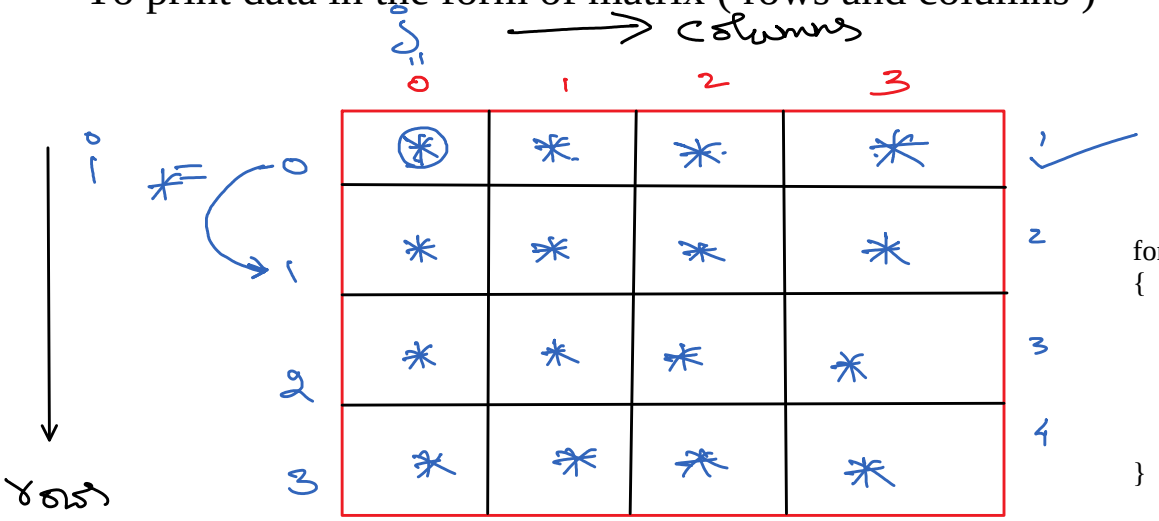
To print data in the form of matrix (rows and columns)




```
for( int i = 0 ; i < 4 ; i++ )
{
    for( int  j = 0 ; j < 4 ; j++ )
    {
        System.out.print("*") ;
    }
    System.out.println() ;
}
```

3. Write a java program to print $ as 5*5 square pattern

4. Write a java program to get the pattern

```
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
```

5. Write a java program to get the pattern

```
1 1 1 1
2 2 2 2
3 3 3 3
4 4 4 4
```

6. Write a java program to get the pattern

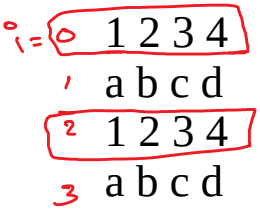
```
a b c d
a b c d
```

a b c d
a b c d

7.

a a a a
b b b b
c c c c
d d d d

8.



sg