

## Loops

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### Q. what is loop?

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Loop means if we want to perform some task repeat again and again called as loop.

If we want to work with loop we have two types of loop.

**1. Entry Control Loop:** entry control loop means first check the condition and after that decide loop will be execute or not called as entry control loop.

**There are two types of loop in entry control**

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1. While loop
2. for loop

**2. Exit Control Loop:** Exit control loop means first execute loop and after that check the condition called as exit control loop.

1. do while loop

**If we want to work with any loop we have three major important points.**

**1. Initialization:** initialization means decide from loop will be start called as initialization.

**2. Condition:** condition means to decide how many times loop will be executed or decide number of iteration

**3. Increment or decrement:** steps to increase the value and decrease the value or gap between every step called as increment or decrement

**Now we want to discuss about while loop**

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### Syntax:

Initialization;

while (condition )

{ Write here logics

Increment or decrement;

}

Example: WAP to print good morning five times

```
int i;      initialization
i=1;
6<=5      condition
while( i<=5 )
{
    System.out.println("good morning");
    i++; //- increment or decrement
}
```

'good morning'  
'good morning'  
'good morning'  
'good morning'  
'good morning'

```

public class WhileLoopApp
{
    public static void main(String x[])
    {
        int i;
        i=1; //initialization

        while(i<=5) //condition
        {
            System.out.println("good morning");

            i++; //increment
        }
    }
}

```

**Output**

```

C:\Program Files\Java\jdk1.8.0_291\bin>javac WhileLoopApp.java
C:\Program Files\Java\jdk1.8.0_291\bin>java WhileLoopApp
good morning
good morning
good morning
good morning
good morning

```

**Example: WAP to print the 1 to 10 values while loop?**

```

public class WhileLoopApp
{
    public static void main(String x[])
    {
        int i;
        i=1; //initialization

        while(i<=10) //condition
        {
            System.out.println(" I = "+i);

            i++; //increment
        }
    }
}

```

**Output**

```

C:\Program Files\Java\jdk1.8.0_291\bin>java WhileLoopApp
I = 1
I = 2
I = 3
I = 4
I = 5
I = 6
I = 7
I = 8
I = 9
I = 10
C:\Program Files\Java\jdk1.8.0_291\bin>

```

**Example: WAP to input number and print its table.**

**Steps**

1. input number
2. start loop from 1
3. execute loop 10 times
4. multiple number\*i
5. gap between every iteration is 1

**Output:**

```

10
20
30
40
50
60
70
80
90
100

```

```

import java.util.*;
public class LoopApp
{
    public static void main(String x[])
    {
        Scanner xyz = new Scanner(System.in);
        int no, i, tab;
        System.out.println("Enter number");
        no=xyz.nextInt(); //10

        i=1;
        while(i<=10)
        {
            tab = no * i;

            System.out.print("\t"+tab);

            i++; //
        }
    }
}

```

no	i	tab
10	2	30

**Example: WAP to input number and calculate its factorial?**

```
2
import java.util.*;
public class FactApp
{
    public static void main(String x[])
    {
        Scanner xyz = new Scanner(System.in);
        int no, f = 1, i;
        System.out.println("Enter number");
        no=xyz.nextInt(); //5

        while( no!= 0) 0!=0
        {
            f = f * no; //120*1 = 120
            --no; //0
        }
        System.out.printf("Factorial is %d\n", f);
    }
}
```

no	f	i
4	120	

**Output: Factorial is 120**

**Example: WAP to calculate sum of all natural number between 1 to 10?**

```
import java.util.*;
public class SumApp
{
    public static void main(String x[])
    {
        int sum=0,i;
        i=1;
        while(i<=10)
        {
            sum = sum + i;

            i++;
        }
        System.out.printf("Sum of all value is %d\n",sum);
    }
}
```

```
C:\Program Files\Java\jdk1.8.0_291\bin>javac SumApp.java
C:\Program Files\Java\jdk1.8.0_291\bin>java SumApp
Sum of all value is 55
C:\Program Files\Java\jdk1.8.0_291\bin>_
```

Example: WAP to input number and reverse it?

Input: 1234

Output: 4321

Input: 12345

Output: 54321

```
no=1234    no    rev
           123    4

4 rem = no % 10;
123 no = no / 10;    1 rem = no % 10;
4 rem = rev*10+rem;  0 no = no/10;
3 rem = no % 10;    4321 rev = rev*10+rem;
12 no = no / 10;    System.out.printf("Reverse is %d\n",rev);
43 rev=rev*10+rem;
2 rem = no % 10;
1 no = no / 10;
432 rev= rev*10+rem;
```

```
import java.util.*;
public class RevApp
{
    public static void main(String x[])
    { Scanner xyz = new Scanner(System.in);
      int no,rev=0,rem;
      System.out.println("Enter number");
      no = xyz.nextInt();

      while( no!=0)
      {
          rem = no % 10;
          no = no / 10;
          rev = rev*10+rem;
      }
      System.out.printf("Reverse is %d\n",rev);
    }
}
```

Example: WAP to input number and check number is duck or not

Duck number means number contain 0 called as duck

Input: 1024 - it is duck number

Input: 1234 – it is not duck number.

Code without using flag variable concept

```
import java.util.*;
public class DuckApp
{
    public static void main(String x[])
    { Scanner xyz = new Scanner(System.in);
      int no,rem;
      System.out.println("Enter number");
      no=xyz.nextInt(); //1024
      while( no!=0)
      {
          1 rem = no % 10;
          0 no = no / 10;
          if(rem == 0)
          { System.out.println("Number is duck");
            }
          else{
              System.out.println("Number is not duck");
          }
      }
    }
}
```

Output

```
Enter number : 1024
Number is not duck'
Number is not duck'
Number is duck'
'Number is not duck'
```

Note: if we think about this about it is not predicated output because our 3 times say not duck and 1 time duck so it is not proper answer because we use if else within loop so either if get executed or either else get executed so we get wrong output so if we want to solve we can use flag variable concept in program

Q. what is flag variable?

flag variable is a concept in programming which indicate either true or false. normally flag use when we use if else block within loop then we not get proper answer so better way you use single if within loop and set flag variable as true and break the using specified condition and write if else after loop and compare value of flag and if your flag value is true then execute true otherwise execute false condition

Q. What will be output of given code?

```
import java.util.*;
public class DuckApp
{
    public static void main(String x[])
    {
        Scanner xyz = new Scanner(System.in);
        System.out.println("Enter number");
        int no=xyz.nextInt(); //1024
        boolean flag=false;
        while(no!=0)
        {
            int rem = no % 10;
            no = no /10;
            if(rem ==0)
            {
                flag=true;
                break;
            }
        }
        if(flag)
        {
            System.out.println("Number is duck");
        }
        else
        {
            System.out.println("Number is not duck");
        }
    }
}
```

**Example:** WAP to input the two values consider first value as base and second value as index and calculate power of number?

```
import java.util.*;
public class PowerApp
{
    public static void main(String x[] )
    {
        Scanner xyz = new Scanner(System.in);
        int base,index,p=1;
        System.out.println("Enter base and index");
        base=xyz.nextInt(); //5
        index=xyz.nextInt(); //3
        while( index!=0 )
        {
            p = p * base;
            index = index -1;
        }
        System.out.printf("Power is %d\n",p);
    }
}
```

3  
5 = 5 x 5 x 5

int p=1;  
p=p\*5; // 1\*5 = 5  
p=p\*5; // 5\*5=25  
p=p\*5; // 25\*5 =125

p=p\*base  
till index!=0

Output:  
Enter base and index  
5  
3

5	3	125
base	index	p

Power is 125

**Example:** WAP to input number and swap its first and last digit?

```
import java.util.*;
public class SwapFirstAndLast
{
    public static void main(String x[] )
    {
        Scanner xyz = new Scanner(System.in);
        int no,count=0,first,last,p,p1,temp;
        System.out.println("Enter number from keyboard");
        no = xyz.nextInt(); //1234
        last=no%10;
        temp=no;
        while(no!=0)
        {
            no = no / 10;
            ++count;
        }
        no=temp;
        p=Math.pow(10,--count); //100
        first = no / p;
        no=no/10;
        p1= Math.pow(10,--count); //p1=100
        no = no % p1;
        last= last*p; //4*1000 = 4000
        no=no*10; //23*10 =230
        no=last+no+first;
        S.o.printf("%d",no); //4231
    }
}
```

Example: WAP to input number and swap first and last digit only.

no	count	first	last	p	p1	temp
1234	4	1	4	1000	100	1234

12345  
last=no%10; //4  
first=no/10000;

1234  
first=no/1000

123  
first=no/100;

12  
first=no/10

1234 = one thousand two hundred thirty four  
4231 = four thousand two hundred thirty one

100)123(1  
100  
23

23  
4000 last=last\*p; //4\*1000 = 4000  
no=no\*10; //23\*10 =230

S.o.printf("%d",no); //4231

**Example with source code**

```
import java.util.*;
public class SwapFirstAndLastDigit
{
    public static void main(String x[])
    {
        Scanner xyz = new Scanner(System.in);
        int no,temp,count=0,p,p1,first,last;
        System.out.println("Enter number");
        no=xyz.nextInt();
        temp=no;
        System.out.printf("\nBefore swapping first and last digit %d\n",no);
        while(no!=0)
        { no = no /10;
          ++count;
        }
        no=temp;
        last=no%10;
        p=((int)Math.pow((double)10,(double)(--count)));
        first=no/p;
        no = no /10;
        p1=((int)Math.pow((double)10,(double)(--count)));
        no=no%p1;
        last=last*p;
        no = no *10;
        no=last+no+first;
        System.out.printf("\nAfter swapping first and last digit %d\n",no);
    }
}
```

**Example:** WAP to input number from keyboard and input search digit from keyboard and check digit present in number or not

**Output:**

**Input number:**

12345

**Input Digit for search**

3

**Output:** Digit found

