Loops
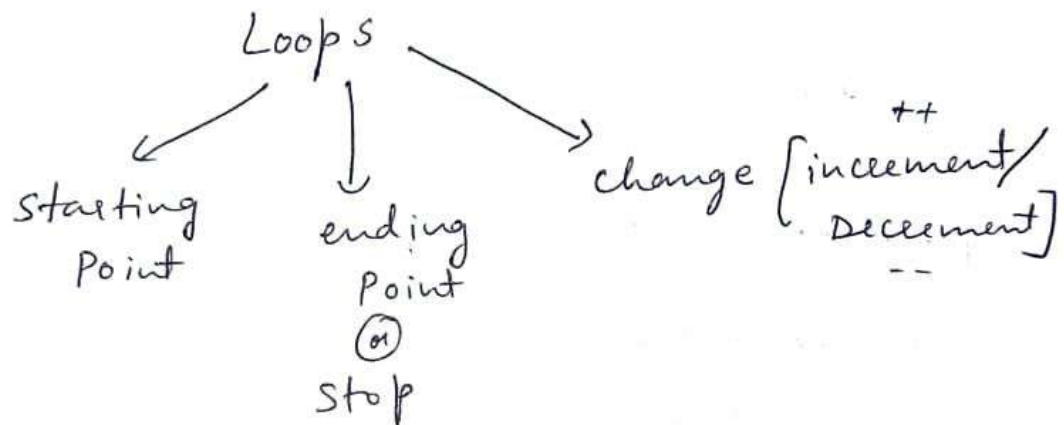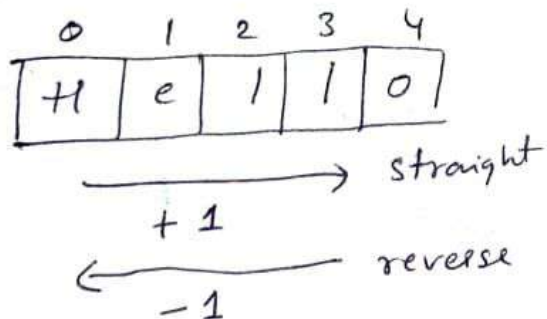
① why we need loops?

* used when we need to execute a block of code repetitively

* To avoid repetitive code and manage space/time complexity.

```
                    Loops
           ↙          ↓          ↘
      Starting      ending       change [increment/  ++
       Point        Point              Decrement]   --
                     (or)
                     stop
```

Small —→ Big value   2 —→ 20   +2

Big value —→ small

```
  0   1   2   3   4
 ┌──┬──┬──┬──┬──┐
 │ H│ e│ l│ l│ o│
 └──┴──┴──┴──┴──┘
   ────────────→  straight
        + 1
   ←────────────  reverse
        − 1
```

① Set / collection of items

② Processing

Searching   Math   Sort   Filter

③ Generation of sequence → loop

1 - 100
2 - 20 even

④ String   "Ananya"   no. of oval
                                 no. of character
                 collection of   find the character
                 caracter

Homogeneous = Same

How to write a loop?

① Generation

1 → 10   w/ generate

start = 1, Stop = 10, + 1

for loop

                    i = index
                ① start   ② stop   ④ increment

⇒   for (int index = 0 ; index <= 10 ; i++) {

                System.out.println (index);
                        ③

        }

* you know the no/ of item

while loop

=>
```
    Initialization
  while (condition)
    {
        ___
  }     increment/Decrement
```

* you don't know no, of item.

do while loop

=>
```
    do {


    } while (condition);
```

* The code will run atleast once.

=> In python their is no do while

```
    while (True):
        if (condition):
            break
```

Break : ⎫ Keywords
         ⎬
Continue : ⎭ The purpose of a break and continue
            statement is to stop a running loop
            ⓸ to continue a particular
            iteration

⟹ for (start ; stop ; change)
{
≡
}   Key == element   * completly
         break ;   stop

outside the loop

⟹ for (start ; stop ; chang)
{
                   * skip and
   if (type == teacher)   continue

        continue ;
}

---

for (int number = 2 ; number <= 10 ; number ++)
{
       Value = 1   Value <= 10
for (int value = number ; value <= (number * 10) ;
                   value = value + number)
{
                   value ++

   Print (number * value);

}
}

for (number = 2   2 <= 10 ✓

   for (value = 1   1 <= 10 ✓

                 $P(2 * 1) = 2$ value ++

   for (value = 2   2 <= 10

              $P(2 * 2) = 4$

   for (value = 3   3 <= 10

              $P(2 * 3) = 6$

   for (value = 4   4 <= 10

              $P(2 * 4) = 8$

   for (value = 5   5 <= 10

             $P(2 * 5) = 10$

   for (value = 6   6 <= 10

             $P(2 * 6) = 12$

   for (value = 7   7 <= 10

             $P(2 * 7) = 14$ * continues till 10th table

   for (value = 8   8 <= 10

             $P(2 * 8) = 16$

   for (value = 9   9 <= 10

             $P(2 * 9) = 18$

   for (value = 10   10 <= 10

             $P(2 * 10) = 20$

```java
package Day15;

public class Loops {
    // Run | Debug
    public static void main(String[] args) {

        //for( datatype START ; STOP (condition) ; CHANGE){}

        for (int Number = 0; Number <= 10; Number++){
            System.out.print(Number +" ");
        }
    }
}
```

PROBLEMS   OUTPUT   TERMINAL   ⋯   🐞 Run: Loops + ∨ ⊞ 🗑 ⋯ │ ⌨ ×

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>  & 'C:\Program Files\Eclip
se Adoptium\jdk-21.0.6.7-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExcept
ionMessages' '-cp' 'C:\Users\ANANYA\AppData\Roaming\Code\User\workspaceStora
ge\015634db8fc5f9a2b840f9e82f267996\redhat.java\jdt_ws\Algorithm365_c0509dd3
\bin' 'Day15.Loops'
0 1 2 3 4 5 6 7 8 9 10
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>
```

```java
package Day15;

public class Loops {
    Run | Debug
    public static void main(String[] args) {

        //for( datatype START ; STOP (condition) ; CHANGE){}

        for (int Number = 10; Number >= 0; Number--){  //Reverse 10 to 0
            System.out.print(Number +" ");
        }
    }
}
```

PROBLEMS   OUTPUT   TERMINAL   ⋯   🐞 Run: Loops ╋ ∨ ⬓ 🗑 ⋯ | ⌐⌐ ✕

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>  & 'C:\Program Files\Eclip
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ge\015634db8fc5f9a2b840f9e82f267996\redhat.java\jdt_ws\Algorithm365_c0509dd3
\bin' 'Day15.Loops'
10 9 8 7 6 5 4 3 2 1 0
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>
```

```java
package Day15;

public class Loops {
    Run | Debug
    public static void main(String[] args) {

        //for( datatype START ; STOP (condition) ; CHANGE){}

        for (int Number = 10; Number >= 0; Number--){  //Reverse 10 to 0
            System.out.print(Number +" ");

            if (Number == 5){   //if number becomes 5 then it stops and come out loop
                break;
            }
        }
    }
}
```

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>  & 'C:\Program Files\Eclipse Adoptium\jdk-21.
0.6.7-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\ANANYA\Ap
pData\Roaming\Code\User\workspaceStorage\015634db8fc5f9a2b840f9e82f267996\redhat.java\jdt_ws\Al
gorithm365_c0509dd3\bin' 'Day15.Loops'
10 9 8 7 6 5
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>
```

```java
package Day15;

public class Loops {
    // Run | Debug
    public static void main(String[] args) {

        //for( datatype START ; STOP (condition) ; CHANGE){}

        for (int Number = 0; Number <= 10; Number++){  //Reverse 10 to 0

            if (Number == 5){   //if number becomes 5 then it skips 5 and continue with next
                continue;
            }

            System.out.print(Number +" ");

        }
    }
}
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   ⌬ Run: Loops + ∨ ⬚ 🗑 … | [] ×

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>  & 'C:\Program Files\Eclipse Adoptium\jdk-21.
0.6.7-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\ANANYA\Ap
pData\Roaming\Code\User\workspaceStorage\015634db8fc5f9a2b840f9e82f267996\redhat.java\jdt_ws\Al
gorithm365_c0509dd3\bin' 'Day15.Loops'
0 1 2 3 4 6 7 8 9 10
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>
```

Day15 > ☕ PrintingTable.java > ...

```java
1    //This code Print's the tables from 2 to 10
2
3    package Day15;
4
5    public class PrintingTable {
     Run | Debug
6        public static void main(String[] args) {
7            for(int number = 2; number <= 10 ; number++){
8                for(int value = 1; value <= 10; value++){
9                    System.out.print(number * value +" ");
10               }
11               System.out.println();
12           }
13       }
14   }
15
```

TERMINAL   ...   ⊗ Run: PrintingTable + ⌄ ▯ 🗑 ... | ⌗ ✕

```
2 4 6 8 10 12 14 16 18 20
3 6 9 12 15 18 21 24 27 30
4 8 12 16 20 24 28 32 36 40
5 10 15 20 25 30 35 40 45 50
6 12 18 24 30 36 42 48 54 60
7 14 21 28 35 42 49 56 63 70
8 16 24 32 40 48 56 64 72 80
9 18 27 36 45 54 63 72 81 90
10 20 30 40 50 60 70 80 90 100
```

```java
package Day15;

public class WhileLoop {
    Run | Debug
    public static void main(String[] args) {
        int count = 0;

        while( count <= 10){
            System.out.print(count +" ");
            count = count + 1;
        }System.out.println();

        do{
            System.out.print(count +" ");
            count = count - 1;
        }while(count >= 0);
    }
}
```

PROBLEMS   OUTPUT   TERMINAL   ⋯   ⬡ Run: WhileLoop + ⌄ ⬚ 🗑 ⋯ | ⌃⌄ ✕

```
-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Us
ers\ANANYA\AppData\Roaming\Code\User\workspaceStorage\015634db8fc5f9a2b840f9e
82f267996\redhat.java\jdt_ws\Algorithm365_c0509dd3\bin' 'Day15.WhileLoop'
0 1 2 3 4 5 6 7 8 9 10
11 10 9 8 7 6 5 4 3 2 1 0
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>
```