**\*\* Stack \*\***

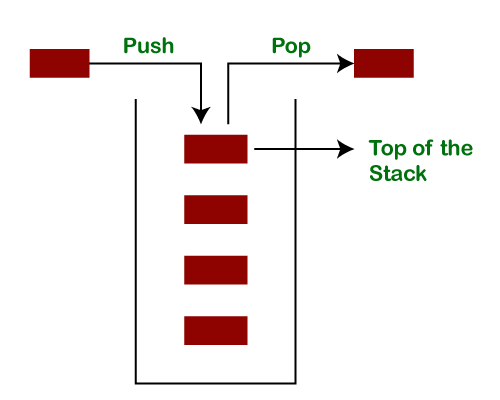
# Java Stack

1. The **stack** is a linear data structure that is used to store the collection of Objects.
2. It is based on **Last-In-First-Out** (LIFO).
3. [Java collection](https://www.javatpoint.com/collections-in-java) framework provides many interfaces and classes to store the collection of objects.
4. One of them is the **Stack class** that provides different operations such as push, pop, search, etc.
5. It also implements interfaces **List, Collection, Inerrable, Clone able, Serializable.**
6. Real world example of stack is
   1. Undo
   2. Reverse String/Number
   3. Balance parenthesis problem.
7. It implements list Interface.
8. It is child class of vector.
9. It follows LIFP (**Last-In-First-Out**).
10. It incremental factor is as :

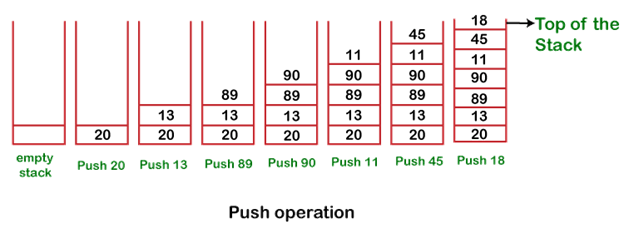
New Capacity = current capacity \* 2.

1. To reverse the word : we need the last inserted character first We can get it with Stack because it words on LIFO.
2. Undo Operation : is also based on Stack.
3. Backtracking : we go one step back, in the also we used the stack ,

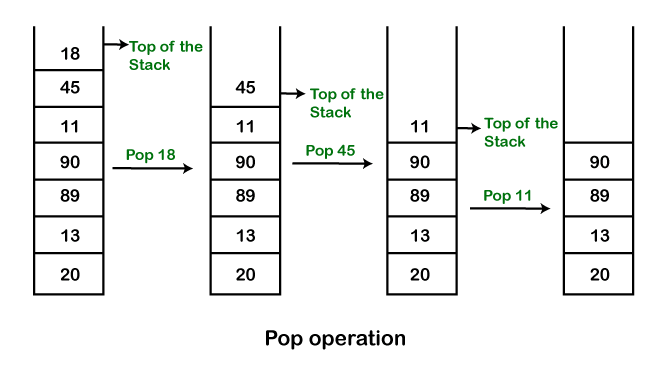
Also back option in brower.



Let's push 20, 13, 89, 90, 11, 45, 18, respectively into the stack.



Let's remove (pop) 18, 45, and 11 from the stack.



**Empty Stack:** If the stack has no element is known as an **empty stack**. When the stack is empty the value of the top variable is -1

**import** java**.**util**.\*;**

class Q01\_Stack\_push

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        st**.**push**(**10**);**        st**.**push**(**20**);**        st**.**push**(**30**);**

        st**.**push**(**40**);**        st**.**push**(**50**);**

        System**.**out**.**println**(** st **);**

**}**

**}**

[10, 20, 30, 40, 50]

**import** java**.**util**.\*;**

class Q02\_Stack\_push

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        System**.**out**.**println**(** st**.**size**()** **);**

        System**.**out**.**println**(** st**.**capacity**()** **);**

**for(**int i **=** 1**;** i  **<=** 10**;** i**++)**

            st**.**push**(**10**\***i**);**

        System**.**out**.**println**(** st**.**size**()** **);**

        System**.**out**.**println**(** st**.**capacity**()** **);**

        st**.**push**(**500**);**

        System**.**out**.**println**(** st**.**size**()** **);**

        System**.**out**.**println**(** st**.**capacity**()** **);**

**}**

**}**

0

10

10

10

11

20

1. Default Capacity of Stack is 10.

2. Increase Capacity for this fromula :

   new Capa. = Curr. \* 2;

**import** java**.**util**.\*;**

class Q03\_Stack\_Constructor

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**(**20**);**

**for(**int i **=** 1**;** i  **<=** 10**;** i**++)**

            st**.**push**(**10**\***i**);**

        System**.**out**.**println**(** st**.**size**()** **);**

        System**.**out**.**println**(** st**.**capacity**()** **);**

**}**

**}**

error: constructor Stack in class Stack<E> cannot be applied to given types;

                Stack st = new Stack(20);

                           ^

**import** java**.**util**.\*;**

class Q04\_Stack\_peek

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        st**.**push**(**10**);**        st**.**push**(**20**);**        st**.**push**(**30**);**

        st**.**push**(**40**);**        st**.**push**(**50**);**

        System**.**out**.**println**(** st **);**

        System**.**out**.**println**(** st**.**peek**()** **);**

        System**.**out**.**println**(** st**.**peek**()** **);**

        System**.**out**.**println**(** st **);**

**}**

**}**

[10, 20, 30, 40, 50]

50

50

[10, 20, 30, 40, 50]

**import** java**.**util**.\*;**

class Q05\_Stack\_pop

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        st**.**push**(**10**);**        st**.**push**(**20**);**        st**.**push**(**30**);**

        st**.**push**(**40**);**        st**.**push**(**50**);**

        System**.**out**.**println**(** st **);**

        System**.**out**.**println**(** st**.**pop**()** **);**

        System**.**out**.**println**(** st**.**pop**()** **);**

        System**.**out**.**println**(** st **);**

**}**

**}**

[10, 20, 30, 40, 50]

50

40

[10, 20, 30]

**import** java**.**util**.\*;**

class Q06\_Stack\_pop

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        System**.**out**.**println**(** st**.**pop**()** **);**

        //System.out.println( st.peek() );

        System**.**out**.**println**(** st **);**

**}**

**}**

Exception in thread "main" java.util.EmptyStackException

**import** java**.**util**.\*;**

class Q07\_Stack\_empty

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        System**.**out**.**println**(** st**.**empty**()** **);**

        st**.**push**(**10**);**        st**.**push**(**20**);**

        st**.**push**(**30**);**        st**.**push**(**40**);**

        st**.**push**(**50**);**        st**.**push**(**60**);**

        System**.**out**.**println**(** st**.**empty**()** **);**

**}**

**}**

true

false

**import** java**.**util**.\*;**

class Q08\_Stack\_Search

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        st**.**push**(**10**);**        st**.**push**(**20**);**        st**.**push**(**30**);**

        st**.**push**(**40**);**        st**.**push**(**50**);**

        System**.**out**.**println**(** st**.**search**(**20**)** **);**

        System**.**out**.**println**(** st**.**search**(**200**)** **);**

        System**.**out**.**println**(** st**.**search**(**50**)** **);**

        System**.**out**.**println**(** st**.**search**(**10**)** **);**

**}**

**}**

4

-1

1

5

.search() method doesn't return int of founded element it return the number

by which it will be poped.

**import** java**.**util**.\*;**

class Q09\_Stack\_Menu\_Drive

**{**

    public static void main**(**String args**[])**

**{**

        Stack st **=** **new** Stack**();**

        Scanner sc **=** **new** Scanner**(**System**.**in**);**

**while(** **true** **)**

**{**

            System**.**out**.**println**(**"Press - 1 :  Push Data"**);**

            System**.**out**.**println**(**"Press - 2 :  Pop  Data"**);**

            System**.**out**.**println**(**"Press - 3 :  Peek Data"**);**

            System**.**out**.**println**(**"Press - 4 :  Empty"**);**

            System**.**out**.**println**(**"Press - 5 :  Search Data"**);**

            System**.**out**.**println**(**"Press - 6 :  Show All Data"**);**

            System**.**out**.**println**(**"Press - 7 :  Exit"**);**

            int num **=** sc**.**nextInt**();**

**switch(**num**)**

**{**

**case** 1**:**

**{**

                    System**.**out**.**print**(**"Enter Element : "**);**

                    st**.**push**(** sc**.**nextInt**()** **);**

                    System**.**out**.**println**(**"Data Inserted"**);**

**break;**

**}**

**case** 2**:**

**{**

**if(** st**.**empty**()** **==** **false)**

                        System**.**out**.**println**(**"Data Poped Succefully : " **+** st**.**pop**()** **);**

**break;**

**}**

**case** 3**:**

**{**

**if(** st**.**empty**()** **==** **false)**

                    System**.**out**.**println**(**"Data Peeked Succefully : " **+** st**.**peek**()** **);**

**break;**

**}**

**case** 4**:**

**{**

**if(**st**.**empty**()** **)**

                        System**.**out**.**println**(**"Stack is Empty."**);**

**else**

                        System**.**out**.**println**(**"Stack is not Empty."**);**

**break;**

**}**

**case** 5**:**

**{**

                    System**.**out**.**print**(**"Enter Element"**);**

                    System**.**out**.**println**(**"This will be Poped At Index : " **+** st**.**search**(**

sc**.**nextInt**()** **)** **);**

**break;**

**}**

**case** 6**:**

**{**

                    System**.**out**.**print**(** st **);**

**break;**

**}**

**case** 7**:**

**{**

                    System**.**exit**(**0**);**

**}**

**default** **:**

**{**

                    System**.**out**.**print**(** "Invalid Number"**);**

**break;**

**}**

**}**

        System**.**out**.**println**(**"\n\n---------------------------\n\n"**);**

**}**

**}**

**}**

Press **-** 1 **:**  Push Data

Press **-** 2 **:**  Pop  Data

Press **-** 3 **:**  Peek Data

Press **-** 4 **:**  Empty

Press **-** 5 **:**  Search Data

Press **-** 6 **:**  Show All Data

Press **-** 7 **:**  Exit

1

Enter Element **:** 100

Data Inserted

1

Enter Element **:** 200

Data Inserted

2

Data Poped Succefully **:** 200

3

Data Peeked Succefully **:** 100

Press **-** 7 **:**  Exit

7