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STACK

- Stack is a type of linear data structure.
- It is a type of data structure in which item can be added or removed only at one end.
- Stack is a data structure which is based on the principle of last in first out (LIFO).

Definition:- Stack is a list in which all the insertion and deletion are made at one end, called the Top of the Stack.

Example :- A stack of plates lying on the counter in a mess. Throughout the lunch hour, students take plate off the top of the stack. The Plate most recently put on the stack is the first one taken off. The bottom plate is the first which has been put on, and the last one to be used.

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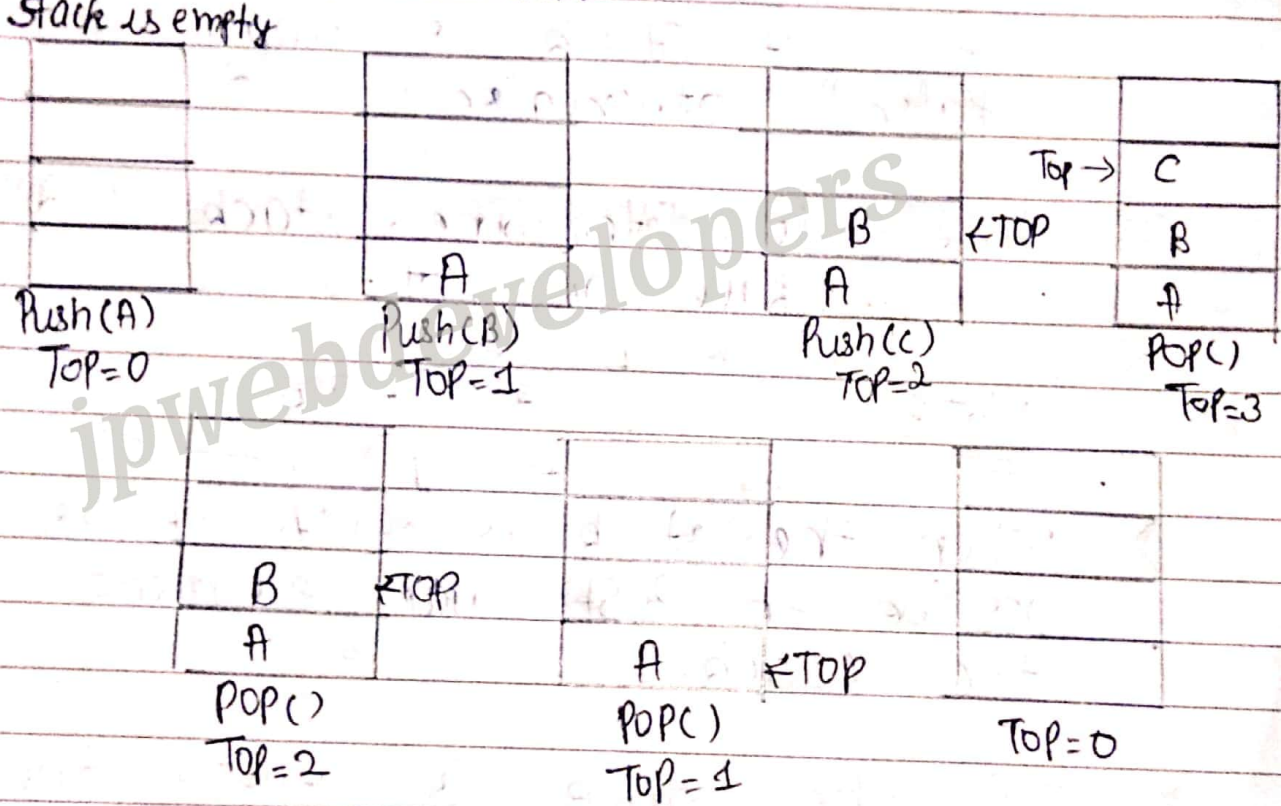
* STACK STRUCTURE:-

Let assume that "S" is a stack with size 4. Initially, stack is empty and we have three elements A, B, C. We have to perform the PUSH or POP operation on stack.



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* STACK OPERATIONS:-

(i) CREATE (A) to create "A" as an empty stack.

(ii) PUSH:- place new information on the top of the stack.

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(3) POP :- take the top item off of the stack.

(4) PEEK :- read the item on the top.

(5) Empty :- to check whether the stack "A" is empty or not.
It returns the value "True" if stack is empty and returns "false" otherwise.

(6) Full :- to determine stack "A" is full or not.

NOTE

- When the stack is FULL it is not possibe to PUSH any element in the stack.
- If the Stack is EMPTY then it is not possible to POP the stack.

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* PUSH AND POP

fundamental working of PUSH and POP.

(i) PUSH :- Push refers to insert an element at the TOS (Top of Stack) of the stack.

(ii) POP :- POP refers to remove an element from TOS of the stack.

* Algorithm for PUSH Operation :- [TOP, N, item]
(TOP: Top of stack; N: max.; item: new value to be inserted)

Step 1 :- Begin
Step 2 :- if TOP = N then
print overflow and Exit.
Step 3 :- Input new item
Step 4 :- TOP ← TOP+1
Step5 :- Stack (TOP) ← Item
Step 6 :- Exit

* Algorithm for POP operation

Step 1 :- Begin
Step 2 :- if Top = -1 then
print underflow and Exit.
Step 3 :- Set item ← Stack [TOP]
Step 4 :- Top ← Top - 1
Step 5 :- print deleted item.
Step 6 :- Exit

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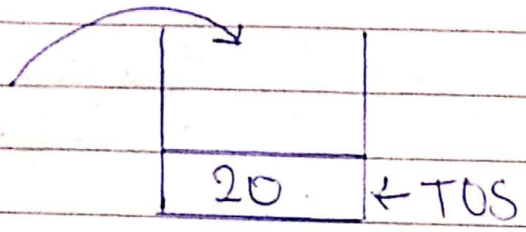
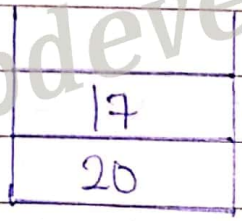
Example :-

1. PUSH :- "20" in the stack will look like :



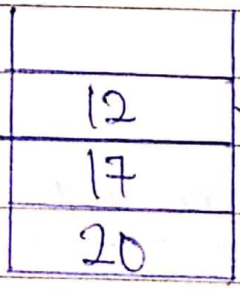
Top of stack is → 20

2. PUSH "17" in the stack. Now stack will become.



Top of stack is 17.

3. PUSH "12" in the stack.



Current Top 12.

4. PUSH "15" on stack.

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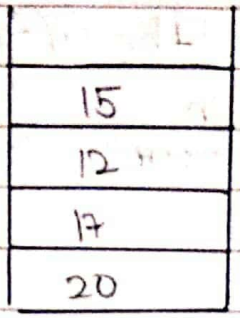
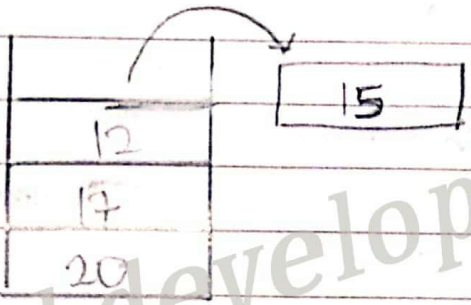


Top of stack is 15.

5. POP an element from stack.



Top of stack will be 12.

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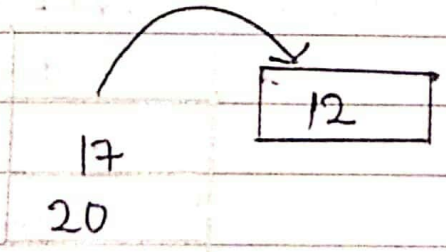
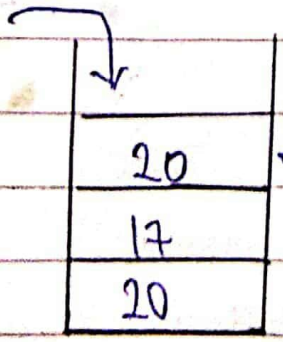
6. POP an element from stack.



Top of stack will be 17.

7. Push "20" on to stack.



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