

SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107

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Department of Artificial Intelligence and Data Science

Course Name: 23ITB201 Data structures and Algorithms

II Year / III semester

Unit II –Stack and Queue ADT

Topic: Stack ADT



Cups



Deck of
Cards



Pile of Plates



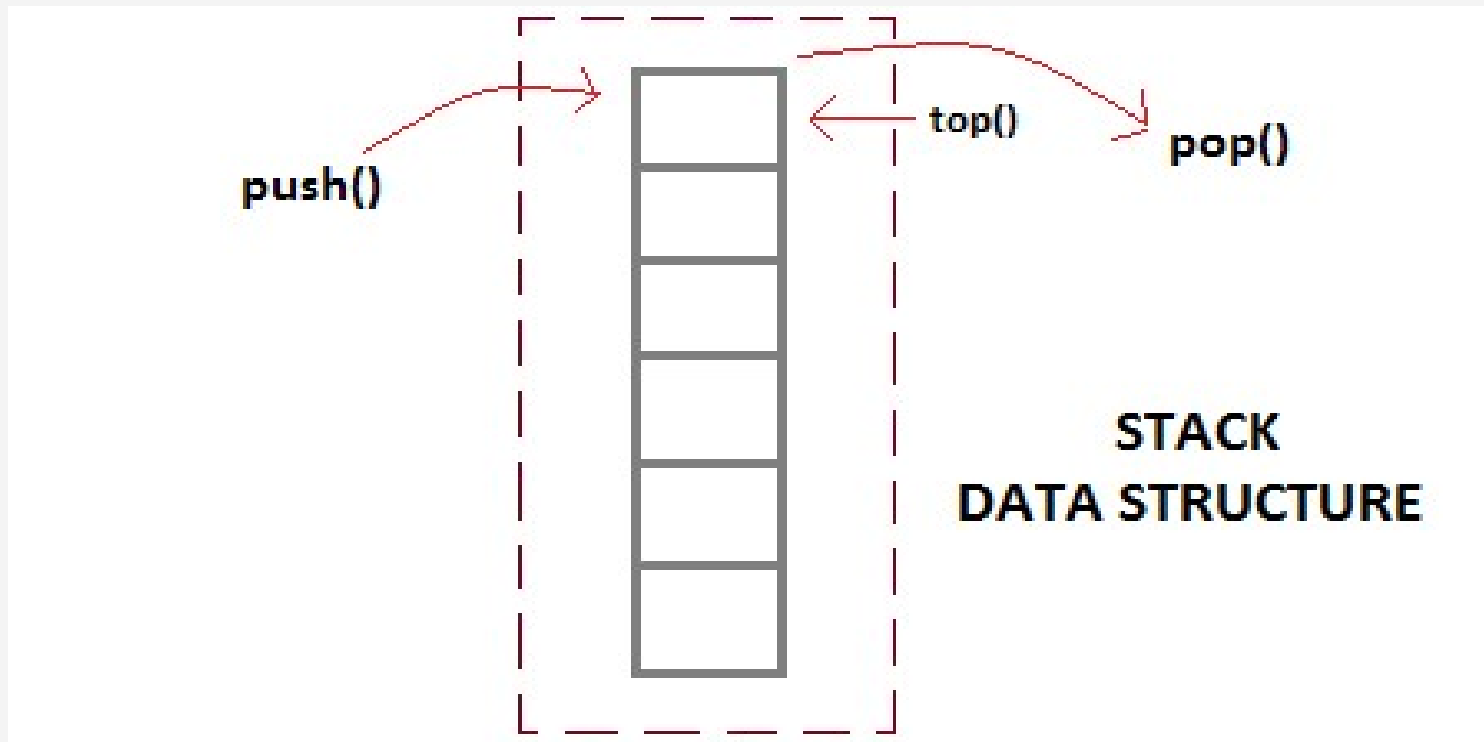
CD

Which CD can you remove first from the
A. Removing the CD residing at top
B. Removing the CD residing at bottom

er data structures. It is an ordered list in which insertions and deletions are performed at the top.

principle called First- In-Last Out (FILO) or Last-in-First-Out (LIFO)

stack, pile of plates, stack of coins, Deck of Cards etc.,



- An "*undo*" mechanism in text editors
- This operation is accomplished by keeping all text changes in a stack.
- *Undo/Redo* stacks in Excel or Word.

Evaluating arithmetic expression

Syntaxes in languages are parsed using stacks.

Stacks can be used to check parenthesis matching in an expression.

case of ordered list. i.e., it is an ordered list with some restrictions on the operations on a list.

implemented using **Array and Linked List**.

S:

ing/Adding a new element at the top of the stack is referred as *Push operation*

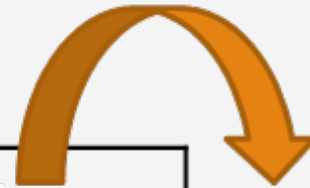
ing/ Deleting an element at the top of the stack is referred as *Pop operation*

top data element of the stack, without removing it.

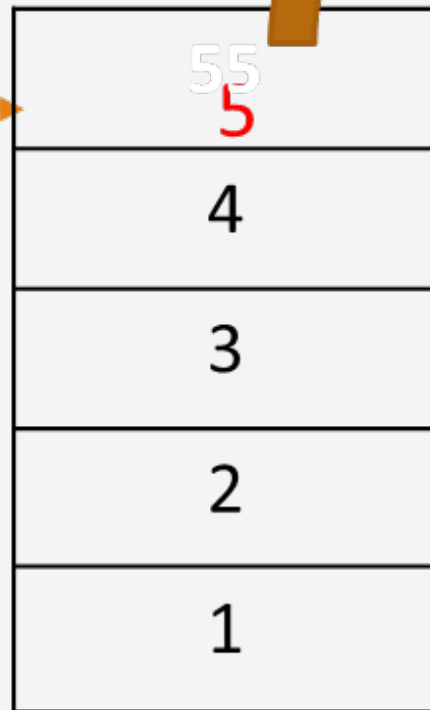
Push 5



POP



top



top



on:

stack is **full** or not. (Overflow condition)

is full, then print error of overflow and exit the program.

is not full, then increment the top and add the element.

nt)

overflow

-1)

Stack Overflow, can't add element to

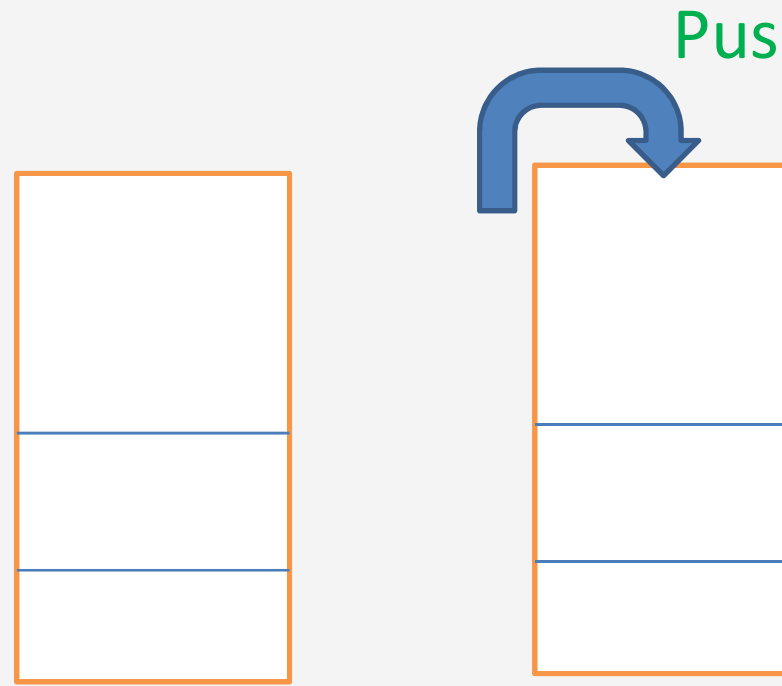
in stack

element;

pushed to stack");

Stack creation

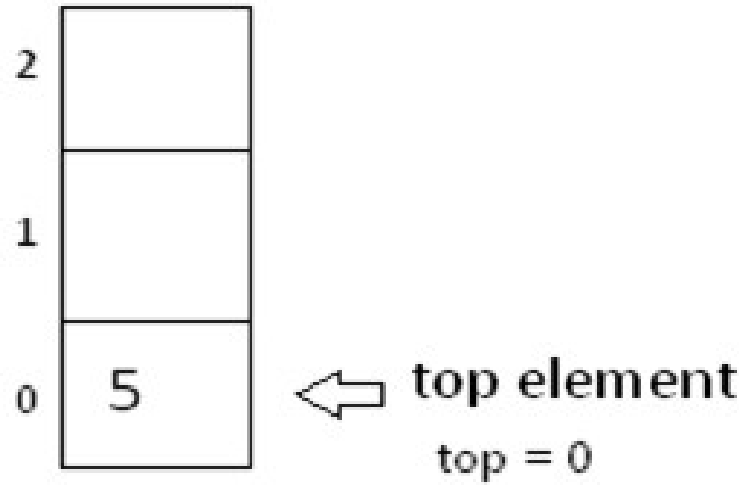
```
int stack[SIZ  
top = -1;
```



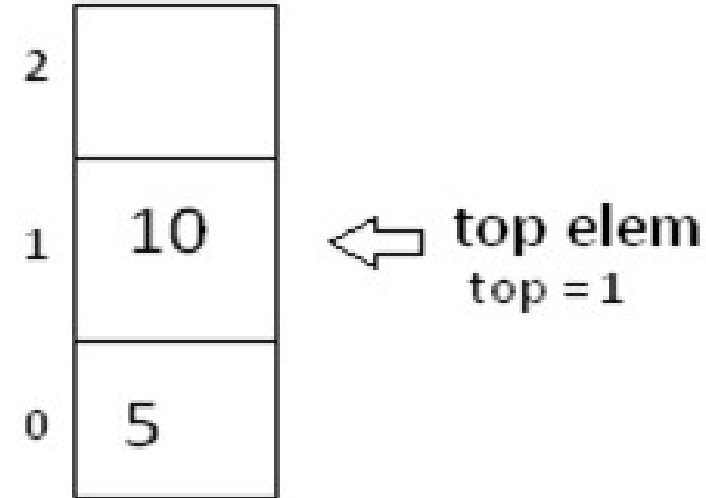
Empty Stack

Initially **stack** is empty.
top = -1.

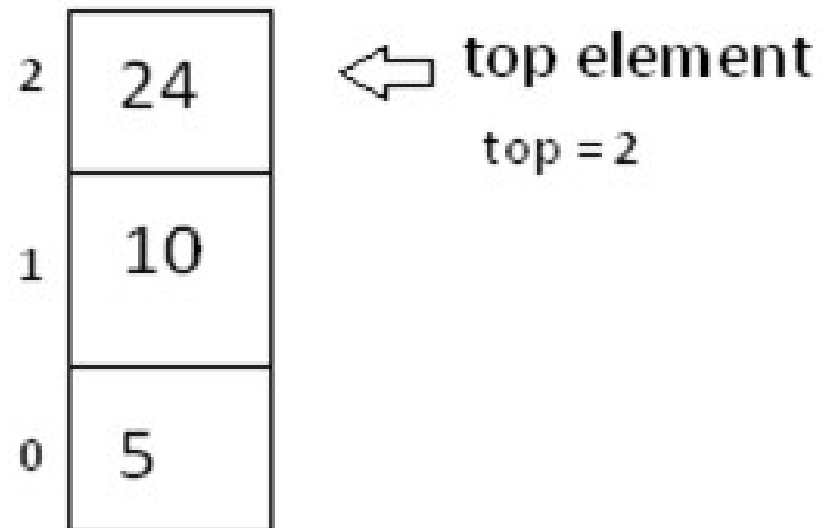
Push (5)



Push (10)



Push (24)



top element (last inserted) from the stack.

stack is **empty** or not. (**Under flow condition**)

is empty, then print error of underflow and exit the program.

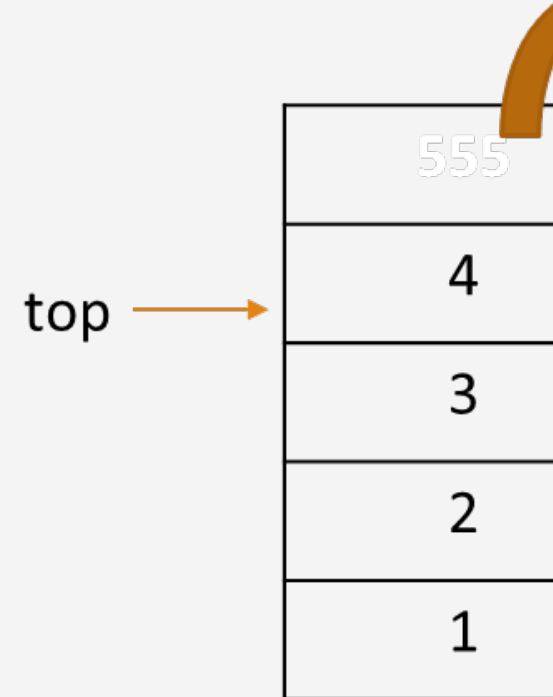
is not empty, then decrement the top.

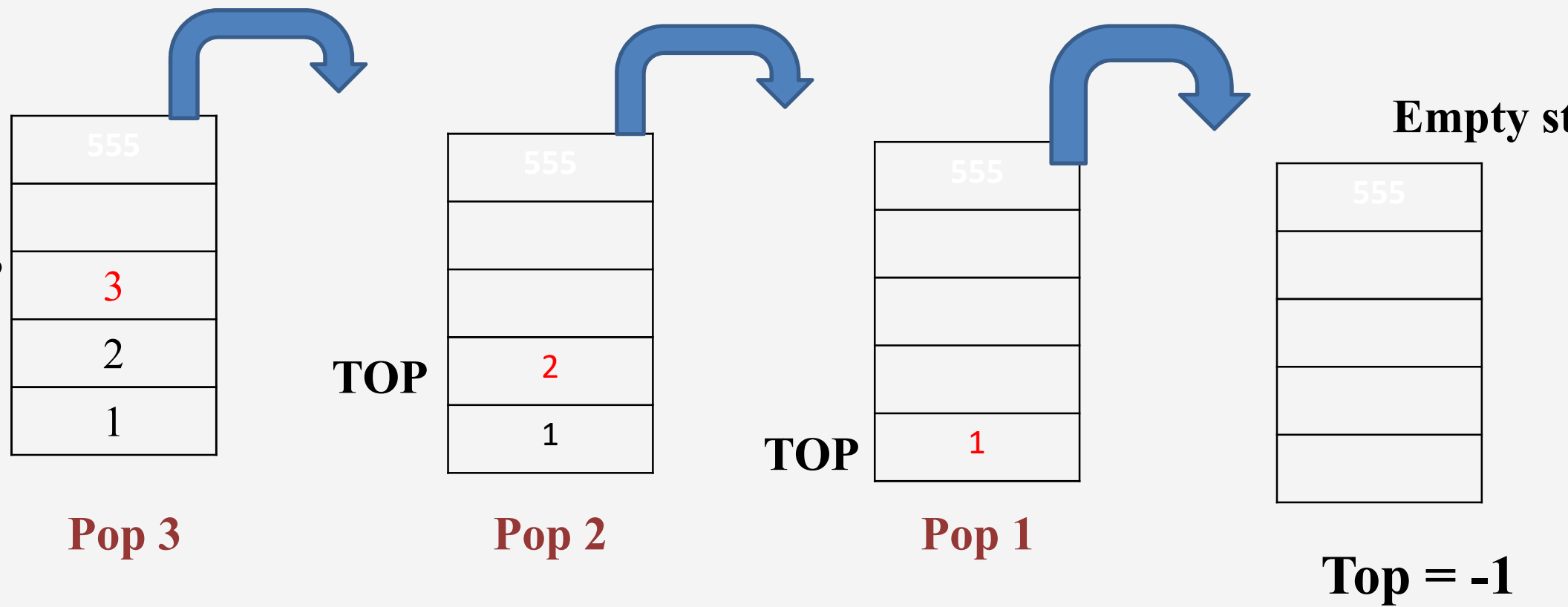
stack underflow

```
printf("Stack is empty!!");
```

```
printf("Deleted element is %d", stack[top]);
```

```
;
```





on : returns the value of the top most
e stack

```
t stack[])
```

```
1)
```

```
STACK IS EMPTY");
```

```
ck[top]);
```

Top



555
4
3
2
1

```
ay(int stack[])
```

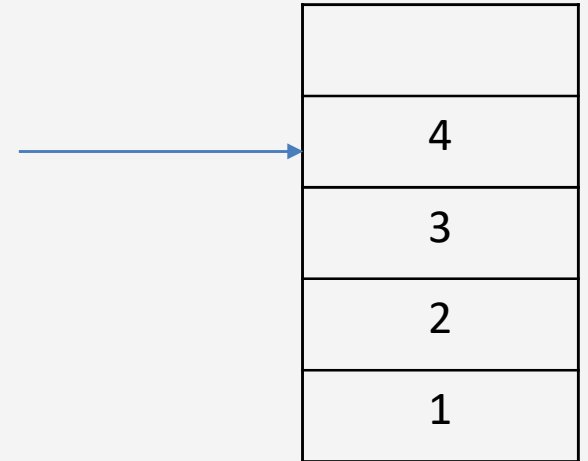
```
-1)
```

```
STACK IS EMPTY");
```

```
p;i >= 0;i--)
```

```
%d",stack[i]);
```

Top



Output: 4 3

