DATA STRUCTURES AND ALGORITHMS

Stack Data Structure

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  - Properties of Stack
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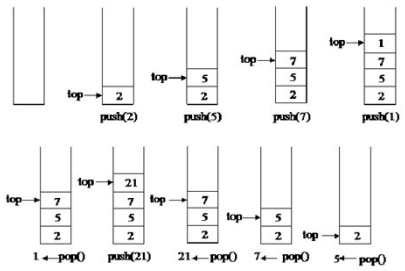
Stack

- Stack is a linear data structure in which elements are added or removed from a single end that is known as the **top** of the stack.
- This single end entry ensures the first-in-last-out (FILO) or last-in-first-out (LIFO) order of insertion and deletion.
- By convention insertion and deletion in stack are termed as Push and Pop, respectively.

Stack



Operations of Stack

- The common operations of stack are as follow:
  - Push()
  - Pop()
  - isEmpty()
  - isFull()
  - topValue()

Operations of Stack-Push(item)

Push(item)

1. If Stack is already full:
2. Display an error of “overflow”
3. Otherwise:
4. Increment top
5. Insert value at top index

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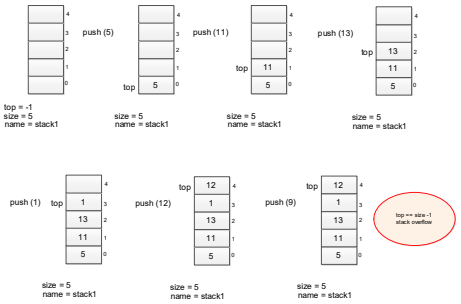
Operations of Stack-Push(item)



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Operations of Stack-Pop()

Pop(stack):

1. If Stack is already empty:
2. Display an error of “underflow”
3. Otherwise:
4. Remove value from top index
5. Decrement top

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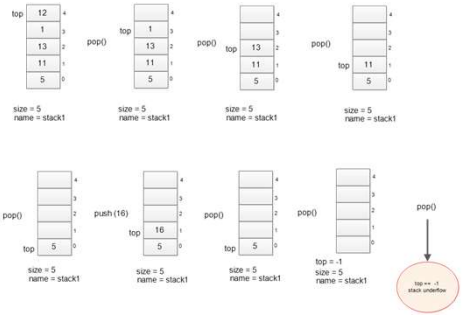
Operations of Stack-Pop()



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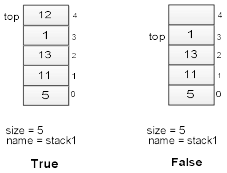
Operations of Stack-isFull()

isFull():

1. If top is at size-1:
2. Return true
3. Otherwise:
4. Return false



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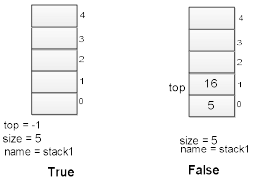
Operations of Stack-isEmpty()

isEmpty():

1. If top is at -1:
2. Return true
3. Otherwise:
4. Return false



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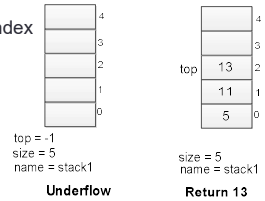
Operations of Stack-topValue()

topValue():

1. If top is at -1:
2. Display error “underflow”
3. Otherwise:
4. Return value at top index



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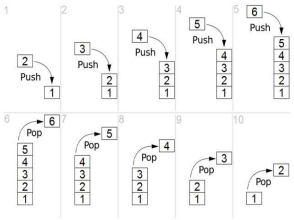
Applications-String Reversal

1. Take input from user e.g. as text
2. Read input character by character till end
3. Push character on to the stack
4. Pop elements from stack till stack becomes empty



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Thank You