Agenda:
1. Linked List implementation of Stack //Done
2. The Stack Class in Java // Done
3. Balanced Parenthesis Problem //Done
4. Infix, Prefix, Postfix Expressions //Done
5. Postfix evaluation //Done
6. Infix to Postfix //30mins - Tomorrow

1 Implement stack using LL

1) Push( ) → insertion at head
2) Pop ( ) → Remove from head
3) isEmpty() → (head == null)
4) Peek() → Print the data at head

} → O(1)

LL → head ← [1] → [2] → [3] → [4] → null

int x = 5; // -> primitive DataType, not a class
//because of this Java is not purely Object Oriented
//Wrapper Classes - Classes for primitive DataType

[List] → LIFO

3

'{' '}' '{ }' → ✓

{ × {}] → ×

×)(→ ×

{[}{[ ]} → ✓

{[× {[)]} → ×

{× { }[ ] → ✓

{ (} → ×

{[)]} →

{[ ]} ↑

① → length of expression
Odd → false
Even → check ahead

② Create a Stack of type characters
Traverse the string

(A) If the current character is opening bracket → Store it

(B) If it is a closing Bracket
→ if Matching Pair with
(Pop) ← top of stack → move forward
→ else return false

if (! isEmpty())
→ return false
else return true

[C]
[{]   ← top

→ operands

4
_____

Infix ~~Expression~~ Expression → a + b
⌐ operands
⌐ operator

<operand> <operator> <operand>

← Precedance

BODMAS

1) Brackets
2) Divisions Multip
   (Left to right)
3) Add & Sub
   (Left to Right)

3 + 4 * 5 → 23

| 7 * 5   → 35 ?? | X

2 ^ 3 = 8

| 2 ^ 3 ^ 2 = 8 ~~2?~~ | (Right to left)
| ✓ 2 ^ 9 ? |

Prefix Expression   + a b
↳ <operator> <operand> <operand>

3 + (4 * 5)

3 ⊕ (* 4 5)

| + 3 * 4 5 | → Prefix Expression

Postfix Expression → a b +
→ <operand> <operand> <operator>
   Left   Right

3 + 4 * 5

3 + (4 * 5)

3 + (4 5 *)

$$3 + (45 *)$$

$$\boxed{3\ 45* \ +} \rightarrow \text{Postfix}$$

5 Postfix Evaluation

We assume this to be correct

$$\left[\textcircled{A}\ 3\ 4\ 5 * \ + \right] \uparrow$$

Traverse till end

① If current is operand store it

② If operator

| List | → | 23 | ← Answer |

↳ 3 | 4 5

| LIFO | → Stack

23

5 | OP2 | ← pop()
4 | OP1 | ← pop()
20 × 5 ← perform (curr, op1, op2)
push(res)

In the end
[top of stack is answer]

L R
2 3 *

$$\textcircled{B}\ 23 * \ 54 * \ + 9 - $$ | OP2 | ← Right | 3 / 2 | *

OP1

9
2

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