PDA Construction Practice Exercise

Objective:

To practice constructing Top-Down and Bottom-Up Pushdown Automata (PDA) and tracing parsing moves for a given context-free grammar and sample string.

Instructions:

For the grammar given below:

1. Construct a Top-Down PDA (by simulating leftmost derivation).
2. Construct a Bottom-Up PDA (by simulating shift-reduce parsing).
3. Show all the moves (stack + input) step-by-step for the sample string 'b * (a + b)'.

Grammar:

S -> S * A | A

A -> A + B | B

B -> (S) | a | b

Sample String:

b * (a + b)

What to Submit:

- PDA construction for Top-Down and Bottom-Up
- Stack and input trace table for both parsing methods
- Clearly indicate when reductions or matches happen
- Final step should show acceptance of the string

Tips:

- In top-down, begin with S and apply production rules to match the input.
- In bottom-up, start with the string and apply reductions to get back to S.

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- Watch for parentheses and operator precedence!
- Neatly organize your stack/input trace steps in a table format.