

Lab Assignment 5: Context-Free Language Parsing

Objective: The objective of this lab assignment is to practice parsing context-free languages using top-down and bottom-up parsing techniques.

Instructions:

- Create a new file and name it "cfparsing.c".
- Implement the following functions:
 - **void parseTopDown(char grammar[], char input[]):** This function should perform top-down parsing on the given context-free grammar using the input string. You can choose any top-down parsing technique you prefer, such as recursive descent parsing or LL(1) parsing. Display the parsing steps and whether the input string is accepted or rejected by the grammar.
 - **void parseBottomUp(char grammar[], char input[]):** This function should perform bottom-up parsing on the given context-free grammar using the input string. You can choose any bottom-up parsing technique you prefer, such as LR(0) parsing or LALR(1) parsing. Display the parsing steps and whether the input string is accepted or rejected by the grammar.
- In the **main()** function, provide a menu-driven program to interact with the top-down and bottom-up parsing functions. The menu should provide the following options:
 - Perform top-down parsing on a grammar and input string
 - Perform bottom-up parsing on a grammar and input string
 - Exit the program
- Test your program with various context-free grammars and input strings to validate the correctness of the parsing operations.
- Document your code and include appropriate comments to explain the purpose of each function and significant sections of code.
- Submit your code along with a brief report summarizing your implementation, any challenges faced, and how you addressed them.