

**Group Project-Part 3**  
**CPCS-302-CS1, CS2**

**Assigned on: 02-May-2024**

**Due Date: 11-May-2024**

**Objective:**

<b>CLO: 10</b>	<b>SO: 1</b>
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- To learn how to make a calculator using JavaCC tool.
- To enhance skills of working with JavaCC and learn how to work as a team

**Student Outcome Covered:**

SO # 1: Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

**Course Learning Objective Covered:**

CLO # 10: Learn lexical analyzer and parser generator tools: JavaCC and/or Lex, YACC.

**Problem Statement (Making Calculator Using JavaCC):**

Write a program to construct **calculator** using lexical analyzer and parser generator tool, JavaCC.

The JavaCC program (Calculator.jj) should accept any arithmetic expression containing integers or real numbers separated by +, -, \*, /, ( ) operators.

**Lexical Specifications:**

SKIP : { " " }

TOKEN : { < EOL : "\n" | "\r" | "\r\n" > }

TOKEN : { < PLUS : "+" > }

TOKEN : { < MINUS : "-" > }

TOKEN : { < TIMES : "\*" > }

TOKEN : { < DIVIDE : "/" > }

TOKEN : { < OPEN\_PAR : "(" > }

TOKEN : { < CLOSE\_PAR : ")" > }

TOKEN : { < NUMBER : < DIGITS > | < DIGITS > "." < DIGITS > | < DIGITS > "." |  
"." < DIGITS > > }

TOKEN : { < #DIGITS : (["0"- "9"])+ > }

**Parser Specifications:**

Start  $\rightarrow$  (Expression EOL)\* EOF

Expression  $\rightarrow$  Term (PLUS Term | MINUS Term ) \*

Term  $\rightarrow$  (TIMES Primary | DIVIDE Primary) \*

Primary  $\rightarrow$  NUMBER | OPEN\_PAR Expression CLOSE\_PAR

**Sample Input:**

$2 * 3 + 4 * 5$

**Sample Output:**

26

**Important Note:**

- Every **group** should consist of **maximum 3 students** of your own choice.
- Any kind of **plagiarism/cheating** will result in **0 marks**.
- **No late submission** will be accepted.
- Only **one student** of each group should **upload the solution** (compressed files: .zip, .7z or .rar containing all JavaCC related files) on Blackboard **on or before due date**.
- **Write ID, Name and Email** of each member of the group as comment in Calculator.jj file.
- **No solution** will be accepted **through email**.
- **Solution in any other file** (.pdf, .docx, etc.) format **will not be entertained** and will result in **0 marks**.
- Your program should **take any expression as an input** at run time and **display the correct value of that expression**, keeping in view the precedence of operators.