



DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF ENGINEERING AND TECHNOLOGY, NEW CAMPUS

CS-471L Compiler Construction

Open Ended Lab (Fall 2024)

Marks: 25

Task 1: Design a Syntax Analyzer for if-else Statements and Expressions. [CLO 3, Marks = 25]

You are tasked with designing a syntax analyzer (or parser) for a subset of a programming language that includes if-else conditional statements and simple arithmetic expressions. The syntax analyzer should verify the syntactic correctness of the input program according to the specified grammar and generate a parse tree or report any syntax errors encountered.

Sample Input 1:

if id = num then if id = num then id = num

Output:

Error: Missing 'else' clause in nested if statement. Expected 'else' after 'if id = num then id = num' before the second 'if'.

Sample Input 2:

if = num then id = num

Output:

Error: Syntax Error at '='. Expected 'id' before '=' in the condition part of the if statement.

Sample Input 3:

if id = num then id = id * num else id = num / id

Output:

Parse Successful: The input conforms to the grammar.

Sample CFG:

$S \rightarrow \text{if } E \text{ then } S \text{ else } S$

$S \rightarrow \text{if } E \text{ then } S$

$S \rightarrow \text{id} = E$

$E \rightarrow E + T \mid E - T \mid T$

$T \rightarrow T * F \mid T / F \mid F$

$F \rightarrow (E) \mid \text{id} \mid \text{num}$

BEST OF LUCK ☺