School of Technology, Pandit Deendayal Energy University, Gandhinagar

Department of Computer Science and Engineering

Name of the Course:	System Software & Compiler Design
Course Code:	20CP302T

Assignment 2 (Unit-2- Top down Parsing, CO2- 10 marks)

Instructions:

1. Write each question followed by answer.
2. Hand-written submission is mandatory.
3. Use file pages to write the answers.
4. Date of submission: 4th Sept., 2023

1) Which of the following grammars are ambiguous? Justify.

1. S → a | Sa | bSS | SSb | SbS
2. S → a | S+S | SS | S* | (S)
3. S → S (S) S | ϵ

2) Parse following string using unambiguous grammar of arithmetic expression:

i) id + id * (id + id ^ id) / id ^ id

ii) – (id * id) – id ^ id ^ id / id + id

3) State whether given grammar is LL(1) or not? Justify using characteristics of LL(1) grammar.

1. S → 1ABd | ϵ
   A → 1AC | &C
   B → &S
   C → 1

2. A → BCx | y
   B → yA | ϵ
   C → Ay | x

4) Eliminate Left recursion from given grammar.

1. S → Aa | b
   A → Ac | Sd | ϵ

2. S → A
   B → bBc | f
   A → Ad | Ae | aB | ac, also perform left factoring on resultant grammar.

5) Compute FIRST and FOLLOW set of following.

1. A → (A) A | ϵ

2. S → ACB | cbB | Ba
   A → da | BC
   B → g | ϵ
   C → h | ϵ

6) Which of the following is present in FIRST(X) ∩ FIRST(B) of the below given?
   X → A
   A → Bb | Cd
   B → aB | Cd | ϵ
   C → Cc | ϵ

7) Construct Predictive parsing table for following grammars.

1. S → (L) | a
   L → L, S | S, parse (a, a, (a, a))

2. E → BA
   A → &BA | ϵ
   B → true | false

3. R → R '|' R | R. R | R* | (R) | a | b, where '|' is union operator. Also parse a|b* (b|a)

8) Construct a recursive decent parser with backtracking for the grammar:
   S → aSbS | bSaS | ϵ