**University of Central Punjab**

**Faculty of Information Technology**



**Compiler Construction**

Project Phase # 2

Submission Before: 11:55PM - 24-06-2020

(Late will be penalty of deduction of 2 absolute marks per day)

TINY-C++:

This is a subset of C++ language. Description of the language as follow:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Detail | Example |
| 1 | Identifiers | (\_|L)(L|\_|D|@)\*(D|\_) | \_r@te2, \_rate\_, r@t@e2 …etc |
| 2 | Numbers | [+-]?(D+)(\.D+)?, and exponent numbers. | 3.43433E+13, |
| 3 | Operators | <,>,!=, <>, :=, ==, \*, +, /,-, >>,<<, ++, +=, &&, ||, >=, =< , % , ; |  |
| 4 | Punctuations | [,{,(,),},] |  |
| 5 | Keyword | |  |  | | --- | --- | | **C-Compiler** | **UCP-Compiler** | | while | loop | | do-while | do-loop | | for | Tour | | if | Iff | | If-else | iif-else | | cin >> , cout << | input -> , output <- |   **Remaining:**  asm else new this auto enum operator throw bool explicit private true break export protected try case extern public typedef catch false char float typename class return union const friend short unsigned goto signed using continue sizeof virtual default inline static void delete int volatile do long struct double switch namespace template |  |

**Grammar**

Right down grammar for C-Like syntax

Function 🡪 Type identifier ( ArgList ) CompoundStmt

ArgList 🡪 Arg | ArgList ,Arg

Arg 🡪 Type identifier

Declaration 🡪 Type IdentList ;

Type 🡪 int | float

IdentList 🡪 identifier ,IdentList | identifier

Stmt 🡪 ForStmt | WhileStmt | Expr ; | IfStmt

| CompoundStmt | Declaration | ;

ForStmt 🡪 for ( Expr ; OptExpr ; OptExpr ) Stmt

OptExpr 🡪 Expr | ε

WhileStmt 🡪 while ( Expr ) Stmt

IfStmt 🡪 if ( Expr ) StmtElsePart

ElsePart 🡪 else Stmt | ε

CompoundStmt 🡪{ StmtList }

StmtList 🡪 StmtListStmt | ε

Expr 🡪 identifier :=Expr | Rvalue

Rvalue 🡪 Rvalue Compare Mag | Mag

Compare 🡪 == | < | > | <= | >= | != | <>

Mag 🡪 Mag + Term

| Mag - Term

| Term

Term 🡪 Term \* Factor

| Term / Factor

| Factor

Factor 🡪 ( Expr )

| identifier

| number

Sub Grammar

Mag 🡪 Mag + Term

| Mag - Term

| Term

Term 🡪 Term \* Factor

| Term / Factor

| Factor

Factor 🡪 ( Expr )

| identifier

| number

# Assignment Description:

For this assignment,

1. Implement the Sub-Grammar only.
2. You have to write a **Parser**for above Grammar.
3. **Parser** will get **Token** from scanner and built a parse tree.
4. Parser will built the parse tree using Predictive Parser (LL(1)) grammar.
5. **Panic Mode** approach will be implemented to output the syntax error.
6. This assignment includes following parts:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PARTS** | **Output** | **Marks** |
| **1** | Convert grammar to LL(1) grammar. |  | 15 |
| **2** | Implement Parser using   1. LL1 Parsing Table | Source Code Files | 85 |
| **3** | Show rules in output file and error in error file |  | 10 |
|  | Total |  | 100 |
|  | **Absolute** |  | **7** |

# Rules:

1. This is an individual assignment. Each student has to submit his/her assignment work.
2. Group discussion is allowed but don’t share code and other part of assignment with other student.
3. Plagiarism is not tolerable in any of its form. Minimum penalty would be an ‘0’ marks in the project module.

# Tools:

Language (For Development): C++

**Note: Student cannot use built-in data structure. Student can use his own data structure Hash Table, Linked List which he/she developed in data structure course. In this case student should know about the data structure.**

# Evaluating Criteria:

1. Source code should reflect the detail given in documents (other parts).
2. A text file with valid source code will be input of the scanner and Token file will be output of the scanner tool.
3. A text file will show the productions in separate lines used in building the parse tree.
4. A text file show the errors generated from both scanner and parser.