

CSE4061 – Compiler Design Assignment #1

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Grammar of our programming language:

Start \rightarrow decls compoundstmt

decls \rightarrow declaration ; decls | ϵ

declaration \rightarrow type **ID** | type **_ID** | type **\$ID**

type \rightarrow **int** | **double** | **short**

compoundstmt \rightarrow statements

statements \rightarrow statement statements | ϵ

statement \rightarrow ifstmt | whilestmt | assignment | compoundstmt | methodCall

methodCall \rightarrow **ID** (optparameters) ; | **_ID** (optparameters) ; | **\$ID** (optparameters) ;

optparameters \rightarrow params | ϵ

params \rightarrow param A'

A' \rightarrow , param A' | ϵ

param \rightarrow **ID** | **_ID** | **\$ID** | intNumber | doubleNumber | shortNumber

ifstmt \rightarrow **if** (booleanExp) { statement } **else** { statement }

whilestmt \rightarrow **while** (booleanExp) { statement }

booleanExp \rightarrow arithmeticExp booleanOp arithmeticExp

booleanOp \rightarrow < | > | <= | >= | == | !=

assignment \rightarrow **ID** = arithmeticExp ; | **ID** = unaryExp ; | **_ID** = arithmeticExp ; | **_ID** = unaryExp ;
; | **\$ID** = arithmeticExp ; | **\$ID** = unaryExp ;

unaryExp \rightarrow ++ **ID** | ++ **_ID** | ++ **\$ID**

arithmeticExp \rightarrow multexpr B'

B' \rightarrow + multexpr B' | - multexpr B' | ϵ

multexpr \rightarrow simpleexpr C'

C' \rightarrow * simpleexpr C' | / simpleexpr C' | ϵ

simpleexpr \rightarrow **ID** | **_ID** | **\$ID** | **intNumber** | **doubleNumber** | **shortNumber** |
(arithmeticExp)

Lexical structure of our programming language:

Keywords: if, else, while, int, double, short

Identifiers: An identifier starts with a letter or underscore or dollar sign and continues with letter or digit. Any of the keywords cannot become identifier. Maximum length of the identifier should be at most 64 characters.

Operator: The followings are operators: + - / * = == < <= > >= !=

Delimiters: whitespace

Numbers: The numbers are defined as follows:

digit \leftarrow 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

intNumber \leftarrow digit+ (the maximum integer number is 127)

doubleNumber \leftarrow digit+ (the maximum integer number is 255)

shortNumber \leftarrow digit+ (the maximum integer number is 63)