**SCANNER DOCUMENTATION**

**Requirement:**

The scanner input will be a text file containind the source program, and will produce as output the following:

- PIF - Program Internal Form

- ST - Symbol Table

In addition, the program should be able to determine the lexical errors, specifying the location, and, if possible, the type of the error.

1. Identifiers: b. arbitrary length, no more than 250 characters;
2. Symbol Table: b. separate tables for indentifiers, respectively constants;
3. Symbol Table Organization: b. lexicographically binary tree;

**Analysis and design:**

Alphabet: {a-z, A-Z} - upper and lower case letters of the English alphabet

{0-9} - decimal digi

Lexic: operators:

logical: !, &

relational: >, <, >=, <=, ==

assign: =

arithmetical: += , -= , \*=, /=

acces: [] for list

separators: {}, (), ;

reserved words: if, for, while, else, int, bool, string, list, null, list, true, false , return, main() , #include, <iostream> , cin>>, cout<<

identifiers : a seq of letter and digits, the first character is a letter

identifier = letter | {letter}/{digit}

letter = {"a"-"z", "A"-"Z"}

digit = {"0","1",..."9"}

constants: integer: identifier = {-} | {digit}

string: identifier = letter|{letter}

list: indetifier = integer "," integer | string "," string

Syntax:

lexical rules: identifier = letter | {letter}/{digit}

letter = {"a"-"z", "A"-"Z"}

digit = {"0","1",..."9"}

relation = "=<", ">=", ">", "<", "="

**Implementation details:**

**Data structures:** lexicographically binary tree used to implement the symbol table in the SymbolTable class.

Classes: PIF class for representing the data in the program internal form.

SymNode class is used for creating nodes in the binary tree.

Token for representing a codifier.

SymbolTable for representing the lexicographically binary tree,

Input/Output: the input will follow the above sintactical rules.

The output will show the pif which contains the type(identifier/constant/keyword) and a code which represents the type position in the symbol table/ keyword list. The symbol table input will show the value and type of an identifier and for constants the type.