

Assignment 1

Deepshikha CS21BTECH11016

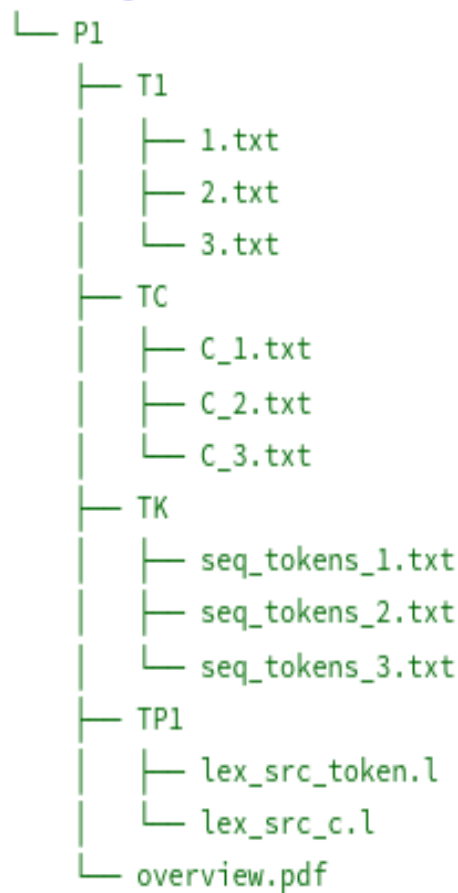
August 27, 2023

0.1 Compilation Steps

1. There are two separate files for generating corresponding token file and C file located in TP1 folder.

2. Lex:

- The lex command reads file input or stdin input and generates a file named lex.yy.c based on the rules defined in our lex program.



- The directory structure is as :
- It generates yylex which is a C language function.
- yylex performs lexical analysis on input, recognises and returns tokens based on the rules.

3. Token file : lex_src_token.l

- Run this command

```
lex lex_src_token.l
gcc lex.yy.c -o lex_src_token -ll
./lex_src_token inp.txt
```

4. Input file : Pass input file (test case P program file) via command line . Here, input file is "inp.txt" ("1.txt", "2.txt", etc)

5. C file : lex_src.c.l

- Run this command

```
lex lex_src.c.l
gcc lex.yy.c -o lex_src_c -ll
./lex_src_c inp.txt
```

0.2 Expalantion of my lex rules

1. Declarations of digits, integers, char, chars,special symbol,keyword,id are defined in the declaration section.

2. Id can be :- (here + means followed by)

- special characters + integers
- special characters + integers + chars
- special characters + chars + integers
- special characters + chars
- chars + integers
- integers + chars
- chars

3. Bracket handling

- In the C program , there are supposed to be two type of brackets: parenthesis and curly brackets.
- If square bracket comes for scope of some keyword, such as:

```
if [ x gt 2 ]
```

then this should be changed to

```
if ( x > 2 )
```

So if "]" comes after a keyword then they are changed to "(" else "{".

- The reserved keyword for the above scenario are : while , for, if . Rules for these keywords are added.
- lex rule defined as: (ex of "in case that")

```
"in case that"([ ]*)"\"
```

The above format is "in case that" followed by spaces followed by "]" .

- For closing bracket:
 - I took a global variable curve_bracket initialised to 0.

- Whenever we encounter the above keyword bracket condition, i am increasing the count of the above variable.
- And when i am getting "]" as input , i am checking if count is 0 or not, if it is not 0 then there is an open parenthesis so "]" is replaced by ")".
- else replace by "}"

4. Square root:-

- Lex rule is as:-

```
{id}([\t]+"_ "[\t ]+)(^2)
```

- This checks if an id followed by space followed by "_" followed by space followed by 2, if so then this a square root .
- id is supposed to be extracted from this.
 - used an array and updating it till the first space.
 - Traversing using yytext
 - array will consist of id now.

5. String constant

- Lex rule:

```
(\")(.)*(\")
```

- This checks if any character is surrounded by double quotes , if so then it is treated as constant.

6. Error handling:

Incorrect size of datatype .Ex:-

```
integer_wr ;
```

This declaration is wrong .Error will be reported.

7. Not including "do" keyword for the "if" statement

0.3 Known Issues with my code

(Supposed to be done by parser)

1. neq and eq are supposed to be used only in the conditionals , but my lex program will not recognise these as errors.
2. If input is like this :-

```
if ( a = b )
```

This should give an error

3. String literal double quotes : if we specify string like this :

```
string s = 'vkewi' ;
```

Note :I made a lex rule earlier such that the above will get error reported .But if i assign value like this :-

```
string s ;
```

```
s = 'vkewi' ;
```

This won't give an error .It will identify the assigned value as punctuations and id. My error reporting would work only when declaration and assignment are in same line. Also, this can also be the case when the variable is assigned to a variable.In that case ,the code is not wrong but that my rules would report an error which is wrong.So i deleted the rule.

This won't give error with my rules. Same goes for integers also.

4. Assigning values to variables:

- can assign characters to integer datatype
- can assign integer value to character datatype
- and so on.

NOTE: Also,please refer to the test cases sent via this assignment.Those are the same as before except the scope of "do".Earlier i added "do" in otherwise statement also but it is supposed to be in the "if" statement only.