**Compiler Design Lab – 4**

1. \*\*Regular Expressions:\*\* - `digit [0-9]\*`: This defines a regular expression for matching zero or more digits. - `letter [a-zA-Z]`: This defines a regular expression for matching a single letter. - `id {letter}({letter}|{digit})\*`: This defines a regular expression for matching identifiers. An identifier starts with a letter and can be followed by zero or more letters or digits. - `int\_num {digit}+`, `uint\_num 0|({int\_num})`: These regular expressions define signed and unsigned integers. An unsigned integer can be either 0 or a sequence of one or more digits.

2. \*\*Floating-Point Numbers:\*\* - `float\_num ({int\_num}\.{digit}+)|({int\_num}\.)|(\.{digit}+)`: This regular expression matches different forms of floating-point numbers. It can be an integer part followed by a decimal point and one or more digits (`{int\_num}\.{digit}+`), an integer part followed by just a decimal point (`{int\_num}\.`), or just a decimal point followed by one or more digits (`\.{digit}+`).

3. \*\*Exponential Notation:\*\* - `exp\_num ({int\_num}|{float\_num})[eE][+-]?{int\_num}`: This regular expression matches numbers in exponential notation. It can be an integer or float part followed by `e` or `E`, an optional `+` or `-`, and then one or more digits.

4. \*\*Tokens and Actions:\*\* - The section after the `%%` delimiter contains rules for recognizing various tokens. - For example, `"//"` is a pattern to match a double forward slash, and the action `{scom=1;}` sets the single-line comment flag to 1. - Keywords, relational operators, assignment operator, etc. are recognized based on the provided patterns.

5. \*\*Ignoring Comments:\*\* - `/\* ... \*/` style comments are ignored using the rules for `"/\*"` and `"\*/"`. - Single-line comments are ignored using the rule for `"//"`.

6. \*\*Printing and Storing:\*\* - When a token is recognized, it prints a message to the output file (`yyout`) indicating the type of the token. - Identifiers are also stored in the symbol table (`st`) if they haven't been encountered before.

7. \*\*Main Function:\*\* - `main()` opens the input and output files, calls `yylex()` to start the lexical analysis, and then prints the contents of the symbol table.

8. \*\*`look\_up` Function:\*\* - This function checks if a given identifier (`id`) is already in the symbol table.

9. \*\*`yywrap` Function:\*\* - This function is used to indicate the end of input.

10. \*\*File Handling:\*\* - The program reads from a file named `x.txt` and writes to a file named `y.txt`. This Lex program will tokenize the input based on the specified rules and print the results to `y.txt`. The program also maintains a symbol table and handles different types of numeric constants and identifiers as per the provided regular expressions.

Commands:

A black screen with a black border

Description automatically generated