Practical 4

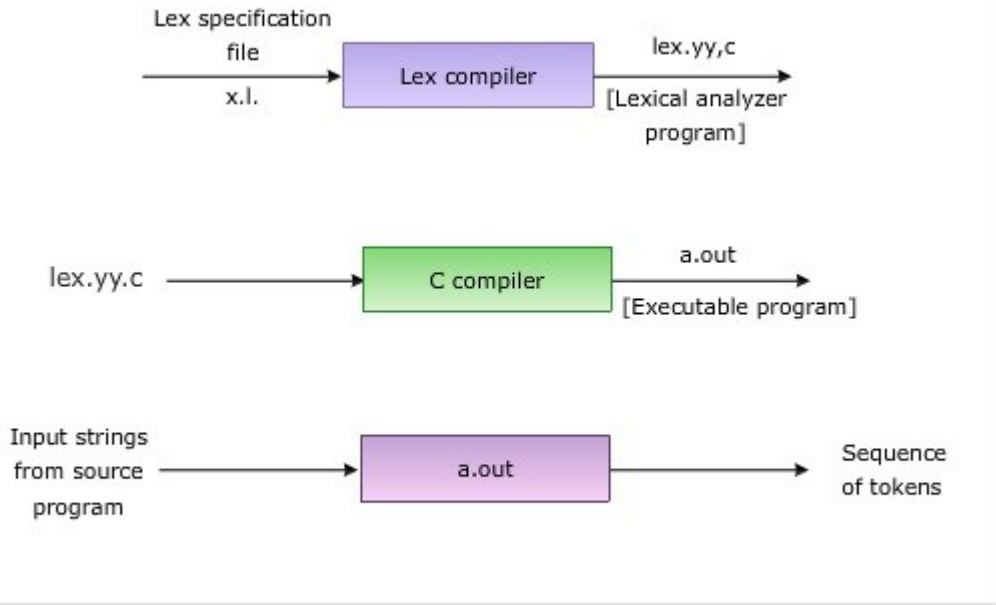
Title: To Study about Lexical Analyzer Generator (LEX) and Flex (Fast Lexical Analyzer).

➢ Lexical Analyzer Generator (LEX) Introduction

It is a tool or software which automatically generates a lexical analyzer (finite Automata). It takes as its input a LEX source program and produces lexical Analyzer as its output. Lexical Analyzer will convert the input string entered by the user into tokens as its output.

LEX is a program generator designed for lexical processing of character input/output stream. Anything from simple text search program that looks for pattern in its input-output file to a C compiler that transforms a program into optimized code.

In program with structure input-output two tasks occurs over and over. It can divide the input-output into meaningful units and then discovering the relationships among the units for C program (the units are variable names, constants, and strings). This division into units (called tokens) is known as lexical analyzer or LEXING. LEX helps by taking a set of descriptions of possible tokens n producing a routine called a lexical analyzer or LEXER or Scanner.



Generation of Lexical Analyzer using Lex

➢ Lex File Format

- A Lex program consists of three parts and is separated by % delimiters:-
  Declarations
  %%
  Translation rules
  %%
  Auxiliary procedures

- **Declarations:** The declarations include declarations of variables.
- **Transition rules:** These rules consist of Pattern and Action.
- **Auxiliary procedures:** The Auxilary section holds auxiliary functions used in the actions.
  For example:
  declaration
  number[0-9]
  %%
  translation
  if {return (IF);}
  %%
  auxiliary function
  int numberSum()

➢ Lex Predefined Function and Variables

- **yylex()**

Purpose: This is the main function of the lexical analyzer.

Returns: An integer token to the parser (yyparse()).

Usage: Called repeatedly to tokenize input.

- **yywrap()**

Purpose: Called when end of input (EOF) is reached in yylex().

Returns: 1 if no more input, else 0.

Usage: You can use it to restart scanning or cleanup.

- **char *yytext**

Purpose: Points to the current matched text (lexeme).

Set by: Flex after each match.

Usage: Access the actual string matched.

- **yyleng**

Purpose: Contains the length of the matched string yytext.

Set by: Automatically by the scanner.

- **yyin**

Purpose: Input file pointer; tells yylex() where to read from.

Default: stdin

Set manually for custom input files.

- **yyout**

Purpose: Output file pointer; where ECHO or printed output goes.

Default: stdout

- **yymore()**

Purpose: Tells Flex to append the next matched text to yytext.

Default behavior: Normally, new matches replace yytext.

Use when you want to build a larger token in parts.

- **yyless(n)**

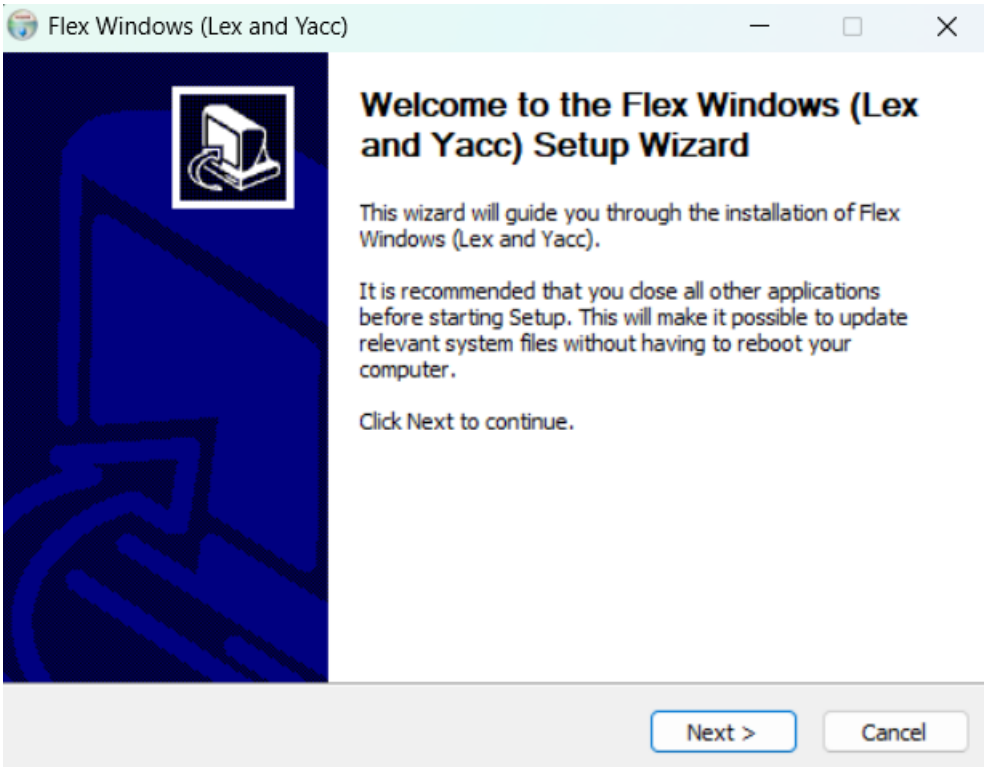
Purpose: Keeps first n characters of yytext, and pushes back the rest.

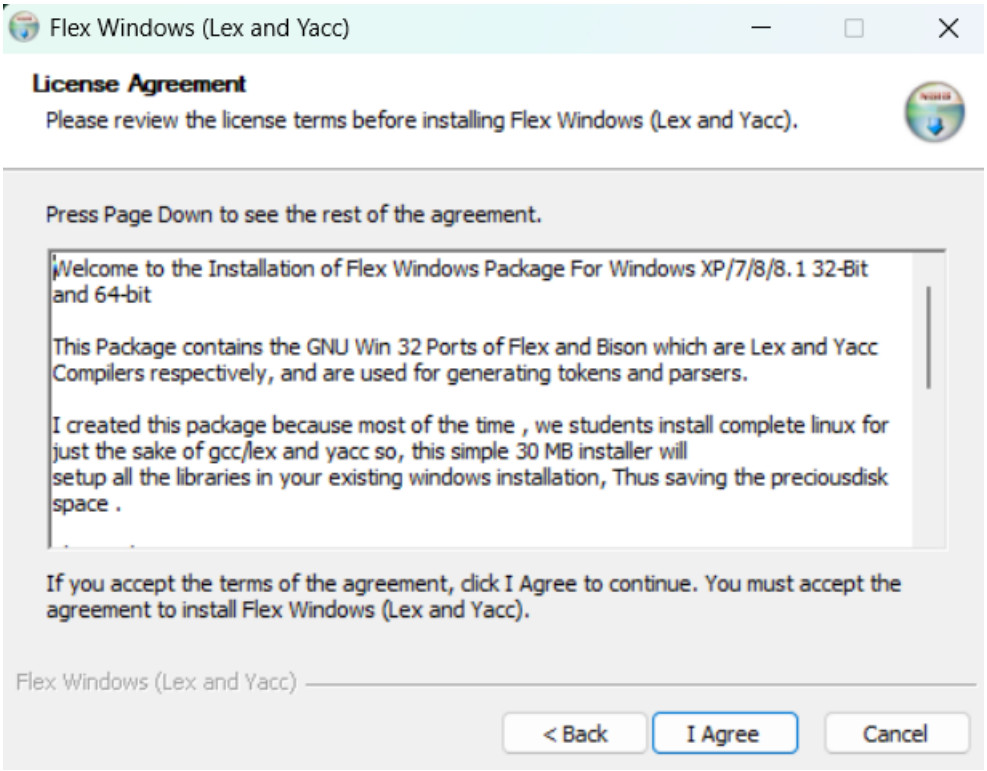
Use case: When you've matched too much and want to keep part of it.

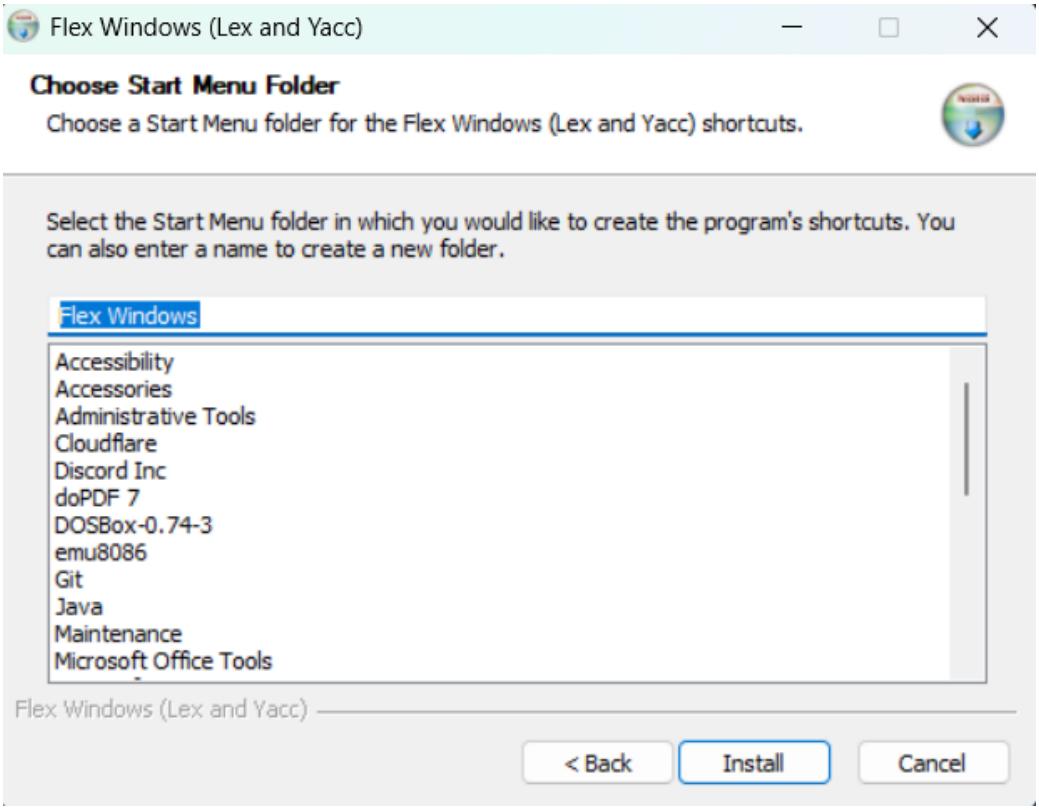
- **yylval**

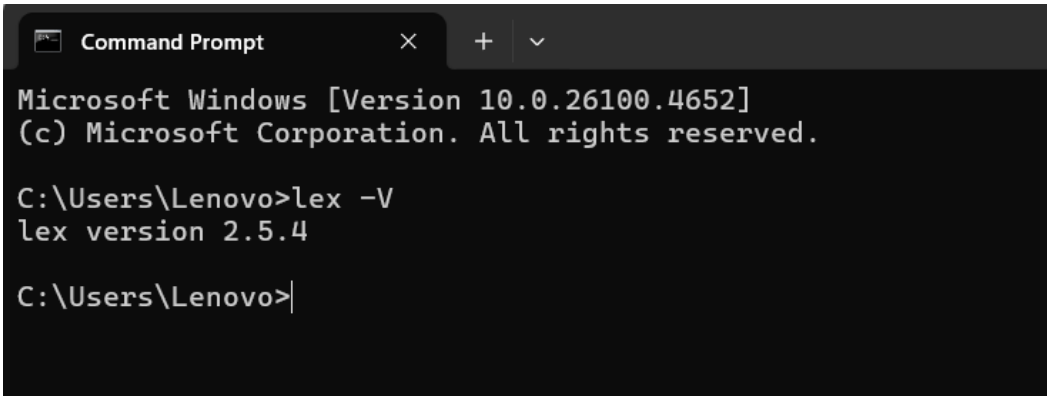
Purpose: Holds the semantic value of a token for the parser (bison/yacc).

Use: Set its value in your rules to pass data to the parser.


Flex Windows (Lex and Yacc)
Welcome to the Flex Windows (Lex and Yacc) Setup Wizard
This wizard will guide you through the installation of Flex Windows (Lex and Yacc).
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel


Flex Windows (Lex and Yacc)
License Agreement
Please review the license terms before installing Flex Windows (Lex and Yacc).
Press Page Down to see the rest of the agreement.
Welcome to the Installation of Flex Windows Package For Windows XP/7/8/8.1 32-Bit and 64-bit
This Package contains the GNU Win 32 Ports of Flex and Bison which are Lex and Yacc Compilers respectively, and are used for generating tokens and parsers.
I created this package because most of the time , we students install complete linux for just the sake of gcc/lex and yacc so, this simple 30 MB installer will
setup all the libraries in your existing windows installation, Thus saving the preciousdisk space .
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install Flex Windows (Lex and Yacc).
Flex Windows (Lex and Yacc)
< Back
I Agree
Cancel


Flex Windows (Lex and Yacc)
Choose Start Menu Folder
Choose a Start Menu folder for the Flex Windows (Lex and Yacc) shortcuts.
Select the Start Menu folder in which you would like to create the program's shortcuts. You can also enter a name to create a new folder.
Flex Windows
Accessibility
Accessories
Administrative Tools
Cloudflare
Discord Inc
doPDF 7
DOSBox-0.74-3
emu8086
Git
Java
Maintenance
Microsoft Office Tools
Flex Windows (Lex and Yacc)
< Back
Install
Cancel


Command Prompt
Microsoft Windows [Version 10.0.26100.4652]
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C:\Users\Lenovo>lex -V
lex version 2.5.4
C:\Users\Lenovo>