



SAVEETHA SCHOOL OF ENGINEERING
SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL
SCIENCES



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE CODE : CSA14
COURSE NAME : Compiler Design

Course Coordinator: Dr. W. Deva Priya

Software Required :

1. FLEX Packages
2. Dev C

LIST OF EXPERIMENTS

1. Write a LEX program to identify the capital words from the given input.
2. Write a LEX program to check whether the given input is digit or not.
3. The Company ABC runs with employees with several departments. The Organization manager had all the mobile numbers of employees. Assume that you are the manager and need to verify the valid mobile numbers because there may be some invalid numbers present. Implement a LEX program to check whether the mobile number is valid or not.
4. In a class, an English teacher was teaching the vowels and consonants to the students. She says “Vowel sounds allow the air to flow freely, causing the chin to drop noticeably, whilst consonant sounds are produced by restricting the air flow”. As a class activity the students are asked to identify the vowels and consonants in the given word/sentence and count the number of elements in each. Write an algorithm to help the student to count the number of vowels and consonants in the given sentence.
5. Keywords are predefined, reserved words used in programming that have special meanings to the compiler. Keywords are part of the syntax and they cannot be used as an identifier. In general there are 32 keywords. The prime function of Lexical Analyser is token Generation. Among the 6 types of tokens, differentiating Keyword and Identifier is a challenging issue. Thus write a LEX program to separate keywords and identifiers.
6. Write a LEX program to identify and count positive and negative numbers.
7. Write a LEX program to recognise numbers and words in a statement. Pooja is a small girl of age 3 always fond of games. Due to the pandemic, she was not allowed to play outside. So her mother designs a gaming event by showing a flash card. Pooja has to separate the numbers in one list and words in another list shown in the flash card.
8. Write a LEX program to accept string starting with vowel.
9. Write a LEX program to find the length of the longest word.



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10. A networking company wants to validate the URL for their clients. Write a LEX program to implement the same.
11. School management wants to validate DOB of all students. Write a LEX program to implement it.
12. Write a LEX program to recognize a word and relational operator.
13. Write a LEX code to replace a word with another word in a file.
14. A School student was asked to do basic mathematical operations. Implement a LEX program to implement the same.
15. Write a LEX Program to check the email address is valid or not.
16. Write a LEX Program to convert the substring abc to ABC from the given input string.
17. The lexical analyzer should ignore redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value. Write a LEX specification file to take input C program from a .c file and count the number of characters, number of lines & number of words.

Input Source Program: (sample.c)

```
#include <stdio.h>

int main()
{
    int number1, number2, sum;
    printf("Enter two integers: ");
    scanf("%d %d", &number1, &number2);
    sum = number1 + number2;
    printf("%d + %d = %d", number1, number2, sum);
    return 0;
}
```

18. Write a LEX program to print all the constants in the given C source program file.



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Input Source Program: (sample.c)

```
#define PI 3.14
```

```
#include<stdio.h> #include<conio.h>
```

```
void main()
```

```
{
```

```
int a,b,c = 30;
```

```
printf("hello");
```

```
}
```

19. Write a LEX program to count the number of Macros defined and header files included in the C program.

Input Source Program: (sample.c)

```
#define PI 3.14
```

```
#include<stdio.h>
```

```
#include<conio.h>
```

```
void main()
```

```
{
```

```
int a,b,c = 30;
```

```
printf("hello");
```

```
}
```

20. Write a LEX program to print all HTML tags in the input file.

Input Source Program: (sample.html)

```
<html>
```

```
<body>
```



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<h1>My First Heading</h1>

<p>My first paragraph.</p>

</body>

</html>

21. Write a LEX program which adds line numbers to the given C program file and display the same in the standard output.

Input Source Program: (sample.c)

```
#define PI 3.14
```

```
#include<stdio.h>
```

```
#include<conio.h>
```

```
void main()
```

```
{
```

```
int a,b,c = 30;
```

```
printf("hello");
```

```
}
```

22. Write a LEX program to count the number of comment lines in a given C program and eliminate them and write into another file.

Input Source File: (input.c)

```
#include<stdio.h>
```

```
int main()
```

```
{
```

```
int a,b,c; /*variable declaration*/
```

```
printf("enter two numbers");
```



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```
scanf("%d %d",&a,&b);  
  
c=a+b;//adding two numbers  
  
printf("sum is %d",c);  
  
return 0;  
  
}
```

23. Implement Lexical Analyzer using LEX or FLEX (Fast Lexical Analyzer). The program should separate the tokens in the given C program and display with appropriate caption.

Input Source Program: (sample.c)

```
#include<stdio.h>  
  
void main()  
{  
  
int a,b,c = 30;  
  
printf("hello");  
  
}
```

24. Write a LEX specification count the number of characters, number of lines & number of words.

25. Write a LEX program to count the frequency of the given word in a given sentence.

26. The lexical analyzer should ignore redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value. Develop a lexical Analyzer to identify identifiers, constants, operators using C program.

27. Extend the lexical Analyzer to Check comments, dened as follows in C:

- a) A comment begins with // and includes all characters until the end of that line.
- b) A comment begins with /* and includes all characters through the next occurrence of the character sequence */Develop a lexical Analyzer to identify whether a given line is a comment or not.



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28. Design a lexical Analyzer to validate operators to recognize the operators +,-,*,/ using regular Arithmetic operators .
29. Design a lexical Analyzer to find the number of whitespaces and newline characters.
30. Develop a lexical Analyzer to test whether a given identifier is valid or not.
31. Implement a C program to eliminate left recursion.
32. Implement a C program to eliminate left factoring.
33. Implement a C program to perform symbol table operations.
34. All languages have Grammar. When people frame a sentence, we usually say whether the sentence is framed as per the rules of the Grammar or Not. Similarly use the same ideology, implement to check whether the given input string is satisfying the grammar or not.
35. Write a C program to construct recursive descent parsing.
36. In a class of Grade 3, Mathematics Teacher asked for the Acronym PEMDAS?. All of them are thinking for a while. A smart kid of the class Kishore of the class says it is Parentheses, Exponentiation, Multiplication, Division, Addition, Subtraction. Can you write a C Program to help the students to understand about the operator precedence parsing for an expression containing more than one operator, the order of evaluation depends on the order of operations.
37. The main function of the Intermediate code generation is producing three address code statements for a given input expression. The three address codes help in determining the sequence in which operations are actioned by the compiler. The key work of Intermediate code generators is to simplify the process of Code Generator. Write a C Program to Generate the Three address code representation for the given input statement.
38. Write a C program for implementing a Lexical Analyzer to Count the number of characters, words, and lines.
39. Write a C Program for code optimization to eliminate common subexpression.
40. Write a C program to implement the back end of the compiler.