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Class – L.Y. B-Tech (Computer) **Batch** – B1

Course Code – CO406U **Course Name** - CDL

Practical no. 4

Aim: Write a program to simulate lexical analyzer for validating operators.

Theory :
A lexical analyzer is responsible for recognizing and validating operators in the source code. Here, I'll provide a simplified Python-based example that simulates a lexical analyzer to validate and recognize operators in a given input. We'll consider a few common operators such as +, -, *, /, and =.

```
import re

# Define a regular expression pattern for operators
operator_pattern = r'[+\-*/=]'

# Define a list of operators
operators = ['+', '-', '*', '/', '=']

def lexer(input_string):
    # Find all occurrences of operators in the input using regular expression
    operator_matches = re.findall(operator_pattern, input_string)

    # Initialize a list to store valid operators
    valid_operators = []

    for match in operator_matches:
        if match in operators:
            valid_operators.append(match)
        else:
            print(f"Invalid operator: {match}")

    return valid_operators

# Example usage:
input_string = "x = 5 + 3 * 2 - 7 / 4"
```

```
result = lexer(input_string)
print("Valid operators:", result)
```

In this example:

1. We define a regular expression pattern `operator_pattern` that matches common operators (+, -, *, /, =).

2. We define a list of valid operators in the `operators` list.

3. The `lexer` function takes an input string and uses the `re.findall` function to find all occurrences of operators in the input string based on the regular expression pattern.

4. It then iterates through the matches, checking if each match is a valid operator. If it's valid, it adds it to the `valid_operators` list; otherwise, it prints an error message for invalid operators.

5. The program demonstrates how to use the `lexer` function to extract and validate operators from the input string.

Please note that this is a simplified example. In a real lexical analyzer, you would need to handle a wide range of operators, keywords, and other language-specific constructs. The regular expression and the list of operators should be adapted to match the specific needs of the programming language you're working with.

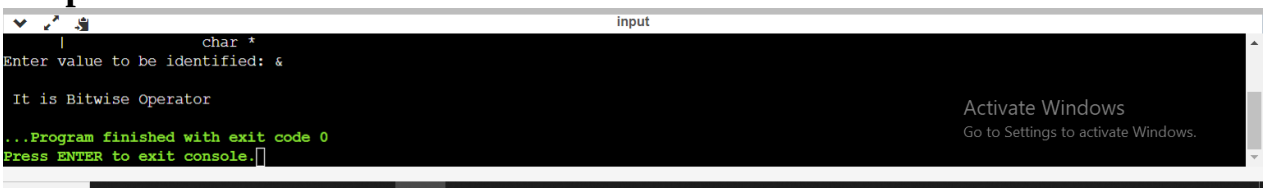
Program Code:

```
#include <stdio.h>
#include <string.h>
int main ()
{
    char arithmetic[5]={'+','-','*','/','%'};
    char relational[4]={'<','>','!','='};
    char bitwise[5]={'&','^','~','|'};
    char str[2]={' ',' '};
    printf ("Enter value to be identified: ");
    scanf ("%s",&str);
    int i;
    if(((str[0]=='&' || str[0]=='|') && str[0]==str[1]) || (str[0]=='!' && str[1]=='\0'))
    {
            printf("\nIt is Logical operator");
    }
    for(i=0;i<4;i++)
    {
            if(str[0]==relational[i]&&(str[1]=='='||str[1]=='\0'))
            {
                    printf("\n It is releational Operator"); break;
            }
    }
    for(i=0;i<4;i++)
    {
            if((str[0]==bitwise[i] && str[1]=='\0') || ((str[0]=='<' || str[0]=='>') &&
str[1]==str[0]))
            {
                    printf("\n It is Bitwise Operator"); break;
            }
    }
    if(str[0]=='?'    && str[1]==':')
    printf("\nIt is ternary operator");
    for(i=0;i<5;i++)
    {
            if((str[0]=='+' || str[0]=='-') && str[0]==str[1])
            {
                    printf("\nIt is unary operator"); break;
            }
```

```
            else if((str[0]==arithmetic[i] && str[1]=='=') || (str[0]=='=' && str[1]=='
'))
            {
                printf("\nIt is Assignment operator"); break;
            }
            else if(str[0]==arithmetic[i] && str[1]=='\0')
            {
                printf("\nIt is arithmetic operator"); break;

            }
    }
    return 0;
}
```

Output:



Conclusion : In this practical we learnt how lexical analyzer validates the operators from a program.