Fr. Conceicao Rodrigues College of Engineering
Department of Computer Engineering

Academic Term : Jan-May 2024 - 25

Class : T.E. (Computer - A)
Subject Name : System Programming and Compiler Construction
Subject Code : (CPC601)

Practical No:	1
Title:	To write a program for implementing Symbol Table.
Date of Performance:	4/02/2025
Date of Submission:	10/02/2025
Roll No:	9913
Name of the Student:	Mark Lopes

Evaluation:

Sr. No	Rubric	Grade
1	Time Line (2)	
2	Output(3)	
3	Code optimization (2)	
4	Postlab (3)	

Signature of the Teacher :

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VI Semester (Computer) **Academic Year: 2024- 25**

Experiment No 1

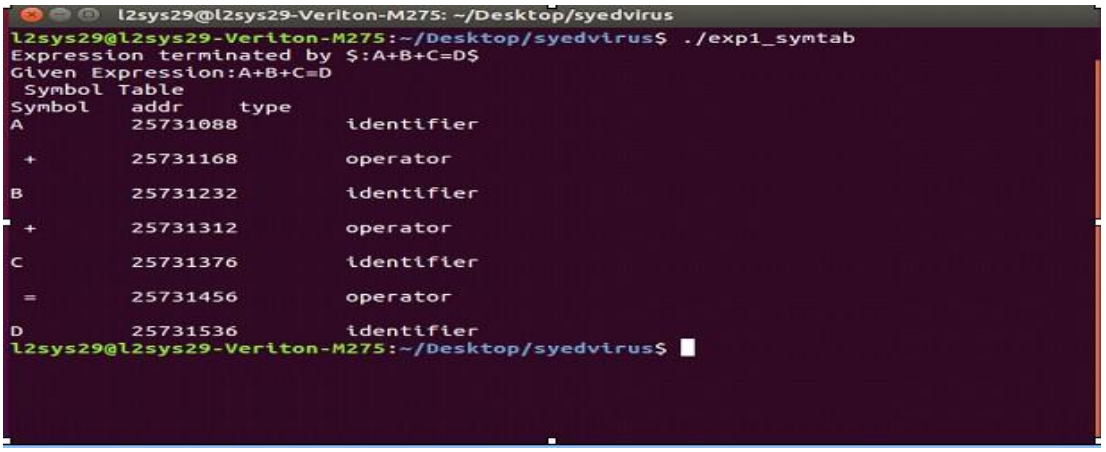
AIM:

To write a program for implementing Symbol Table.

ALGORITHM

Step1: Start the program for performing insert, display, delete, search and modify option in symbol table
Step2: Define the structure of the Symbol Table
Step3: Enter the choice for performing the operations in the symbol Table
Step4: If the entered choice is 1, search the symbol table for the symbol to be inserted. If the symbol is
already present, it displays “Duplicate Symbol”. Else, insert the symbol and the corresponding address in
the symbol table.
Step5: If the entered choice is 2, the symbols present in the symbol table are displayed.
Step6: If the entered choice is 3, the symbol to be deleted is searched in the symbol table.
Step7: If it is not found in the symbol table it displays “Label Not found”. Else, the symbol is deleted.
Step8: If the entered choice is 5, the symbol to be modified is searched in the symbol table.

Sample Input and Output:



```
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
#include<ctype.h>

#define MAX 100

typedef struct{
   char symbol;
   char type[20];
} Symbol;

Symbol symbolTable[MAX];
int symbolCount = 0;

int search(char symbol)
{
   for (int i = 0; i < symbolCount; i++)
   {
      if (symbolTable[i].symbol == symbol){
         return i; // found
      }
   }
   return -1; // not found
}

void insert(char symbol, char *type)
{
   if (search(symbol) != -1)
   {
      printf("Duplicate Symbol: %c \n", symbol);
      return;
   }
   symbolTable[symbolCount].symbol = symbol;
   strcpy(symbolTable[symbolCount].type, type);
   symbolCount++;
}

void createSymbolTable(char *expr)
{
   printf("The expression is: %s \n", expr);

   for (int i = 0; expr[i] != '\0'; i++)
   {
      if (expr[i] == '$')
      {
         break; // expression terminated
      }
      if (isalpha(expr[i]))  // If the character is an alphabet (identifier)
      {
```

```
            insert(expr[i], "identifier");
        }
        else if (expr[i] == '+' || expr[i] == '-' || expr[i] == '=' || expr[i] == '*')  // If it's an operator
        {
            insert(expr[i], "operator");
        }
        else if (isdigit(expr[i]))  // If it's a digit (constant)
        {
            insert(expr[i], "constant");
        }
    }
    printf("Table is created.");
}

void display_table()
{
    printf("\nSymbol Table\n");
    printf("Symbol      Type\n");
    for(int i  = 0; i < symbolCount; i++)
    {
        printf("%c      %s\n", symbolTable[i].symbol, symbolTable[i].type);
    }
}

void delete_Symbol(char symbol)
{
    int pos = search(symbol);
    if(pos == -1){
        printf("Symbol not found.");
        return;
    }
    for(int i = pos; i < symbolCount -1; i++)
    {
        symbolTable[i] = symbolTable[i+1];
    }
    symbolCount--;
    printf("Symbol %c is deleted successfully.\n", symbol);
}
int main()
{
    char expr[MAX];
    int choice;

    while(1) {
        printf("Enter your choice: \n1. Enter your expression\n2. Create Table\n3. Display Table\n4.
Delete Symbol\n5.Exit\n");
        scanf("%d", &choice);

        // Clear the input buffer
        while(getchar() != '\n');
```

```
    switch (choice)
    {
    case 1:
       printf("Enter your expression: ");
       fgets(expr, MAX, stdin);  // Read the expression

       // Remove newline character if present
       expr[strcspn(expr, "\n")] = 0;
       break;

    case 2:
       createSymbolTable(expr);
       break;

    case 3:
       display_table();
       break;

    case 4:
       char n;
       printf("Enter the symbol to be deleted");
       scanf("%c",&n);
       delete_Symbol(n);
       break;

    case 5:
       printf("Exiting program.....");
       return;

    default:
       printf("Invalid choice. Please enter a valid option.\n");
       break;
    }
  }
}
```

```
Enter your choice:
1. Enter your expression
2. Create Table
3. Display Table
4. Delete Symbol
5.Exit
1
Enter your expression: 12k2+3=5
Enter your choice:
1. Enter your expression
2. Create Table
3. Display Table
4. Delete Symbol
5.Exit
2
The expression is: 12k2+3=5
Duplicate Symbol: 2
Table is created.Enter your choice:
1. Enter your expression
2. Create Table
3. Display Table
4. Delete Symbol
5.Exit
3
```

```
3

Symbol Table
Symbol      Type
1       constant
2       constant
k       identifier
+       operator
3       constant
=       operator
5       constant
Enter your choice:
1. Enter your expression
2. Create Table
3. Display Table
4. Delete Symbol
5.Exit
4
Enter the symbol to be deletedk
Symbol k is deleted successfully.
```

```
Enter your choice:
1. Enter your expression
2. Create Table
3. Display Table
4. Delete Symbol
5.Exit
3

Symbol Table
Symbol      Type
1       constant
2       constant
+       operator
3       constant
=       operator
5       constant
Enter your choice:
1. Enter your expression
2. Create Table
3. Display Table
4. Delete Symbol
5.Exit
5
Exiting program.....
PS C:\Users\Mark Lopes\Desktop\college\Sem 6\sncc>
```

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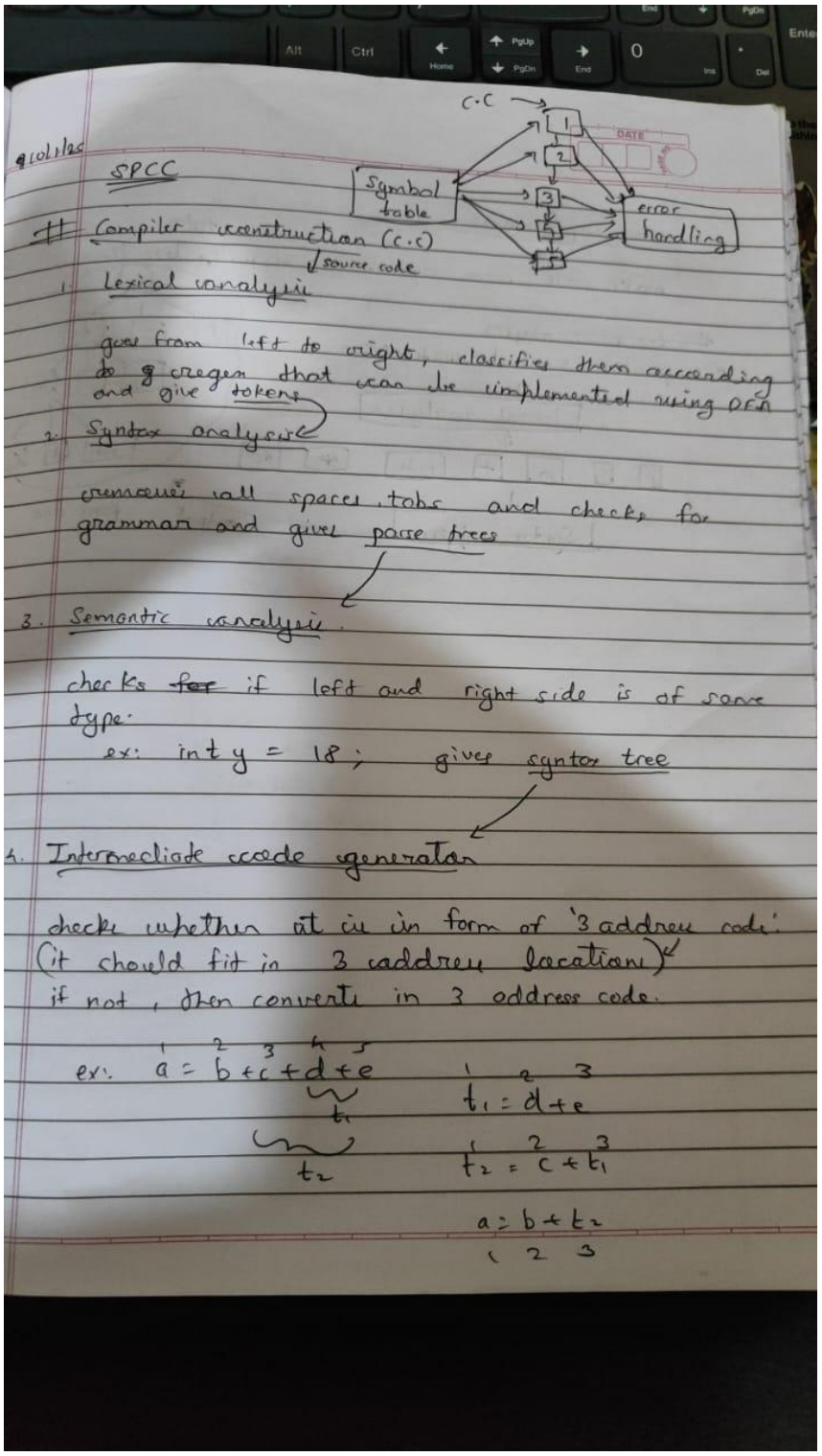
Postlab Questions:

1. Explain different phases of compiler. Illustrate all the output after each phase for the following statement

a= b +c -d *5



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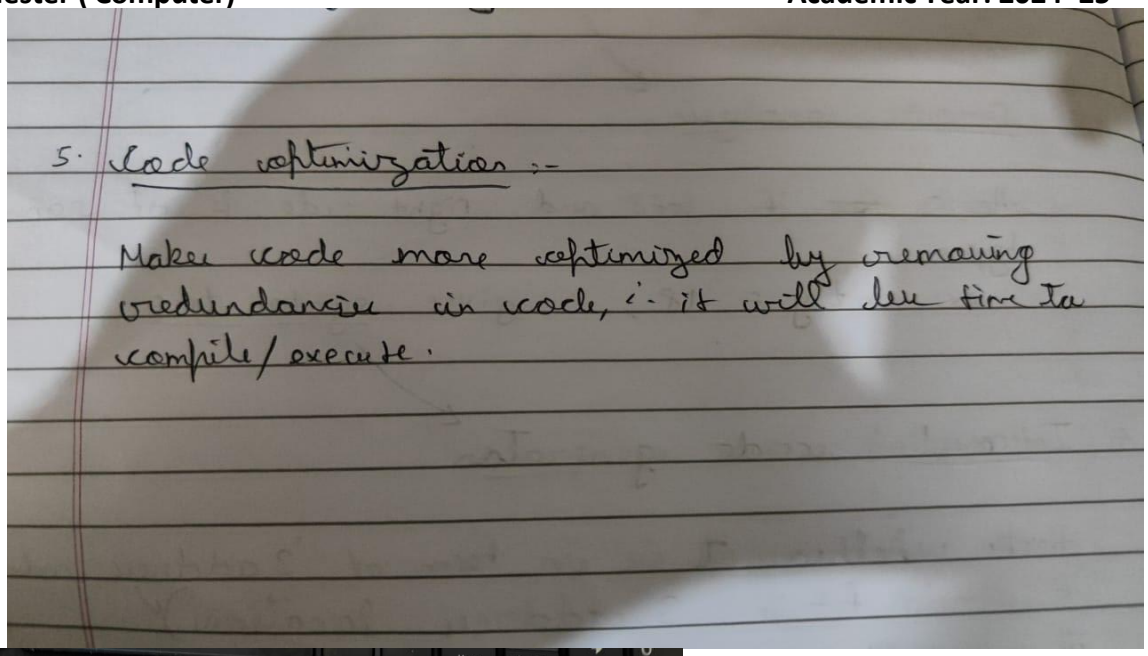

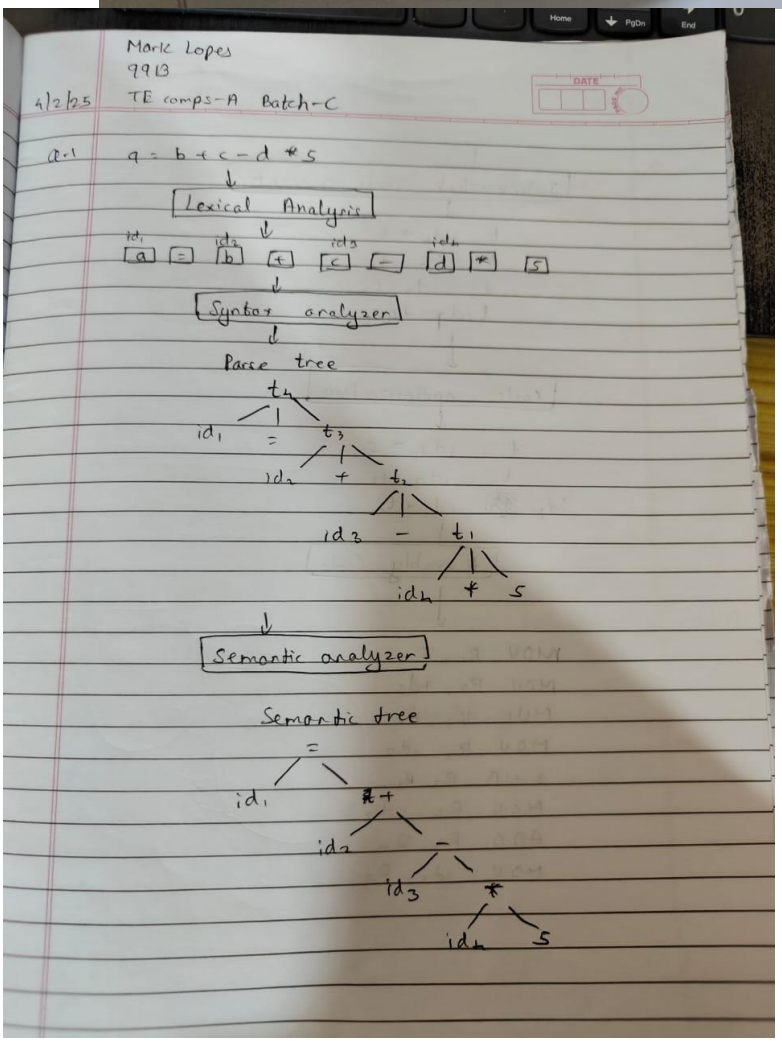

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