Lab no 1: Write program in C to test whether given entered string within valid comment section or not.

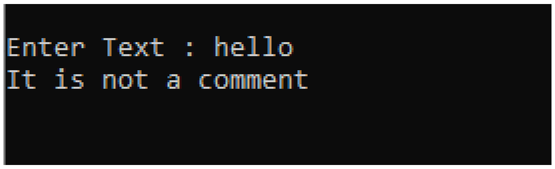
Source Code:

```
#include <stdio.h>
#include <conio.h>
void main()
{
   char text[100];
   int i = 2, a = 0;
   printf("\n\nEnter Text : ");
   gets(text);
   if (isComment(text))
      printf("It is a comment");
   else
      printf("It is not a comment");

   getch();
}
int isComment(char cmt[])
{
   int i = 2, a = 0;
   if (cmt[0] == '/')
   {
      if (cmt[1] == '/')
      {
         return 1;
      }
      else if (cmt[1] == '*')
      {
         for (i = 2; i <= 100; i++)
         {
            if (cmt[i] == '*' && cmt[i + 1] == '/')
            {
               return 1;
               a = 1;
               break;
            }
            else
            {
               continue;
            }
         }
         if (a == 0)
         {
            return 0;
         }
      }
```

```
    else
    {
      return 0;
    }
  }
  else
  {
    return 0;
  }
}
```

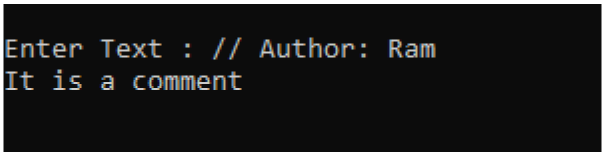
Output:

Run1:



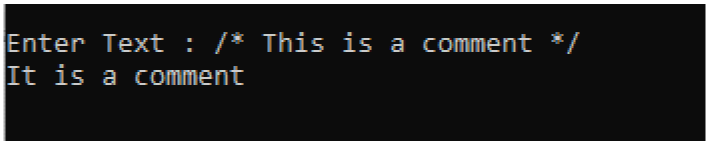
```
Enter Text : hello
It is not a comment
```

Run2:



```
Enter Text : // Author: Ram
It is a comment
```

Run3:



```
Enter Text : /* This is a comment */
It is a comment
```

Lab no 2: Write a C program to recognize strings under 'a*', 'a*b+', 'abb'

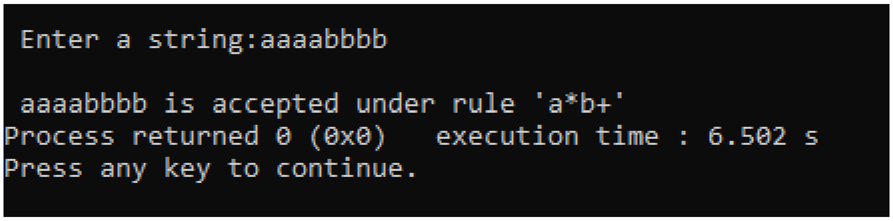
Source Code:

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
int main()
{
   char s[20], c;
   int state = 0, i = 0;
   printf("\n Enter a string:");
   gets(s);
   while (s[i] != '\0')
   {
      switch (state)
      {
      case 0:
         c = s[i++];
         if (c == 'a')
            state = 1;
         else if (c == 'b')
            state = 2;
         else
            state = 6;
         break;
      case 1:
         c = s[i++];
         if (c == 'a')
            state = 3;
         else if (c == 'b')
            state = 4;
         else
            state = 6;
         break;
      case 2:
         c = s[i++];
         if (c == 'a')
            state = 6;
         else if (c == 'b')
            state = 2;
         else
            state = 6;
         break;
      case 3:
         c = s[i++];
         if (c == 'a')
            state = 3;
         else if (c == 'b')
```

```
                state = 2;
            else
                state = 6;
            break;
        case 4:
            c = s[i++];
            if (c == 'a')
                state = 6;
            else if (c == 'b')
                state = 5;
            else
                state = 6;
            break;
        case 5:
            c = s[i++];
            if (c == 'a')
                state = 6;
            else if (c == 'b')
                state = 2;
            else
                state = 6;
            break;
        case 6:
            printf("\n %s is not recognized", s);
            exit(0);
        }
    }
    if (state == 1)
        printf("\n %s is accepted under rule 'a'", s);
    else if ((state == 2) || (state == 4))
        printf("\n %s is accepted under rule 'a*b+'", s);
    else if (state == 5)
        printf("\n %s is accepted under rule 'abb'", s);
    return 0;
}
```

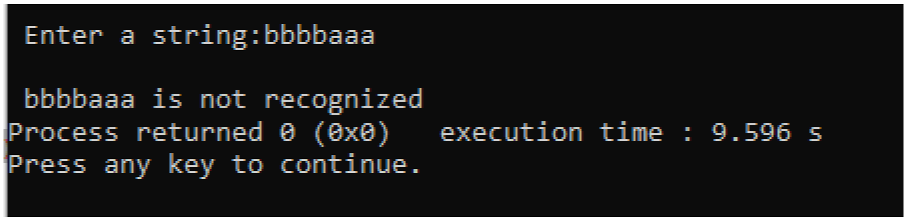
Output:

Run1:



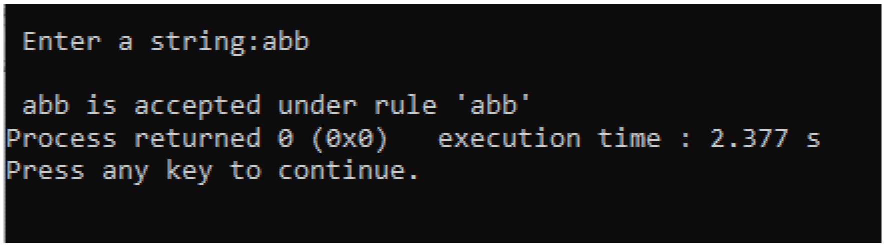
```
 Enter a string:aaaabbbb

 aaaabbbb is accepted under rule 'a*b+'
Process returned 0 (0x0)   execution time : 6.502 s
Press any key to continue.
```

Run2:



```
 Enter a string:bbbbaaa

 bbbbaaa is not recognized
Process returned 0 (0x0)   execution time : 9.596 s
Press any key to continue.
```

Run3:



```
 Enter a string:abb

 abb is accepted under rule 'abb'
Process returned 0 (0x0)   execution time : 2.377 s
Press any key to continue.
```

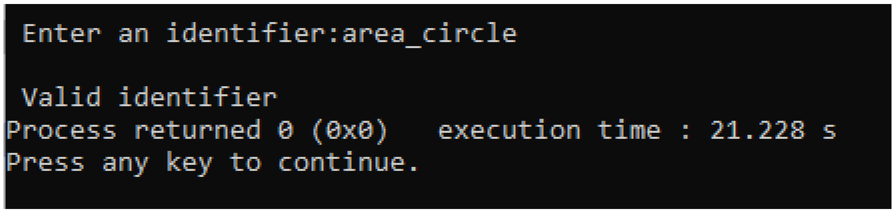
Lab no 3: Write a C program to test whether a given identifier is valid or not

Source Code:

```
#include <stdio.h>
#include <conio.h>
#include <ctype.h>
int main()
{
    char a[10];
    int flag, i = 1;
    printf("\n Enter an identifier:");
    gets(a);
    if (isalpha(a[0]) || a[0] == '_')
        flag = 1;
    else
        printf("\n Not a valid identifier");
    while (a[i] != '\0')
    {
        if (!isdigit(a[i]) && !isalpha(a[i]) && a[i] != '_')
        {
            flag = 0;
            break;
        }
        i++;
    }
    if (flag == 1)
        printf("\n Valid identifier");
    else
        printf("Not a valid identifier");
    return 0;
}
```

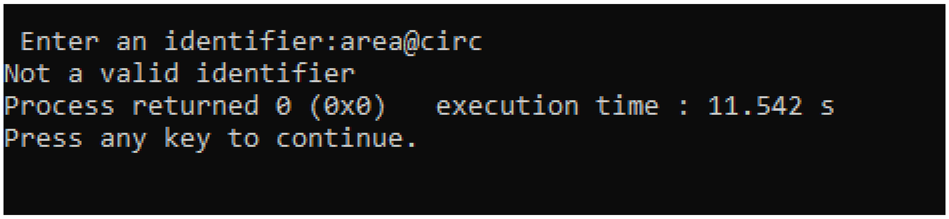
Output:

Run1:



```
 Enter an identifier:area_circle

 Valid identifier
Process returned 0 (0x0)   execution time : 21.228 s
Press any key to continue.
```

Run2:



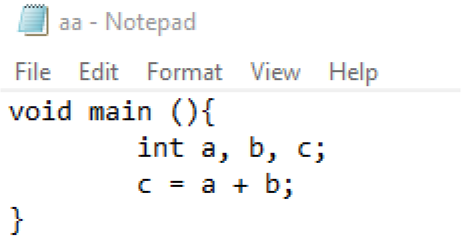
```
 Enter an identifier:area@circ
Not a valid identifier
Process returned 0 (0x0)   execution time : 11.542 s
Press any key to continue.
```

Lab no 4: Program for Lexical Analyzer in C

Source Code:

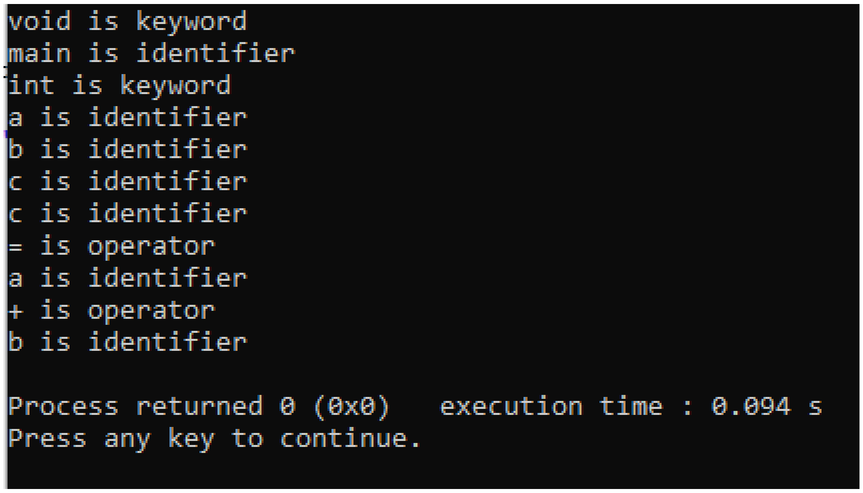
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
int isKeyword(char buffer[])
{
   char keywords[32][10] = {"auto", "break", "case", "char", "const", "continue", "default", "do",
"double", "else", "enum", "extern", "float", "for", "goto", "if", "int", "long", "register", "return", "short",
"signed", "sizeof", "static", "struct", "switch", "typedef", "union",
                              "unsigned", "void", "volatile", "while"};
   int i, flag = 0;
   for (i = 0; i < 32; ++i)
   {
      if (strcmp(keywords[i], buffer) == 0)
      {
         flag = 1;
         break;
      }
   }
   return flag;
}
int main()
{
   char ch, buffer[15], operators[] = "+-*/%=";
   FILE *fp;
   int i, j = 0;
   fp = fopen("aa.txt", "r");
   if (fp == NULL)
   {
      printf("error while opening the file\n");
      exit(0);
   }
   while ((ch = fgetc(fp)) != EOF)
   {
      for (i = 0; i < 6; ++i)
      {
         if (ch == operators[i])
            printf("%c is operator\n", ch);
      }
      if (isalnum(ch))
      {
         buffer[j++] = ch;
      }
      else if ((ch == ' ' || ch == '\n') && (j != 0))
      {
            buffer[j] = '\0';
            j = 0;
            if (isKeyword(buffer) == 1)
                printf("%s is keyword\n", buffer);
            else
                printf("%s is identifier\n", buffer);
        }
    }
    fclose(fp);
    return 0;
}
```

Input:



```
void main (){
        int a, b, c;
        c = a + b;
}
```

Output:



```
void is keyword
main is identifier
int is keyword
a is identifier
b is identifier
c is identifier
c is identifier
= is operator
a is identifier
+ is operator
b is identifier

Process returned 0 (0x0)   execution time : 0.094 s
Press any key to continue.
```

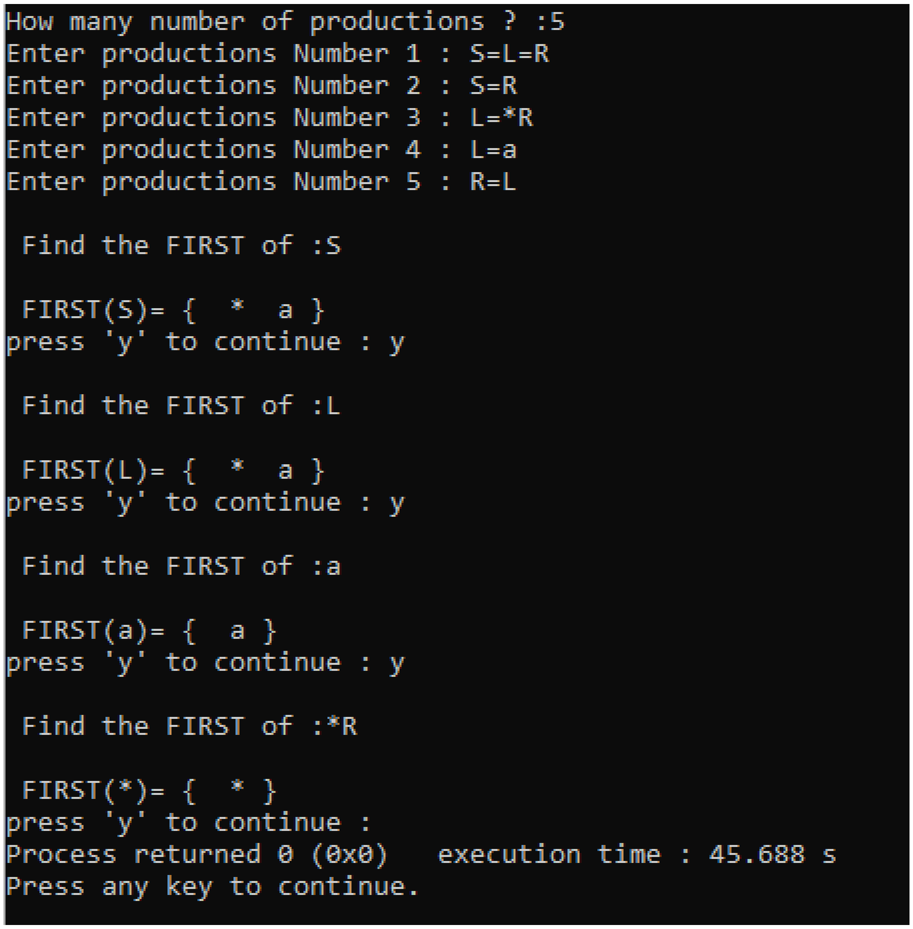
Lab no 5: C- program to implement first of a given grammar

Source Code:

```
#include <stdio.h>
#include <ctype.h>
void FIRST(char[], char);
void addToResultSet(char[], char);
int numOfProductions;
char productionSet[10][10];
int main()
{
    int i;
    char choice;
    char c;
    char result[20];
    printf("How many number of productions ? :");
    scanf(" %d", &numOfProductions);
    for (i = 0; i < numOfProductions; i++) //read production string e.g.: E=E+T
    {
        printf("Enter productions Number %d : ", i + 1);
        scanf(" %s", productionSet[i]);
    }
    do
    {
        printf("\n Find the FIRST of :");
        scanf(" %c", &c);
        FIRST(result, c); //Compute FIRST; Get Answer in 'result' array
        printf("\n FIRST(%c)= { ", c);
        for (i = 0; result[i] != '\0'; i++)
            printf(" %c ", result[i]); //Display result
        printf("}\n");
        printf("press 'y' to continue : ");
        scanf(" %c", &choice);
    } while (choice == 'y' || choice == 'Y');
}
void FIRST(char *Result, char c)
{
    int i, j, k;
    char subResult[20];
    int foundEpsilon;
    subResult[0] = '\0';
    Result[0] = '\0';
    //If X is terminal, FIRST(X) = {X}
    if (!(isupper(c)))
    {
        addToResultSet(Result, c);
        return;
    }
```

```
   //If X is non terminal then read each production
   for (i = 0; i < numOfProductions; i++)
   {
      //Find production with X as LHS
      if (productionSet[i][0] == c)
      {
         if (productionSet[i][2] == '$')
            addToResultSet(Result, '$');
         //If X is a non-terminal, and X → Y1 Y2 … Yk is a production, then add a to FIRST(X)
         else
         {
            j = 2;
            while (productionSet[i][j] != '\0')
            {
               foundEpsilon = 0;
               FIRST(subResult, productionSet[i][j]);
               for (k = 0; subResult[k] != '\0'; k++)
                  addToResultSet(Result, subResult[k]);
               for (k = 0; subResult[k] != '\0'; k++)
               {
                  if (subResult[k] == '$')
                  {
                     foundEpsilon = 1;
                     break;
                  }
               }
               //No e found, no need to check next element
               if (!foundEpsilon)
                  break;
               j++;
            }
         }
      }
   }
   return;
}
void addToResultSet(char Result[], char val)
{
   int k;
   for (k = 0; Result[k] != '\0'; k++)
      if (Result[k] == val)
         return;
   Result[k] = val;
   Result[k + 1] = '\0';
}
```

Output:



```
How many number of productions ? :5
Enter productions Number 1 : S=L=R
Enter productions Number 2 : S=R
Enter productions Number 3 : L=*R
Enter productions Number 4 : L=a
Enter productions Number 5 : R=L

 Find the FIRST of :S

 FIRST(S)= {  *  a }
press 'y' to continue : y

 Find the FIRST of :L

 FIRST(L)= {  *  a }
press 'y' to continue : y

 Find the FIRST of :a

 FIRST(a)= {  a }
press 'y' to continue : y

 Find the FIRST of :*R

 FIRST(*)= {  * }
press 'y' to continue :
Process returned 0 (0x0)   execution time : 45.688 s
Press any key to continue.
```

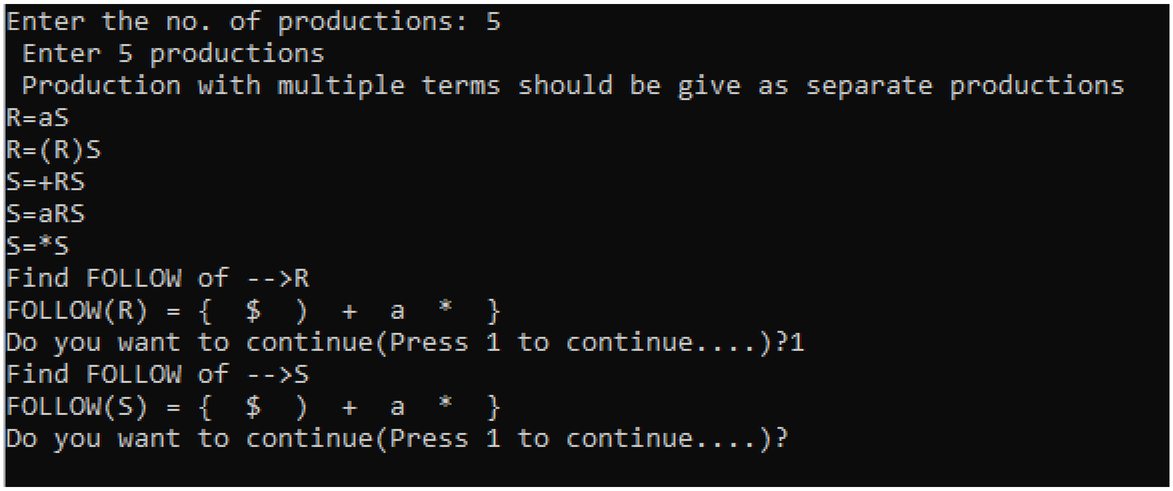
Lab no 6: C-Program to Calculate Follow(A)

Source Code:

```
#include <stdio.h>
#include <string.h>
#include <ctype.h>
int n, p, i = 0, j = 0;
char a[10][10], Result[10];
char subResult[20];
void follow(char *Result, char c);
void first(char *Result, char c);
void addToResultSet(char[], char);
int main()
{
        int i;
        int choice;
        char c, ch;
        printf("Enter the no. of productions: ");
        scanf("%d", &n);
        printf(" Enter %d productions\n Production with multiple terms should be give as separate
productions \n", n);
        for (i = 0; i < n; i++)
                scanf("%s", a[i]);
        do
        {
                printf("Find FOLLOW of -->");
                scanf(" %c", &c);
                follow(Result, c);
                printf("FOLLOW(%c) = { ", c);
                for (i = 0; Result[i] != '\0'; i++)
                        printf(" %c ", Result[i]);
                printf(" }\n");
                printf("Do you want to continue(Press 1 to continue....)?");
                scanf("%d", &choice);
        } while (choice == 1);
}

void follow(char *Result, char c)
{
        int k;
        subResult[0] = '\0';
        Result[0] = '\0';
        if (a[0][0] == c)
                addToResultSet(Result, '$');
        for (i = 0; i < n; i++)
        {
                for (j = 2; j < strlen(a[i]); j++)
                {
```

```
            if (a[i][j] == c)
            {
                if (a[i][j + 1] != '\0')
                    first(subResult, a[i][j + 1]);
                if (a[i][j + 1] == '\0' && c != a[i][0])
                    follow(subResult, a[i][0]);
                for (k = 0; subResult[k] != '\0'; k++)
                    addToResultSet(Result, subResult[k]);
            }
        }
    }
}

void first(char *R, char c)
{
    int k, m;
    if (!(isupper(c)) && c != '#')
        addToResultSet(R, c);
    for (k = 0; k < n; k++)
    {
        if (a[k][0] == c)
        {
            if (a[k][2] == '#' && c != a[i][0])
                follow(R, a[i][0]);
            else if ((!(isupper(a[k][2]))) && a[k][2] != '#')
                addToResultSet(R, a[k][2]);
            else
                first(R, a[k][2]);
            for (m = 0; R[m] != '\0'; m++)
                addToResultSet(Result, R[m]);
        }
    }
}

void addToResultSet(char Result[], char val)
{
    int k;
    for (k = 0; Result[k] != '\0'; k++)
    {
        if (Result[k] == val)
            return;
    }
    Result[k] = val;
    Result[k + 1] = '\0';
}
```

Output:



```
Enter the no. of productions: 5
 Enter 5 productions
 Production with multiple terms should be give as separate productions
R=aS
R=(R)S
S=+RS
S=aRS
S=*S
Find FOLLOW of -->R
FOLLOW(R) = {  $  )  +  a  *  }
Do you want to continue(Press 1 to continue....)?1
Find FOLLOW of -->S
FOLLOW(S) = {  $  )  +  a  *  }
Do you want to continue(Press 1 to continue....)?
```

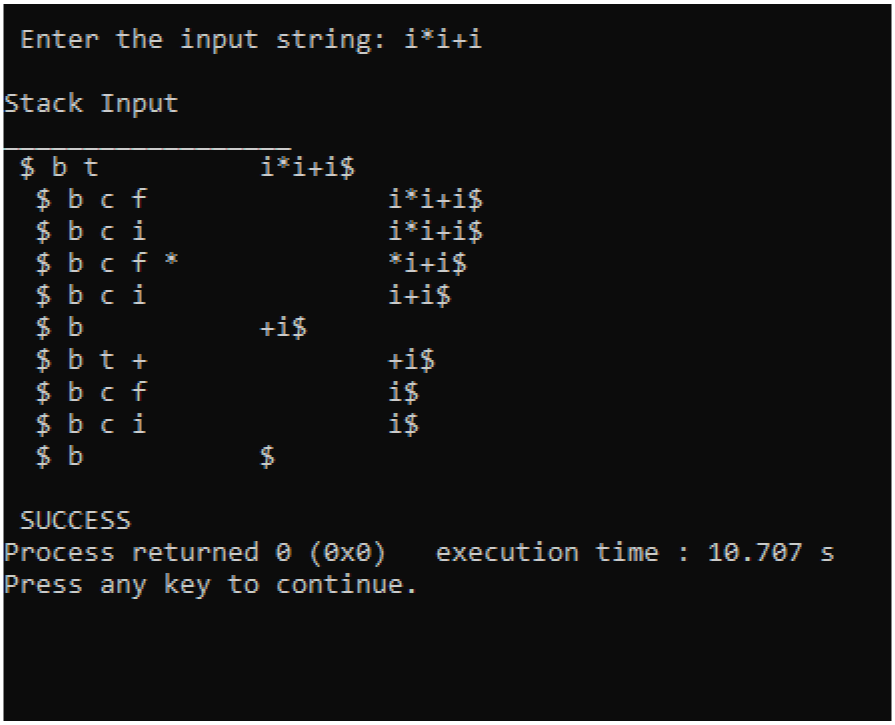
Lab no 7: Write a C program for constructing of LL (1) parsing

Source Code:

```
#include <stdio.h>
#include <string.h>
#include <process.h>
char s[20], stack[20];
int main()
{
   char m[5][6][4] = {"tb", " ", " ", "tb", " ", " ", " ", "+tb", " ", " ", "n", "n", "fc", " ", " ", "fc", " ", " ", " ", "n",
"*fc", " a", "n", "n", "i", " ", " ", "(e)", " ", " "};
   int size[5][6] = {2, 0, 0, 2, 0, 0, 0, 3, 0, 0, 1, 1, 2, 0, 0, 2, 0, 0, 0, 1, 3, 0, 1, 1, 1, 0, 0, 3, 0, 0};
   int i, j, k, n, str1, str2;
   printf("\n Enter the input string: ");
   scanf("%s", s);
   strcat(s, "$");
   n = strlen(s);
   stack[0] = '$';
   stack[1] = 'e';
   i = 1;
   j = 0;
   printf("\nStack Input\n");
   printf("___________________\n");
   while ((stack[i] != '$') && (s[j] != '$'))
   {
      if (stack[i] == s[j])
      {
         i--;
         j++;
      }
      switch (stack[i])
      {
      case 'e':
         str1 = 0;
         break;
      case 'b':
         str1 = 1;
         break;
      case 't':
         str1 = 2;
         break;
      case 'c':
         str1 = 3;
         break;
      case 'f':
         str1 = 4;
         break;
      }
```

```
        switch (s[j])
        {
        case 'i':
            str2 = 0;
            break;
        case '+':
            str2 = 1;
            break;
        case '*':
            str2 = 2;
            break;
        case '(':
            str2 = 3;
            break;
        case ')':
            str2 = 4;
            break;
        case '$':
            str2 = 5;
            break;
        }
        if (m[str1][str2][0] == '\0')
        {
            printf("\nERROR");
            exit(0);
        }
        else if (m[str1][str2][0] == 'n')
            i--;
        else if (m[str1][str2][0] == 'i')
            stack[i] = 'i';
        else
        {
            for (k = size[str1][str2] - 1; k >= 0; k--)
            {
                stack[i] = m[str1][str2][k];
                i++;
            }
            i--;
        }
        for (k = 0; k <= i; k++)
            printf(" %c", stack[k]);
        printf(" \t\t");
        for (k = j; k <= n; k++)
            printf("%c", s[k]);
        printf(" \n ");
    }
    printf("\n SUCCESS");
    return 0;
}
```

Output:



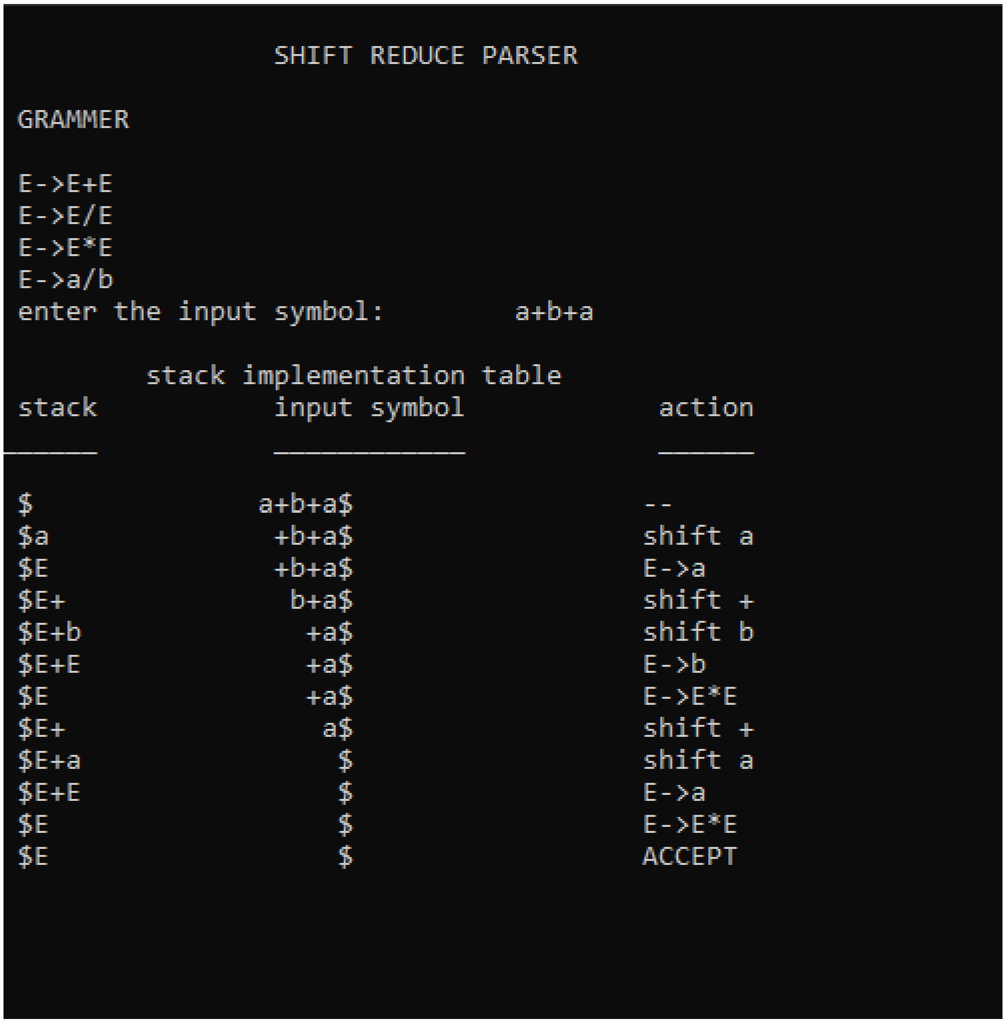
```
 Enter the input string: i*i+i

Stack Input
__________________
 $ b t          i*i+i$
  $ b c f               i*i+i$
  $ b c i               i*i+i$
  $ b c f *             *i+i$
  $ b c i               i+i$
  $ b           +i$
  $ b t +               +i$
  $ b c f               i$
  $ b c i               i$
  $ b           $

 SUCCESS
Process returned 0 (0x0)   execution time : 10.707 s
Press any key to continue.
```

Lab no 8: C Program to Implement Shift Reduce Parser

Source Code:

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <string.h>
char ip_sym[15], stack[15];
int ip_ptr = 0, st_ptr = 0, len, i;
char temp[2], temp2[2];
char act[15];
void check();
void main()
{
  printf("\n\t\t SHIFT REDUCE PARSER\n");
  printf("\n GRAMMER\n");
  printf("\n E->E+E\n E->E/E");
  printf("\n E->E*E\n E->a/b");
  printf("\n enter the input symbol:\t");
  gets(ip_sym);
  printf("\n\t stack implementation table");
  printf("\n stack\t\t input symbol\t\t action");
  printf("\n______\t\t ____________\t\t ______\n");
  printf("\n $\t\t%s$\t\t\t--", ip_sym);
  strcpy(act, "shift ");
  temp[0] = ip_sym[ip_ptr];
  temp[1] = '\0';
  strcat(act, temp);
  len = strlen(ip_sym);
  for (i = 0; i <= len - 1; i++)
  {
    stack[st_ptr] = ip_sym[ip_ptr];
    stack[st_ptr + 1] = '\0';
    ip_sym[ip_ptr] = ' ';
    ip_ptr++;
    printf("\n $%s\t\t%s$\t\t\t%s", stack, ip_sym, act);
    strcpy(act, "shift ");
    temp[0] = ip_sym[ip_ptr];
    temp[1] = '\0';
    strcat(act, temp);
    check();
    st_ptr++;
  }
  st_ptr++;
  check();
}
void check()
{
    int flag = 0;
    temp2[0] = stack[st_ptr];
    temp2[1] = '\0';
    if ((!strcmpi(temp2, "a")) || (!strcmpi(temp2, "b")))
    {
        stack[st_ptr] = 'E';
        if (!strcmpi(temp2, "a"))
            printf("\n $%s\t\t%s$\t\t\tE->a", stack, ip_sym);
        else
            printf("\n $%s\t\t%s$\t\t\tE->b", stack, ip_sym);
        flag = 1;
    }
    if ((!strcmpi(temp2, "+")) || (strcmpi(temp2, "*")) || (!strcmpi(temp2, "/")))
    {
        flag = 1;
    }
    if ((!strcmpi(stack, "E+E")) || (!strcmpi(stack, "E\E")) || (!strcmpi(stack, "E*E")))
    {
        strcpy(stack, "E");
        st_ptr = 0;
        if (!strcmpi(stack, "E+E"))
            printf("\n $%s\t\t%s$\t\t\tE->E+E", stack, ip_sym);
        else if (!strcmpi(stack, "E\E"))
            printf("\n $%s\t\t %s$\t\t\tE->E\E", stack, ip_sym);
        else
            printf("\n $%s\t\t%s$\t\t\tE->E*E", stack, ip_sym);
        flag = 1;
    }
    if (!strcmpi(stack, "E") && ip_ptr == len)
    {
        printf("\n $%s\t\t%s$\t\t\tACCEPT", stack, ip_sym);
        getch();
        exit(0);
    }
    if (flag == 0)
    {
        printf("\n%s\t\t\t%s\t\t reject", stack, ip_sym);
        exit(0);
    }
    return;
}
```

Output:



```
                SHIFT REDUCE PARSER

GRAMMER

E->E+E
E->E/E
E->E*E
E->a/b
enter the input symbol:        a+b+a

        stack implementation table
stack           input symbol            action
______          ____________            ______

$              a+b+a$                  --
$a              +b+a$                  shift a
$E              +b+a$                  E->a
$E+              b+a$                  shift +
$E+b              +a$                  shift b
$E+E              +a$                  E->b
$E                +a$                  E->E*E
$E+                a$                  shift +
$E+a                $                  shift a
$E+E                $                  E->a
$E                  $                  E->E*E
$E                  $                  ACCEPT
```

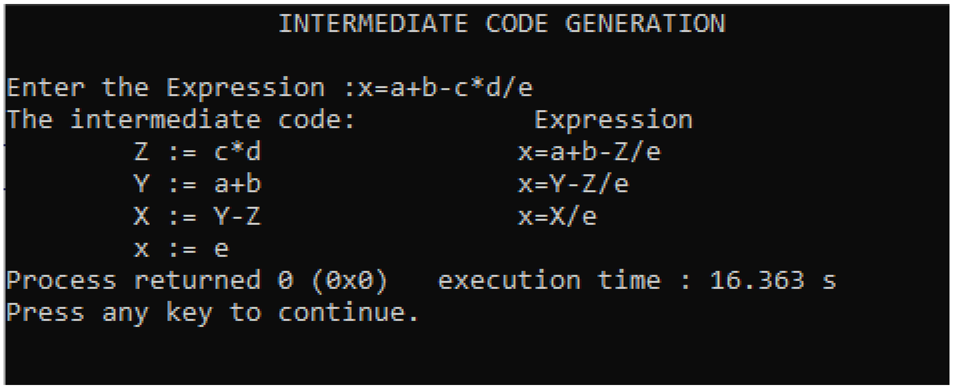
Lab no 9: C-program for intermediate Code Generation

Source Code:

```
#include <stdio.h>
#include <string.h>
#include <process.h>
int i = 1, j = 0, no = 0, tmpch = 90;
char str[100], left[15], right[15];
void findopr();
void explore();
void fleft(int);
void fright(int);
struct exp
{
   int pos;
   char op;
} k[15];
int main()
{
   printf("\t\t INTERMEDIATE CODE GENERATION\n\n");
   printf("Enter the Expression :");
   scanf("%s", str);
   printf("The intermediate code:\t\t Expression\n");
   findopr();
   explore();
   return 0;
}
void findopr()
{
   for (i = 0; str[i] != '\0'; i++)
      if (str[i] == ':')
      {
         k[j].pos = i;
         k[j++].op = ':';
      }
   for (i = 0; str[i] != '\0'; i++)
      if (str[i] == '/')
      {
         k[j].pos = i;
         k[j++].op = '/';
      }
   for (i = 0; str[i] != '\0'; i++)
      if (str[i] == '*')
      {
         k[j].pos = i;
         k[j++].op = '*';
      }
   for (i = 0; str[i] != '\0'; i++)
      if (str[i] == '+')
```

```
        {
            k[j].pos = i;
            k[j++].op = '+';
        }
    for (i = 0; str[i] != '\0'; i++)
    {
        if (str[i] == '-')
        {
            k[j].pos = i;
            k[j++].op = '-';
        }
    }
}
void explore()
{
    i = 1;
    while (k[i].op != '\0')
    {
        fleft(k[i].pos);
        fright(k[i].pos);
        str[k[i].pos] = tmpch--;
        printf("\t%c := %s%c%s\t\t", str[k[i].pos], left, k[i].op, right);
        for (j = 0; j < strlen(str); j++)
            if (str[j] != '$')
                printf("%c", str[j]);
        printf("\n");
        i++;
    }
    fright(-1);
    if (no == 0)
    {
        fleft(strlen(str));
        printf("\t%s := %s", right, left);
        exit(0);
    }
    printf("\t%s := %c", right, str[k[--i].pos]);
}
void fleft(int x)
{
    int w = 0, flag = 0;
    x--;
    while (x != -1 && str[x] != '+' && str[x] != '*' && str[x] != '=' && str[x] != '\0' && str[x] != '-' && str[x] !=
'/' && str[x] != ':')
    {
        if (str[x] != '$' && flag == 0)
        {
            left[w++] = str[x];
            left[w] = '\0';
            str[x] = '$';
            flag = 1;
        }
        x--;
    }
}
void fright(int x)
{
    int w = 0, flag = 0;
    x++;
    while (x != -1 && str[x] != '+' && str[x] != '*' && str[x] != '\0' && str[x] != '=' && str[x] != ':' && str[x] !=
'-' && str[x] != '/')
    {
        if (str[x] != '$' && flag == 0)
        {
            right[w++] = str[x];
            right[w] = '\0';
            str[x] = '$';
            flag = 1;
        }
        x++;
    }
}
```

Output:



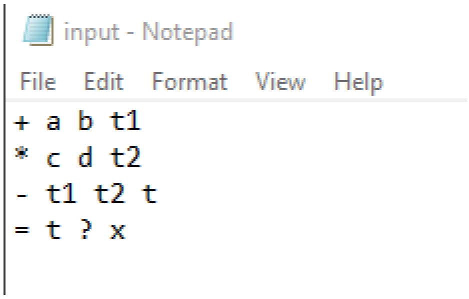
```
                 INTERMEDIATE CODE GENERATION

Enter the Expression :x=a+b-c*d/e
The intermediate code:          Expression
        Z := c*d               x=a+b-Z/e
        Y := a+b               x=Y-Z/e
        X := Y-Z               x=X/e
        x := e
Process returned 0 (0x0)   execution time : 16.363 s
Press any key to continue.
```

Lab no 10: C-program for Final Code Generation

Source Code:

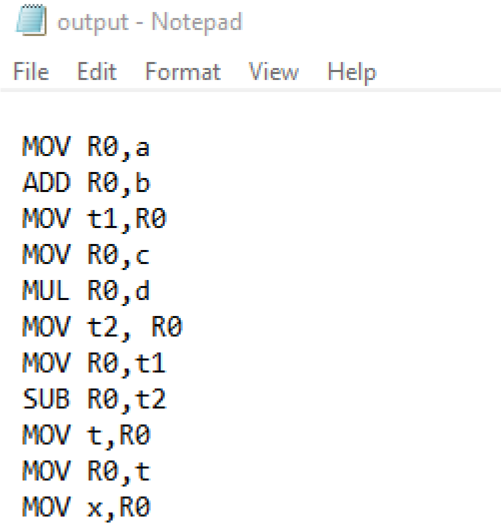
```
#include <stdio.h>
#include <string.h>
char op[2], arg1[5], arg2[5], result[5];
int main()
{
   FILE *fp1, *fp2;
   fp1 = fopen("input.txt", "r");
   fp2 = fopen("output.txt", "w");
   while (!feof(fp1))
   {
      fscanf(fp1, "%s%s%s%s", op, arg1, arg2, result);
      if (strcmp(op, "+") == 0)
      {
         fprintf(fp2, "\n MOV R0,%s", arg1);
         fprintf(fp2, "\n ADD R0,%s", arg2);
         fprintf(fp2, "\n MOV %s,R0", result);
      }
      if (strcmp(op, "*") == 0)
      {
         fprintf(fp2, "\n MOV R0,%s", arg1);
         fprintf(fp2, "\n MUL R0,%s", arg2);
         fprintf(fp2, "\n MOV %s, R0", result);
      }
      if (strcmp(op, "-") == 0)
      {
         fprintf(fp2, "\n MOV R0,%s", arg1);
         fprintf(fp2, "\n SUB R0,%s", arg2);
         fprintf(fp2, "\n MOV %s,R0", result);
      }
      if (strcmp(op, "/") == 0)
      {
         fprintf(fp2, "\n MOV R0,%s", arg1);
         fprintf(fp2, "\n DIV R0,%s", arg2);
         fprintf(fp2, "\n MOV %s,R0", result);
      }
      if (strcmp(op, "=") == 0)
      {
         fprintf(fp2, "\n MOV R0,%s", arg1);
         fprintf(fp2, "\n MOV %s,R0", result);
      }
   }
   fclose(fp1);
   fclose(fp2);
   return 0;
}
```

Input:



```
+ a b t1
* c d t2
- t1 t2 t
= t ? x
```

Output:



```
MOV R0,a
ADD R0,b
MOV t1,R0
MOV R0,c
MUL R0,d
MOV t2, R0
MOV R0,t1
SUB R0,t2
MOV t,R0
MOV R0,t
MOV x,R0
```