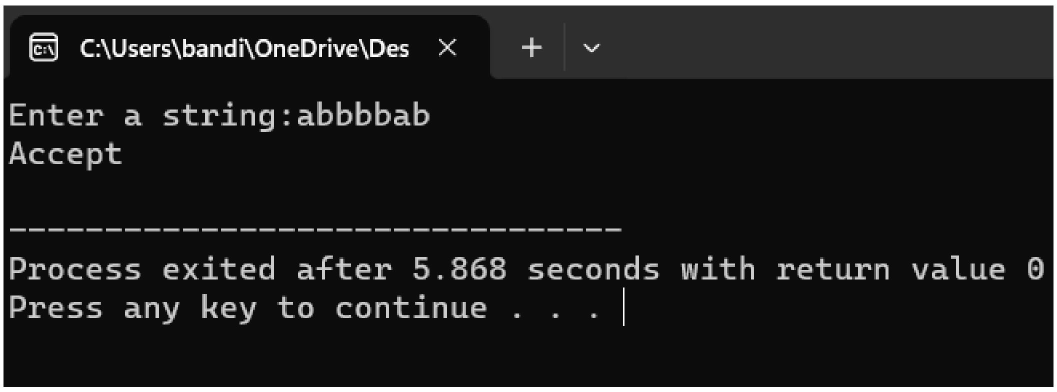
C-programm for dfg

Code:

```
#include<stdio.h>

#include<string.h>

#define max 20

int main()

{

int trans_table[4][2]={{1,3},{1,2},{1,2},{3,3}};

int final_state=2,i;

int present_state=0;

int next_state=0;

int invalid=0;

char input_string[max];

printf("Enter a string:");

scanf("%s",input_string);

int l=strlen(input_string);

for(i=0;i<l;i++)

{

if(input_string[i]=='a')

next_state=trans_table[present_state][0];

else if(input_string[i]=='b')

next_state=trans_table[present_state][1];

else

invalid=l;

present_state=next_state;

}
if(invalid==l)
{
printf("Invalid input");
}
else if(present_state==final_state)
printf("Accept\n");
else
printf("Don't Accept\n");
}
```

Output:



```
Enter a string:abbbbab
Accept

--------------------------------
Process exited after 5.868 seconds with return value 0
Press any key to continue . . .
```

c-programm for nfa

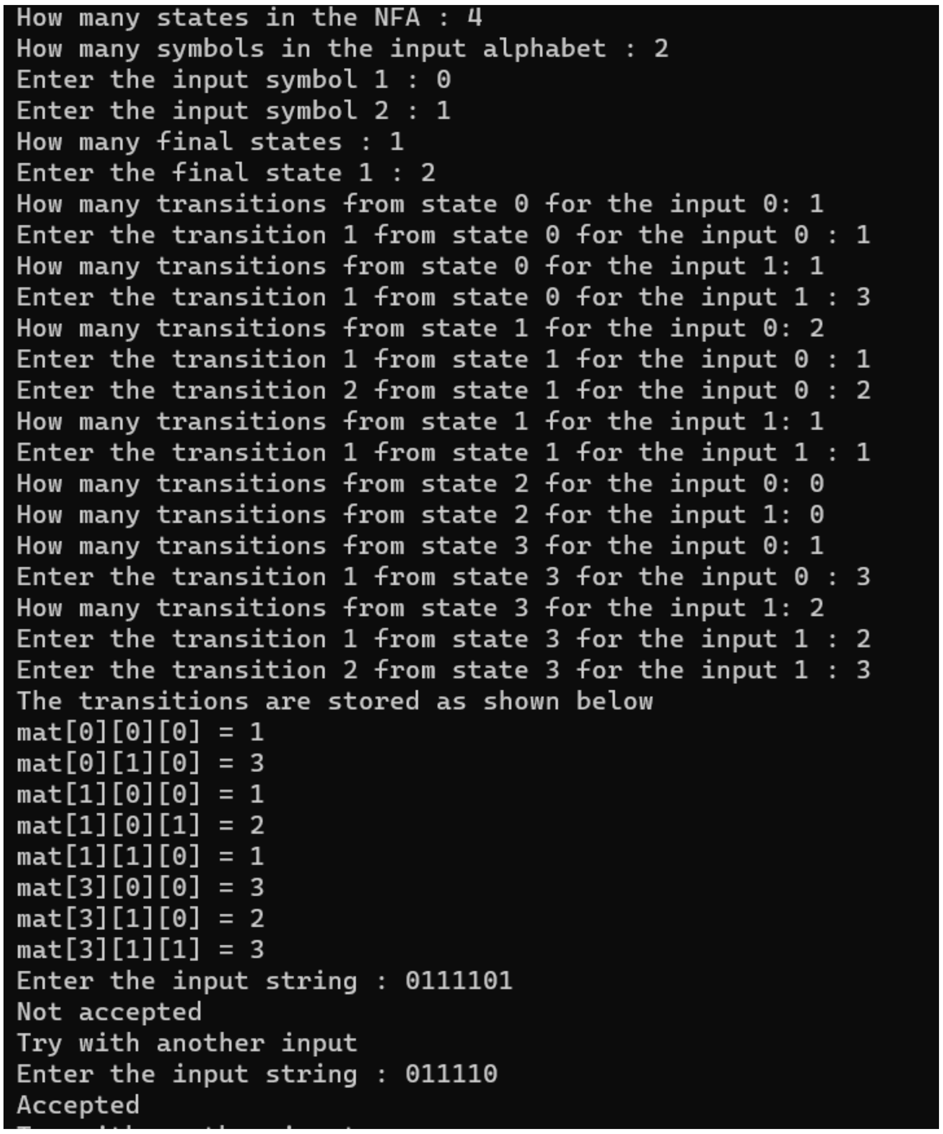
```
#include<stdio.h>
#include<string.h>
#include<stdlib.h> // Include stdlib.h for exit()


int main() {
   int i, j, k, l, m, next_state[20], n, mat[10][10][10],
flag, p;
```

```
    int num_states, final_state[5], num_symbols,
num_final;
    int present_state[20], prev_trans, new_trans;
    char input[20];
    int symbol[5], inp, inp1;

    printf("How many states in the NFA : ");
    scanf("%d", &num_states);

    printf("How many symbols in the input alphabet : ");
    scanf("%d", &num_symbols);

    for (i = 0; i < num_symbols; i++) {
        printf("Enter the input symbol %d : ", i + 1);
        scanf("%d", &symbol[i]);
    }

    printf("How many final states : ");
    scanf("%d", &num_final);
    for (i = 0; i < num_final; i++) {
        printf("Enter the final state %d : ", i + 1);
        scanf("%d", &final_state[i]);
    }

    for (i = 0; i < 10; i++) {
        for (j = 0; j < 10; j++) {
            for (k = 0; k < 10; k++) {
                mat[i][j][k] = -1;
            }
        }
    }

    // Get input from the user and fill the 3D transition
table
    for (i = 0; i < num_states; i++) {
        for (j = 0; j < num_symbols; j++) {
            printf("How many transitions from state %d for
the input %d: ", i, symbol[j]);
            scanf("%d", &n);
            for (k = 0; k < n; k++) {
                printf("Enter the transition %d from state %d
for the input %d : ", k + 1, i, symbol[j]);
                scanf("%d", &mat[i][j][k]);
            }
        }
    }

    printf("The transitions are stored as shown
below\n");
    for (i = 0; i < 10; i++) {
        for (j = 0; j < 10; j++) {
            for (k = 0; k < 10; k++) {
                if (mat[i][j][k] != -1)
                    printf("mat[%d][%d][%d] = %d\n", i, j, k,
mat[i][j][k]);
            }
        }
    }

    while (1) {
        printf("Enter the input string : ");
```

```
scanf("%s", input);
present_state[0] = 0;
prev_trans = 1;
l = strlen(input);

for (i = 0; i < l; i++) {
    if (input[i] == '0')
        inp1 = 0;
    else if (input[i] == '1')
        inp1 = 1;
    else {
        printf("Invalid input\n");
        exit(0);
    }
    for (m = 0; m < num_symbols; m++) {
        if (inp1 == symbol[m]) {
            inp = m;
            break;
        }
    }
```

```
        new_trans = 0;
        for (j = 0; j < prev_trans; j++) {
            k = 0;
            p = present_state[j];
            while (mat[p][inp][k] != -1) {
                next_state[new_trans++] = mat[p][inp][k];
                k++;
            }
        }
        for (j = 0; j < new_trans; j++) {
            present_state[j] = next_state[j];
        }
        prev_trans = new_trans;
    }
    flag = 0;
    for (i = 0; i < prev_trans; i++) {
        for (j = 0; j < num_final; j++) {
            if (present_state[i] == final_state[j]) {
                flag = 1;
                break;
            }
        }
    }
    if (flag == 1)
        printf("Accepted\n");
    else
        printf("Not accepted\n");
    printf("Try with another input\n");
  }
  return 0;
}
```

Output:



```
How many states in the NFA : 4
How many symbols in the input alphabet : 2
Enter the input symbol 1 : 0
Enter the input symbol 2 : 1
How many final states : 1
Enter the final state 1 : 2
How many transitions from state 0 for the input 0: 1
Enter the transition 1 from state 0 for the input 0 : 1
How many transitions from state 0 for the input 1: 1
Enter the transition 1 from state 0 for the input 1 : 3
How many transitions from state 1 for the input 0: 2
Enter the transition 1 from state 1 for the input 0 : 1
Enter the transition 2 from state 1 for the input 0 : 2
How many transitions from state 1 for the input 1: 1
Enter the transition 1 from state 1 for the input 1 : 1
How many transitions from state 2 for the input 0: 0
How many transitions from state 2 for the input 1: 0
How many transitions from state 3 for the input 0: 1
Enter the transition 1 from state 3 for the input 0 : 3
How many transitions from state 3 for the input 1: 2
Enter the transition 1 from state 3 for the input 1 : 2
Enter the transition 2 from state 3 for the input 1 : 3
The transitions are stored as shown below
mat[0][0][0] = 1
mat[0][1][0] = 3
mat[1][0][0] = 1
mat[1][0][1] = 2
mat[1][1][0] = 1
mat[3][0][0] = 3
mat[3][1][0] = 2
mat[3][1][1] = 3
Enter the input string : 0111101
Not accepted
Try with another input
Enter the input string : 011110
Accepted
```

c-prograame for e-closure

```
#include<stdio.h>

#include<string.h>

int trans_table[10][5][3];

char symbol[5],a;

int e_closure[10][10],ptr,state;

void find_e_closure(int x);

int main()
```

```
{
int i,j,k,n,num_states,num_symbols;
for(i=0;i<10;i++)
{
for(j=0;j<5;j++)
{
for(k=0;k<3;k++)
{
trans_table[i][j][k]=-1;
}
}
}
printf("How may states in the NFA with e-moves:");
scanf("%d",&num_states);
printf("How many symbols in the input alphabet
including e :");
scanf("%d",&num_symbols);
printf("Enter the symbols without space. Give 'e'
first:");
scanf("%s",symbol);
for(i=0;i<num_states;i++)
```

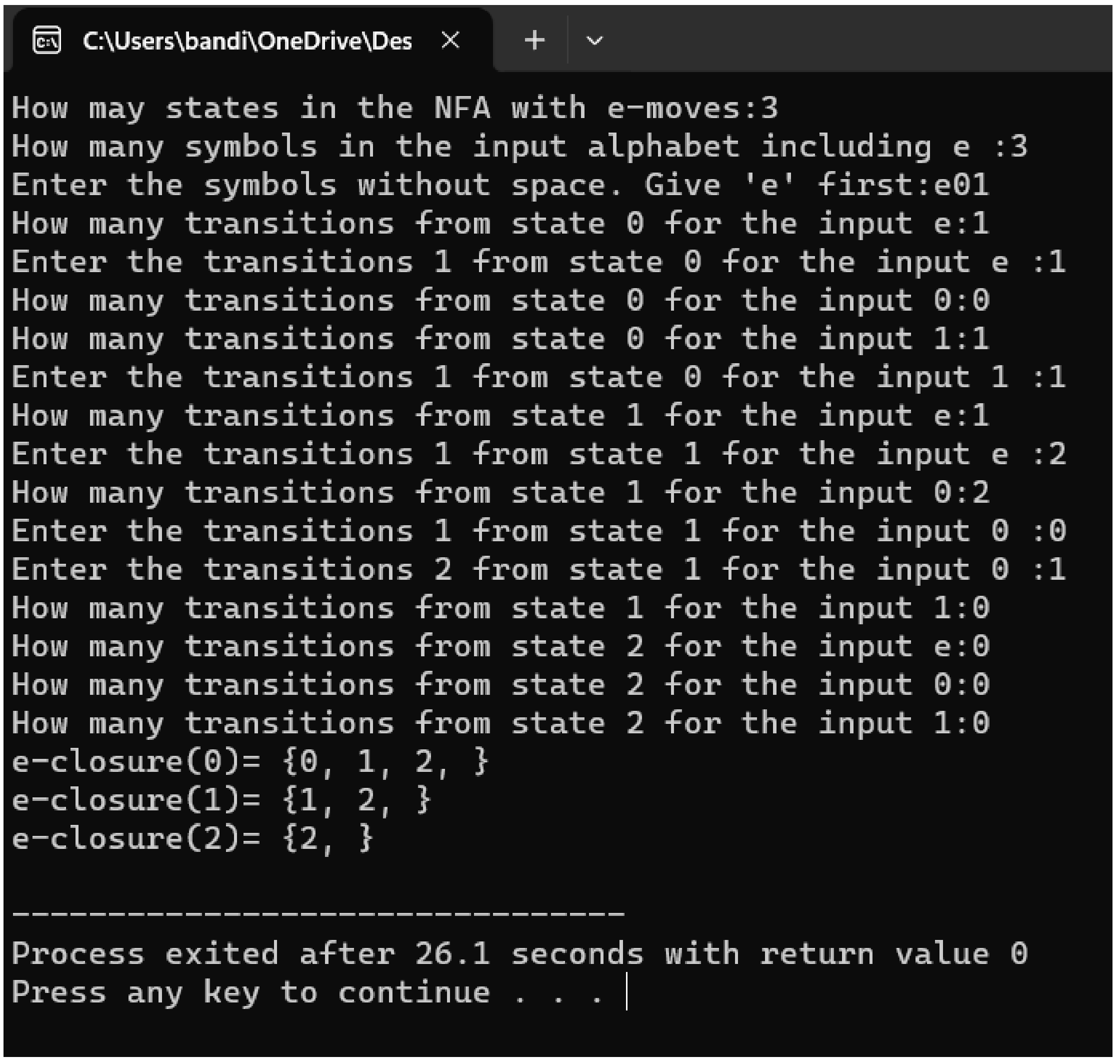
```
{
for(j=0;j<num_symbols;j++)
{
printf("How many transitions from state %d for the
input %c:",i,symbol[j]);
scanf("%d",&n);
for(k=0;k<n;k++)
{
printf("Enter the transitions %d from state %d for the
input %c :", k+1,i,symbol[j]);
scanf("%d",&trans_table[i][j][k]);
}
}
}
for(i=0;i<10;i++)
{
for(j=0;j<10;j++)
{
e_closure[i][j]=-1;
}
}
```

```
for(i=0;i<num_states;i++)
e_closure[i][0]=i;
for(i=0;i<num_states;i++)
{
if(trans_table[i][0][0]==-1)
continue;
else
{
state=i;
ptr=1;
find_e_closure(i);
}
}
for(i=0;i<num_states;i++)
{
printf("e-closure(%d)= {",i);
for(j=0;j<num_states;j++)
{
if(e_closure[i][j]!=-1)
{
```

```
printf("%d, ",e_closure[i][j]);
}
}
printf("}\n");
}
}
void find_e_closure(int x)
{
int i,j,y[10],num_trans;
i=0;
while(trans_table[x][0][i]!=-1)
{
y[i]=trans_table[x][0][i];
i=i+1;
}
num_trans=i;
for(j=0;j<num_trans;j++)
{
e_closure[state][ptr]=y[j];
ptr++;
```

```
find_e_closure(y[j]);
}
}
```

Output:



C:\Users\bandi\OneDrive\Des

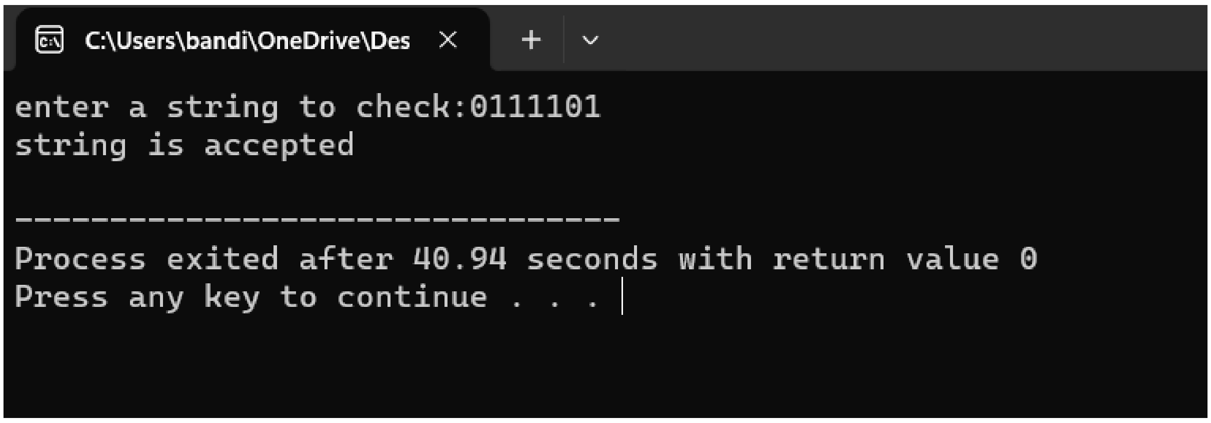
```
How may states in the NFA with e-moves:3
How many symbols in the input alphabet including e :3
Enter the symbols without space. Give 'e' first:e01
How many transitions from state 0 for the input e:1
Enter the transitions 1 from state 0 for the input e :1
How many transitions from state 0 for the input 0:0
How many transitions from state 0 for the input 1:1
Enter the transitions 1 from state 0 for the input 1 :1
How many transitions from state 1 for the input e:1
Enter the transitions 1 from state 1 for the input e :2
How many transitions from state 1 for the input 0:2
Enter the transitions 1 from state 1 for the input 0 :0
Enter the transitions 2 from state 1 for the input 0 :1
How many transitions from state 1 for the input 1:0
How many transitions from state 2 for the input e:0
How many transitions from state 2 for the input 0:0
How many transitions from state 2 for the input 1:0
e-closure(0)= {0, 1, 2, }
e-closure(1)= {1, 2, }
e-closure(2)= {2, }

--------------------------------
Process exited after 26.1 seconds with return value 0
Press any key to continue . . .
```

c-programme for cfg:

```
#include<stdio.h>
#include<string.h>
int main(){
```

```
char s[100];
int i,flag;
int l;
printf("enter a string to check:");
scanf("%s",s);
l=strlen(s);
flag=1;
for(i=0;i<l;i++)
{
if(s[i]!='0' && s[i]!='1')
{
 flag=0;
}
}
if(flag!=1)
printf("string is Not Valid\n");
if(flag==1)
{
if (s[0]=='0'&&s[l-1]=='1')
printf("string is accepted\n");
else
printf("string is Not accepted\n");
}
}
```

Output:



```
enter a string to check:0111101
string is accepted

--------------------------------
Process exited after 40.94 seconds with return value 0
Press any key to continue . . .
```