To write a C program to simulate a Non-Deterministic Finite Automata.

AIM : To write a C program to simulate a Non-Deterministic Finite Automata..

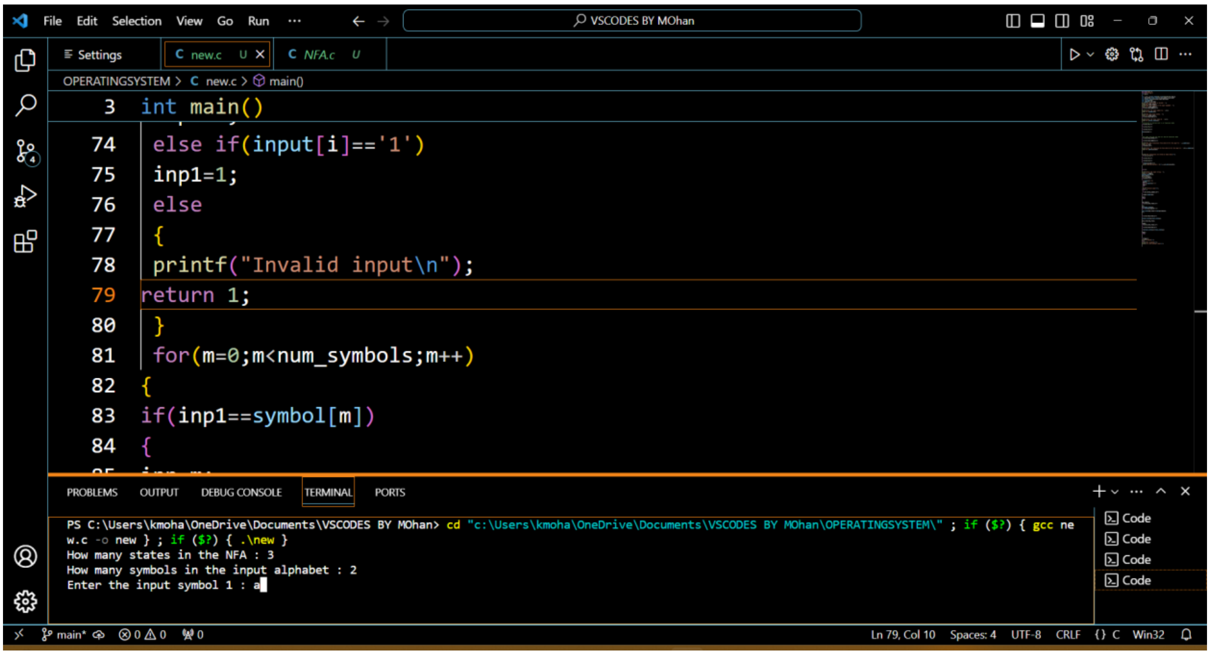
Program:

```
#include<stdio.h>
#include<string.h>
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 ch,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]);
}
//Initialize all entries with -1 in Transition table
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("Acepted\n");
else
printf("Not accepted\n");
printf("Try with another input\n");
}
```

OUTPUT:



File Edit Selection View Go Run ···
VSCODES BY MOhan
Settings
new.c U
NFA.c U
OPERATINGSYSTEM > new.c > main()
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
Code
Code
Code
Code
main* 0 0 0
Ln 79, Col 10 Spaces: 4 UTF-8 CRLF {} C Win32

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

```
PS C:\Users\kmoha\OneDrive\Documents\VSCODES BY MOhan> cd "c:\Users\kmoha\OneDrive\Documents\VSCODES BY MOhan\OPERATINGSYSTEM\" ; if ($?) { gcc ne
w.c -o new } ; if ($?) { .\new }
How many states in the NFA : 3
How many symbols in the input alphabet : 2
Enter the input symbol 1 : a
```

}**RESULT:** Output is successfully obtained.