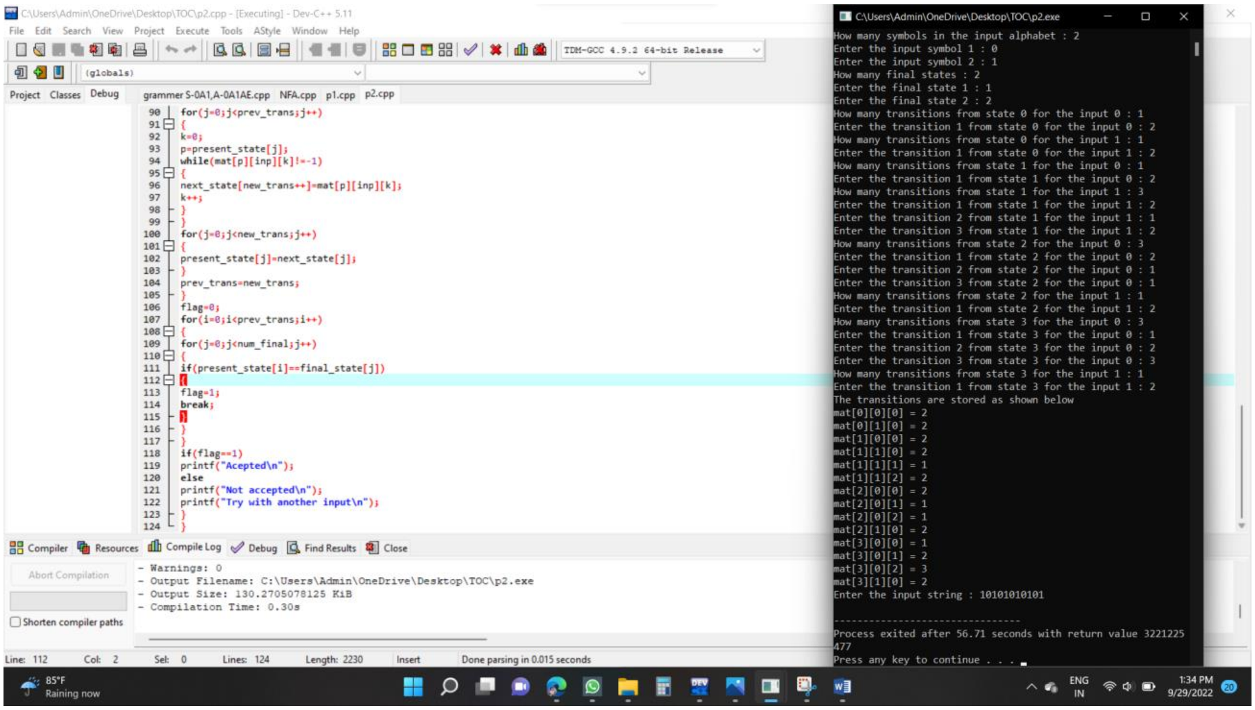
write a C program to simulate a Non-Deterministic Finite Automata.

```
#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(1);
 }
 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 Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
grammer S-0A1,A-0A1AE.cpp NFA.cpp p1.cpp p2.cpp
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
85°F
Raining now
ENG
IN
1:34 PM
9/29/2022

C:\Users\Admin\OneDrive\Desktop\TOC\p2.cpp - [Executing] - Dev-C++ 5.11

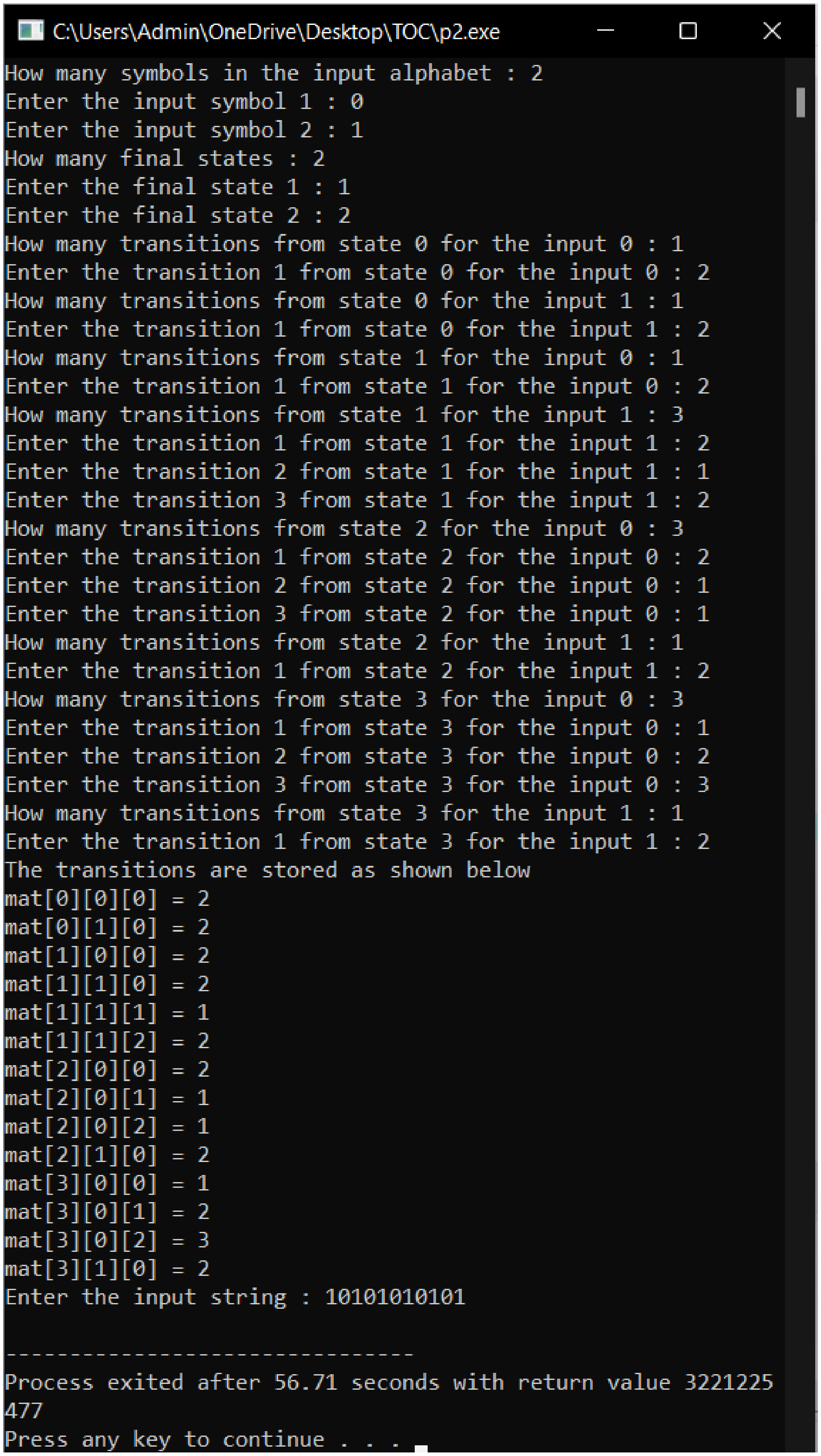
```
for(j=0;j<prev_trans;j++)
{
k=0;
p=present_state[j];
while(mat[p][inp][k]!=-1)
{
next_state[new_trans++]=mat[p][inp][k];
k++;
}
}
for(j=0;j<new_trans;j++)
{
present_state[j]=next_state[j];
}
prev_trans=new_trans;
}
flag=0;
for(i=0;i<prev_trans;i++)
{
for(j=0;j<num_final;j++)
{
if(present_state[i]==final_state[j])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

```
- Warnings: 0
- Output Filename: C:\Users\Admin\OneDrive\Desktop\TOC\p2.exe
- Output Size: 130.2705078125 KiB
- Compilation Time: 0.30s
```

Line: 112 Col: 2 Sel: 0 Lines: 124 Length: 2230 Insert Done parsing in 0.015 seconds

C:\Users\Admin\OneDrive\Desktop\TOC\p2.exe

```
How many symbols in the input alphabet : 2
Enter the input symbol 1 : 0
Enter the input symbol 2 : 1
How many final states : 2
Enter the final state 1 : 1
Enter the final state 2 : 2
How many transitions from state 0 for the input 0 : 1
Enter the transition 1 from state 0 for the input 0 : 2
How many transitions from state 0 for the input 1 : 1
Enter the transition 1 from state 0 for the input 1 : 2
How many transitions from state 1 for the input 0 : 1
Enter the transition 1 from state 1 for the input 0 : 2
How many transitions from state 1 for the input 1 : 3
Enter the transition 1 from state 1 for the input 1 : 2
Enter the transition 2 from state 1 for the input 1 : 1
Enter the transition 3 from state 1 for the input 1 : 2
How many transitions from state 2 for the input 0 : 3
Enter the transition 1 from state 2 for the input 0 : 2
Enter the transition 2 from state 2 for the input 0 : 1
Enter the transition 3 from state 2 for the input 0 : 1
How many transitions from state 2 for the input 1 : 1
Enter the transition 1 from state 2 for the input 1 : 2
How many transitions from state 3 for the input 0 : 3
Enter the transition 1 from state 3 for the input 0 : 1
Enter the transition 2 from state 3 for the input 0 : 2
Enter the transition 3 from state 3 for the input 0 : 3
How many transitions from state 3 for the input 1 : 1
Enter the transition 1 from state 3 for the input 1 : 2
The transitions are stored as shown below
mat[0][0][0] = 2
mat[0][1][0] = 2
mat[1][0][0] = 2
mat[1][1][0] = 2
mat[1][1][1] = 1
mat[1][1][2] = 2
mat[2][0][0] = 2
mat[2][0][1] = 1
mat[2][0][2] = 1
mat[2][1][0] = 2
mat[3][0][0] = 1
mat[3][0][1] = 2
mat[3][0][2] = 3
mat[3][1][0] = 2
Enter the input string : 10101010101

--------------------------------
Process exited after 56.71 seconds with return value 3221225
477
Press any key to continue . . .
```



```
How many symbols in the input alphabet : 2
Enter the input symbol 1 : 0
Enter the input symbol 2 : 1
How many final states : 2
Enter the final state 1 : 1
Enter the final state 2 : 2
How many transitions from state 0 for the input 0 : 1
Enter the transition 1 from state 0 for the input 0 : 2
How many transitions from state 0 for the input 1 : 1
Enter the transition 1 from state 0 for the input 1 : 2
How many transitions from state 1 for the input 0 : 1
Enter the transition 1 from state 1 for the input 0 : 2
How many transitions from state 1 for the input 1 : 3
Enter the transition 1 from state 1 for the input 1 : 2
Enter the transition 2 from state 1 for the input 1 : 1
Enter the transition 3 from state 1 for the input 1 : 2
How many transitions from state 2 for the input 0 : 3
Enter the transition 1 from state 2 for the input 0 : 2
Enter the transition 2 from state 2 for the input 0 : 1
Enter the transition 3 from state 2 for the input 0 : 1
How many transitions from state 2 for the input 1 : 1
Enter the transition 1 from state 2 for the input 1 : 2
How many transitions from state 3 for the input 0 : 3
Enter the transition 1 from state 3 for the input 0 : 1
Enter the transition 2 from state 3 for the input 0 : 2
Enter the transition 3 from state 3 for the input 0 : 3
How many transitions from state 3 for the input 1 : 1
Enter the transition 1 from state 3 for the input 1 : 2
The transitions are stored as shown below
mat[0][0][0] = 2
mat[0][1][0] = 2
mat[1][0][0] = 2
mat[1][1][0] = 2
mat[1][1][1] = 1
mat[1][1][2] = 2
mat[2][0][0] = 2
mat[2][0][1] = 1
mat[2][0][2] = 1
mat[2][1][0] = 2
mat[3][0][0] = 1
mat[3][0][1] = 2
mat[3][0][2] = 3
mat[3][1][0] = 2
Enter the input string : 10101010101

--------------------------------
Process exited after 56.71 seconds with return value 3221225
477
Press any key to continue . . .
```