**Compiler Design Lab**

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**Experiment –** 2

**Aim:** To study and perform regular expression to NFA (Non Deterministic Automata) conversion in C++.

**Algorithm:**

• Start • Get the input from the user • Initialise separate variables and functions for Postfix, Display and NFA. • Create separate methods for different operators like +,\*,. • By using Switch case initialise different cases for the input • For ‘.’ operator initialise a separate method by using various stack functions. Do the same for other operators like \*,+ • Regular expression is in the form of a.b(or) a+b • Display the output • Stop

**Code:**

#include<iostream>

#include<string.h>

int main()

{

printf("Enter the regular expression: ");

char reg[20];

int q[20][3],i,j,len,a,b;

for(a=0;a<20;a++)

{

for(b=0;b<3;b++)

{

q[a][b]=0;

}

}

scanf("%s",reg);

len=strlen(reg);

i=0;

j=1;

while(i<len)

{

if(reg[i]=='a'&&reg[i+1]!='|'&&reg[i+1]!='\*')

{

q[j][0]=j+1;

j++;

}

if(reg[i]=='b'&&reg[i+1]!='|'&&reg[i+1]!='\*')

{

q[j][1]=j+1;

j++;

}

if(reg[i]=='e'&&reg[i+1]!='|'&&reg[i+1]!='\*')

{

q[j][2]=j+1;

j++;

}

if(reg[i]=='a'&&reg[i+1]=='|'&&reg[i+2]=='b')

{

q[j][2]=((j+1)\*10)+(j+3);

j++;

q[j][0]=j+1;

j++;

q[j][2]=j+3;

j++;

q[j][1]=j+1;

j++;

q[j][2]=j+1;

j++;

i=i+2;

}

if(reg[i]=='b'&&reg[i+1]=='|'&&reg[i+2]=='a')

{

q[j][2]=((j+1)\*10)+(j+3);

j++;

q[j][1]=j+1;

j++;

q[j][2]=j+3;

j++;

q[j][0]=j+1;

j++;

q[j][2]=j+1;

j++;

i=i+2;

}

if(reg[i]=='a'&&reg[i+1]=='\*')

{

q[j][2]=((j+1)\*10)+(j+3);

j++;

q[j][0]=j+1;

j++;

q[j][2]=((j+1)\*10)+(j-1);

j++;

}

if(reg[i]=='b'&&reg[i+1]=='\*')

{

q[j][2]=((j+1)\*10)+(j+3);

j++;

q[j][1]=j+1;

j++;

q[j][2]=((j+1)\*10)+(j-1);

j++;

}

if(reg[i]==')'&&reg[i+1]=='\*')

{

q[0][2]=((j+1)\*10)+1;

q[j][2]=((j+1)\*10)+1;

j++;

}

i++;

}

printf("Transition function \n");

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

{

if(q[i][0]!=0)

printf("\n q[%d,a]-->%d",i,q[i][0]);

if(q[i][1]!=0)

printf("\n q[%d,b]-->%d",i,q[i][1]);

if(q[i][2]!=0)

{

if(q[i][2]<10)

printf("\n q[%d,e]-->%d",i,q[i][2]);

else

printf("\n q[%d,e]-->%d & %d",i,q[i][2]/10,q[i][2]%10);

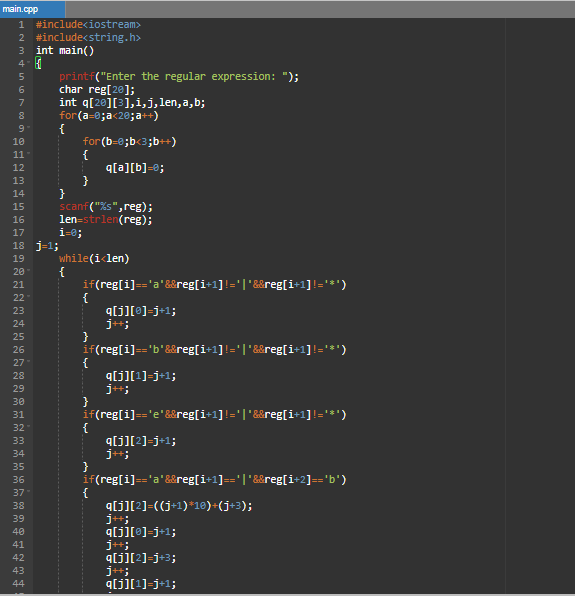
}

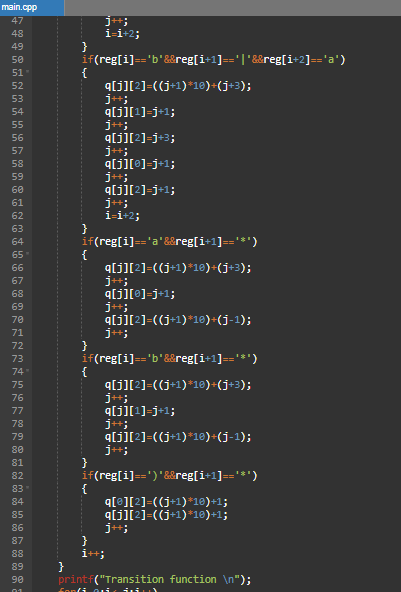
}

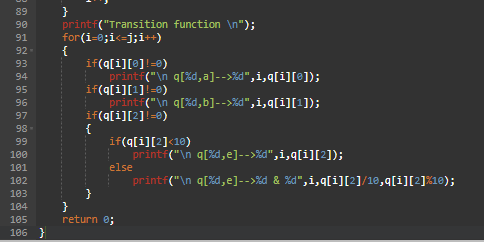
return 0;

}

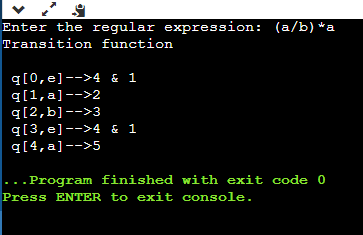
**Screenshots:**

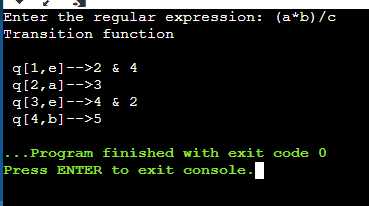






**Output:**





**Result:** The regular expression to NFA conversion was successfully executed in C++.