CONVERSION FROM REGULAR EXPRESSION TO NFA

NAME: **RISHAL RAMESH** ***EXP NO:*** **2**

REG NO: **RA1911030010084**

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AIM:

To study and perform regular expression to NFA(non deterministic automata) conversion in any of the programming languages.

LANGUAGE USED:

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()
```

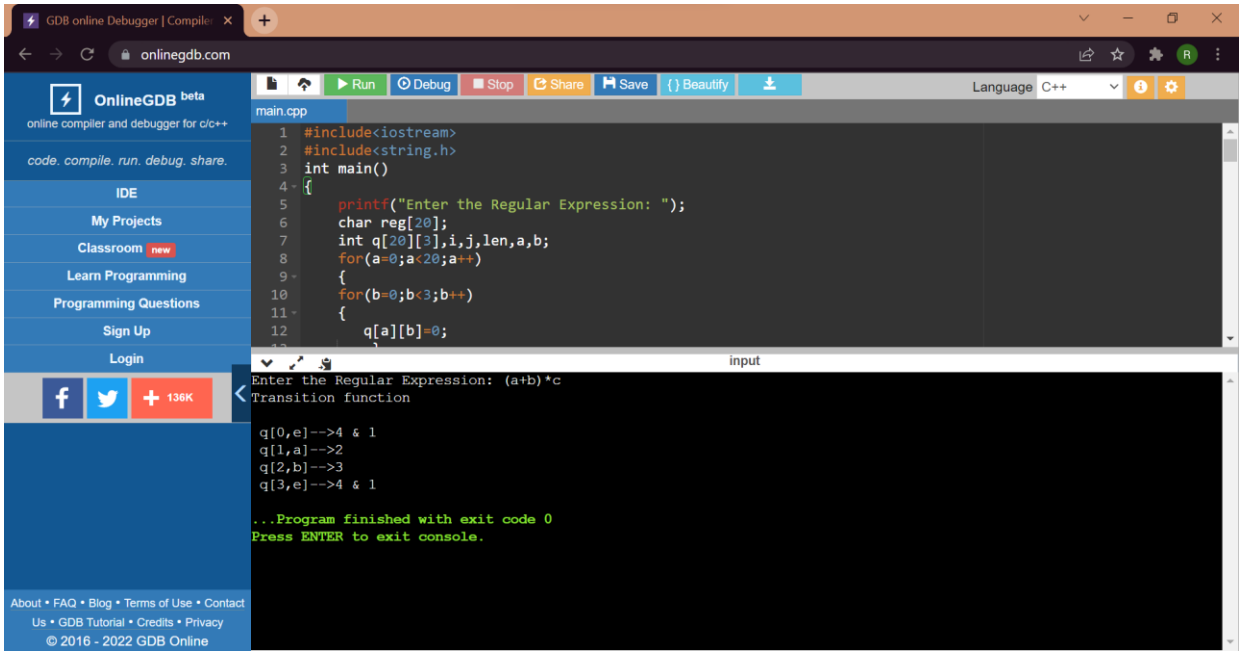
```
{
    printf("Enter the Regular Expression: ");
    char reg[20];
    int q[20][3],i,j,len,a,b;
    for(a=0;a<20;a++)
    {
            for(b=0;b<3;b++)
            {
               q[a][b]=0;
        }
    }
    scanf("%s",reg);
    len=strlen(reg);
    i=0;
    j=1;
    while(i<len)
    {
            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;
}
```

OUTPUT:



RESULT:

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