Program

```cpp
#include<bits/stdc++.h>
using namespace std;

struct productions{
    char lhs[20];
    char rhs[20];
}prod[10];

int main()
{
    int i,stpos,j,k,l,m,o,p,f,r;
    int np,tspos,cr;

    cout<<"\nEnter Number of productions:";
    cin>>np;

    char sc,ts[10];

    cout<<"\nEnter productions:\n";
    for(i=0;i<np;i++)
    {
        cin>>ts;
        strncpy(prod[i].lhs,ts,1);
        strcpy(prod[i].rhs,&ts[3]);
    }

    char ip[10];

    cout<<"\nEnter Input:";
    cin>>ip;

    int lip=strlen(ip);

    char stack[10];

    stpos=0;
    i=0;


    sc=ip[i];
    stack[stpos]=sc;
    i++;stpos++;

    cout<<"\n\nStack\tInput\t  Action";
    cout<<"\n$\t"<<ip<<"$";
    do
```

```cpp
{
    r=1;
    while(r!=0)
    {
        cout<<"\n"<<"$";
        for(p=0;p<stpos;p++)
        {
            cout<<stack[p];
        }
        cout<<"\t";
        for(p=i;p<lip;p++)
        {
            cout<<ip[p];
        }
        cout<<"$";

        if(r==2)
        {
            cout<<"\t  Reduced";
        }
        else
        {
            cout<<"\t  Shifted";
        }
        r=0;


        for(k=0;k<stpos;k++)
        {
            f=0;

            for(l=0;l<10;l++)
            {
                ts[l]='\0';
            }

            tspos=0;
            for(l=k;l<stpos;l++)
            {
                ts[tspos]=stack[l];
                tspos++;
            }


            for(m=0;m<np;m++)
            {
                cr = strcmp(ts,prod[m].rhs);
```

```cpp
                    if(cr==0)
                    {
                        for(l=k;l<10;l++)
                        {
                            stack[l]='\0';
                            stpos--;
                        }

                        stpos=k;


                        strcat(stack,prod[m].lhs);
                        stpos++;
                        r=2;
                    }
                }
            }
        }


        sc=ip[i];
        stack[stpos]=sc;
        i++;stpos++;

    }while(strlen(stack)!=1 && stpos!=lip);

    if(strlen(stack)==1)
    {
        cout<<"\n String Accepted";
    }
    else
    {
        cout<<"\n Error: String Rejected";
    }
 return 0;

}
```

Result

String Accepted

```
PS C:\Users\shubh> cd "c:\User
iftReduceParsing }

Enter Number of productions:4

Enter productions:
E->E+E
E->E*E
E->(E)
E->a

Enter Input:(a+a)*a


Stack        Input         Action
$            (a+a)*a$
$(           a+a)*a$       Shifted
$(a          +a)*a$        Shifted
$(E          +a)*a$        Reduced
$(E+         a)*a$         Shifted
$(E+a        )*a$          Shifted
$(E+E        )*a$          Reduced
$(E          )*a$          Reduced
$(E)         *a$           Shifted
$E           *a$           Reduced
$E*          a$            Shifted
$E*a         $             Shifted
$E*E         $             Reduced
$E           $             Reduced
  String Accepted
```

String Rejected

```
Enter Number of productions:4

Enter productions:
E->E+E
E->E*E
E->(E)
E->a

Enter Input:(a*a


Stack     Input        Action
$         (a*a$
$(        a*a$         Shifted
$(a       *a$          Shifted
$(E       *a$          Reduced
$(E*      a$           Shifted
 Error: String Rejected
```