Week-9

Implementation of Shift Reduce parser using C for the following grammar and illustrate the parser's actions for a valid and an invalid string.

E -> E+E
E -> E*E
E -> (E)
E -> id

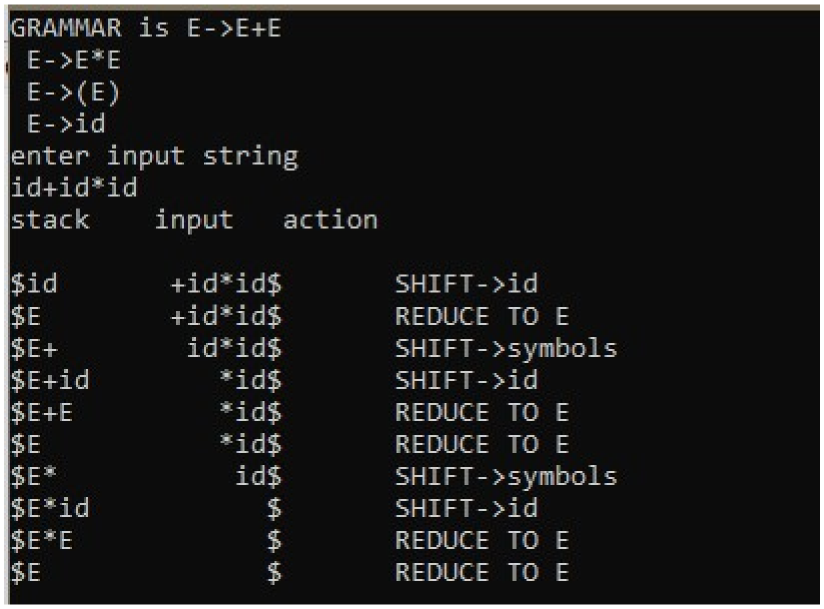
Code:

```
#include<stdio.h>
#include<string.h>
int k=0,z=0,i=0,j=0,c=0;
char a[16],ac[20],stk[15],act[10];
void check();
int main()
{
puts("GRAMMAR is E->E+E \n E->E*E \n E->(E) \n E->id");
puts("enter input string ");
scanf("%s",a);
c=strlen(a);
strcpy(act,"SHIFT->");
puts("stack \t input \t action");
for(k=0,i=0; j<c; k++,i++,j++)
{
if(a[j]=='i' && a[j+1]=='d')
{
stk[i]=a[j];
stk[i+1]=a[j+1];
stk[i+2]='\0';
a[j]=' ';
a[j+1]=' ';
printf("\n$%s\t%s$\t%sid",stk,a,act);
check();
}
else
{
stk[i]=a[j];
stk[i+1]='\0';
a[j]=' ';
printf("\n$%s\t%s$\t%ssymbols",stk,a,act);
check();
}
}
}
void check()
{
strcpy(ac,"REDUCE TO E");
for(z=0; z<c; z++)
if(stk[z]=='i' && stk[z+1]=='d')
```

```
{
stk[z]='E';
stk[z+1]='\0';
printf("\n$%s\t%s$\t%s",stk,a,ac);
j++;
}
for(z=0; z<c; z++)
if(stk[z]=='E' && stk[z+1]=='+' && stk[z+2]=='E')
{
stk[z]='E';
stk[z+1]='\0';
stk[z+2]='\0';
printf("\n$%s\t%s$\t%s",stk,a,ac);
i=i-2;
}
for(z=0; z<c; z++)
if(stk[z]=='E' && stk[z+1]=='*' && stk[z+2]=='E')
{
stk[z]='E';
stk[z+1]='\0';
stk[z+1]='\0';
printf("\n$%s\t%s$\t%s",stk,a,ac);
i=i-2;
}
for(z=0; z<c; z++)
```

```
if(stk[z]=='(' && stk[z+1]=='E' && stk[z+2]==')')
{
stk[z]='E';
stk[z+1]='\0';
stk[z+1]='\0';
printf("\n$%s\t%s$\t%s",stk,a,ac);
i=i-2;
}
}
```

Output:



```
GRAMMAR is E->E+E
 E->E*E
 E->(E)
 E->id
enter input string
id+id*id
stack    input   action

$id       +id*id$       SHIFT->id
$E        +id*id$       REDUCE TO E
$E+        id*id$       SHIFT->symbols
$E+id        *id$       SHIFT->id
$E+E         *id$       REDUCE TO E
$E           *id$       REDUCE TO E
$E*           id$       SHIFT->symbols
$E*id           $       SHIFT->id
$E*E            $       REDUCE TO E
$E              $       REDUCE TO E
```