Compiler Design(18CSC304J)

Experiment 9

Predictive Parsing Table

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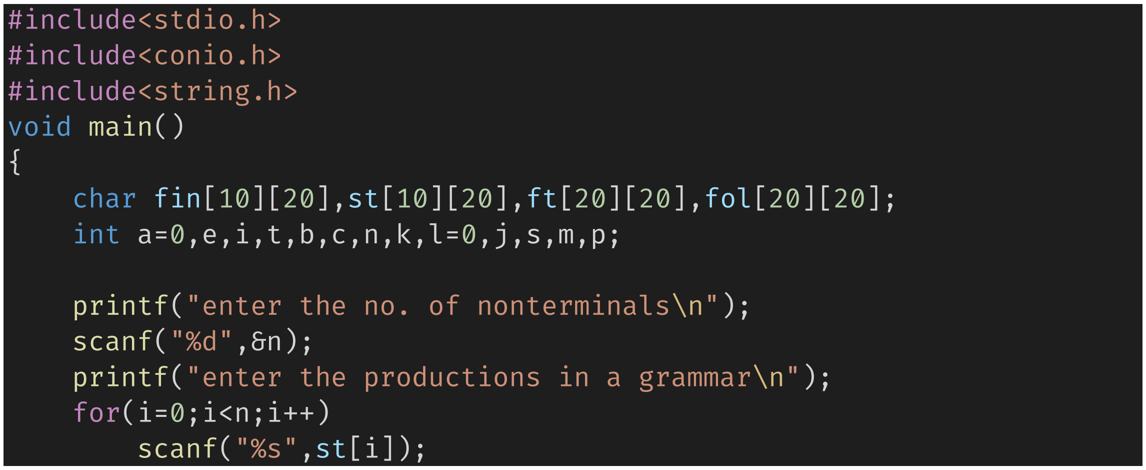
Aim: To study and implement Predictive Parsing table.

Language: Python

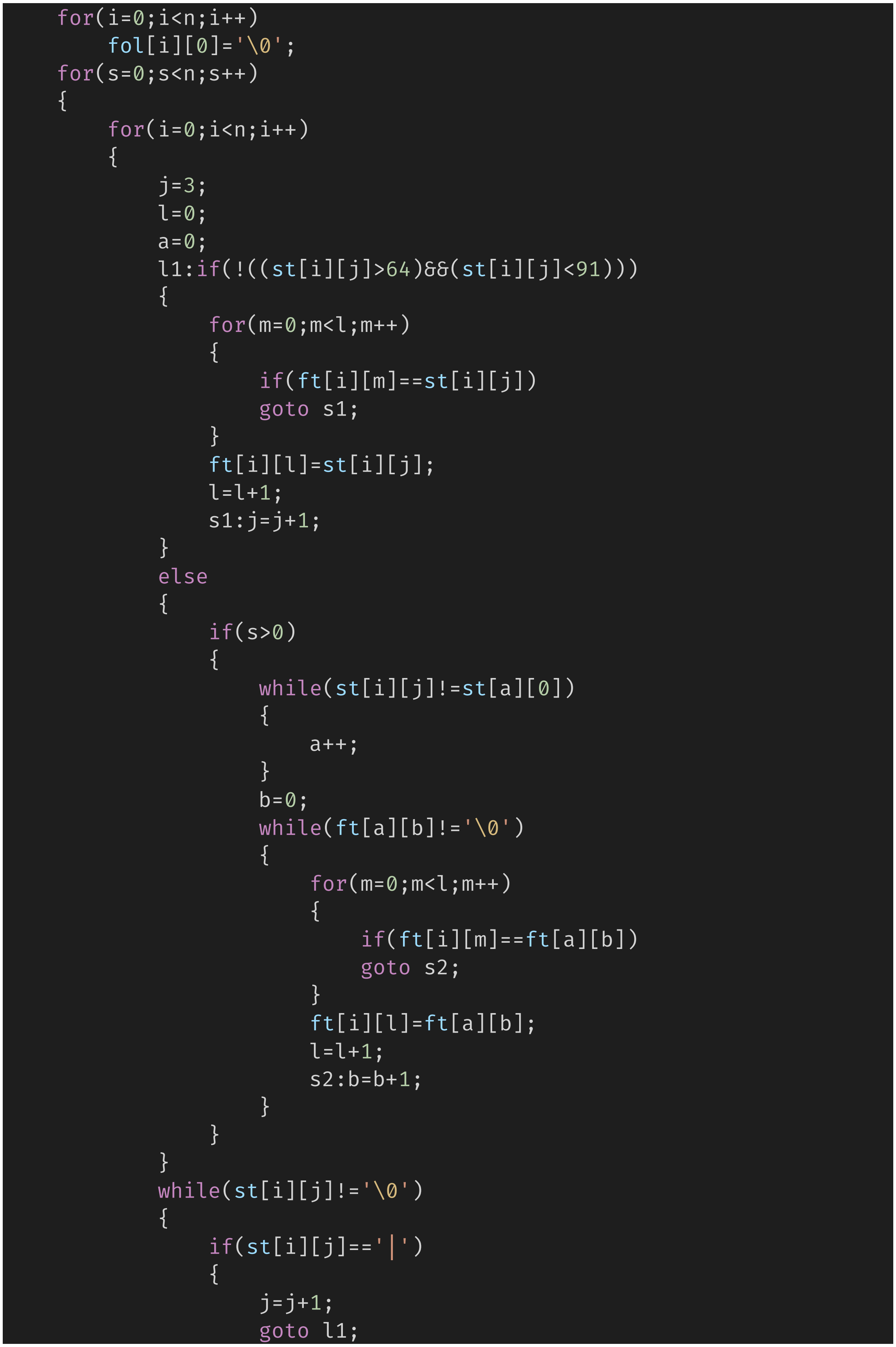
Procedure:

1. Start the program.
2. Initialize the required variables.
3. Get the number of coordinates and productions from the user.
4. Perform the following
   a. for (each production A → α in G) {
   b. for (each terminal a in FIRST(α))
   c. add A → α to M[A, a];
   d. if (ε is in FIRST(α))
   e. for (each symbol b in FOLLOW(A))
   f. add A → α to M[A, b];
5. Print the resulting stack.
6. Print if the grammar is accepted or not.
7. Exit the program

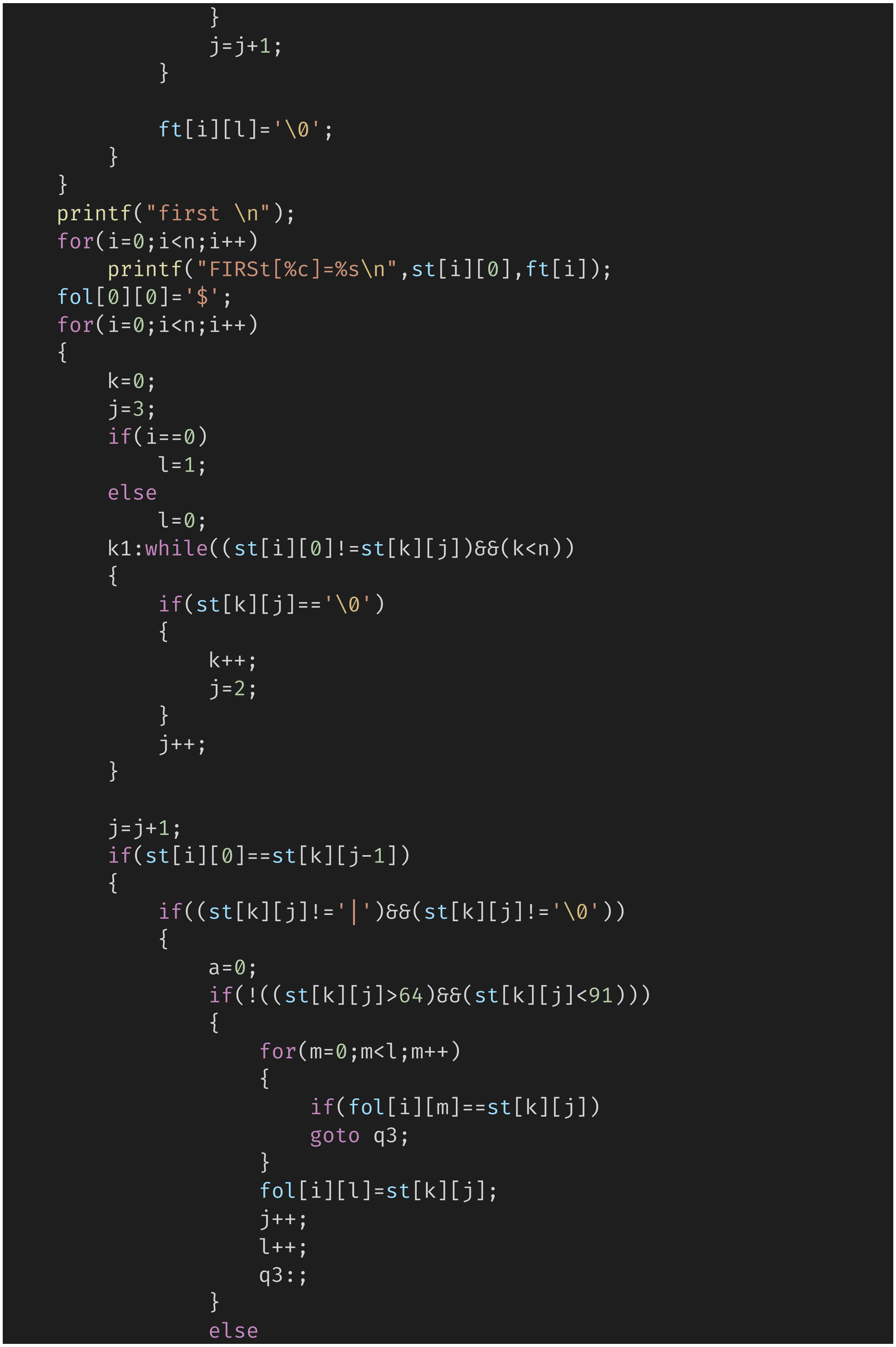
Code Snippet:



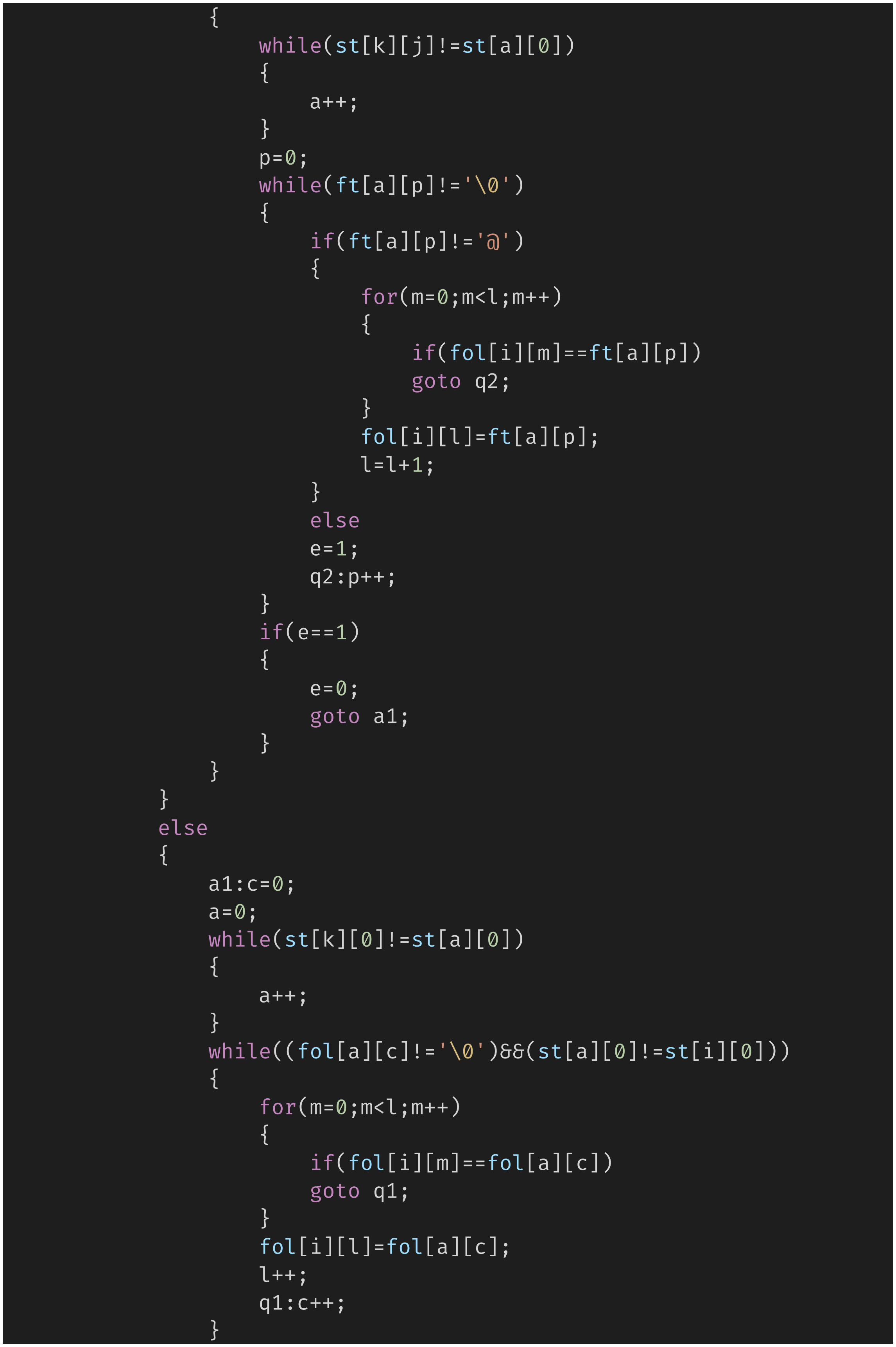
```
#include<stdio.h>
#include<conio.h>
#include<string.h>
void main()
{
    char fin[10][20],st[10][20],ft[20][20],fol[20][20];
    int a=0,e,i,t,b,c,n,k,l=0,j,s,m,p;

    printf("enter the no. of nonterminals\n");
    scanf("%d",&n);
    printf("enter the productions in a grammar\n");
    for(i=0;i<n;i++)
        scanf("%s",st[i]);
```



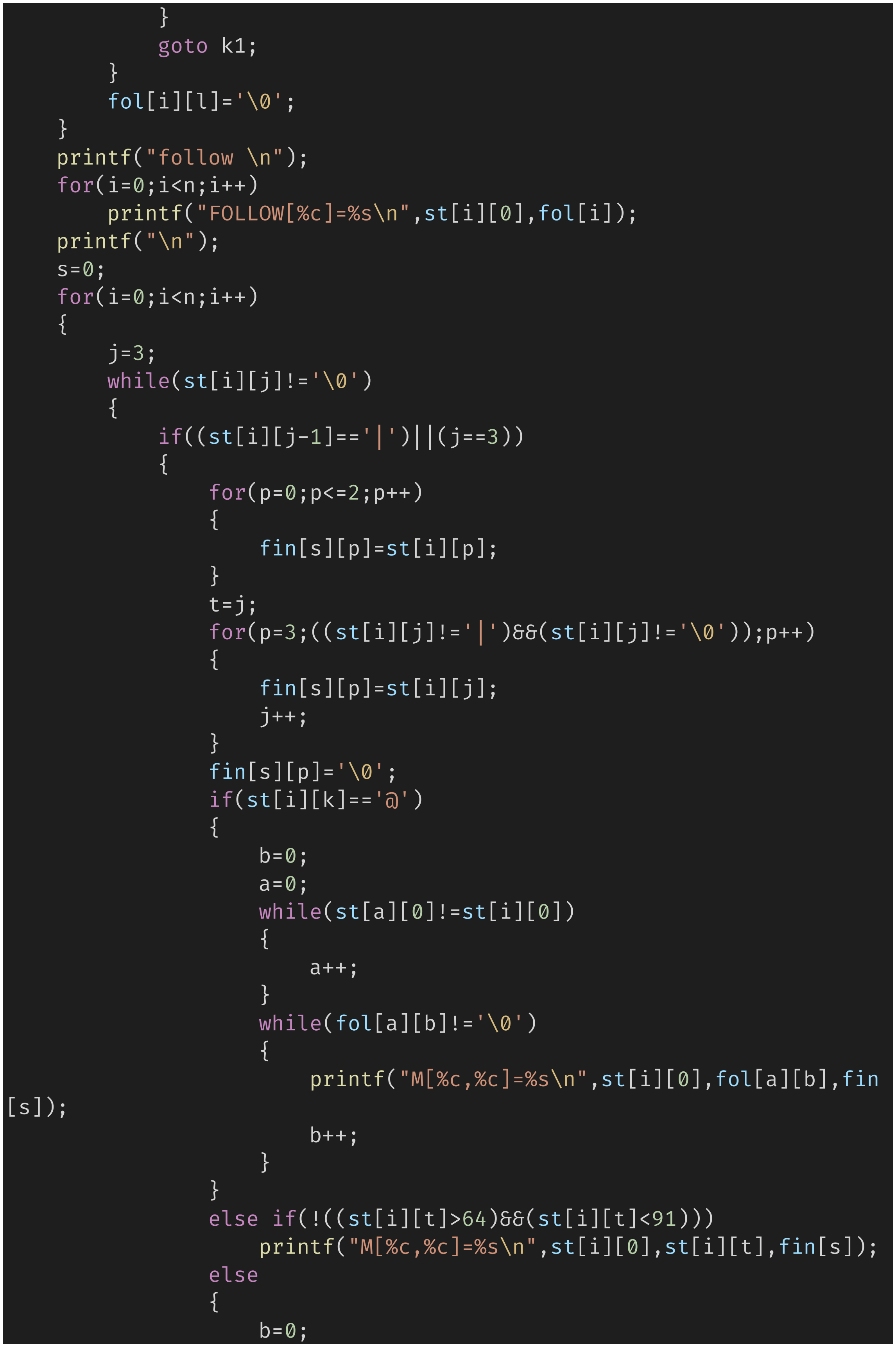
```
    for(i=0;i<n;i++)
        fol[i][0]='\0';
    for(s=0;s<n;s++)
    {
        for(i=0;i<n;i++)
        {
            j=3;
            l=0;
            a=0;
            l1:if(!((st[i][j]>64)&&(st[i][j]<91)))
            {
                for(m=0;m<l;m++)
                {
                    if(ft[i][m]==st[i][j])
                    goto s1;
                }
                ft[i][l]=st[i][j];
                l=l+1;
                s1:j=j+1;
            }
            else
            {
                if(s>0)
                {
                    while(st[i][j]!=st[a][0])
                    {
                        a++;
                    }
                    b=0;
                    while(ft[a][b]!='\0')
                    {
                        for(m=0;m<l;m++)
                        {
                            if(ft[i][m]==ft[a][b])
                            goto s2;
                        }
                        ft[i][l]=ft[a][b];
                        l=l+1;
                        s2:b=b+1;
                    }
                }
            }
            while(st[i][j]!='\0')
            {
                if(st[i][j]=='|')
                {
                    j=j+1;
                    goto l1;
```



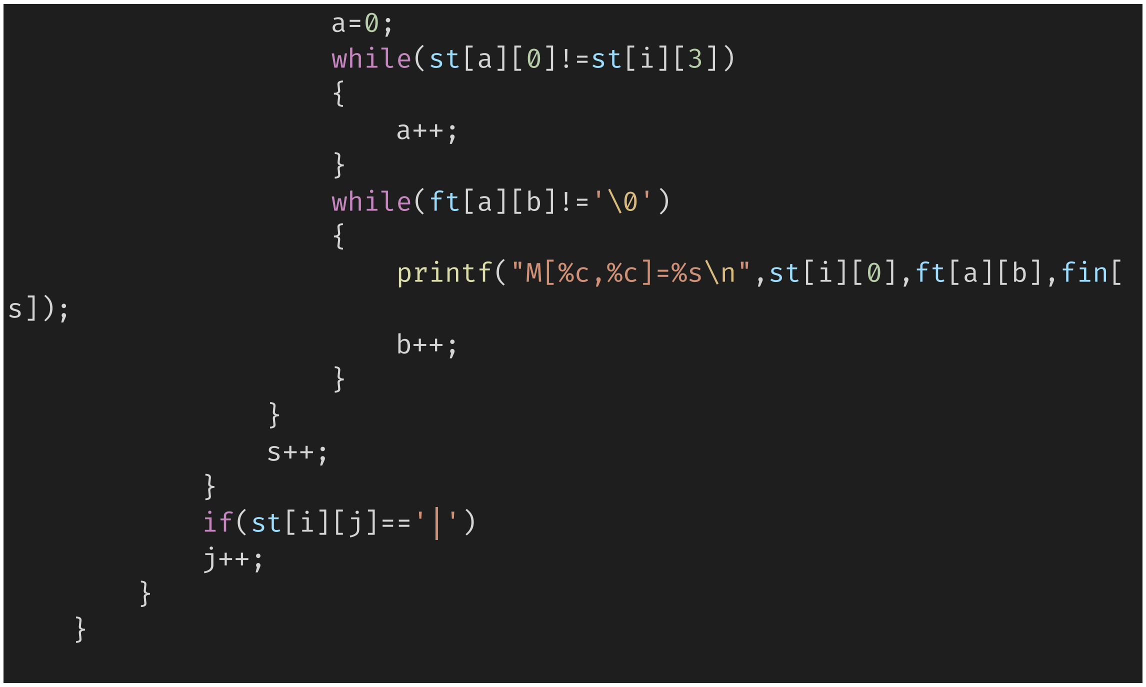
```
                }
                j=j+1;
            }

            ft[i][l]='\0';
        }
    }
    printf("first \n");
    for(i=0;i<n;i++)
        printf("FIRSt[%c]=%s\n",st[i][0],ft[i]);
    fol[0][0]='$';
    for(i=0;i<n;i++)
    {
        k=0;
        j=3;
        if(i==0)
            l=1;
        else
            l=0;
        k1:while((st[i][0]!=st[k][j])&&(k<n))
        {
            if(st[k][j]=='\0')
            {
                k++;
                j=2;
            }
            j++;
        }

        j=j+1;
        if(st[i][0]==st[k][j-1])
        {
            if((st[k][j]!='|')&&(st[k][j]!='\0'))
            {
                a=0;
                if(!((st[k][j]>64)&&(st[k][j]<91)))
                {
                    for(m=0;m<l;m++)
                    {
                        if(fol[i][m]==st[k][j])
                        goto q3;
                    }
                    fol[i][l]=st[k][j];
                    j++;
                    l++;
                    q3:;
                }
                else
```



```
                {
                    while(st[k][j]!=st[a][0])
                    {
                        a++;
                    }
                    p=0;
                    while(ft[a][p]!='\0')
                    {
                        if(ft[a][p]!='@')
                        {
                            for(m=0;m<l;m++)
                            {
                                if(fol[i][m]==ft[a][p])
                                goto q2;
                            }
                            fol[i][l]=ft[a][p];
                            l=l+1;
                        }
                        else
                        e=1;
                        q2:p++;
                    }
                    if(e==1)
                    {
                        e=0;
                        goto a1;
                    }
                }
            }
            else
            {
                a1:c=0;
                a=0;
                while(st[k][0]!=st[a][0])
                {
                    a++;
                }
                while((fol[a][c]!='\0')&&(st[a][0]!=st[i][0]))
                {
                    for(m=0;m<l;m++)
                    {
                        if(fol[i][m]==fol[a][c])
                        goto q1;
                    }
                    fol[i][l]=fol[a][c];
                    l++;
                    q1:c++;
                }
```

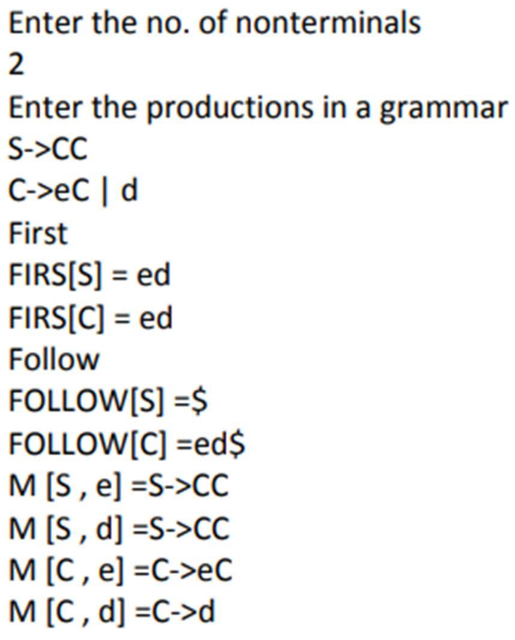


```
            }
            goto k1;
        }
        fol[i][l]='\0';
    }
    printf("follow \n");
    for(i=0;i<n;i++)
        printf("FOLLOW[%c]=%s\n",st[i][0],fol[i]);
    printf("\n");
    s=0;
    for(i=0;i<n;i++)
    {
        j=3;
        while(st[i][j]!='\0')
        {
            if((st[i][j-1]=='|')||(j==3))
            {
                for(p=0;p<=2;p++)
                {
                    fin[s][p]=st[i][p];
                }
                t=j;
                for(p=3;((st[i][j]!='|')&&(st[i][j]!='\0'));p++)
                {
                    fin[s][p]=st[i][j];
                    j++;
                }
                fin[s][p]='\0';
                if(st[i][k]=='@')
                {
                    b=0;
                    a=0;
                    while(st[a][0]!=st[i][0])
                    {
                        a++;
                    }
                    while(fol[a][b]!='\0')
                    {
                        printf("M[%c,%c]=%s\n",st[i][0],fol[a][b],fin
[s]);

                        b++;
                    }
                }
                else if(!((st[i][t]>64)&&(st[i][t]<91)))
                    printf("M[%c,%c]=%s\n",st[i][0],st[i][t],fin[s]);
                else
                {
                    b=0;
```



```
                    a=0;
                    while(st[a][0]!=st[i][3])
                    {
                        a++;
                    }
                    while(ft[a][b]!='\0')
                    {
                        printf("M[%c,%c]=%s\n",st[i][0],ft[a][b],fin[
s]);

                        b++;
                    }
                }
                s++;
            }
            if(st[i][j]=='|')
            j++;
        }
    }
```

Output Screenshots:



```
Enter the no. of nonterminals
2
Enter the productions in a grammar
S->CC
C->eC | d
First
FIRS[S] = ed
FIRS[C] = ed
Follow
FOLLOW[S] =$
FOLLOW[C] =ed$
M [S , e] =S->CC
M [S , d] =S->CC
M [C , e] =C->eC
M [C , d] =C->d
```

Result:

The code was successfully implemented and output was recorded.