Electric Circuit Analysis

Project Report

Submitted by

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Under the Guidance of

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Department of Computer Science and Engineering

Kumaraguru College of Technology

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Department of Computer Science and Engineering

Kumaraguru College of Technology

Coimbatore-641 006

Certificate

This is to Certify that the report entitled

Electric Circuit Analysis

hes been Submitted by

Mr. .....

in partial fulfilment for the award of Bachelor of Engineering in the Computer Science and Engineering branch of the Bharathiar University, Coimbatore-641 046 during the academic year 1991-92.

.....
Guide

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Head of the Department

Certified that the candidate was Examined by us in the Projec
Work Viva - Voce Examination held on ..... and th
University Register Number was .....

.....
Internal Examiner

.....
External Examiner

CHAPTER 9

Appendix A

```
/* J M S */

#include<stdio.h>
#include<graphics.h>
int   driver=CGA,mode=CGAC1;

main()
  { int i,j;
  initgraph(&driver,&mode,"a:\\");
    clrscr();
    rectangle(1,1,3119,119);
    for(i=0;i<26;i++)
     { gotoxy(1,i);
      printf("              ");
      }
    settextstyle(3,0,3);
       for(i=1;i<=8;i++)
       {
       gotoxy(17,i);
       printf("w");
       delay(200);
       gotoxy(17,i);
       printf(" ");
  }
  gotoxy(17,i);
  printf("W");
  for(i=25;i>=10;i--)
        {
        gotoxy(18,i);
        printf("E");
        delay(200);
        gotoxy(18,i);
        printf(" ");
   }
   gotoxy(18,i);
   printf("E");
         for(i=1;i<=8;i++)
         {
         gotoxy(19,i);
         printf("L");
         delay(200);
         gotoxy(19,i);
         printf(" ");
    }
    gotoxy(19,i);
    printf("L");
          for(i=25;i>=10;i--)
          {
          gotoxy(20,i);
          printf("C");
          delay(200);
          gotoxy(20,i);
          printf(" ");
     }
```

```
gotoxy(20,i);
printf("C");
       for(i=1;i<=8;i++)
       {
       gotoxy(21,i);
       printf("O");
       delay(200);
       gotoxy(21,i);
       printf(" ");
     }
gotoxy(21,i);
printf("O");
       for(i=25;i>=10;i--)
       {
       gotoxy(22,i);
       printf("M");
       delay(200);
       gotoxy(22,i);
       printf(" ");
}
gotoxy(22,i);
printf("M");
       for(i=1;i<=8;i++)
       {
       gotoxy(23,i);
       printf("E");
       delay(200);
       gotoxy(23,i);
       printf(" ");
 }
 gotoxy(23,i);
 printf("E");
 rectangle(100,55,225,75);
for(i= 1;i<=20;i++)
    {gotoxy(i,13);
    printf("T");
    gotoxy(41-i,13);
    printf("O");
    delay(200);
       gotoxy(i,13);
    printf(" ");
    gotoxy(41-i,13);
    printf(" ");
    }
    gotoxy(i-1,13);
    printf("T");
    gotoxy(41-i+1,13);
    printf("O");
    rectangle(145,90,175,110);
    for(i=25;i>=18;i--)
    {
```

```
gotoxy(10,i);
printf("ELECTRIC CIRCUIT ANALYSIS");
delay(300);
for(j=0;j<=25;j++)
{gotoxy(10+j,i);
printf(" ");}
}
gotoxy( 10,i);
printf("ELECTRIC CIRCUIT ANALYSIS");
rectangle(50,118,275,138);
delay(600);
rectangle(40,50,285,145);
clrscr();
settextstyle(3,0,3);
outtextxy(75,50,"ELECTRIC");
rectangle(60,30,250,135);
outtextxy(90,75,"CIRCUIT");
rectangle(63,33,240,130);
outtextxy(110,100,"ANALYSIS");
rectangle(66,36,230,125);
settextstyle(1,0,3);
rectangle(200,180,300,195);
outtextxy(210,185,"HIT ANY KEY");
getch();
clrscr();
settextstyle(3,0,3);
rectangle(50,50,300,190);
rectangle(53,53,290,180);
rectangle(56,56,280,170);
outtextxy(70,70,"DONE BY");
outtextxy(60,100,"MR. B.MURALI");
outtextxy(60,130,"MR. T.SATISH KUMAR");
outtextxy(60,160,"MR. JO JO JOHN");
settextstyle(1,0,3);
rectangle(200,180,300,195);
outtextxy(210,185,"HIT ANY KEY");
getch();
}
```

```
   /*SUBPROGRAM TO DRAW WINDOW */


 void windo(int r,int c,int r1,int c1,char cho)

{  int i,tlc,hl,trc,vl,blc,brc;

  if ((cho=='d')||(toupper(cho)=='D'))
          {
            tlc = 201;hl=205;trc=187;vl=186;blc=200;brc=188;
          }
           else
  if ((cho=='s')||(toupper(cho)=='S'))
           {
             tlc=218;hl=196;trc=191;vl=179;blc=192;brc=217;
           }
  if ((cho=='h')||(toupper(cho)=='H'))
          {
           tlc = 213;hl=205;trc=184;vl=179;blc=212;brc=190;
          }
           else
  if ((cho=='v')||(toupper(cho)=='V'))
           {
           tlc=214;hl=196;trc=183;vl=186;blc=211;brc=189;
           }
          gotoxy(c,r);printf("%c",(char)(tlc));

  for(i=1;i<=((c1-c)-1);i++)
          {
           gotoxy(c+i,r);printf("%c",(char)(hl));
          }
          gotoxy(c1,r);printf("%c",(char)(trc));

  for(i=1;i<=((r1-r)-1);i++)
          {
          gotoxy(c,r+i);printf("%c",(char)(vl));
          gotoxy(c1,r+i);printf("%c",(char)(vl));
          }
          gotoxy(c,r1);printf("%c",(char)(blc));

  for (i=1;i<=((c1-c)-1);i++)
          {

           gotoxy(c+i,r1);printf("%c",(char)(hl));

          }
          gotoxy(c1,r1);printf("%c",(char)(brc));

          }
```

```
/* ROUTINE TO CLEAR THE SCREEN WITH SUITABLE ATTRIBUTE */

clear(int r1 , int c1 , int r2 , int c2 , int k)

      {
            union REGS regs;
            regs.h.ah = 0x06;
            regs.h.al = 0;
            regs.h.ch = r1;
            regs.h.cl = c1;
            regs.h.dh = r2;
            regs.h.dl = c2;
            regs.h.bh = k;
            int86(0x10,&regs,&regs);

              }
```

/* SUBPROGRAM TO CREATE MENU */

```
#include<dos.h>
#define UPAR 72
#define DNAR 80
#define ENTER 13
#define BELL putchar('\007')
void puts_attr();
int row,locrow,i,x,col,y,n1;
union REGS regs;
int menu(x1,y1,name,n)
int x1;int y1;int n;
char name[][50];
{
    int key;
    void move();
    int max();
    textbackground(12);
    x=x1;y=y1;n1=n;
    windo(y1,x1,y1+n+1,x1+max(name)+1,'c');
    gotoxy(x1+1,y1+1);
    puts_attr(name[0],0x70);
    for(i=1;i<n;i++)
    {
       gotoxy(x1+1,y1+i+1);
       textcolor(2);
       printf("%s",name[i]);
    }
       gotoxy(x1+1,y1+1);
    label :   fflush(stdin);
                        regs.h.ah=0x00;
                        regs.h.al=0;
                        int86(0x16,&regs,&regs);
                        key=regs.x.ax;
                        if((key & 0xff)==ENTER)return(row-y1);
                switch(key>>8)
                    {
                        case UPAR :
                                    locrow = row-1;
                                    if(locrow==y1)
                                    locrow=y1+n;
                                    move(name);
                                    goto label;
                        case DNAR :
                                    locrow = row+1;
                        if(row==y1+n) locrow=y1+1;
                                    move(name);
                                    goto label;
```

```
                        default :
                                        BELL;
                                        goto label;
                        }
                }

void puts_attr(char ch[], int y)
{
col=wherex();
row=wherey();
for(i=0;ch[i]!='\0';i++)
{
 regs.h.ah=9;
 regs.h.al=ch[i];
 regs.h.bh=0;
 regs.h.bl=y;
 regs.x.cx=1;
 regs.x.dx=0;
 int86(0x10,&regs,&regs);
 gotoxy(++col,row);
 }

 gotoxy(x+1,row);

 }


void move(char name1[][50])
{
 puts_attr(name1[row-y-1],0x12);
 gotoxy(x+1,locrow);
 puts_attr(name1[locrow-y-1],0x70);
 }
 int max (char loc[][50])
 {
 int vari;
 vari=strlen(loc[0]);
 for(i=0;i<n1;i++)
 {
 if (strlen(loc[i])>vari)
 vari=strlen(loc[i]);
 }
 return(vari);
 }
```

```
     /*SUBPROGRAM TO DISPLAY CURRENT*/

disct(float ca[10][10])

    {

line((int)ca[1][1],(int)(ca[2][1]),(int)(ca[1][2]),(int)(ca[2][2]));
line((int)(ca[1][5]),(int)(ca[2][5]),(int)(ca[1][6]),(int)(ca[2][6])

        circle((int)(ca[1][3]),(int)(ca[2][3]),5);
        circle((int)(ca[1][4]),(int)(ca[2][4]),4);
        return;

        }
```



```
            /* SUBPROGRAM TO DISPLAY INDUCTANCE*/


 void   disind(float ca[10][10])

{

 line((int)(ca[1][1]),(int)(ca[2][1]),(int)(ca[1][2]),(int)(ca[2][2])

 line((int)(ca[1][7]),(int)(ca[2][7]),(int)(ca[1][8]),(int)(ca[2][8])

          circle((int)(ca[1][3]),(int)(ca[2][3]),3);
          circle((int)(ca[1][4]),(int)(ca[2][4]),3);
          circle((int)(ca[1][5]),(int)(ca[2][5]),3);
          circle((int)(ca[1][6]),(int)(ca[2][6]),3);
           return;

         }
```

```
      /*SUBPROGRAM TO DISPLAY RESSISTANCE*/

void  disres(float ca[10][10], int pt1)

     {
       int i,j,x0,y0,x1,y1;

          for(j=1;j<pt1;j++)

          {     x0=abs((int)(ca[1][j]));
                y0=abs((int)(ca[2][j]));
                i=j+1;
          x1=abs((int)(ca[1][i]));
          y1=abs((int)(ca[2][i]));
       line(x0,y0,x1,y1);

     }
          return;

          }
```

```
      /*SUBPROGRAM TO DISPLAY VOLTAGE*/

disv(float ca[10][10])
    {
 line((int) ca[1][1],(int) ca[2][1],(int) ca[1][2],(int) ca[2][2]);
 line((int) ca[1][3],(int) ca[2][3],(int) ca[1][4],(int) ca[2][4]);
 line((int) ca[1][5],(int) ca[2][5],(int) ca[1][6],(int) ca[2][6]);
 line((int) ca[1][7],(int) ca[2][7],(int) ca[1][8],(int) ca[2][8]);
      return;

        }
```

```
/*SUBPROGRAM TO FIND MATRIX MUL.*/

void  mm(float ab[10][10],float ba[10][10],
                          float bc[10][10],int pt1)
   {  int i,j,k,k1,k2;

   for(i=1;i<=3;i++)
  {
  for(j=1;j<=pt1;j++)
     {
       bc[i][j]=0.0;
       for(k=1;k<=3;k++)
         bc[i][j]=bc[i][j]+ab[i][k]*ba[k][j];
       }
  }
           return;
           }


          /*SUBPROGRAM TO TRANSLATE ANY OBJECT*/

void tr(float txx,float tyy)
  { int i,j;
    for(i=1;i<=3;i++)
      {
        for(j=1;j<=3;j++)
        {
         t[i][j]=0;
         t[i][i]=1;}}
         t[1][3]=txx;
         t[2][3]=tyy;
         return;
         }


    /*SUBPROGRAM TO  SCALE ANY OBJECT*/

   void scal (float sx11, float sx22)
   { int i,j;
   for(i=1;i<3;i++)
     {for(j=1;j<=3;j++)
       s[i][j]=0;
     }
     s[1][1]=sx11;
     s[2][2]=sx22;
     s[3][3]=1;
     return;
     }
```

```
/* SUBPROGRAM TO FIND DET2. VALUE*/

float  det(float a[10][10])
  {
  float r11,r22,r33,d;
  r11=a[1][1]*(a[2][2]*a[3][3]-a[3][2]*a[2][3]);
  r22=a[1][2]*(a[2][1]*a[3][2]-a[2][2]*a[3][1]);
  r33=a[1][3]*(a[2][1]*a[3][2]-a[2][2]*a[3][1]);
  d=r11-r22+r33;
  return(d);}
```

```
/*SUBPROGRAM TO ROTATE ANY OBJECT*/

void rotc(float r[10][10])
   {
   int i;
     r[1][1]=0;
     r[1][2]=-1;
     r[2][2]=0;
     r[2][1]=1;
     r[3][3]=1;
       for(i=1;i<=2;i++)
         {r[i][3]=0;
           r[3][i]=0;
           }
      return;
           }
```

```
/*SUBPROGRAM TO ROTATE ANY OBJECT IN ANCL.*/

  void rota(float r[10][10])
   {
   int i;
     r[1][1]=0;
     r[1][2]=1;
     r[2][2]=0;
     r[2][1]=-1;
     r[3][3]=1;
       for(i=1;i<=2;i++)
         {r[i][3]=0;
           r[3][i]=0;
           }
      return;
           }
```

```
/*SUBPROGRAM TO FIND MAG.*/

float  mag(float x,float y)
     {
     float  v;
     if(x<0)
     {v=(-1)*(x*x+y*y);}
     else
       v=sqrt(x*x+y*y);
       return(v);}
```

```
/*SUBPROGRAM TO FIND ANG.*/

float ang(float x,float y)
{
  float v,x1;
  if(x==0)
     {return(0);}
     else
  {x1=y/x;
   v=atan(x1);
   v=(v*180/3.14);
   return(v);}
   }
```

/*SUBPROGRAM TO FIND SOLUTIONS FOR D.C CIRCUITS*/

```
void branc(int n9,float r6[10],float v6[10],float i6[10])
 {       float de(float a[10][10]);
         float det(float a[10][10]);
         float r3,lp1,lp2,lp3,lp4,rr1[10],xx1;
         float m[10][10],m1[10][10];
         float i11,i12,i13,i14,i15,i111,i222,i333;
         float i16,i17,p,r2[10],r22[10],rr[10];
         float d1,d2,d3,d4,v1,v2,v3,i2;
          int i,j;

    switch(n9)
    {
     case 1:
             r3=r6[1]+r6[2]+r6[3];
            if(v6[1]!=0)
          {
           i11=(v6[1])/r3;
      }
              else
              {i11=i6[1];
              }
               gotoxy(15,15);
              printf("loop ct %f",i11);
              gotoxy(16,16);
              printf("total resistance %f",r3);
              p=i11*i11*r3;
              gotoxy(17,17);
              printf("power deliverd %f",p);
              break;
      case 2:

             r2[1]=r6[1]+r6[2];
             r2[2]=r6[3];
             r2[3]=r6[4]+r6[5];
             rr[1]=r2[1];rr[2]=r2[2];rr[3]=r2[3];
             rr1[1]=r2[1];rr1[2]=r2[2];rr1[3]=r2[3];
             if(v6[1]!=0)
              i11=v6[1]/r2[1];
            if(i6[1]!=0)
            {rr1[1]=0;
            rr[1]=1;
            rr[2]=1;
             i11=i6[1];}
             if(v6[3]!=0)
             i12=v6[3]/r2[2];
            if(i6[3]!=0)
               {rr1[2]=0;
               rr[2]=1;
               rr[3]=1;
```

```
 i12=i6[3];}
if(v6[5]!=0)
 i13=v6[5]/r2[3];
if(i6[5]!=0)
{rr1[3]=0;
rr[3]=1;
rr[1]=1;
i13=i6[5];}
xx1=rr[1]*rr1[2]+rr[2]*rr1[3]+rr[3]*rr1[1];
for(i=1;i<=3;i++)
  {rr1[i]=r2[i];
    rr[i]=r2[i];}

     if(v6[1]!=0)
  i11=v6[1]/r2[1];
if(i6[1]!=0)
{rr1[1]=0;
rr[1]=1;
 i11=i6[1];}
 if(v6[3]!=0)
 i12=v6[3]/r2[2];
if(i6[3]!=0)
   {rr1[2]=0;
   rr[2]=1;
  i12=i6[3];}

 if(v6[5]!=0)
  i13=v6[5]/r2[3];
 if(i6[5]!=0)
 {rr1[3]=0;
 rr[3]=1;
 i13=i6[5];}

v1=(i11+i12+i13)*(rr[1]*rr[2]*rr[3])/xx1;

   gotoxy(15,15);
   printf("VOLTAGE AT 1 st NODE");
   gotoxy(50,15);
  printf("%f",v1);

  if(v6[1]!=0)
   {i11=(v6[1]-v1)/r2[1];}

   if(i6[1]!=0)
   {i11=i6[1];}
   else
    { i11=v1/r2[1];}
   if(v6[3]!=0)
```

```
{i12=(v1-v6[3])/r2[2];}
if(i6[3]!=0)
{i12=i6[3];}
else
{i12=v1/r2[2];}
 if (v6[5]!=0)
{i13=(v1-v6[5])/r2[3];}
if(i6[5]!=0)
{i13=i6[5];}
else
{i13=v1/r2[3];}
gotoxy(16,16);
printf("CU. In 1 st bran");
gotoxy(50,16);
printf("%f",i11);

gotoxy(17,17);
printf("CU. in 2 nd btran");
gotoxy(50,17);
printf("%f",i12);

gotoxy(18,18);
printf("CU. in 3 rd bran");
gotoxy(50,18);
printf("%f",i13);
 break;

case 3:
    r2[1]=r6[1]+r6[2];
    r22[1]=1/r2[1];
     r2[2]=r6[3];
    r22[2]=1/r2[2];
     r2[3]=r6[4];
    r22[3]=1/r2[3];
    r2[4]=r6[5];
     r22[4]=1/r2[4];
    r2[5]=r6[6]+r6[7];
    r22[5]=1/r2[5];
    if(v6[1]!=0)        /*here i =1*/
    {i11=v6[1]/r2[1];

  }
     else
      {i11=i6[1];}
      if(v6[3]!=0)
      {i12=v6[3]/r2[4];}
       else
       {i12=i6[3];}
```

```
if(v6[5]!=0)
{i13=v6[5]/r2[4];}
 else
   {i13=i6[5];}
   if(v6[7]!=0)
   {i14=v6[7]/r2[5];}
    else
     {i14=i6[7];}
     i111=i11+i12;
     i222=i13+i14;
     m[1][1]=r22[1]+r22[2]+r22[3];
     m[1][2]=-r22[3];
     m[2][1]=m[1][2];
     m[2][2]=r22[5]+r22[4]+r22[3];
     d1=de(m);
     for(i=1;i<=2;i++)
     {for(j=1;j<=2;j++)
     m1[i][j]=m[i][j];}
     m1[1][1]=i111;
     m1[2][1]=i222;
     d2=de(m1);
      for(i=1;i<=2;i++)
     {for(j=1;j<=2;j++)
     m1[i][j]=m[i][j];}
     m1[1][2]=i111;
     m1[2][2]=i222;
     d3=de(m1);
      v1=d2/d1;
     v2=d3/d1;

     if(v6[1]!=0)
     {i11=(v6[1]-v1)/r2[1];}
    else
   {i11=v1/r2[1]-i6[1];}
    if(v6[3]!=0)
    {i12=(v1-v6[3])/r2[2];}
    else
    {i12=v1/r2[2]-i6[3];}
    if(v6[5]!=0)
    {i13=(v2-v6[5])/r2[4];}
    else
    {i13=v2/r2[4]-i6[5];}
     if(v6[7]!=0)
    {i14=(v2-v6[7])/r2[5];}
    else
    {i14=v2/r2[5]-i6[7];}
     i15=(v1-v2)/r2[8];
```

```
                gotoxy(25,11);
                printf("VOL. at 2 nd node");
                gotoxy(45,11);
                printf("%f",v1);

                 gotoxy(25,12);
                printf("VOL. at 3 nd node");
                gotoxy(45,12);
                printf("%f",v2);

                   gotoxy(25,13);
            printf("Cu. in 2 nd branch");
            gotoxy(45,13);
            printf("%f",i11);

               gotoxy(25,14);
            printf("CU. in 3 rd branch");
            gotoxy(45,14);
            printf("%f",i12);
               gotoxy(25,15);
            printf("CU. in 4 th branch");
            gotoxy(45,15);
            printf("%f",i13);

               gotoxy(25,16);
            printf("CU. in 5th branch");
            gotoxy(45,16);
            printf("%f",i14);

               gotoxy(25,17);
            printf("CU. in 6 &7 th branch");
            gotoxy(45,17);
            printf("%f",i15);

                  break;


case 4:
     r2[1]=r6[1]+r6[2];      r22[1]=1/r2[1];
     r2[2]=r6[3];           r22[2]=1/r2[2];
     r2[3]=r6[4];           r22[3]=1/r2[3];
     r2[4]=r6[5];           r22[4]=1/r2[4];
     r2[5]=r6[6];           r22[5]=1/r2[5];
     r2[6]=r6[7];           r22[6]=1/r2[6];
     r2[7]=r6[8]+r6[9];      r22[7]=1/r2[7];

     if(v6[1]!=0)
      {i11=v6[1]/r2[1];}
```

```
else
 {i11=i6[1];}
if(v6[3]!=0)
{i12=v6[3]/r2[2];}
else
 {i12=i6[3];}
if(v6[5]!=0)
{i13=v6[5]/r2[4];}
else
{i13=i6[5];}
if (v6[7]!=0)
{i14=v6[7]/r2[6];}
else
 {i14=i6[7];}
if(v6[9]!=0)
{i15=v6[9]/r2[7];}
else
{i15=i6[9];}
i111=i11+i12;
i222=i13;
i333=i14+i15;
m[1][1]=r22[1]+r22[2]+r22[5];
m[1][2]=-r22[3];
m[1][3]=0;
m[2][1]=m[1][2];
m[2][2]=r22[3]+r22[4]+r22[5];
m[2][3]=-r22[5];
m[3][1]=0;
m[3][2]=m[2][3];
m[3][3]=r22[7]+r22[5]+r22[6];
d1=de(m);
for(i=1;i<=3;i++)
  {for(j=1;j<=3;j++)
     m1[i][j]=m[i][j];}
m1[1][1]=i111;
m1[2][1]=i222;
m1[3][1]=i333;
d2=de(m1);
for(i=1;i<=3;i++)
  {for(j=1;j<=3;j++)
     m1[i][j]=m[i][j];}
m1[1][2]=i111;
m1[2][2]=i222;
m1[3][2]=i333;
d3=de(m1);
 for(i=1;i<=3;i++)
  {for(j=1;j<=3;j++)
     m1[i][j]=m[i][j];}
```

```
m1[1][3]=i111;
m1[2][3]=i222;
m1[3][3]=i333;
d4=de(m1);
v1=d2/d1;
v2=d3/d1;
v3=d4/d1;
if(v6[1]!=Ø)
{i11=(v6[1]-v1)/r2[1];}
else
{i11=v1/r2[1]-i6[1];}

if(v6[3]!=Ø)
{i12=(v1-v6[3])/r2[2];}
else
 {i12=v1/r2[2]-i6[3];}

if(v6[5]!=Ø)
{i14=v2-v6[5]/r2[4];}
else
 {i14=v2/r2[4]-i6[5];}

i13=(v1-v2)/r2[3];
i15=(v2-v3)/r2[5];
if(v6[7]!=Ø)
{i16=(v3-v6[7])/r2[6];}
else
{i16=v3/r2[7]-i6[7];}
if(v6[9]!=Ø)
{i17=(v3-v6[9])/r2[7];}
else
{i17=v3/r2[7]-i6[9];}

  gotoxy(25,1Ø);
         printf("VOL. at 2 nd node");
         gotoxy(45,1Ø);
         printf("%f",v1);

          gotoxy(25,11);
         printf("VOL. at 2 nd node");
         gotoxy(45,11);
         printf("%f",v2);

         gotoxy(25,12);
         printf("VOL. at 2 nd node");
         gotoxy(45,12);
         printf("%f",v3);
            gotoxy(25,13);
   printf("CU. in 2 nd branch");
   gotoxy(45,13);
```

```
    printf("%f",i11);
     gotoxy(25,14);
    printf("CU. in 3 rd branch");
    gotoxy(45,14);
    printf("%f",i12);
       gotoxy(25,15);
    printf("CU. in 4 th branch");
    gotoxy(45,15);
    printf("%f",i13);
       gotoxy(25,16);
    printf("CU. in 5th branch");
    gotoxy(45,16);
    printf("%f",i14);
       gotoxy(25,17);
    printf("CU. in 6 th branch");
    gotoxy(45,17);
    printf("%f",i15);
      gotoxy(25,18);
    printf("CU. in 7 th branch");
    gotoxy(45,18);
    printf("%f",i16);
      gotoxy(25,19);
    printf("CU. in 8 th branch");
    gotoxy(45,19);
    printf("%f",i17);
 break;
 }
if(n9==1)
{
gotoxy(15,19);
printf("1 st LOOP cu.");
gotoxy(50,19);
printf("%f",i11);        }
if(n9==2)
{
lp2=i13;
lp1=lp2+i12;
gotoxy(15,19);
printf("1 st loop cu.");
gotoxy(50,19);
printf("%f",lp1);
gotoxy(15,20);
printf(" 2 nd loop cu.");
gotoxy(50,20);
printf("%f",lp2);
}
if(n9==3)
{
lp3=i15;
lp2=i14+lp3;
lp1=lp2+i12;
```

```
gotoxy(15,19);
printf("1 st loop cu.");
gotoxy(50,19);
printf("%f",lp1);
gotoxy(15,20);
printf(" 2 nd loop cu.");
gotoxy(50,20);
printf("%f",lp2);
gotoxy(15,21);
printf(" 3 rd loop cu.");
gotoxy(50,21);
printf("%f",lp3);
}
if(n9==4)

{lp4=i17;
lp3=i16+lp4;
lp2=i14+lp3;
lp1=lp2+i12;
gotoxy(15,20);
printf("1 st loop cu.");
gotoxy(50,20);
printf("%f",lp1);
gotoxy(15,21);
printf(" 2 nd loop cu.");
gotoxy(50,21);
printf("%f",lp2);
gotoxy(15,22);
printf(" 3 rd loop cu.");
gotoxy(50,22);
printf("%f",lp3);
gotoxy(15,23);
printf(" 4 th loop cu.");
gotoxy(50,23);
printf("%f",lp4);
}
 }
```

/*SUPROGRAM TO FIND DET. VALUE*/

```
float    de(float a[10][10])
    { float d;
    d=a[1][1]*a[2][2]-a[1][2]*a[2][1];
    return(d);}
```

/*SUBPROGRAM TO SOLVE SINGLE LOOP A.C CIRCUIT*/

```
#include<math.h>
#include<stdio.h>
#include "b:box.c"

float  mag(float x,float y);
float ang(float x,float y);
FILE  *fp2,*fopen();
main()


 { int i,j,d,ff,n;
  float xx,yy;
  float a[11],k[11],a1[11],r[11],v[11],i1[11];
  float i11,i12,i13,i14;

  clrscr();
    fp2=fopen("b:re.dat","r");
    for(i=1;i<=5;i++)
       {
  fscanf(fp2,"%f %f %f %f %f %f/n",&r[i],&k[i],
                      &v[i],&a[i],&i1[i],&a1[i]);
       }
   fclose(fp2);
     windo(2,2,23,78,'d');
     if(v[1]!=0)
           { xx=k[1]+k[2]+k[3];
             yy=r[1]+r[2]+r[3];
         i11=mag(yy,xx);
         i12=ang(yy,xx);
          i13=v[1]/i11;
          i14=a[1]-i12;}
          else
          {i13=i1[1];
          i14=a1[1];}
         windo(4,4,9,60,'d');
          gotoxy(25,4);
         printf("CURRENT IN LOOP");
         gotoxy(5,6);
          printf("%f          %f",i13,i14);
          gotoxy(3,20);
     printf("PRESS ANY KEY TO CONTINUE");
     getch();
        }
         float mag(float x,float y)
         {
         float  v;
           v=sqrt(x*x+y*y);
           return(v);
         }
```

```
                /* SUBPROGRAM TO SOLVE TWO LOOP A.C CIRCUIT*/

#include<math.h>
#include<stdio.h>
#include "b:box.c"

 float  mag(float x,float y);
  float ang(float x,float y);
  FILE *fp2,*fopen();

   main()

  { int i,j,d,ff,n;
   float xx,yy;
   float m[10][10],m1[10][10],m2[10][10],m3[10][10],r8[10],k8[10];
   float a[10],k2[10],z11[10],z12[10],r2[10];
   float k[11],a1[11],r[11],v[11];
   float i16,i11,i12,i13,i14,i15,i1[11],a3[10];
   float k3[10],i2[10],i3[10],i4,i5[10],v6[10];
   float a7[10],a5,a6,r3[10];
   float v7,a8,k5,k6,a2[10],v1[10],a4[10],r4,r5;
   float r6,k4,xx1,yy1,k7[10];
   float ct3,xx35,xx45,xx2,xx3,yy2,yy3,xx4,yy4,ct1,ct2,r7[10];
   double loi[10],lo2[10];
   clrscr();

  fp2=fopen("b:re.dat","r");
  for(i=1;i<=5;i++)
{
 fscanf(fp2,"%f %f %f %f %f %f/n",&r[i],&k[i],
                          &v[i],&a[i],&i1[i],&a1[i]);
   if(v[i]!=0)
  {
        v1[i]=v[i]*cos(a[i]*3.14/180);
        a2[i]=v[i]*sin(a[i]*3.14/180);
    }
   if(i1[i]!=0)
 {
   i2[i]=i1[i]*cos(a1[i]*3.14/180);
   a3[i]=i1[i]*sin(a2[i]*3.14/180);
   }
  }

  fclose(fp2);

      windo(2,2,23,78,'d');
         r2[1]=r[1]+r[2];
         r2[2]=r[3];
         r2[3]=r[4]+r[5];
         k2[1]=k[1]+k[2];
         k2[2]=k[3];
         k2[3]=k[4]+k[5];
          for(i=1;i<=3;i++)
            {r7[i]=r2[i];
               k7[i]=k2[i];
```

```
                r8[i]=r2[i];
                k8[i]=k2[i];}


            if(v[1]!=0)
              {i3[1]=(v1[1]*r2[1]-a2[1]*(-1)*k2[1])/(r2[1]*r2[1]+k2[1]*k2[1

               a4[1]=(v1[1]*(-1)*k2[1]+a2[1]*r2[1])/(r2[1]*r2[1]+k2[1]*k2[1


             if(i1[1]!=0)
               {i3[1]=i2[1];
               a4[1]=a3[1];
               r8[1]=0;
               k8[1]=0;
               k7[1]=0;
               r7[1]=1;
               k7[2]=0;
               r7[2]=1;}

                 if(v[3]!=0)
              {i3[2]=(v1[3]*r2[2]-a2[3]*(-1)*k2[2])/(r2[2]*r2[2]+k2[2]*k2[2

               a4[2]=(v1[3]*(-1)*k2[2]+a2[2]*r2[2])/(r2[2]*r2[2]+k2[2]*k2[2
}
             if(i1[3]!=0)
               {i3[2]=i2[3];
               a4[2]=a3[3];
               r8[2]=0;
               k8[2]=0;
               k7[2]=0;
               r7[2]=1;
               r7[3]=1;
               k7[3]=0;}
                 if(v[5]!=0)
              {i3[3]=(v1[5]*r2[3]-a2[3]*(-1)*k2[3])/(r2[3]*r2[3]+k2[3]*k2[3

               a4[3]=(v1[5]*(-1)*k2[3]+a2[3]*r2[3])/(r2[3]*r2[3]+k2[3]*k2[3]

               if(i1[5]!=0)
                   {i3[3]=i2[5];
                a4[3]=a3[5];
                r8[3]=0;
                k8[3]=0;
                r7[3]=1;
                k7[3]=0;
                r7[1]=1;
                k7[1]=0;}
                 r3[1]=r7[1]*r8[2]-k7[1]*k8[2];
                 k3[1]=r7[1]*k8[2]+k7[1]*r8[2];
                 r3[2]=r7[2]*r8[3]-k7[2]*k8[3];
                 k3[2]=r7[2]*k8[3]+k7[2]*r8[3];
                 r3[3]=r8[1]*r7[3]-k7[3]*k8[1];
                 k3[3]=r8[1]*k7[3]+k8[1]*r7[3];
                 r6=r3[1]+r3[2]+r3[3];
                 k6=k3[1]+k3[2]+k3[3];
```

```
 for(i=1;i<=3;i++)
     {r7[i]=r2[i];
        k7[i]=k2[i];
        r8[i]=r2[i];
        k8[i]=k2[i];}
if(v[1]!=0)
{i3[1]=(v1[1]*r2[1]-a2[1]*(-1)*k2[1])/(r2[1]*r2[1]+k2[1]*k2[1

 a4[1]=(v1[1]*(-1)*k2[1]+a2[1]*r2[1])/(r2[1]*r2[1]+k2[1]*k2[1

if(i1[1]!=0)
  {i3[1]=i2[1];
  a4[1]=a3[1];
  r8[1]=0;
  k8[1]=0;
  k7[1]=0;
  r7[1]=1;
   }
   if(v[3]!=0)
 {i3[2]=(v1[3]*r2[2]-a2[3]*(-1)*k2[2])/(r2[2]*r2[2]+k2[2]*k2[2

  a4[2]=(v1[3]*(-1)*k2[2]+a2[2]*r2[2])/(r2[2]*r2[2]+k2[2]*k2[2

if(i1[3]!=0)
  {i3[2]=i2[3];
  a4[2]=a3[3];
  r8[2]=0;
  k8[2]=0;
  k7[2]=0;
  r7[2]=1;
  }
   if(v[5]!=0)
 {i3[3]=(v1[5]*r2[3]-a2[3]*(-1)*k2[3])/(r2[3]*r2[3]+k2[3]*k2[3

 a4[3]=(v1[5]*(-1)*k2[3]+a2[3]*r2[3])/(r2[3]*r2[3]+k2[3]*k2[3]

 if(i1[5]!=0)
     {i3[3]=i2[5];
  a4[3]=a3[5];
  r8[3]=0;
  k8[3]=0;
  r7[3]=1;
  k7[3]=0;
  }
r4=r7[1]*r7[2]-k7[1]*k7[2];
k4=r7[1]*k7[2]+k7[1]*r7[2];
r5=r4*r7[3]-k4*k7[3];
k5=r4*k7[3]+k4*r7[3];
xx1=mag(r5,k5);
yy1=ang(r5,k5);
```

```
    i4=i3[1]+i3[2]+i3[3];
    a5=a4[1]+a4[2]+a4[3];
    xx3=mag(i4,a5);
    yy3=ang(i4,a5);



    v7=xx3/xx2*xx1;
    a8=yy3-yy2+yy1;

       windo(3,3,5,60,'d');
    gotoxy(25,3);
    printf("NODE VOLTGE");
    gotoxy(4,4);
   printf("%f",v7);
   gotoxy(30,4);
   printf("¦__%f",a8);

    xx2=v7*cos(a8*3.14/180);
    yy2=v7*sin(a8*3.14/180);

    windo(7,3,12,60,'d');
    gotoxy(25,7);
    printf("BRANCH CURRENT");
     if(i1[1]!=0)
        {
        ct3=i1[1];
   ct2=a1[1];
   lo1[1]=ct3;
   lo2[1]=ct2;
/*     printf("\n%f%f",ct1,ct2);*/
     }
     else
     {xx1=v1[1]-xx2;
     yy1=a2[1]-yy2;
     ct1=(xx1*r2[1]-yy1*(-1)*k2[1])/(r2[1]*r2[1]+k2[1]*k2[1]);
   ct2=(xx1*(-1)*k2[1]+yy1*r2[1])/(r2[1]*r2[1]-k2[1]*k2[1]);
   lo1[1]=ct1;
   lo2[1]=ct2;
     ct3=mag(ct1,ct2);
     ct2=ang(ct1,ct2);
     }

     gotoxy(4,8);
      printf("1 st BRANCH CURRENT");
      gotoxy(30,8);
      printf("%f ¦__%f",ct3,ct2);

        if(i1[3]!=0)
        {ct3=(-1)*i1[3];
   ct2=(-1)*a1[3];
   lo1[2]=ct3;
   lo2[2]=ct2;
     }
     else
     {xx1=xx2-v1[3];
```

```
  yy1=yy2-a2[3];
  ct1=(xx1*r2[2]-yy1*(-1)*k2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
ct2=(xx1*(-1)*k2[2]+yy1*r2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
lo1[2]=ct1;
lo2[2]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
  }


  gotoxy(4,9);
   printf("2nd BRANCH CURRENT");
   gotoxy(30,9);
   printf("%f ¦__%f",ct3,ct2);
  if(i1[5]!=0)
     {ct3=(-1)*i1[5];
ct2=(-1)*a1[5];
lo1[3]=ct3;
lo2[3]=ct2;
  }
 else
  {xx1=xx2-v1[5];
  yy1=yy2-a2[5];
  ct1=(xx1*r2[3]-yy1*(-1)*k2[3])/(r2[3]*r2[3]+k2[3]*k2[3]);
ct2=(xx1*(-1)*k2[3]+yy1*r2[3])/(r2[3]*r2[3]+k2[3]*k2[3]);
lo1[3]=ct1;
lo2[3]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
  }

  gotoxy(4,10);
   printf("2nd BRANCH CURRENT");
   gotoxy(30,10);
   printf("%f ¦__%f",ct3,ct2);

   windo(13,6,16,57,'d');
   gotoxy(16,13);
  printf("LOOP CURRENT's");

   lo1[4]=mag(lo1[3],lo2[3]);
   lo2[4]=ang(lo1[3],lo2[3]);
lo1[1]=mag(lo1[3]+lo1[2],lo2[3]+lo2[2]);
lo2[1]=ang(lo1[3]+lo1[2],lo2[3]+lo2[2]);

gotoxy(8,14);
printf("1  st loop cu.");
gotoxy(36,14);
printf("%f",lo1[1]);
```

```
 gotoxy(46,14);
 printf("%f",lo2[1]);
 gotoxy(8,15);
 printf("2 nd loop cu.");
 gotoxy(36,15);
 printf("%f",lo1[4]);
   gotoxy(46,15);
 printf("%f",lo2[4]);
gotoxy(4,21);
 printf("PRESS ANY KEY TO CONTINUE");
 getch();
    }
```

/*SUBPROGRAM TO FIND MAGNITUDE*/

```
float  mag(float x,float y)
     {
     float  v;
       v=sqrt(x*x+y*y);
       return(v);}
```

/*SUBPROGRAM TO FIND ANGLE*/

```
    float ang(float x,float y)
    {
      float v,x1;
      if(x==0)
         {return(0);}
         else
      {x1=y/x;
       v=atan(x1);
       v=(v*180/3.14);
       return(v);}

       }
```

```
/*PROGRAM TO SOLVE THREE LOOP A.C CIRCUIT*/

#include<math.h>
#include<stdio.h>
#include "b:box.c"

 float  mag(float x,float y);
  float ang(float x,float y);
  float mdet(float x[5][5],float y[5][5]);
  float mdet1(float x[5][5],float y[5][5]);
  float mdet2(float x[5][5],float y[5][5]);
  float mdet3(float x[5][5],float y[5][5]);
   FILE *fp2,*fopen();
   main()

  { int i,j,d,ff,n;
   float xx,yy,cc[10][10],l1[10][10];
   float m[5][5],m1[5][5],m3[5][5],m4[5][5],r8[5],k8[5];
   float a[11],k2[10],z11[10],z12[10],r2[10];
   float k[11],a1[11],r[11],v[11];
   float i16,i11,i12,i13,i14,i15,I1[11];
   float k3[10],i2[10],i3[10],i4[10],i5[10];
   float v6[10],a7[10],a5,a6,r3[10];
   float v7,a8,k5,k6,a2[10],v1[10],a3[10];
   float a4[10],r4,r5,r6,k4,xx1,yy1;
   float ct3,xx35,xx45,xx2,xx3,yy2,yy3;
   float  xx4,yy4,ct1,ct2,i10,xx5,yy5;
   float ct5[10],ct6[10],xx7,yy7,xx6,yy6;
   static na[]={"PRESSANYKEYTOCONTINUE"};
   clrscr();

  fp2=fopen("b:re.dat","r");
  for(i=1;i<=7;i++)
  {
  fscanf(fp2,"%f %f %f %f %f %f/n",&r[i],&k[i],&v[i]
                                  ,&a[i],&i1[i],&a1[i]);
  if(v[i]!=0)
  {
 v1[i]=v[i]*cos(a[i]*3.14/180);
 a2[i]=v[i]*sin(a[i]*3.14/180);
 }
 if(i1[i]!=0)
 {
   i2[i]=i1[i]*cos(a1[i]*3.14/180);
   a3[i]=i1[i]*sin(a2[i]*3.14/180);
   }
  }
   fclose(fp2);

         windo(2,2,23,78,'d');
         /* sol 3 loop*/
           r2[1]=r[1]+r[2];
```

```
r2[2]=r[3];
r2[3]=r[4];
r2[4]=r[5];
r2[5]=r[6]+r[7];
 k2[1]=k[1]+k[2];
k2[2]=k[3];
k2[3]=k[4];
k2[4]=k[5];
k2[5]=k[6]+k[7];
 for(i=1;i<=5;i++)
   {
   z11[i]=r2[i]/(r2[i]*r2[i]+k2[i]*k2[i]);
    z12[i]=(-1)*(k2[i])/(r2[i]*r2[i]+k2[i]*k2[i]);
    }
    m[1][1]=z11[1]+z11[2]+z11[3];
    m[1][2]=(-1)*z11[3];
    m[2][1]=m[1][2];
    m[2][2]=z11[3]+z11[4]+z11[5];
    m1[1][1]=z12[1]+z12[2]+z12[3];
    m1[1][2]=(-1)*z12[3];
    m1[2][1]=m1[1][2];
    m1[2][2]=z12[3]+z12[4]+z12[5];

      if(v[1]!=0)
      {i1[1]=v[1]/mag(r2[1],k2[1]);
       a1[1]=a[1]-(ang(r2[1],k2[1]));}
      if(v[3]!=0)
      {i1[3]=v[3]/mag(r2[2],k2[2]);
      a1[3]=a[3]-ang(r2[2],k2[2]);}
      if(v[5]!=0)
      {i1[5]=v[5]/mag(r2[4],k2[4]);
      a1[5]=a[5]-ang(r2[4],k2[4]);}
      if(v[7]!=0)
     { i1[7]=v[7]/mag(r2[5],k2[5]);
      a1[7]=a[7]-ang(r2[5],k2[5]);}
      i2[1]=i1[1]*cos(a1[1]*3.14/180);
      a3[1]=i1[1]*sin(a1[1]*3.14/180);
      i2[3]=i1[3]*cos(a1[3]*3.14/180);
      a3[3]=i1[3]*sin(a1[3]*3.14/180);
      i2[5]=i1[5]*cos(a1[5]*3.14/180);
      a3[5]=i1[5]*sin(a1[5]*3.14/180);
      i2[7]=i1[7]*cos(a1[7]*3.14/180);
      a3[7]=i1[7]*sin(a1[7]*3.14/180);
      i4[1]=i2[1]+i2[3];
      i4[2]=i2[5]+i2[7];
      a4[1]=a3[1]+a3[3];
      a4[2]=a3[5]+a3[7];
      i3[3]=mdet(m,m1);
a4[3]=mdet1(m,m1);
```

```
            m3[1][2]=m[1][2];
             m3[2][2]=m[2][2];
             m4[1][2]=m1[1][2];
             m4[2][2]=m1[2][2];
             m3[1][1]=i4[1];
             m3[2][1]=i4[2];
             m4[1][1]=a4[1];
             m4[2][1]=a4[2];
             i3[4]=mdet(m3,m4);
             a4[4]=mdet1(m3,m4);

            m3[1][1]=m[1][1];
             m3[2][1]=m[2][1];
             m4[1][1]=m1[1][1];
             m4[2][1]=m1[2][1];
             m3[1][2]=i4[1];
             m3[2][2]=i4[2];
             m4[1][2]=a4[1];
             m4[2][2]=a4[2];
          i3[5]=mdet(m3,m4);
            a4[5]=mdet1(m3,m4);
        xx4=i3[4]/i3[3];
        yy4=a4[4]-a4[3];
        xx5=i3[5]/i3[3];
        yy5=a4[5]-a4[3];
      windo(3,3,7,60,'d');
      gotoxy(10,3);
      printf("NODE  VOLTAGE's");
        gotoxy(5,4);
        printf("1 st Node voltage");
        gotoxy(25,4);
      printf("%f    |__%f",xx4,yy4);

        gotoxy(5,6);
        printf("2 nd Node voltage");
        gotoxy(25,6);
      printf("%f   |__%f",xx5,yy5);

       xx2=xx5*cos(3.14*yy5/180);
       yy2=xx5*sin(3.14*yy5/180);
       xx1=xx4*cos(3.14*yy4/180);
       yy1=xx4*sin(3.14*yy4/180);
       /*printf("%f%f\n%f%f",xx1,yy1,xx2,yy2);*/


if(v[1]!=0)
{xx3=v1[1]-xx1;
yy3=a2[1]-yy1;
ct1=(xx3*r2[1]-yy3*(-1)*k2[1])/(r2[1]*r2[1]+k2[1]*k2[1]);
```

```
 ct2=(xx3*(-1)*k2[1]+yy3*r2[1])/(r2[1]*r2[1]+k2[1]*k2[1]);
 ct5[1]=ct1;
 ct6[1]=ct2;
   ct3=mag(ct1,ct2);
   ct2=ang(ct1,ct2);
 /*  printf("\n%f%f",ct3,ct2);*/
  }
  else
      { if(i1[1]!=0)
      {ct1=i1[1];
 ct2=a1[1];
 ct5[1]=ct1*cos(ct2*3.14/180);
  ct6[1]=ct1*sin(ct2*3.14/180);
 /*  printf("\n%f%f",ct1,ct2);    */
    }
    else
     {ct1=xx4/mag(r2[1],k2[1]);
 ct2=yy4-ang(r2[1],k2[1]);
/*  printf("\n%f%f",ct1,ct2);*/
  ct5[1]=ct1*cos(ct2*3.14/180);
  ct6[1]=ct1*sin(ct2*3.14/180);
           }}
           windo(8,3,17,60,'d');
           gotoxy(25,8);
           printf("BRANCH CURRENT's");
    gotoxy(5,10);
    printf("2 nd Branch cu.");
    gotoxy(25,10);
    printf("%f    |___%f",ct1,ct2);

   if(v[3]!=0)
   { xx3=xx1-v1[3];
   yy3=yy1-a2[3];
   ct1=(xx3*r2[2]-yy3*(-1)*k2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
 ct2=(xx3*(-1)*k2[2]+yy3*r2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
 ct5[2]=ct1;
 ct6[2]=ct2;
   ct3=mag(ct1,ct2);
   ct2=ang(ct1,ct2);
/*   printf("\n%f%f",ct3,ct2);*/
  }
  else
     {if(i1[3]!=0)
       {ct3=(-1)*i1[3];
       ct2=(-1)*a1[3];
  ct5[2]=ct3;
 ct6[2]=ct2;
/*   printf("\n%f%f",ct1,ct2); */
    }
   else
```

```
      {ct3=xx4/mag(r2[2],k2[2]);
  ct2=yy4-ang(r2[2],k2[2]);
   /* printf("\n%f%f",ct1,ct2);*/
    ct5[2]=ct3*cos(ct2*3.14/180);
   ct6[2]=ct3*sin(ct2*3.14/180);
    }
     }

     gotoxy(5,11);
     printf("3 rd Branch cu.");
     gotoxy(25,11);
     printf("%f    |___%f",ct3,ct2);

    if(v[5]!=0)
     {xx3=xx2-v1[5];
     yy3=yy2-a2[5];
     ct1=(xx3*r2[4]-yy3*(-1)*k2[4])/(r2[4]*r2[4]+k2[4]*k2[4]);
   ct2=(xx3*(-1)*k2[4]+yy3*r2[4])/(r2[4]*r2[4]+k2[4]*k2[4]);
   ct5[4]=ct1;
   ct6[4]=ct2;
     ct3=mag(ct1,ct2);
     ct2=ang(ct1,ct2);
   /*  printf("\n%f%f",ct3,ct2);*/
    }
    else
      {if(i1[5]!=0)
        {ct3=(-1)*i1[5];
   ct2=(-1)*a1[5];
   ct5[4]=ct3;
   ct6[4]=ct2;
/*    printf("\n%f%f",ct1,ct2);      */
    }
    else
      { ct3=xx5/mag(r2[4],k2[4]);
   ct2=yy5-ang(r2[4],k2[4]);
   /*  printf("\n%f%f",ct1,ct2);*/
      ct5[4]=ct3*cos(ct2*3.14/180);
    ct6[4]=ct3*sin(ct2*3.14/180);
     }
      }

      gotoxy(5,12);
      printf("5th Branch cu.");
      gotoxy(25,12);
      printf("%f    |___%f",ct3,ct2);

     if(v[7]!=0)
     {xx3=xx2-v1[7];
    /* printf("\n     xx3    %f",xx3);*/
     yy3=yy2-a2[7];
```

```
  ct1=(xx3*r2[5]-yy3*(-1)*k2[5])/(r2[5]*r2[5]+k2[5]*k2[5]);
  ct2=(xx3*(-1)*k2[5]+yy3*r2[5])/(r2[5]*r2[5]+k2[5]*k2[5]);
  ct5[5]=ct1;
  ct6[5]=ct2;
    ct3=mag(ct1,ct2);
    ct2=ang(ct1,ct2);
 /*   printf("\n%f%f",ct3,ct2);            */
    }
    else
      {if(i1[7]!=0)
        {ct3=(-1)*i1[7];
  ct2=(-1)*a1[7];
  ct5[5]=ct3;
  ct6[5]=ct2;
  /*  printf("\n%f%f",ct1,ct2);*/
        }
     else
      {ct3=xx5/mag(r2[5],k2[5]);
  ct2=yy5-ang(r2[5],k2[5]);
/*     printf("\n%f%f",ct1,ct2);     */
      ct5[5]=ct3*cos(ct2*3.14/180);
    ct6[5]=ct3*sin(ct2*3.14/180);
     }
      }

      gotoxy(5,13);
      printf("6 &7 th Branch cu.");
      gotoxy(25,13);
      printf("%f  ¦___%f",ct3,ct2);

     xx3=xx1-xx2;
     yy3=yy1-yy2;

     ct1=(xx3*r2[3]-yy3*(-1)*k2[3])/(r2[3]*r2[3]+k2[3]*k2[3]);
   ct2=(xx3*(-1)*k2[3]+yy3*r2[3])/(r2[3]*r2[3]+k2[3]*k2[3]);
      ct5[3]=ct1;
   ct6[3]=ct2;
     ct3=mag(ct1,ct2);
     ct2=ang(ct1,ct2);

      gotoxy(5,14);
      printf("4 th Branch cu.");
      gotoxy(25,14);
      printf("%f  ¦___%f",ct3,ct2);

     r[3]=mag(ct5[5],ct6[5]);
     k[3]=ang(ct5[5],ct6[5]);
     r[2]=mag(ct5[4]+r[3],ct6[4]+k[3]);
     k[2]=ang(ct5[4]+r[3],ct6[4]+k[3]);
```

```
        /*SUBPROGRAM TO SOLVE FOUR LOOP A.C CIRCUIT*/

#include<math.h>
#include<stdio.h>
#include "b:box.c"
 float  mag(float x,float y);
  float ang(float x,float y);
  float mdet(float x[10][10],float y[10][10]);
  float mdet1(float x[10][10],float y[10][10]);
  float mdet2(float x[10][10],float y[10][10]);
  float mdet3(float x[10][10],float y[10][10]);
     FILE *fp2,*fopen();
    main()

  { int i,j,d,ff,n;
    float xx,yy;
    float m[10][10],m1[10][10],m2[10][10];
    float m3[10][10],m4[10][10],r8[10],k8[10];
    float k2[10],z11[10],z12[10],r2[10],k[11];
    float a1[11],r[11],v[11],i1[11];
    float i16,i11,i12,i13,i14,i15,a[11];
    float k3[10],i2[10],i3[20],i4[10],i5[10];
    float v6[10],a7[10],a5,a6,r3[10];
    float v7,a8,k5,k6,a2[10],v1[10],a3[10],a4[20],r4;
    float r5,r6,k4,xx1,yy1,k7[10];
    float ct3,xx35,xx45,xx2,xx3,yy2,yy3,xx4,yy4,ct1;
    float ct2,r7[10],i10,xx5,yy5;
    float ct5[10],ct6[10],xx7,yy7,xx6,yy6,lo3[10];
    double lo1[10],lo2[10];

    clrscr();

     fp2=fopen("b:re.dat","r");
 for(i=1;i<=9;i++)
   {
  fscanf(fp2,"%f %f %f %f %f %f/n",&r[i],&k[i],
                          &v[i],&a[i],&i1[i],&a1[i]);
   printf("%f %f %f %f %f %f\n",r[i],k[i],v[i],a[i],i1[i],a1[i]);
  if(v[i]!=0)
  {
   v1[i]=v[i]*cos(a[i]*3.14/180);
   a2[i]=v[i]*sin(a[i]*3.14/180);
  }
  if(i1[i]!=0)
  {
    i2[i]=i1[i]*cos(a1[i]*3.14/180);
    a3[i]=i1[i]*sin(a2[i]*3.14/180);
    }
}
   fclose(fp2);
   clrscr();
            r2[1]=r[1]+r[2];
            r2[2]=r[3];
            r2[3]=r[4];
```

```
r2[4]=r[5];
r2[5]=r[6];
r2[6]=r[7];
r2[7]=r[8]+r[9];
 k2[1]=k[1]+k[2];
k2[2]=k[3];
k2[3]=k[4];
k2[4]=k[5];
k2[5]=k[6];
k2[6]=k[7];
k2[7]=k[8]+k[9];
 for(i=1;i<=7;i++)
   {
   z11[i]=r2[i]/(r2[i]*r2[i]+k2[i]*k2[i]);
    z12[i]=(-1)*(k2[i])/(r2[i]*r2[i]+k2[i]*k2[i]);
    }
    m[1][1]=z11[1]+z11[2]+z11[3];
    m[1][2]=(-1)*z11[3];
    m[1][3]=0;
    m[2][1]=m[1][2];
    m[2][2]=z11[3]+z11[4]+z11[5];
    m[2][3]=(-1)*z11[5];
    m[3][1]=0;
    m[3][2]=m[2][3];
    m[3][3]=z11[5]+z11[6]+z11[7];
    m1[1][1]=z12[1]+z12[2]+z12[3];
    m1[1][2]=(-1)*z12[3];
    m1[1][3]=0;
    m1[2][1]=m1[1][2];
    m1[2][2]=z12[3]+z12[4]+z12[5];
    m1[2][3]=(-1)*z12[5];
    m1[3][1]=0;
    m1[3][2]=m1[2][3];
    m1[3][3]=z12[5]+z12[6]+z12[7];
      if(v[1]!=0)
      {i1[1]=v[1]/mag(r2[1],k2[1]);
       a2[1]=a[1]-(ang(r2[1],k2[1]));}
      if(v[3]!=0)
      {i1[3]=v[3]/mag(r2[2],k2[2]);
      a2[3]=a[3]-ang(r2[2],k2[2]);}
      if(v[5]!=0)
      {i1[5]=v[5]/mag(r2[4],k2[4]);
      a2[5]=a[5]-ang(r2[4],k2[4]);}
      if(v[7]!=0)
     { i1[7]=v[7]/mag(r2[6],k2[6]);
      a2[7]=a[7]-ang(r2[6],k2[6]);}
      if(v[9]!=0)
     { i1[9]=v[9]/mag(r2[7],k2[7]);
      a2[9]=a[9]-ang(r2[7],k2[7]);}
```

```
i2[1]=i1[1]*cos(a2[1]*3.14/180);
a3[1]=i1[1]*sin(a2[1]*3.14/180);
i2[3]=i1[3]*cos(a2[3]*3.14/180);
a3[3]=i1[3]*sin(a2[3]*3.14/180);
i2[5]=i1[5]*cos(a2[5]*3.14/180);
a3[5]=i1[5]*sin(a2[5]*3.14/180);
i2[7]=i1[7]*cos(a2[7]*3.14/180);

a3[7]=i1[7]*sin(a2[7]*3.14/180);
i2[9]=i1[9]*cos(a2[9]*3.14/180);
a3[9]=i1[9]*sin(a2[9]*3.14/180);
i4[1]=i2[1]+i2[3];
i4[2]=i2[5]+i2[7];
a4[1]=a3[1]+a3[3];
a4[2]=a3[5]+a3[7];
i4[3]=i2[7]+i2[9];
a4[3]=a3[7]+a3[9];
i3[10]=mdet2(m,m1);
a4[10]=mdet3(m,m1);
 for(i=1;i<=3;i++)
    {for(j=1;j<=3;j++)
      {m3[i][j]=m[i][j];
       m4[i][j]=m1[i][j];
       }
       }
   m3[1][1]=i4[1];
   m3[2][1]=i4[2];
   m3[3][1]=i4[3];
   m4[1][1]=a4[1];
   m4[2][1]=a4[2];
   m4[3][1]=a3[3];
   i3[11]=mdet2(m3,m4);
   a4[11]=mdet3(m3,m4);
   for(i=1;i<=3;i++)
    {for(j=1;j<=3;j++)
      {m3[i][j]=m[i][j];
       m4[i][j]=m1[i][j];
       }
       }
   m3[1][2]=i4[1];
   m3[2][2]=i4[2];
   m3[3][2]=i4[3];
   m4[1][2]=a4[1];
   m4[2][2]=a4[2];
   m4[3][2]=a3[3];
i3[12]=mdet2(m3,m4);
  a4[12]=mdet3(m3,m4);
```

```
 for(i=1;i<=3;i++)
      {for(j=1;j<=3;j++)
        {m3[i][j]=m[i][j];
         m4[i][j]=m1[i][j];
         }
         }
       m3[1][3]=i4[1];
       m3[2][3]=i4[2];
       m3[3][3]=i4[3];
       m4[1][3]=a4[1];
       m4[2][3]=a4[2];
       m4[3][3]=a3[3];
       i3[13]=mdet2(m3,m4);
      a4[13]=mdet3(m3,m4);

 xx4=i3[11]/i3[10];
 yy4=a4[11]-a4[10];
 xx5=i3[12]/i3[10];
 yy5=a4[12]-a4[10];
 xx6=i3[13]/i3[10];
 yy6=a4[13]-a4[10];
 windo(2,2,23,78,'d');
 windo(3,3,11,35,'d');
 gotoxy(20,3);
 printf("NODE VOLTAGE's");
 gotoxy(4,5);
 printf("Voltage at 1 st node");
 gotoxy(7,6);
printf(" %f",xx4);
gotoxy(14,6);
printf("¦__%f",yy4);

 gotoxy(4,7);
 printf("Voltage at 2 nd node");
 gotoxy(7,8);
printf("%f",xx5);
gotoxy(14,8);
printf("¦__%f",yy5);

 gotoxy(4,9);
 printf("Voltage at 3 rd node");
 gotoxy(7,10);
printf("%f",xx6);
gotoxy(14,10);
printf("¦__%f",yy6);
xx2=xx5*cos(3.14*yy5/180);
yy2=xx5*sin(3.14*yy5/180);
xx1=xx4*cos(3.14*yy4/180);
```

```
                yy1=xx4*sin(3.14*yy4/180);
                xx7=xx6*cos(3.14*yy6/180);
                yy7=xx6*sin(3.14*yy6/180);
               windo(12,3,22,60,'d');
               gotoxy(20,12);
             printf("BRANCH CURRENT's");
            if(v[1]!=0)
            {xx3=v1[1]-xx1;
            yy3=a2[1]-yy1;
            ct1=(xx3*r2[1]-yy3*(-1)*k2[1])/(r2[1]*r2[1]+k2[1]*k2[1]);
          ct2=(xx3*(-1)*k2[1]+yy3*r2[1])/(r2[1]*r2[1]+k2[1]*k2[1]);
          ct5[1]=ct1;
          ct6[1]=ct2;
            ct3=mag(ct1,ct2);
            ct2=ang(ct1,ct2);
        /*    printf("\n    brct1   %f%f",ct3,ct2);*/
            }
            else
                { if(i1[1]!=0)
                {ct1=i1[1];
          ct2=a1[1];
          ct5[1]=ct1;
          ct6[1]=ct2;
      /*      printf("\n    brct1%f%f",ct1,ct2);*/
             }
             else
              {ct1=xx4/mag(r2[1],k2[1]);
          ct2=yy4-ang(r2[1],k2[1]);
/*         printf("\n  brct1 %f%f",ct1,ct2);    */
          ct5[1]=ct1*cos(ct2*3.14/180);
          ct6[1]=ct1*sin(ct2*3.14/180);
                    }}

          gotoxy(7,14);
          printf("2 nd branch current");
          gotoxy(30,14);
          printf("%f    %f",ct1,ct2);

            if(v[3]!=0)
            {xx3=xx1-v1[3];
            yy3=yy1-a2[3];
            ct1=(xx3*r2[2]-yy3*(-1)*k2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
          ct2=(xx3*(-1)*k2[2]+yy3*r2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
           ct5[2]=ct1;
          ct6[2]=ct2;
            ct3=mag(ct1,ct2);
            ct2=ang(ct1,ct2);
        /*    printf("\n  br ct2 %f%f",ct3,ct2);*/
            }
```

```
            else
               {if(i1[3]!=0)
                 {ct3=(-1)*i1[3];
              ct2=(-1)*a1[1];
               ct5[2]=ct3;
              ct6[2]=ct2;
      /*       printf("\n br ct2 %f%f",ct1,ct2);*/
               }
               else
                  {ct3=xx4/mag(r2[2],k2[2]);
              ct2=yy4-ang(r2[2],k2[2]);

                gotoxy(7,15);
              printf("3 rd branch current");
              gotoxy(30,15);
              printf("%f    %f",ct3,ct2);
/*            printf("\n br ct 2%f%f",ct3,ct2);*/

               ct5[2]=ct3*cos(ct2*3.14/180);
              ct6[2]=ct3*sin(ct2*3.14/180);
               }
                }
                  xx3=xx1-xx2;
               yy3=yy1-yy2;

               ct1=(xx3*r2[3]-yy3*(-1)*k2[3])/(r2[3]*r2[3]+k2[3]*k2[3]);
              ct2=(xx3*(-1)*k2[3]+yy3*r2[3])/(r2[3]*r2[3]+k2[3]*k2[3]);
                ct5[3]=ct1;
              ct6[3]=ct2;
               ct3=mag(ct1,ct2);
               ct2=ang(ct1,ct2);

                 gotoxy(7,16);
              printf("4 th branch current");
              gotoxy(30,16);
              printf("%f    %f",ct3,ct2);
            /*   printf("\n br ct 3 %f%f",ct3,ct2);*/

              if(v[5]!=0)
               {xx3=xx2-v1[5];
               yy3=yy2-a2[5];
               ct1=(xx3*r2[4]-yy3*(-1)*k2[4])/(r2[4]*r2[4]+k2[4]*k2[4]);
              ct2=(xx3*(-1)*k2[4]+yy3*r2[4])/(r2[4]*r2[4]+k2[4]*k2[4]);
              ct5[4]=ct1;
              ct6[4]=ct2;
               ct3=mag(ct1,ct2);
               ct2=ang(ct1,ct2);
/*             printf("\n br ct 4 %f%f",ct3,ct2);*/
              }
```

```
   else
     {if(i1[5]!=0)
       {ct3=(-1)*i1[5];
  ct2=(-1)*a1[5];
  ct5[4]=ct3;
  ct6[4]=ct2;
/*    printf("\n    br ct 4 %f%f",ct1,ct2);*/
    }
    else
      { ct3=xx5/mag(r2[4],k2[4]);
  ct2=yy5-ang(r2[4],k2[4]);
    gotoxy(7,17);
  printf("5 th branch current");
  gotoxy(30,17);
  printf("%f    ¦__%f",ct3,ct2);
/*     printf("\n br ct 4 %f%f",ct1,ct2);*/
      ct5[4]=ct3*cos(ct2*3.14/180);
    ct6[4]=ct3*sin(ct2*3.14/180);
     }
      }
      xx3=xx2-xx7;
     yy3=yy2-yy7;

     ct1=(xx3*r2[5]-yy3*(-1)*k2[5])/(r2[5]*r2[5]+k2[5]*k2[5]);
  ct2=(xx3*(-1)*k2[5]+yy3*r2[5])/(r2[5]*r2[5]+k2[5]*k2[5]);
     ct5[5]=ct1;
  ct6[5]=ct2;
     ct3=mag(ct1,ct2);
     ct2=ang(ct1,ct2);

       gotoxy(7,18);
  printf("6 th branch current");
  gotoxy(30,18);
  printf("%f    ¦__%f",ct3,ct2);

     if(v[7]!=0)
     {xx3=xx7-v1[7];
     yy3=yy7-a2[7];
     ct1=(xx3*r2[6]-yy3*(-1)*k2[6])/(r2[5]*r2[6]+k2[6]*k2[6]);
  ct2=(xx3*(-1)*k2[6]+yy3*r2[6])/(r2[6]*r2[6]+k2[6]*k2[6]);
  ct5[6]=ct1;
  ct6[6]=ct2;
     ct3=mag(ct1,ct2);
     ct2=ang(ct1,ct2);
    }
    else
      {if(i1[7]!=0)
        {ct3=(-1)*a1[7];
```

```
 ct2=(-1)*a1[7];;
ct5[6]=ct3;
ct6[6]=ct2;
      }
  else
   {ct3=xx7/mag(r2[6],k2[6]);
ct2=yy7-ang(r2[6],k2[6]);
  gotoxy(7,19);
printf("7 th branch current");
gotoxy(30,19);
printf("%f    %f",ct3,ct2);

   ct5[6]=ct3*cos(ct2*3.14/180);
 ct6[6]=ct3*sin(ct2*3.14/180);
  }
   }
    if(v[9]!=0)
  {xx3=xx7-v1[9];
  yy3=yy7-a2[9];
  ct1=(xx3*r2[7]-yy3*(-1)*k2[7])/(r2[7]*r2[7]+k2[7]*k2[7]);
ct2=(xx3*(-1)*k2[7]+yy3*r2[7])/(r2[7]*r2[7]+k2[7]*k2[7]);
ct5[7]=ct1;
ct6[7]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
 }
 else
   {if(i1[9]!=0)
     {ct3=(-1)*i1[9];
ct2=(-1)*a1[9];
ct5[7]=ct3;
ct6[7]=ct2;
      }
  else
   {ct3=xx7/mag(r2[7],k2[7]);
ct2=yy7-ang(r2[7],k2[7]);
  gotoxy(7,20);
printf("8&9 th branch current");
gotoxy(30,20);
printf("%f    %f",ct3,ct2);
 ct5[7]=ct3*cos(ct2*3.14/180);
 ct6[7]=ct3*sin(ct2*3.14/180);
  }
   }
     windo(3,40,12,78,'d');
     gotoxy(45,3);
 printf("LOOP CURRENT's");
  lo1[4]=mag(ct5[7],ct6[7]);
  lo2[4]=ang(ct5[7],ct6[7]);
```

```
        lo1[3]=mag(ct5[6]+lo1[4],ct6[6]+lo2[4]);
        lo2[3]=ang(ct5[6]+lo1[4],ct6[6]+lo2[4]);
       lo1[2]=mag(ct5[4]+lo1[3],ct6[4]+lo2[3]);
        lo2[2]=ang(ct5[4]+lo1[3],ct6[4]+lo2[3]);
        lo1[1]=mag(ct5[2]+lo1[2],ct6[2]+lo2[2]);
        lo2[1]=ang(ct5[2]+lo1[2],ct6[2]+lo2[2]);
        gotoxy(42,4);
        printf("1 st Loop cu.");
        gotoxy(48,5);
        printf("%f",lo1[1]);
        gotoxy(60,5);
        printf(" ¦___%f",lo2[1]);

           gotoxy(42,6);
        printf("2 nd Loop cu.");
        gotoxy(48,7);
        printf("%f",lo1[2]);
        gotoxy(60,7);
        printf("¦__%f",lo2[2]);

        gotoxy(42,8);
        printf("3 rd Loop cu.");
        gotoxy(48,9);
        printf("%f ",lo1[3]);
        gotoxy(60,9);
        printf("¦__%f",lo2[3]);

        gotoxy(42,10);
        printf("4 th Loop cu.");
        gotoxy(48,11);
        printf("%f ",lo1[4]);
        gotoxy(60,11);
        printf("¦__%f",lo2[4]);


        }
             /*PROGRAM TO FIND DET2. VALUE*/

float mdet2(float x[10][10],float y[10][10])
      {
        double d,d1,d2,d3,r1,r2,r3,r4,r5,r6;
   d=x[2][2]*x[3][3]-y[2][2]*y[3][3];
   d1=x[2][2]*y[3][3]+y[2][2]*x[3][3];
   d2=x[3][2]*x[2][3]-y[3][2]*y[2][3];
   d3=x[3][2]*y[2][3]+y[3][2]*x[2][3];
   d=d-d2;
   d1=d1-d3;
   d2=x[1][1]*d-y[1][1]*d1;
   d3=x[1][1]*d1+y[1][1]*d;
```

```
r1=d2;
r2=d3;
d=x[2][1]*x[3][3]-y[2][1]*y[3][3];
d1=x[2][1]*y[3][3]+y[2][1]*x[3][3];
d2=x[3][1]*x[2][3]-y[3][1]*y[2][3];
d3=x[3][1]*y[2][3]+y[3][1]*x[2][3];
d=d-d2;
d1=d1-d3;
d2=x[1][2]*d-y[1][2]*d1;
d3=x[1][2]*d1+y[1][2]*d;
r3=d2;
r4=d3;
d=x[2][1]*x[3][2]-y[2][1]*y[3][2];
d1=x[2][1]*y[3][2]+y[2][1]*x[3][2];
d2=x[3][1]*x[2][2]-y[3][1]*y[2][2];
d3=x[3][1]*y[2][2]+y[3][1]*x[2][2];
d=d-d2;
d1=d1-d3;
d2=x[1][3]*d-y[1][3]*d1;
d3=x[1][3]*d1+y[1][3]*d;
r5=d2;
r6=d3;
r1=r1-r3+r5;
r2=r2-r4+r6;
return(mag(r1,r2));
}

        /*PROGRAM TO FIND DET3. VALUE*/

float mdet3(float x[10][10],float y[10][10])
   {
     double d,d1,d2,d3,r1,r2,r3,r4,r5,r6;
d=x[2][2]*x[3][3]-y[2][2]*y[3][3];
d1=x[2][2]*y[3][3]+y[2][2]*x[3][3];
d2=x[3][2]*x[2][3]-y[3][2]*y[2][3];
d3=x[3][2]*y[2][3]+y[3][2]*x[2][3];
d=d-d2;
d1=d1-d3;
d2=x[1][1]*d-y[1][1]*d1;
d3=x[1][1]*d1+y[1][1]*d;
r1=d2;
r2=d3;
d=x[2][1]*x[3][3]-y[2][1]*y[3][3];
d1=x[2][1]*y[3][3]+y[2][1]*x[3][3];
d2=x[3][1]*x[2][3]-y[3][1]*y[2][3];
d3=x[3][1]*y[2][3]+y[3][1]*x[2][3];
d=d-d2;
d1=d1-d3;
d2=x[1][2]*d-y[1][2]*d1;
d3=x[1][2]*d1+y[1][2]*d;
```

```
r3=d2;
r4=d3;
d=x[2][1]*x[3][2]-y[2][1]*y[3][2];
d1=x[2][1]*y[3][2]+y[2][1]*x[3][2];
d2=x[3][1]*x[2][2]-y[3][1]*y[2][2];
d3=x[3][1]*y[2][2]+y[3][1]*x[2][2];
d=d-d2;
d1=d1-d3;
d2=x[1][3]*d-y[1][3]*d1;
d3=x[1][3]*d1+y[1][3]*d;
r5=d2;
r6=d3;
r1=r1-r3+r5;
r2=r2-r4+r6;
return(ang(r1,r2));
}
```

/*SUBPROGRAM TO DRAW FREQ. RESPONSE */

```
#include<math.h>
#include<graphics.h>
#include<stdio.h>
 float  mag(float x,float y);
  float ang(float x,float y);
  FILE *fp1,*fopen();
   main()
      { int mm,kk1,i,j,d,driver,mode;
       int e[11];
       float xx,yy,x1,y1,x,y,cc[10][10],l1[10][10];
       char e1[10][10],kk[10];
       float c[10],a1[10],r1[10],l[10],v[10],i1[10],a[10];
       float c1[10][10],l1[10][10],i11,i12,i13,i14,i15;

     fp1=fopen("re1.dat","r");

       fscanf(fp1,"%d",&d);
           clrscr();
           printf("%d",d);
           getch();
     for(i=1;i<=d;i++)
     {
      fscanf(fp1,"%d ",&e[i]);
      printf("\n%d",e[i]);
          getch();
     for(j=1;j<=e[i];j++)
     {
 fscanf(fp1,"%c ",&e1[i][j]);
 fscanf(fp1,"%f %f %f %f %f %f ",&r1[i],&c1[i][j]
                       ,&l1[i][j],&kk[i],&v[i]);

 fscanf(fp1,"%f %f %f ",&a[i],&i1[i],&a1[i]);
printf("\n%c        %f        %f        %f        %f        %f
",e1[i][j],r1[i],c1[i][j],l1[i][j],kk[i],v[i]);
printf("%f %f %f",a[i],i1[i],a1[i]);
                       }
         printf("\n");
                        }
                    getch();
                        fclose(fp1);
                  if(v[1]!=0)
              { xx=kk[1]+kk[2]+kk[3];
                yy=r1[1]+r1[2]+r1[3];
            i11=mag(yy,xx);
            i12=ang(yy,xx);
             i13=v[1]/i11;
             i14=a[1]-i12;}
             else
             {i13=i1[1];
             i14=a1[1];}
```

```
  driver=CGA;
 mode=CGAC1;
 initgraph(&driver,&mode,"a:\\");
       x1=250;y1=50;
 line(x1-50,y1,x1+50,y1);
 line(x1,y1-50,x1,y1+50);
 line(x1-50,y1,x1-47,y1-3);
 line(x1-50,y1,x1-47,y1+3);
 line(x1+50,y1,x1+47,y1-3);
 line(x1+50,y1,x1+47,y1+3);
 line(x1,y1-50,x1-3,y1-47);
 line(x1,y1-50,x1+3,y1-47);
 line(x1,y1+50,x1-3,y1+47);
 line(x1,y1+50,x1+3,y1+47);
 outtextxy(200,1,"P");
 outtextxy(200,7,"h");
 outtextxy(200,14,"a");
 outtextxy(200,21,"s");
 outtextxy(200,28,"o");
 outtextxy(200,35,"r");
 outtextxy(200,42," ");
 outtextxy(200,49,"D");
 outtextxy(200,56,"i");
 outtextxy(200,63,"a");
 x=x1+50*cos(3.14/180*a[1]);
 y=y1-50*sin(3.14/180*a[1]);
line(x1,y1,(int)x,(int)y);
outtextxy(x,y,"V");
       x=x1+50*cos(3.14/180*(i14));
 y=y1-50*sin(3.14/180*(i14));
 line(x1,y1,(int)x,(int)y);
 outtextxy(x,y,"I");
 x1=250;y1=150;
 line(x1-50,y1,x1+50,y1);
 line(x1,y1-50,x1,y1+50);
     line(x1-50,y1,x1+50,y1);
 line(x1,y1-50,x1,y1+50);
 line(x1-50,y1,x1-47,y1-3);
 line(x1-50,y1,x1-47,y1+3);
 line(x1+50,y1,x1+47,y1-3);
 line(x1+50,y1,x1+47,y1+3);
 line(x1,y1-50,x1-3,y1-47);
 line(x1,y1-50,x1+3,y1-47);
 line(x1,y1+50,x1-3,y1+47);
 line(x1,y1+50,x1+3,y1+47);
 outtextxy(200,100,"I");
 outtextxy(200,107,"m");
```

```
outtextxy(200,114,"p");
outtextxy(200,121,"e");
outtextxy(200,128,"d");

outtextxy(200,135,"a");
outtextxy(200,142,"n");
outtextxy(200,149,"c");
outtextxy(200,156,"e");
outtextxy(220,1,"a1=");
outtextxy(220,7,"a2=");
gotoxy(53,1);
printf("%d",(int)a[1]);
gotoxy(53,2);
printf("%d",(int)i14);
x=x1+10*xx;
y=y1-10*yy;
line(x1,y1,(int)x,(int)y);
line((int)x,(int)y,x1,(int)y);
line((int)x,(int)y,(int)x,y1);
getch();
 driver=CGA;
 mode=CGAC1;
 initgraph(&driver,&mode,"a:\\");
 x1=220;y1=100;
 line(x1+100,y1,x1,y1);
 line(x1,y1,x1,y1-100);
 line(x1+100,y1,x1+95,y1-3);
 line(x1+100,y1,x1+95,y1+3);
 line(x1,y1-100,x1-3,y1-95);
 line(x1,y1-100,x1+3,y1-95);
    setcolor(RED);
    settextstyle(SMALL_FONT,HORIZ_DIR,3);
 outtextxy(220,105,"0");
 outtextxy(210,1,"100");
 outtextxy(210,25,"75");
 outtextxy(210,50,"50");
 outtextxy(210,75,"25");
 outtextxy(240,105,"25");
 outtextxy(265,105,"50");
 outtextxy(290,105,"75");
 outtextxy(310,105,"100");

 settextstyle(SMALL
                    _FONT,HORIZ_DIR,4);
 outtextxy(300,110,"f");
     settextstyle(SMALL_FONT,HORIZ_DIR,4);
 outtextxy(215,32,"i");
 setcolor(12);
 line(x1+25,y1-3,x1+25,y1+3);
 line(x1+50,y1-3,x1+50,y1+3);
 line(x1+75,y1-3,x1+75,y1+3);
 line(x1+99,y1-3,x1+99,y1+3);
```

```
            line(x1+3,y1-25,x1-3,y1-25);
            line(x1+3,y1-50,x1-3,y1-50);
            line(x1+3,y1-75,x1-3,y1-75);
            line(x1+3,y1-99,x1-3,y1-99);
```

```
            mm=2;
            moveto(220,100);
for(kk1=1;kk1<=100;kk1++)
           {for(i=1;i<=d;i++)
    {c[i]=0;l[i]=0;
       for(j=0;j<=e[i];j++)
       {
       switch(e1[i][j])
       {
       case 'c':
            c1[i][j]=1/(2*3.14*(mm)*cc[i][j]);
            c[i]=c[i]+c1[i][j];
            break;
       case 'l':
          l1[i][j]=l1[i][j]*2*3.14*(mm);
          l[i]=l[i]+l1[i][j];
          break;
          }
          kk[i]=l[i]+c[i];
              }}
              if(v[1]!=0)
             {
              xx=kk[1]+kk[2]+kk[3];
              yy=r1[1]+r1[2]+r1[3];
          i11=mag(yy,xx);
          i12=ang(yy,xx);
           i13=v[1]/i11;
           i14=a[1]-i12;}
           else
           {i13=i1[1];
           i14=a1[1];}
           lineto(x1+kk1,y1-abs(i13));/*
           putpixel(x1+kk1,y1-i13,2);*/
           mm=mm+4;
           }
         }
```

```
        /* PROGRAM TO DRAW FREQ. RES. FOR 2 LOOP A.C*/

#include<graphics.h>
#include<math.h>
#include<stdio.h>
 float  mag(float x,float y);
  float ang(float x,float y);
  FILE *fp1,*fopen();
   main()

       { int i,j,d,ff,n,mm,kk,driver,mode;
        int e[10];
        float xx,yy,l1[10][10],cc[10][10];
        float m[10][10],m1[10][10],m2[10][10],m3[10][10];
        float r8[10],k8[10];
   char e1[10][10];
        float c[10],a[10],k2[10],z11[10],z12[10];
         float r2[10],k[10],a1[10],r[10],l[10],v[10],l1[10];
        float c1[10][10],r1[10][10],l1[10][10];
        float i16,i11,i12,i13,i14,i15;
        float k3[10],i2[10],i3[10],i4,i5[10];
        float v6[10],a7[10],a5,a6,r3[10];
        float v7,a8,k5,k6,a2[10],v1[10],a3[10];
        float a4[10],r4,r5,r6,k4,xx1,yy1,k7[10];
        float ct3,xx35,xx45,xx2,xx3,yy2,yy3;
        float xx4,yy4,ct1,ct2,r7[10],x1,y1;
   double lo1[10],lo2[10];
        clrscr();
     fp1=fopen("re1.dat","r");
       fscanf(fp1,"%d",&d);
            clrscr();
            printf("%d",d);
            getch();
     for(i=1;i<=d;i++)
     {
      fscanf(fp1,"%d ",&e[i]);
      printf("\n%d",e[i]);
          getch();
     for(j=1;j<=e[i];j++)
     {
 fscanf(fp1,"%c ".&e1[i][j]);
 fscanf(fp1,"%f          %f          %f          %f          %f
",&r1[i],&c1[i][j],&l1[i][j],&kk[i],&v[i]);

 fscanf(fp1,"%f %f %f ",&a[i],&i1[i],&a1[i]);
                        }
         printf("\n");
                          }
                    getch();
                          fclose(fp1);
             driver=CGA;
         mode=CGAC1;
```

```
        initgraph(&driver,&mode,"c:\\");
        x1=220;y1=100;
        line(x1+100,y1,x1,y1);
        line(x1,y1,x1,y1-100);
        line(x1+100,y1,x1+95,y1-3);
        line(x1+100,y1,x1+95,y1+3);
        line(x1,y1-100,x1-3,y1-95);
        line(x1,y1-100,x1+3,y1-95);
           setcolor(RED);
           settextstyle(SMALL_FONT,HORIZ_DIR,3);
        outtextxy(220,105,"0");
        outtextxy(210,1,"100");
        outtextxy(210,25,"75");
        outtextxy(210,50,"50");
        outtextxy(210,75,"25");
        outtextxy(240,105,"25");
        outtextxy(265,105,"50");
        outtextxy(290,105,"75");
        outtextxy(310,105,"100");
        settextstyle(SMALL_FONT,HORIZ_DIR,4);
        outtextxy(300,110,"f");
        settextstyle(SMALL_FONT,HORIZ_DIR,4);
        outtextxy(215,32,"i");
        setcolor(12);
        line(x1+25,y1-3,x1+25,y1+3);
        line(x1+50,y1-3,x1+50,y1+3);
        line(x1+75,y1-3,x1+75,y1+3);
        line(x1+99,y1-3,x1+99,y1+3);
        line(x1+3,y1-25,x1-3,y1-25);
        line(x1+3,y1-50,x1-3,y1-50);
        line(x1+3,y1-75,x1-3,y1-75);
        line(x1+3,y1-99,x1-3,y1-99);
        outtextxy(220,120,"Frequency");
        mm=2;
for(kk=1;kk<=100;kk++)
     {for(i=1;i<=d;i++)
 {c[i]=0;l[i]=0;
    for(j=0;j<=e[i];j++)
    {
    switch(e1[i][j])
    {
    case 'c':
         c1[i][j]=1/(2*3.14*(mm)*cc[i][j]);
         c[i]=c[i]+c1[i][j];
         break;
    case 'l':
       l1[i][j]=l[i][j]*2*3.14*(mm);
       l[i]=l[i]+l1[i][j];
```

```
      break;
      }
      k[i]=l[i]+c[i];}}
     r2[1]=r[1]+r[2];
     r2[2]=r[3];
     r2[3]=r[4]+r[5];
     k2[1]=k[1]+k[2];
     k2[2]=k[3];
     k2[3]=k[4]+k[5];
      for(i=1;i<=3;i++)
        {r7[i]=r2[i];
           k7[i]=k2[i];
           r8[i]=r2[i];
           k8[i]=k2[i];}
if(v[1]!=0)
  {i3[1]=(v1[1]*r2[1]-a2[1]*(-1)*k2[1])/
                      (r2[1]*r2[1]+k2[1]*k2[1]);
   a4[1]=(v1[1]*(-1)*k2[1]+a2[1]*r2[1])/
                     (r2[1]*r2[1]+k2[1]*k2[1]);}
 if(i1[1]!=0)
   {i3[1]=i2[1];
   a4[1]=a3[1];
   r8[1]=0;
   k8[1]=0;
   k7[1]=0;
   r7[1]=1;
   k7[2]=0;
   r7[2]=1;}
    if(v[3]!=0)
  {i3[2]=(v1[3]*r2[2]-a2[3]*(-1)*k2[2])/
                        (r2[2]*r2[2]+k2[2]*k2[2]);
   a4[2]=(v1[3]*(-1)*k2[2]+a2[2]*r2[2])/
                      (r2[2]*r2[2]+k2[2]*k2[2]);}
 if(i1[3]!=0)
   {i3[2]=i2[3];
   a4[2]=a3[3];
   r8[2]=0;
   k8[2]=0;
   k7[2]=0;
   r7[2]=1;
   r7[3]=1;
   k7[3]=0;}
    if(v[5]!=0)
  {i3[3]=(v1[5]*r2[3]-a2[3]*(-1)*k2[3])/
              (r2[3]*r2[3]+k2[3]*k2[3]);
   a4[3]=(v1[5]*(-1)*k2[3]+a2[3]*r2[3])/
                    (r2[3]*r2[3]+k2[3]*k2[3]);}
   if(i1[5]!=0)
       {i3[3]=i2[5];
    a4[3]=a3[5];
    r8[3]=0;
    k8[3]=0;
```

```
    r7[3]=1;
    k7[3]=0;
    r7[1]=1;
    k7[1]=0;}
     r3[1]=r7[1]*r8[2]-k7[1]*k8[2];
     k3[1]=r7[1]*k8[2]+k7[1]*r8[2];
     r3[2]=r7[2]*r8[3]-k7[2]*k8[3];
     k3[2]=r7[2]*k8[3]+k7[2]*r8[3];
     r3[3]=r8[1]*r7[3]-k7[3]*k8[1];
     k3[3]=r8[1]*k7[3]+k8[1]*r7[3];
     r6=r3[1]+r3[2]+r3[3];
     k6=k3[1]+k3[2]+k3[3];
    xx2=mag(r6,k6);
    yy2=ang(r6,k6);
   /*printf("%f%f",xx2,yy2);*/
    for(i=1;i<=3;i++)
        {r7[i]=r2[i];
           k7[i]=k2[i];
           r8[i]=r2[i];
           k8[i]=k2[i];}
  if(v[1]!=0)
  {i3[1]=(v1[1]*r2[1]-a2[1]*(-1)*k2[1])/
                  (r2[1]*r2[1]+k2[1]*k2[1]);
   a4[1]=(v1[1]*(-1)*k2[1]+a2[1]*r2[1])/
                    (r2[1]*r2[1]+k2[1]*k2[1]);}
 if(i1[1]!=0)
   {i3[1]=i2[1];
   a4[1]=a3[1];
   r8[1]=0;
   k8[1]=0;
   k7[1]=0;
   r7[1]=1;
    }
    if(v[3]!=0)
  {i3[2]=(v1[3]*r2[2]-a2[3]*(-1)*k2[2])/
             (r2[2]*r2[2]+k2[2]*k2[2]);
   a4[2]=(v1[3]*(-1)*k2[2]+a2[2]*r2[2])/
                    (r2[2]*r2[2]+k2[2]*k2[2]);}
 if(i1[3]!=0)
   {i3[2]=i2[3];
   a4[2]=a3[3];
   r8[2]=0;
   k8[2]=0;
   k7[2]=0;
   r7[2]=1;
   }
    if(v[5]!=0)
  {i3[3]=(v1[5]*r2[3]-a2[3]*(-1)*k2[3])/
                   (r2[3]*r2[3]+k2[3]*k2[3]);
   a4[3]=(v1[5]*(-1)*k2[3]+a2[3]*r2[3])/
                  (r2[3]*r2[3]+k2[3]*k2[3]);}
```

```
        if(i1[5]!=0)
        {i3[3]=i2[5];
    a4[3]=a3[5];
    r8[3]=0;
    k8[3]=0;
    r7[3]=1;
    k7[3]=0;
    }
r4=r7[1]*r7[2]-k7[1]*k7[2];
k4=r7[1]*k7[2]+k7[1]*r7[2];
r5=r4*r7[3]-k4*k7[3];
k5=r4*k7[3]+k4*r7[3];
xx1=mag(r5,k5);
yy1=ang(r5,k5);
/*printf("%f%f",xx1,yy1);*/
    i4=i3[1]+i3[2]+i3[3];
    a5=a4[1]+a4[2]+a4[3];
    xx3=mag(i4,a5);
    yy3=ang(i4,a5);
    /*printf("%f%f",xx3,yy3);*/
    v7=xx3/xx2*xx1;
    a8=yy3-yy2+yy1;
    /*printf("\n%f%f\n",v7,a8);*/
    xx2=v7*cos(a8*3.14/180);
    yy2=v7*sin(a8*3.14/180);
    /*printf("BRANCH CURRENT");*/
     if(i1[1]!=0)
         {
         ct1=i1[1];
  ct2=a1[1];
  !o1[1]=ct1;
  !o2[1]=ct2;
    /*printf("\n%f%f",ct1,ct2.);*/
    }
    else
    {xx1=v1[1]-xx2;
    yy1=a2[1]-yy2;
    ct1=(xx1*r2[1]-yy1*(-1)*k2[1])/
                    (r2[1]*r2[1]+k2[1]*k2[1]);
  ct2=(xx1*(-1)*k2[1]+yy1*r2[1])/
                  (r2[1]*r2[1]+k2[1]*k2[1]);
  !o1[1]=ct1;
  !o2[1]=ct2;
    ct3=mag(ct1,ct2);
    ct2=ang(ct1,ct2);
   /*printf("\n%f%f",ct3,ct2);*/
    }
        if(i1[3]!=0)
        {ct1=(-1)*i1[3];
  ct2=(-1)*a1[3];
```

```
      lo1[2]=ct1;
      lo2[2]=ct2;
    /*printf("%f%f",ct1,ct2);*/
    }
    else
    {xx1=xx2-v1[3];
    yy1=yy2-a2[3];
    ct1=(xx1*r2[2]-yy1*(-1)*k2[2])/
                    (r2[2]*r2[2]+k2[2]*k2[2]);
  ct2=(xx1*(-1)*k2[2]+yy1*r2[2])/
                  (r2[2]*r2[2]+k2[2]*k2[2]);
  lo1[2]=ct1;
  lo2[2]=ct2;
    ct3=mag(ct1,ct2);
    ct2=ang(ct1,ct2);
    /*printf("\n%f%f",ct3,ct2);*/
    }
    if(i1[5]!=0)
       {ct1=(-1)*i1[5];
  ct2=(-1)*a1[5];
  lo1[3]=ct1;
  lo2[3]=ct2;
    /*printf("\n%f%f",ct1,ct2);*/
    }
   else
    {xx1=xx2-v1[5];
    yy1=yy2-a2[5];
    ct1=(xx1*r2[3]-yy1*(-1)*k2[3])/
                  (r2[3]*r2[3]+k2[3]*k2[3]);
  ct2=(xx1*(-1)*k2[3]+yy1*r2[3])/
                    (r2[3]*r2[3]+k2[3]*k2[3]);
  lo1[3]=ct1;
  lo2[3]=ct2;
    ct3=mag(ct1,ct2);
    ct2=ang(ct1,ct2);
    /*printf("\n%f%f",ct3,ct2);*/
    }
    /*printf("LOOP CURRENT");*/
lo1[4]=mag(lo1[3],lo2[3]);
lo2[4]=ang(lo1[3],lo2[3]);
lo1[3]=lo1[4]*cos(3.14*lo2[4]/180);
lo2[3]=lo1[4]*sin(3.14*lo2[4]/180);

lo1[1]=mag(lo1[3]+lo1[2],lo2[3]+lo2[2]);
lo2[1]=ang(lo1[3]+lo1[2],lo2[3]+lo2[2]);
/*printf("%f%f%f%f",lo1[1],lo2[1],lo1[2],lo2[2]);*/
putpixel(x1+kk,y1-abs(lo1[1]),2);
 putpixel(x1+kk,y1-abs(lo1[4]),2);
 mm=mm+4;}
    }
```

```
/*PROGRAM TO DRAW FREQ. RES. FOR 3 LOOP A.C*/

    #include<graphics.h>
    #include<math.h>
    #include<stdio.h>
     float  mag(float x,float y):
      float ang(float x,float y);
      float mdet(float x[5][5],float y[5][5]):
      float mdet1(float x[5][5],float y[5][5]);
      float mdet2(float x[5][5],float y[5][5]);
      float mdet3(float x[5][5],float y[5][5]);
      FILE *fp1,*fopen();
       main()

          { int i,j,d,ff,n,mm,kk,driver,mode;
           int e[10];
           float xx,yy,cc[10][10],l1[10][10],x1,y1;
           float m[5][5],m1[5][5],m3[5][5],m4[5][5],r8[5],k8[5];
           char e1[10][10];
            float c[10],a[10],k2[10],z11[10],z12[10];
           float  r2[10],k[10],a1[10],r[10],l[10],v[10],l1[10];
          float c1[10][10],r1[10][10],l1[10][10],i16,i11,i12,i13,i14,
;
           float k3[10],i2[10],i3[10];
            float i4[10],i5[10],v6[10],a7[10],a5,a8,r3[10];
           float v7,a8,k5,k6,a2[10],v1[10];
           float a3[10],a4[10],r4,r5,r6,k4,xx1,yy1;
           float  ct3,xx35,xx45,xx2,xx3,yy2,yy3;
           float xx4,yy4,ct1,ct2,i10,xx5,yy5;
           float ct5[10],ct6[10],xx7,yy7,xx8,yy8;
           clrscr();
         fp1=fopen("re1.dat","r");
           fscanf(fp1,"%d",&d);
               clrscr();
               printf("%d",d);
               getch();
         for(i=1;i<=d;i++)
         {
          fscanf(fp1,"%d ",&e[i]);
          printf("\n%d",e[i]);
              getch();
         for(j=1;j<=e[i];j++)
         {
fscanf(fp1,"%c ",&e1[i][j]);
fscanf(fp1,"%f %f %f %f %f ",&r1[i],&c1[i][j],&l1[i][j]
                          ,&kk[i],&v[i]);
fscanf(fp1,"%f %f %f ",&a[i],&i1[i],&a1[i]);
                            }
             printf("\n");
                              }
                          getch();
                         fclose(fp1);
                    driver=CGA;
```

```
        mode=CGAC1;
       initgraph(&driver,&mode,"a:\\");
       x1=220;y1=100;
       line(x1+100,y1,x1,y1);
       line(x1,y1,x1,y1-100);
       line(x1+100,y1,x1+95,y1-3);
       line(x1+100,y1,x1+95,y1+3);
       line(x1,y1-100,x1-3,y1-95);
       line(x1,y1-100,x1+3,y1-95);
          setcolor(RED);
          settextstyle(SMALL_FONT,HORIZ_DIR,3);
       outtextxy(220,105,"0");
       outtextxy(210,1,"100");
       outtextxy(210,25,"75");
       outtextxy(210,50,"50");
       outtextxy(210,75,"25");
       outtextxy(240,105,"25");
       outtextxy(265,105,"50");
       outtextxy(290,105,"75");
       outtextxy(310,105,"100");
       settextstyle(SMALL_FONT,HORIZ_DIR,4);
       outtextxy(300,110,"f");
       settextstyle(SMALL_FONT,HORIZ_DIR,4);
       outtextxy(215,32,"i");
       setcolor(12);
       line(x1+25,y1-3,x1+25,y1+3);
       line(x1+50,y1-3,x1+50,y1+3);
       line(x1+75,y1-3,x1+75,y1+3);
       line(x1+99,y1-3,x1+99,y1+3);
       line(x1+3,y1-25,x1-3,y1-25);
       line(x1+3,y1-50,x1-3,y1-50);
       line(x1+3,y1-75,x1-3,y1-75);
       line(x1+3,y1-99,x1-3,y1-99);
       outtextxy(220,120,"FREQUENCY CURVE");
       mm=2;
  for(kk=1;kk<=100;kk++)
    {for(i=1;i<=d;i++)
{c[i]=0;l[i]=0;
   for(j=0;j<=e[i];j++)
   {
   switch(e1[i][j])
   {
   case 'c':
         c1[i][j]=1/(2*3.14*(mm)*cc[i][j]);
         c[i]=c[i]+c1[i][j];
         break;
   case 'l':
      l1[i][j]=ll[i][j]*2*3.14*(mm);
      l[i]=l[i]+l1[i][j];
      break;}
      k[i]=l[i]+c[i];}}
```

```
r2[1]=r[1]+r[2];
r2[2]=r[3];
r2[3]=r[4];
r2[4]=r[5];
r2[5]=r[6]+r[7];
 k2[1]=k[1]+k[2];
k2[2]=k[3];
k2[3]=k[4];
k2[4]=k[5];
k2[5]=k[6]+k[7];
 for(i=1;i<=5;i++)
   {
   z11[i]=r2[i]/(r2[i]*r2[i]+k2[i]*k2[i]);
    z12[i]=(-1)*(k2[i])/(r2[i]*r2[i]-k2[i]*k2[i]);
    }
    m[1][1]=z11[1]+z11[2]+z11[3];
    m[1][2]=(-1)*z11[3];
    m[2][1]=m[1][2];
    m[2][2]=z11[3]+z11[4]+z11[5];
    m1[1][1]=z12[1]+z12[2]+z12[3];
    m1[1][2]=(-1)*z12[3];
    m1[2][1]=m1[1][2];
    m1[2][2]=z12[3]+z12[4]+z12[5];
      if(v[1]!=0)
      {i1[1]=v[1]/mag(r2[1],k2[1]);
       a1[1]=a[1]-(ang(r2[1],k2[1]));}
      if(v[3]!=0)
      {i1[3]=v[3]/mag(r2[2],k2[2]);
      a1[3]=a[3]-ang(r2[2],k2[2]);}
      if(v[5]!=0)
      {i1[5]=v[5]/mag(r2[4],k2[4]);
      a1[5]=a[5]-ang(r2[4],k2[4]);}
      if(v[7]!=0)
     { i1[7]=v[7]/mag(r2[5],k2[5]);
      a1[7]=a[7]-ang(r2[5],k2[5]);}
      i2[1]=i1[1]*cos(a1[1]*3.14/180);
      a3[1]=i1[1]*sin(a1[1]*3.14/180);
      i2[3]=i1[3]*cos(a1[3]*3.14/180);
      a3[3]=i1[3]*sin(a1[3]*3.14/180);
      i2[5]=i1[5]*cos(a1[5]*3.14/180);
      a3[5]=i1[5]*sin(a1[5]*3.14/180);
      i2[7]=i1[7]*cos(a1[7]*3.14/180);
      a3[7]=i1[7]*sin(a1[7]*3.14/180);
      i4[1]=i2[1]+i2[3];
      i4[2]=i2[5]+i2[7];
      a4[1]=a3[1]+a3[3];
      a4[2]=a3[5]+a3[7];
      i3[3]=mdet(m,m1);
      a4[3]=mdet1(m,m1);
        m3[1][2]=m[1][2];
```

```
                m3[2][2]=m[2][2];
                m4[1][2]=m1[1][2];
                m4[2][2]=m1[2][2];
                m3[1][1]=i4[1];
                m3[2][1]=i4[2];
                m4[1][1]=a4[1];
                m4[2][1]=a4[2];
                i3[4]=mdet(m3,m4);
                a4[4]=mdet1(m3,m4);
               m3[1][1]=m[1][1];
                m3[2][1]=m[2][1];
                m4[1][1]=m1[1][1];
                m4[2][1]=m1[2][1];
                m3[1][2]=i4[1];
                m3[2][2]=i4[2];
                m4[1][2]=a4[1];
                m4[2][2]=a4[2];
             i3[5]=mdet(m3,m4);
               a4[5]=mdet1(m3,m4);
          xx4=i3[4]/i3[3];
          yy4=a4[4]-a4[3];
          xx5=i3[5]/i3[3];
          yy5=a4[5]-a4[3];
         xx2=xx5*cos(3.14*yy5/180);
         yy2=xx5*sin(3.14*yy5/180);
         xx1=xx4*cos(3.14*yy4/180);
         yy1=xx4*sin(3.14*yy4/180);
  if(v[1]!=0)
  {xx3=v1[1]-xx1;
  yy3=a2[1]-yy1;
  ct1=(xx3*r2[1]-yy3*(-1)*k2[1])/(r2[1]*r2[1]+k2[1]*k2[1]
ct2=(xx3*(-1)*k2[1]+yy3*r2[1])/(r2[1]*r2[1]+k2[1]*k2[1]);
ct5[1]=ct1;
ct6[1]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
 }
 else
     { if(i1[1]!=0)
     {ct1=i1[1];
ct2=a1[1];
ct5[1]=ct1*cos(ct2*3.14/180);
 ct6[1]=ct1*sin(ct2*3.14/180);
   }
   else
    {ct1=xx4/mag(r2[1],k2[1]);
ct2=yy4-ang(r2[1],k2[1]);
 ct5[1]=ct1*cos(ct2*3.14/180);
 ct6[1]=ct1*sin(ct2*3.14/180);}}
```

```
   if(v[3]!=0)
   { xx3=xx1-v1[3];
   yy3=yy1-a2[3];
   ct1=(xx3*r2[2]-yy3*(-1)*k2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
ct2=(xx3*(-1)*k2[2]+yy3*r2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
ct5[2]=ct1;
ct6[2]=ct2;
   ct3=mag(ct1,ct2);
   ct2=ang(ct1,ct2);
 }
 else
    {if(i1[3]!=0)
      {ct1=(-1)*i1[3];
      ct2=(-1)*a1[3];
 ct5[2]=ct1;
ct6[2]=ct2;
    }
   else
      {ct1=xx4/mag(r2[2],k2[2]);
ct2=yy4-ang(r2[2],k2[2]);
   ct5[2]=ct1*cos(ct2*3.14/180);
 ct6[2]=ct1*sin(ct2*3.14/180);
   }
    }
 if(v[5]!=0)
   {xx3=xx2-v1[5];
   yy3=yy2-a2[5];
   ct1=(xx3*r2[4]-yy3*(-1)*k2[4])/(r2[4]*r2[4]+k2[4]*k2[4]);
ct2=(xx3*(-1)*k2[4]+yy3*r2[4])/(r2[4]*r2[4]+k2[4]*k2[4]);
ct5[4]=ct1;
ct6[4]=ct2;
   ct3=mag(ct1,ct2);
   ct2=ang(ct1,ct2);
 }
 else
    {if(i1[5]!=0)
      {ct1=(-1)*i1[5];
ct2=(-1)*a1[5];
ct5[4]=ct1;
ct6[4]=ct2;
 }
 else
    { ct1=xx5/mag(r2[4],k2[4]);
ct2=yy5-ang(r2[4],k2[4]);
   ct5[4]=ct1*cos(ct2*3.14/180);
 ct6[4]=ct1*sin(ct2*3.14/180);}}
  if(v[7]!=0)
  {xx3=xx2-v1[7];
  yy3=yy2-a2[7];
ct1=(xx3*r2[5]-yy3*(-1)*k2[5])/(r2[5]*r2[5]+k2[5]*k2[5]);
```

```
 float mdet(float x[5][5],float y[5][5])
{
double d,d1,d2,d3;
d=x[1][1]*x[2][2]-y[1][1]*y[2][2];
d1=x[1][1]*y[2][2]+y[1][1]*x[2][2];
d2=x[2][1]*x[1][2]-y[2][1]*y[1][2];
d3=x[2][1]*y[1][2]+y[2][1]*x[1][2];
d=d-d2;
d1=d1-d3;
d=mag(d,d1);
return(d);}


float mdet1(float x[5][5],float y[5][5])
 {
double d,d1,d2,d3;
d=x[1][1]*x[2][2]-y[1][1]*y[2][2];
d1=x[1][1]*y[2][2]+y[1][1]*x[2][2];
d2=x[2][1]*x[1][2]-y[2][1]*y[1][2];
d3=x[2][1]*y[1][2]+y[2][1]*x[1][2];
d=d-d2;
d1=d1-d3;
d=ang(d,d1);
return(d);}
```

```
/*PROGRAM TO DRAW FREQ.RES. FOR 4 LOOP 4.C*/

#include<graphics.h>
#include<math.h>
#include<stdio.h>
 float  mag(float x,float y);
  float ang(float x,float y);
  float mdet(float x[10][10],float y[10][10]);
  float mdet1(float x[10][10],float y[10][10]);
  float mdet2(float x[10][10],float y[10][10]);
  float mdet3(float x[10][10],float y[10][10]);
  FILE      *fp1,*fopen();
   main()

      { int i,j,d,ff,n,mm,kk,driver,mode;
        int e[10];
        float xx,yy,x1,y1,cc[10][10],l[10][10];
   float m[10][10],m1[10][10],m2[10][10],m3[10][10];
   float m4[10][10],r8[10],k8[10];
   char e1[10][10];
   float c[10],a[10],k2[10],z1[10],z12[10];
   float r2[10],k[10],a1[10],r[10],l[10],v[10],i1[10];
   float c1[10][10],r1[10][10],l1[10][10],i16,i11,i12,i13,i14,i
   float k3[10],i2[10],i3[20],i4[10],i5[10],v8[10];
   float a7[10],a5,a6,r3[10];
   float v7,a8,k5,k6,a2[10],v1[10],a3[10];
   float a4[20],r4,r5,r6,k4,xx1,yy1,k7[10];
   float ct3,xx35,xx45,xx2,xx3,yy2,yy3,xx4;
   float yy4,ct1,ct2,r7[10],i10,xx5,yy5;
   float ct5[10],ct6[10],xx7,yy7,xx6,yy6,lc8[10];
   double lc1[10],lc2[10];
   clrscr();
     fp1=fopen("re1.dat","r");

      fscanf(fp1,"%d",&d);
          clrscr();
          printf("%d",d);
          getch();
     for(i=1;i<=d;i++)
     {
      fscanf(fp1,"%d ",&e[i]);
      printf("\n%d",e[i]);
          getch();
     for(j=1;j<=e[i];j++)
     {
  fscanf(fp1,"%c ",&e1[i][j]);
  fscanf(fp1,"%f %f %f %f %f ",&r1[i],&c1[i][j],&l1[i][j],
                          &kk[i],&v[i]);
  fscanf(fp1,"%f %f %f ",&a[i],&i1[i],&e1[i]);
                        }
        printf("\n");
                          }
                    getch();
```

```
        driver=CGA;
        mode=CGAC1;
        initgraph(&driver,&mode,"a:\\");
        x1=220;y1=100;
        line(x1+100,y1,x1,y1);
        line(x1,y1,x1,y1-100);
        line(x1+100,y1,x1+95,y1-3);
        line(x1+100,y1,x1+95,y1+3);
        line(x1,y1-100,x1-3,y1-95);
        line(x1,y1-100,x1+3,y1-95);
           setcolor(RED);
           settextstyle(SMALL_FONT,HORIZ_DIR,3);
        outtextxy(220,105,"0");
        outtextxy(210.1,"100");
        outtextxy(210,25,"75");
        outtextxy(210,50,"50");
        outtextxy(210,75,"25");
        outtextxy(240,105,"25");
        outtextxy(265,105,"50");
        outtextxy(290,105,"75");
        outtextxy(310,105,"100");
        settextstyle(SMALL_FONT,HORIZ_DIR,4);
        outtextxy(300,110,"f");
        settextstyle(SMALL_FONT,HORIZ_DIR,4);
        outtextxy(215,32,"f");
        setcolor(12);
        line(x1+25,y1-3,x1+25,y1+3);
        line(x1+50,y1-3,x1-50,y1-3);
        line(x1+75,y1-3,x1+75,y1+3);
        line(x1+99,y1-3,x1+99,y1+3);
        line(x1+3,y1-25,x1-3,y1-25);
        line(x1+3,y1-50,x1-3,y1-50);
        line(x1+3,y1-75,x1-3,y1-75);
        line(x1+3,y1-99,x1-3,y1-99);
        outtextxy(220,120,"FREQUENCY CURVE");
        mm=2;
for(kk=1;kk<=100;kk++)
      {for(i=1;i<=d;i++)
  {c[i]=0;l[i]=0;
     for(j=0;j<=e[i];j++)
     {
     switch(e1[i][j])
     {
     case 'c':
          c1[i][j]=1/(2*3.14*(mm)*cc[i][j]);
          c[i]=c[i]+c1[i][j];
          break;
     case 'l':
        l1[i][j]=l[i][j]*2*3.14*(mm);
        l[i]=l[i]+l1[i][j];
```

```
 r2[1]=r[1]+r[2];
 r2[2]=r[3];
 break;
}
k[i]=l[i]+c[i];}}


 r2[3]=r[4];
 r2[4]=r[5];
 r2[5]=r[6];
 r2[6]=r[7];
 r2[7]=r[8]+r[9];
  k2[1]=k[1]+k[2];
 k2[2]=k[3];
 k2[3]=k[4];
 k2[4]=k[5];
 k2[5]=k[6];
 k2[6]=k[7];
 k2[7]=k[8]+k[9];
  for(i=1;i<=7;i++)
    {
    z11[i]=r2[i]/(r2[i]*r2[i]+k2[i]*k2[i] );
     z12[i]=(-1)*(k2[i])/(r2[i]*r2[i]+k2[i]*k2[i]);
     }
     m[1][1]=z11[1]+z11[2]+z11[3];
     m[1][2]=(-1)*z11[3];
     m[1][3]=0;
     m[2][1]=m[1][2];
     m[2][2]=z11[3]+z11[4]+z11[5];
     m[2][3]=(-1)*z11[5];
     m[3][1]=0;
     m[3][2]=m[2][3];
     m[3][3]=z11[5]+z11[6]+z11[7];
     m1[1][1]=z12[1]+z12[2]+z12[3];
     m1[1][2]=(-1)*z12[3];
     m1[1][3]=0;
     m1[2][1]=m1[1][2];
     m1[2][2]=z12[3]+z12[4]+z12[5];
     m1[2][3]=(-1)*z12[5];
     m1[3][1]=0;
     m1[3][2]=m1[2][3];
     m1[3][3]=z12[5]+z12[6]+z12[7];
       if(v[1]!=0)
       {i1[1]=v[1]/mag(r2[1],k2[1]);
        a2[1]=a[1]-(ang(r2[1],k2[1]));}
       if(v[3]!=0)
       {i1[3]=v[3]/mag(r2[2],k2[2]);
       a2[3]=a[3]-ang(r2[2],k2[2]);}
       if(v[5]!=0)
       {i1[5]=v[5]/mag(r2[4],k2[4]);
       a2[5]=a[5]-ang(r2[4],k2[4]);}
       if(v[7]!=0)
```

```
{ i1[7]=v[7]/mag(r2[6],k2[6]);
 a2[7]=a[7]-ang(r2[6],k2[6]);}
 if(v[9]!=0)
{ i1[9]=v[9]/mag(r2[7],k2[7]);
 a2[9]=a[9]-ang(r2[7],k2[7]);}
 i2[1]=i1[1]*cos(a2[1]*3.14/180);
 a3[1]=i1[1]*sin(a2[1]*3.14/180);
 i2[3]=i1[3]*cos(a2[3]*3.14/180);
 a3[3]=i1[3]*sin(a2[3]*3.14/180);
 i2[5]=i1[5]*cos(a2[5]*3.14/180);
 a3[5]=i1[5]*sin(a2[5]*3.14/180);
 i2[7]=i1[7]*cos(a2[7]*3.14/180);
 a3[7]=i1[7]*sin(a2[7]*3.14/180);
 i2[9]=i1[9]*cos(a2[9]*3.14/180);
 a3[9]=i1[9]*sin(a2[9]*3.14/180 );
 i4[1]=i2[1]+i2[3];
 i4[2]=i2[5]+i2[7];
 a4[1]=a3[1]+a3[3];
 a4[2]=a3[5]+a3[7];
 i4[3]=i2[7]+i2[9];
 a4[3]=a3[7]+a3[9];
 i3[10]=mdet2(m,m1);
 a4[10]=mdet3(m,m1);
  for(i=1;i<=3;i++)
     {for(j=1;j<=3;j++)
       {m3[i][j]=m[i][j];
        m4[i][j]=m1[i][j];}}
    m3[1][1]=i4[1];
    m3[2][1]=i4[2];
    m3[3][1]=i4[3];
    m4[1][1]=a4[1];
    m4[2][1]=a4[2];
    m4[3][1]=a3[3];
    i3[11]=mdet2(m3,m4);
    a4[11]=mdet3(m3,m4);
    for(i=1;i<=3;i++)
     {for(j=1;j<=3;j++)
       {m3[i][j]=m[i][j];
        m4[i][j]=m1[i][j];}}
    m3[1][2]=i4[1];
    m3[2][2]=i4[2];
    m3[3][2]=i4[3];
    m4[1][2]=a4[1];
```

```
                    {m3[i][j]=m[i][j];
                     m4[i][j]=m1[i][j];}}
                  m3[1][3]=i4[1];
                  m3[2][3]=i4[2];
                  m3[3][3]=i4[3];
                  m4[1][3]=a4[1];
                  m4[2][3]=a4[2];
                  m4[3][3]=a3[3];
                  i3[13]=mdet2(m3,m4);
                 a4[13]=mdet3(m3,m4);
           xx4=i3[11]/i3[10];
           yy4=a4[11]-a4[10];
           xx5=i3[12]/i3[10];
           yy5=a4[12]-a4[10];
           xx6=i3[13]/i3[10];
           yy6=a4[13]-a4[10];
          xx2=xx5*cos(3.14*yy5/180);
          yy2=xx5*sin(3.14*yy5/180);
          xx1=xx4*cos(3.14*yy4/180);
          yy1=xx4*sin(3.14*yy4/180);
          xx7=xx6*cos(3.14*yy6/180);
          yy7=xx6*sin(3.14*yy6/180);
   if(v[1]!=0)
   {xx3=v1[1]-xx1;
   yy3=a2[1]-yy1;
   ct1=(xx3*r2[1]-yy3*(-1)*k2[1])/(r2[1]*r2[1]+k2[1]*k2[1]);
ct2=(xx3*(-1)*k2[1]+yy3*r2[1])/(r2[1]*r2[1]-k2[1]*k2[1]);
ct5[1]=ct1;
ct6[1]=ct2;
   ct3=mag(ct1,ct2);
   ct2=ang(ct1,ct2);
 }
 else
      { if(i1[1]!=0)
      {ct1=i1[1];
ct2=a1[1];
ct5[1]=ct1;
ct6[1]=ct2;
   }
    else
     {ct1=xx4/mag(r2[1],k2[1]);
ct2=yy4-ang(r2[1],k2[1]);
 ct5[1]=ct1*cos(ct2*3.14/180);
 ct6[1]=ct1*sin(ct2*3.14/180);}}
  if(v[3]!=0)
  {xx3=xx1-v1[3];
  yy3=yy1-a2[3];
  ct1=(xx3*r2[2]-yy3*(-1)*k2[2])/(r2[2]*r2[2]+k2[2]*k2[2]);
ct2=(xx3*(-1)*k2[2]+yy3*r2[2])/(r2[2]*r2[2]-k2[2]*k2[2]);
```

```
 ct5[2]=ct1;
ct6[2]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
 }
   else
    {if(i1[3]!=0)
      {ct1=(-1)*i1[3];
ct2=(-1)*a1[1];
 ct5[2]=ct1;
ct6[2]=ct2;
   }
  else
     {ct1=xx4/mag(r2[2],k2[2]);
ct2=yy4-ang(r2[2],k2[2]);
  ct5[2]=ct1*cos(ct2*3.14/180);
 ct6[2]=ct1*sin(ct2*3.14/180);
  }
   }
     xx3=xx1-xx2;
  yy3=yy1-yy2;
  ct1=(xx3*r2[3]-yy3*(-1)*k2[3])/(r2[3]*r2[3]-k2[3]*k2[3]);
ct2=(xx3*(-1)*k2[3]+yy3*r2[3])/(r2[3]*r2[3]-k2[3]*k2[3]);
   ct5[3]=ct1;
ct6[3]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
 if(v[5]!=0)
  {xx3=xx2-v1[5];
  yy3=yy2-a2[5];
  ct1=(xx3*r2[4]-yy3*(-1)*k2[4])/(r2[4]*r2[4]+k2[4]*k2[4]);
ct2=(xx3*(-1)*k2[4]+yy3*r2[4])/(r2[4]*r2[4]-k2[4]*k2[4]);
ct5[4]=ct1;
ct6[4]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
 }
 else
   {if(i1[5]!=0)
     {ct1=(-1)*i1[5];
ct2=(-1)*a1[5];
ct5[4]=ct1;
ct6[4]=ct2;
 }
 else
   { ct1=xx5/mag(r2[4],k2[4]);
ct2=yy5-ang(r2[4],k2[4]);
   ct5[4]=ct1*cos(ct2*3.14/180);
 ct6[4]=ct1*sin(ct2*3.14/180);}}
```

```
      xx3=xx2-xx7;
   yy3=yy2-yy7;
   ct1=(xx3*r2[5]-yy3*(-1)*k2[5])/(r2[5]*r2[5]+k2[5]*k2[5]
ct2=(xx3*(-1)*k2[5]+yy3*r2[5])/(r2[5]*r2[5]+k2[5]*k2[5]);
    ct5[5]=ct1;
ct6[5]=ct2;
   ct3=mag(ct1,ct2);
   ct2=ang(ct1,ct2);
   if(v[7]!=0)
   {xx3=xx7-v1[7];
   yy3=yy7-a2[7];
   ct1=(xx3*r2[6]-yy3*(-1)*k2[6])/(r2[5]*r2[6]+k2[6]*k2[6]
ct2=(xx3*(-1)*k2[6]+yy3*r2[6])/(r2[6]*r2[6]+k2[6]*k2[6]);
ct5[6]=ct1;
ct6[6]=ct2;
   ct3=mag(ct1,ct2);
   ct2=ang(ct1,ct2);
 }
 else
    {if(i1[7]!=0)
      {ct1=(-1)*a1[7];
ct2=(-1)*a1[7];;
ct5[6]=ct1;
ct6[6]=ct2;
      }
  else
    {ct1=xx7/mag(r2[6],k2[6]);
ct2=yy7-ang(r2[6],k2[6]);
    ct5[6]=ct1*cos(ct2*3.14/180);
 ct6[6]=ct1*sin(ct2*3.14/180);
  }
   }
    if(v[9]!=0)
  {xx3=xx7-v1[9];
  yy3=yy7-a2[9];
  ct1=(xx3*r2[7]-yy3*(-1)*k2[7])/(r2[7]*r2[7]+k2[7]*k2[7])
ct2=(xx3*(-1)*k2[7]+yy3*r2[7])/(r2[7]*r2[7]+k2[7]*k2[7]);
ct5[7]=ct1;
ct6[7]=ct2;
  ct3=mag(ct1,ct2);
  ct2=ang(ct1,ct2);
 }
 else
   {if(i1[9]!=0)
     {ct1=(-1)*i1[9];
ct2=(-1)*a1[9];
ct5[7]=ct1;
ct6[7]=ct2;}
```

```
        else
       {ct1=xx7/mag(r2[7],k2[7]);
     ct2=yy7-ang(r2[7],k2[7]);
       ct5[7]=ct1*cos(ct2*3.14/180);
      ct6[7]=ct1*sin(ct2*3.14/180);}
       lo1[4]=mag(ct5[7],ct6[7]);
       lo2[4]=ang(ct5[7],ct6[7]);
       lo1[5]=lo1[4]*cos(3.14*lo2[4]/180);
       lo2[5]=lo1[4]*sin(3.14*lo2[4]/180);
       lo1[3]=mag(ct5[6]+lo1[5],ct6[6]+lo2[5]);
       lo2[3]=ang(ct5[6]+lo1[5],ct6[6]+lo2[5]);
       lo1[5]=lo1[3]*cos(3.14*lo2[3]/180);
       lo2[5]=lo1[3]*sin(3.14*lo2[3]/180);
       lo1[2]=mag(ct5[4]+lo1[5],ct6[4]+lo2[5]);
       lo2[2]=ang(ct5[4]+lo1[5],ct6[4]+lo2[5]);
       lo1[5]=lo1[2]*cos(3.14*lo2[2]/180);
       lo2[5]=lo1[2]*sin(3.14*lo2[2]/180);
       lo1[1]=mag(ct5[2]+lo1[5],ct6[2]+lo2[5]);
       lo2[1]=ang(ct5[2]+lo1[5],ct6[2]+lo2[5]);
       if(kk==1)
            {lo1[6]=lo1[1];
            lo1[7]=lo1[2];
            lo1[8]=lo1[3];
            lo1[9]=lo1[4];}
            putpixel(x1+kk,y1-abs(lo1[1]),2);
            putpixel(x1+kk,y1-abs(lo1[2]),2);
            putpixel(x1+kk,y1-abs(lo1[3]),2);
            putpixel(x1+kk,y1-abs(lo1[4]),2);
         lo1[6]=lo1[1];
           lo1[7]=lo1[2];
           lo1[8]=lo1[3];
           lo1[9]=lo1[4];
       mm=mm+4;}
       outtextxy(x1+kk-5,y1-abs(lo1[1])-10,"1");
       outtextxy(x1+kk-10,y1-abs(lo1[2])-10,"2");
       outtextxy(x1+kk-20,y1-abs(lo1[3])-10,"3");
       outtextxy(x1+kk-27,y1-abs(lo1[4])-10,"4");
              }


    float mdet2(float x[10][10],float y[10][10]
    {
      double d,d1,d2,d3,r1,r2,r3,r4,r5,r6;
d=x[2][2]*x[3][3]-y[2][2]*y[3][3];
d1=x[2][2]*y[3][3]+y[2][2]*x[3][3];
d2=x[3][2]*x[2][3]-y[3][2]*y[2][3];
d3=x[3][2]*y[2][3]+y[3][2]*x[2][3];
d=d-d2;
d1=d1-d3;
d2=x[1][1]*d-y[1][1]*d1;
```

```
   d3=x[1][1]*d1+y[1][1]*d;
   r1=d2;
   r2=d3;
d=x[2][1]*x[3][3]-y[2][1]*y[3][3];
d1=x[2][1]*y[3][3]+y[2][1]*x[3][3];
d2=x[3][1]*x[2][3]-y[3][1]*y[2][3];
d3=x[3][1]*y[2][3]+y[3][1]*x[2][3];
d=d-d2;
d1=d1-d3;
d2=x[1][2]*d-y[1][2]*d1;
d3=x[1][2]*d1+y[1][2]*d;
r3=d2;
r4=d3;
d=x[2][1]*x[3][2]-y[2][1]*y[3][2];
d1=x[2][1]*y[3][2]+y[2][1]*x[3][2];
d2=x[3][1]*x[2][2]-y[3][1]*y[2][2];
d3=x[3][1]*y[2][2]-y[3][1]*x[2][2];
d=d-d2;
d1=d1-d3;
d2=x[1][3]*d-y[1][3]*d1;
d3=x[1][3]*d1+y[1][3]*d;
r5=d2;
r6=d3;
r1=r1-r3+r5;
r2=r2-r4+r6;
return(mag(r1,r2));
}

float mdet3(float x[10][10],float y[10][10]
   {
     double d,d1,d2,d3,r1,r2,r3,r4,r5,r6;
d=x[2][2]*x[3][3]-y[2][2]*y[3][3];
d1=x[2][2]*y[3][3]+y[2][2]*x[3][3];
d2=x[3][2]*x[2][3]-y[3][2]*y[2][3];
d3=x[3][2]*y[2][3]+y[3][2]*x[2][3];
d=d-d2;
d1=d1-d3;
d2=x[1][1]*d-y[1][1]*d1;
d3=x[1][1]*d1+y[1][1]*d;
r1=d2;
r2=d3;
d=x[2][1]*x[3][3]-y[2][1]*y[3][3];
d1=x[2][1]*y[3][3]+y[2][1]*x[3][3];
d2=x[3][1]*x[2][3]-y[3][1]*y[2][3];
d3=x[3][1]*y[2][3]+y[3][1]*x[2][3];
d=d-d2;
d1=d1-d3;
d2=x[1][2]*d-y[1][2]*d1;
d3=x[1][2]*d1+y[1][2]*d;
r3=d2;
r4=d3;
```

```
d=x[2][1]*x[3][2]-y[2][1]*y[3][2];
d1=x[2][1]*y[3][2]+y[2][1]*x[3][2];
d2=x[3][1]*x[2][2]-y[3][1]*y[2][2];
d3=x[3][1]*y[2][2]+y[3][1]*x[2][2];
d=d-d2;
d1=d1-d3;
d2=x[1][3]*d-y[1][3]*d1;
d3=x[1][3]*d1+y[1][3]*d;
r5=d2;
r6=d3;
r1=r1-r3+r5;
r2=r2-r4+r6;
return(ang(r1,r2));
}
```

```
                /* MAIN PROGRAM */

      #include<stdio.h>
      #include<math.h>
      #include<graphics.h>
      #include<dos.h>
      #include "b:box.c"
      #include "b:menu.c"
      #include "b:clear.c"
      #include "b:branch.c"
      #include "b:det1.c"
      #include "b:det2.c"
      #include "b:disind.c"
      #include "b:disres.c"
      #include "b:disv.c"
      #include "b:disct.c"
      #include "b:rotc.c"
      #include "b:rota.c"

      void  mm(float ab[10][10],float ba[10][10],
                    float bc[10][10],int pt1);
      void scal (float sx11, float sx22);
      void tr(float txx,float tyy);

        static char na[][50]={"RESISTANCE","VOLTAGE",
 "CAPCITANCE","CURRENT","INDUCTANCE","LINE"
 ,"PREVIOUSSTEP","MAINMENU"};
        static char na1[][50]={" HELP "," PROGRAM "," EXIT "};
        static char na2[][50]={" press ENTER to continue"};
        static char na3[][50]={"SINGLE LOOP","DOUBLE LOOP"
      ,"TRIPLE LOOP","QUDRAPLE LOOP","MAIN MENU"};
        static char na4[][50]={"CAPACITANCE c1","REACTANCE xc"
        ,"PRESTEP"};
        static char na5[][50]={"INDUCTANCE l" "REACTANCE xl"
          ,"PRESTEP"};

     float t[10][10],rc[10][10],s[10][10];
      FILE *fpt,*fp,*fopen();
       main()
          {

int n,i,k2,sat,ii,sc,c5,j,d,k1,k,m,x1;
int y1,x2,li,y2,x,y,driver,mode,pt;
int  sat1[10][10],tx,ty,cho,i2,i3,i4,i5,i6,i7,e1[3][3],i8;
      float sx,s1,txxx,tyyy,p[10][10],ff=50.0;
      float c6[10][10],c[10][10];
      float c2[10][10] ;
      float c1[10][10],l1[10][10],s1[13],v[10],e[3][3];
      float i1[10],rr[10][10];
      float kk[10],l[10],a3[10],i2[10],a[10];
      float v1[10],a2[10],c7[10];
char cc,e1[3][3];
```

```
    clrscr();
textmode();
    textbackground(BLUE);
      gotoxy(40,12);
      textcolor(RED);
    printf("ELECTRIC CICUIT ANALYSIS");
    delay(100);
    clrscr();

    15: sat=2;
       windo(2,2,23,78,'d');
        cho=menu(5,18,na2,1);
       clear(17,2,20,30,0x1d);
      textcolor(2);

      cho=menu(10,10,na1,3);
       clear(9,9,14,25,0x1d);
       textcolor(BLUE);
       /*help*/
       if(cho==2)
       goto 13;        /* CONTINUATION*/
       if(cho==3)
       goto 14;         /*EXIT*/

     13:  sat=2;
   windo(14,40,16,55,'d');
    textcolor(2);
    gotoxy(41,15);
    cprintf("NO. OF LOOPS");
    cho=menu(5,5,na3,5);
    clear(4,4,11,27,0x1d);
    if(cho==5)
    { clear(13,38,13,57,0x1d);
    goto 15;}           /* TO MAIN MENU*/
    else{
       n=cho;
     d=2*n+1;
     windo(3,30,5,60,'d');
     for(i=1;i<=d;i++)
     {  if(i==d) {
       windo(18,55,21,75,'d');
       gotoxy(56,19);
       textcolor(12);
         printf("L A S T B R A N C H");
       gotoxy(31,4);
        if(i<=2)
        ii=1;
        if(i==3)
        {  if((d==3)||(n==1))
             ii=1;
```

```
        else
          textcolor(2);
          cprintf("COMMON TO LOOP 1&2");
         goto 16; }
      if(i==4)
      ii=2;
        if(i==5)
      {  if((d==5)||(n==2))
           ii=2;
         else
           textcolor(2);
           cprintf("COMMON TO LOOP 2&3");
         goto 16; }
      if(i==6)
      ii=3;
    if(i==7)
      {  if(d==7)
           ii=3;
         else
           textcolor(2);
           cprintf("COMMON TO LOOP 3&4");
         goto 16; }
      if((i>7)&&(i<=9))
      ii=4;
      gotoxy(31,4);
      printf("                              ");
      gotoxy(31,4);
      textcolor(2);
      printf(" L O O P %d ",ii);

16:     windo(14,40,16,75,'d');
            gotoxy(41,15);
      textcolor(12);
      cprintf("NO. OF ELEMENTS IN %d BRANCH",i);
  17:  gotoxy(73,15);
      scanf("%d",&e[i]);
      for(j=1;j<=e[i];j++)
      { 112: cho=menu(4,4,na,8);
           clear(3,3,13,27,0x1d);
           if(cho==1)
           e1[i][j]='r';
            if(cho==2)
           e1[i][j]='v';
            if(cho==3)
            { sat=1;
              sat1[i][j]=menu(10,10,na4,3);
              clear(8,8,15,25,0x1d);
              if(sat1[i][j]==3)
              goto 112;
           e1[i][j]='c';}
```

```
                if(cho==4)
                 e1[i][j]='i';
                  if(cho==5)
                  {  sat=1;
                   sat1[i][j]=menu(10,10,mas,3);
                   clear(8,8,15,28,0x1d);
                   if(sat1[i][j]==3)
                   goto l12;
                 e1[i][j]='i';   }
                 if(cho==6)
                 e1[i][j]='j';
                  if(cho==7)
                  { gotoxy(73,15);
                  printf("  ");
                  goto l7;
                  }
                  if(cho==8)
                  {  clear(13,39,15,78,0x1d);
                      clear(2,29,7,82,0x1d);
                  goto l8;                  }
                  }
                  gotoxy(73,15);
                  printf(" ");
                  gotoxy(73,15);}
                  }
                   clear(13,39,15,78,0x1d);
                   clear(2,29,7,82,0x1d);
                   clear(17,54,21,78,0x1d);
                   for(i=2;i<=10;i++)
                   { windo(i+2,i+2,28-i,78-i,'d');
                    gotoxy(36,13);
                    printf("R E L A X...");
                    delay(100);
                     }

driver=CGA;
mode=CGAC1;
initgraph(&driver,&mode,"a:\\");
cleardevice();
setbkcolor(12);
rectangle(1,1,220,90);
rectangle(1,90,220,160);
   rectangle(1,160,220,199);
rectangle(220,1,319,199);

line(10,168,20,168);
line(20,168,22,165);
line(22,165,26,171);
line(26,171,30,165);
line(30,165,34,171);
```

```
    line(34,171,38,165);
    line(38,165,40,168);
    line(40,168,50,168);
    line(70,183,88,183);
    line(94,183,110,183);
    line(88,179,88,187);
    line(94,180,94,186);

    line(70,168,88,168);
    line(94,168,110,168);
    line(88,164,88,172);
    line(94,164,94,172);

    line(10,183,23,183);
    line(50,183,37,183);
    circle(28,183,5);
    circle(33,183,4);

    line(130,168,139,168);
    line(155,168,164,168);
       circle(141,168,2);
       circle(145,168,2);
       circle(149,168,2);
       circle(153,168,2);

    line(130,183,165,183);

    for(i=1;i<=d;i++)
    {
    for(j=1;j<=e[i];j++)
    {
       sx=1.0/e[i];
         if((i==2)||(i==4)||(i==6)||(i==8)
          { tx=(int)((50/e[i])*(j-1));
            ty=0;
            }

            else
            {tx=0;
            ty=(int)((50/e[i])*(j-1));
                                    }
     switch(i)
{
          case 1:x1=5;y1=5;
                 break;
          case 2:x1=5;y1=5;
                 break;
          case 3:
                  x1=55;y1=5;
                  break;
```

```
     case 4:
               x1=55;y1=5;
               break;
     case 5: x1=105;y1=5:
              break;
   case 6:
            x1=105;y1=5;
            break;
   case 7: x1=155;y1=5;
            break;
   case 8: x1=155;y1=5;
             break;
 case 9: x1=205;y1=5;
            break;
                }
                x1=x1+10;
                y1=y1+10;
switch(e1[i][j])
{
case 'r':

              p[1][1]=x1;
              p[2][1]=y1;
              p[1][2]=x1+3;
              p[2][2]=y1;
              p[1][3]=x1+13;
              p[2][3]=y1-3;
              p[1][4]=x1+19;
              p[2][4]=y1+3;
              p[1][5]=x1+25;
              p[2][5]=y1-3;
              p[1][6]=x1+31;
              p[2][6]=y1+3;
              p[1][7]=x1+37;
              p[2][7]=y1-3;
             p[1][8]=x1+40;
             p[2][8]=y1;
             p[1][9]=x1+50;  /* HORI. RES*/
             p[2][9]=y1;
             pt=9;
               for(k1=1;k1<=pt;k1++)
              p[3][k1]=1;
              tyyy=(-1)*p[2][1];
               txxx=(-1)*p[1][1];

            if((i==2)||(i==4)||(i==6)||(i==8))
          {
           tr(txxx,tyyy);
             mm(t,p,c,pt);
             scal(sx,sx);
```

```
                    mm(s,c,c6,pt);
                    tr(p[1][1],p[2][1]);
                    mm(t,c6,c2,pt);
                     tr(tx,ty);
                    mm(t,c2,c6,pt);
                    disres(c6,pt);}
                 else
                    { tr(txxx,tyyy);
                    mm(t,p,c,pt);
                     rotc(ro);
                    mm(ro,c,c6,pt);
                     tr(p[1][1],p[2][1]);
                    mm(t,c6,c2,pt);
                     tr(-p[1][1],-p[2][1]);
                    mm(t,c2,c,pt);
                     scal(sx,sx);
                    mm(s,c,c6,pt);
                     tr(p[1][1],p[2][1]);
                    mm(t,c6,c2,pt);
                     tr(tx,ty);
                    mm(t,c2,c6,pt);
                   disres(c6,pt);}
                    break;
case 'v':
                    p[1][1]=x1;
                    p[2][1]=y1;
                    p[1][2]=x1;                    /*VER. VOLTA*/
                    p[2][2]=y1+20;
                    p[1][3]=x1+5;
                    p[2][3]=y1+20;
                    p[1][4]=x1-5;
                    p[2][4]=y1+20;
                    p[1][5]=x1+3;
                    p[2][5]=y1+25;
                    p[1][6]=x1-3;
                    p[2][6]=y1+25;
                    p[1][7]=x1;
                    p[2][7]=y1+28;
                    p[1][8]=x1;
                    p[2][8]=y1+50;
                    pt=8;
                    for(k1=1;k1<=pt;k1++)
                    p[3][k1]=1;
                    if((i==1)||(i==3)||(i==5)||(i==7)    i==9)
                   {tr(-p[1][1],-p[2][1]);
                   mm(t,p,c,pt);
                    scal(sx,sx);
                   mm(s,c,c2,pt);
                    tr(p[1][1],p[2][1]);
```

```
                mm(t,c2,c6,pt);
                 tr(tx,ty);
                mm(t,c6,c,pt);
                disv(c);}
            else
                { tr(-p[1][2],-p[2][1]);
                mm(t,p,c,pt);
                 rota(ro);
                mm(ro,c,c2,pt);
                 tr(p[1][1],p[2][1]);
                mm(t,c2,c6,pt);
                 tr(-p[1][1],-p[2][1]);
                mm(t,c6,c,pt);
                 scal(sx,sx);
                mm(s,c,c2,pt);
                 tr(p[1][1],p[2][1]);
                mm(t,c2,c6,pt);
                 tr(tx,ty);
                mm(t,c6,c,pt);
               disv(c);}
                break;
case 'c':
                p[1][1]=x1;
                p[2][1]=y1;
                p[1][2]=x1;                    /*VERT. DAD*
                p[2][2]=y1+20;
                p[1][3]=x1-5;
                p[2][3]=y1+20;
                p[1][4]=x1-5;
                p[2][4]=y1+20;
                p[1][5]=x1+5;
                p[2][5]=y1+25;
                p[1][6]=x1-5;
                p[2][6]=y1+25;
                p[1][7]=x1;
                p[2][7]=y1+25;
                p[1][8]=x1;
                p[2][8]=y1+50;
                pt=8;
                 for(k1=1;k1<=pt;k1++)
               p[3][k1]=1;
              if((i==1)||(i==3)||(i==5)||(i==7)||(i==9))
              {tr(-p[1][1],-p[2][1]);
               mm(t,p,c,pt);
               scal(sx,sx);
               mm(s,c,c2,pt);
               tr(p[1][1],p[2][1]);
               mm(t,c2,c6,pt);
```

```
            tr(tx,ty);
            mm(t,c6,c,pt);
           disv(c);}
       else
         {                          tr(-p[1][1],-p[2][1]);
           mm(t,p,c,pt);
           rota(ro);
           mm(ro,c,c6,pt);
           tr(p[1][1],p[2][1]);
           mm(t,c6,c2,pt);
           tr(-p[1][1],-p[2][1]);
           mm(t,c2,c,pt);
           scal(sx,sx);
           mm(s,c,c6,pt);
           tr(p[1][1],p[2][1]);
           mm(t,c6,c2,pt);
           tr(tx,ty);
           mm(t,c2,c,pt);
        disv(c);}
         break;
case 'i':
           p[1][1]=x1;
           p[2][1]=y1;
           p[1][2]=x1+17;
           p[2][2]=y1;
           p[1][3]=x1+22;
           p[2][3]=y1;
           p[1][4]=x1+30;
           p[2][4]=y1;
           p[1][6]=x1+50;
           p[2][6]=y1;
           p[1][5]=x1+34;
           p[2][5]=y1;
           pt=6;
            for(k1=1;k1<=pt;k1--)
        p[3][k1]=1;
     if((i==2)||(i==4)||(i==6)||(i==8);
          {tr(-p[1][1],-p[2][1]);
        mm(t,p,c,pt);
        scal(sx,sx);
        mm(s,c,c2,pt);
        tr(p[1][1],p[2][1]);
        mm(t,c2,c6,pt);
        tr(tx,ty);
              mm(t,c6,c,pt);

       disct(c);}
   else
{
```

```
            tr(-p[1][1],-p[2][1]);
            mm(t,p,c,pt);
            rotc(rc);
            mm(rc,c,c2,pt);
            tr(p[1][1],p[2][1]);
            mm(t,c2,c6,pt);
            tr(-p[1][1],-p[2][1]);
            mm(t,c6,c,pt);
            scal(sx,sx);
            mm(s,c,c2,pt);
            tr(p[1][1],p[2][1]);
            mm(t,c2,c6,pt);
            tr(tx,ty);
            mm(t,c6,c,pt);
          disct(c); }
          break;
case 'l':
            p[1][1]=x1;
           p[2][1]=y1;
           p[1][2]=x1+10;                          /*HORI.
           p[2][2]=y1;
           p[1][3]=x1+18;
           p[2][3]=y1;
           p[1][4]=x1+21;
           p[2][4]=y1;
           p[1][5]=x1+28;
           p[2][5]=y1;
           p[1][6]=x1+37;
           p[2][6]=y1;
           p[1][7]=x1+40;
           p[2][7]=y1;
           p[1][8]=x1+50;
           p[2][8]=y1;
           pt=8;
            for(k1=1;k1<=pt;k1++)
          p[3][k1]=1;
    if((i==2)||(i==4)||(i==6)||(i==8))
      {tr(-p[1][1],-p[2][1]);
       mm(t,p,c,pt);
       scal(sx,sx);
       mm(s,c,c2,pt);
       tr(p[1][1],p[2][1]);
       mm(t,c2,c6,pt);
       tr(tx,ty);
       mm(t,c6,c,pt);
     disind(c);}
  else
  {
  tr(-p[1][1],-p[2][1]);
```

```
            mm(t,p,c,pt);
             rotc(ro);
             mm(ro,c,c2,pt);
             tr(p[1][1],p[2][1]);
             mm(t,c2,c6,pt);
             tr(-p[1][1],-p[2][1]);
             mm(t,c6,c,pt);
             scal(sx,sx);
             mm(s,c,c2,pt);
             tr(p[1][1],p[2][1]);
             mm(t,c2,c6,pt);
             tr(tx,ty);
             mm(t,c6,c,pt);
           disind(c);}
           break;
case 'j':      if((i==2)||(i==4)||(i==8)||(i==1))
            line(x1,y1,x1+50,y1);
            else
             line(x1,y1,x1,y1+50);
             break;
                  } /*switch*/
         }/*forj*/
        }/*for i*/
      switch (n)
      {
       case 1: line(15,65,64,65);
               break;
       case 2:line(15,65,64,65);
              line(65,65,117,65);
                 break;
       case 3:line(15,65,65,65);
              line(65,65,120,65);
              line(120,65,167,65);
            break;
       case 4:line(15,65,65,65);
              line(65,65,120,65);
              line(120,65,170,65);
               line(170,65,218,65);
             break;}
       fpt=fopen("re.dat","w");

       fp=fopen("re1.dat","w");
          fprintf(fp,"%d",d);
   for(i=1;i<=d;i++)
   {r1[i]=0; l1[i]=0; c7[i]=0;
     fprintf(fp,"\n%d",e[i]);
    for(j=1;j<=e[i];j++)
       {s1=6/e[i];
```

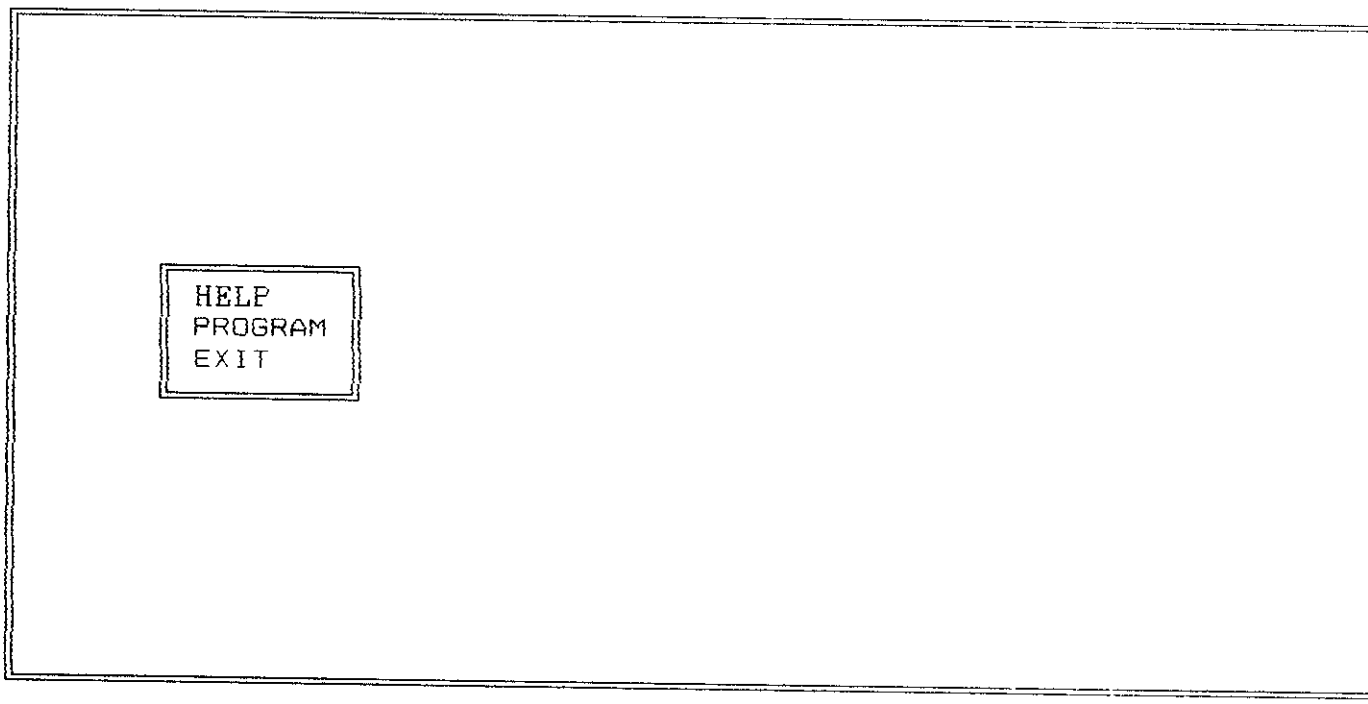
```
          switch(i)
        {
       case 1:
            x1=3;y1=1;
            break;

     case 2:
            x1=3;y1=2;
            break;
     case 3:
             x1=9;y1=2;
             break;
     case 4:
              x1=9;y1=2;
              break;
   case 5:
    x1=15;y1=1.5;
            break;
  case 6:
           x1=15;y1=2;
           break;
  case 7:
           x1=21;y1=2;
           break;
  case 8:
           x1=23;y1=2;
            break;
case 9:
           x1=27;y1=2;
           break;
               }


           if((i==1)||(i==3)||(i==5)||(i==7)||(i==9))
           {x1=x1;
             y1=y1+(j-1)*s1-s1/2;
         gotoxy(x1,y1);  }
           else
           {  x1=x1+(j-1)*s1-s1/2;
              y1=y1;
           gotoxy(x1,y1);
           }
           if(sat==2)
           {
          if(e1[i][j]=='p')

             {
             scanf("%f",&rr[i][j]);
               r1[i]=r1[i]-rr[i][j];
```

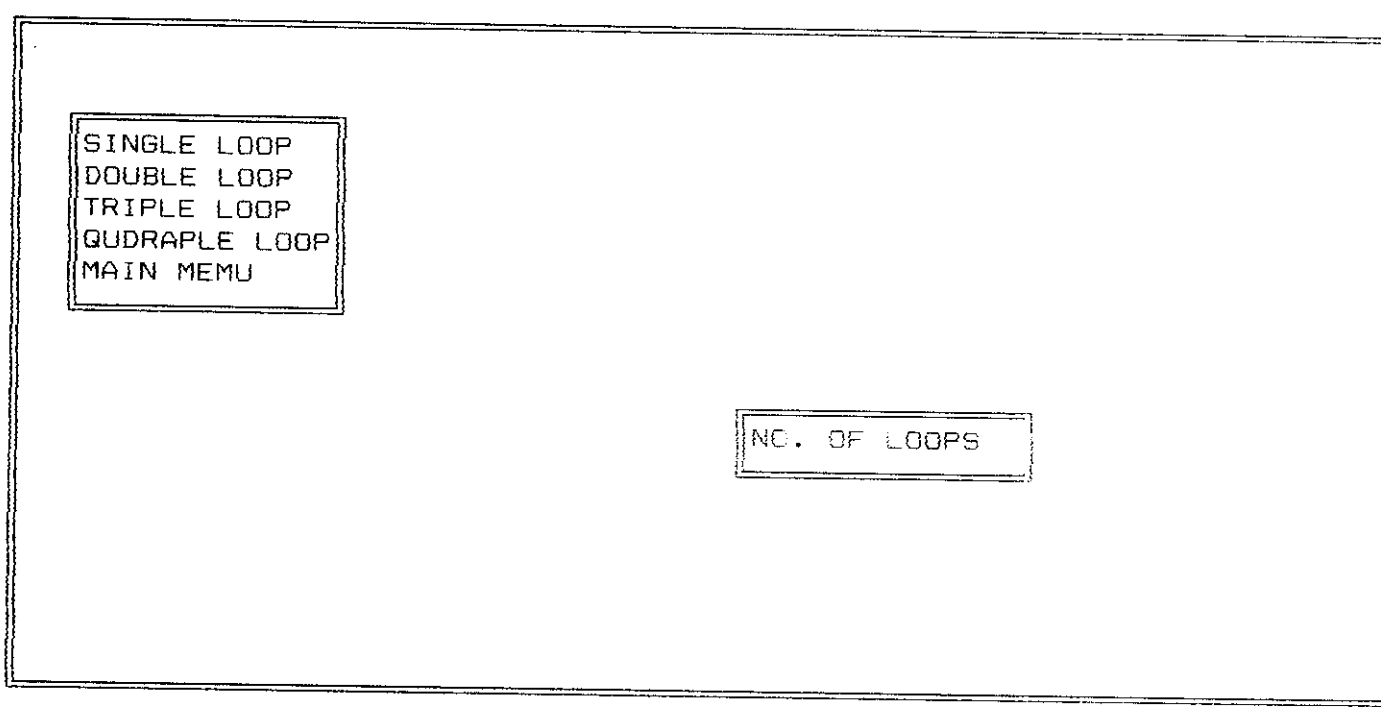
```
                    v1[i]=0;i1[i]=0;
                    outtextxy(x1+2,y1,"j");
                       }

                   if(e1[i][j]=='y')
                      {scanf("%f",&v[i]);
                     i1[i]=0;}
                    if(e1[i][j]=='i')
                      {scanf("%f",&i1[i]);
                      v[i]=0;}
                      .
                      if(sat==1)
                      {

   switch(e1[i][j])
   {
   case 'r':
      scanf("%f",&rr[i][j]);
     r1[i]=rr[i][j]+r1[i];
     i1[i]=0; i2[i]=0; a1[i]=0;
     c1[i][j]=0; a3[i]=0; v[i]=0;
         a[i]=0; v1[i]=0; a2[i]=0;
          l1[i][j]=0; kk[i]=0;
     break;
  case 'c':
        scanf("%f",&c1[i][j]);
        if(sat1[i][j]==1)
         c1[i][j]=1/(2*3.14*ff*c1[i][j]);
        c7[i]=c7[i]+c1[i][j];
         i2[i]=0;
        i1[i]=0; l1[i][j]=0; a1[i]=0;
        rr[i][j]=0; v[i]=0; a3[i]=0;
         a[i]=0; v1[i]=0; a2[i]=0;
        break;
 case 'l':
    scanf("%f",&l1[i][j]);
    if(sat1[i][j]==1)
    l1[i][j]=2*3.14*ff*l1[i][j];
    l[i]=l[i]+l1[i][j];
    i1[i]=0; i2[i]=0; a[i]=0;
    rr[i][j]=0; c1[i][j]=0; v[i]=0;
     a[i]=0; v1[i]=0; a2[i]=0;
           break;
case 'v':
       scanf("%f",&v[i]);
       i1[i]=0;
       scanf("%f",&a[i]);
       a1[i]=0;    l1[i][j]=0;
       v1[i]=v[i]*cos(a[i]*3.14/180);
       a2[i]=v[i]*sin(a[i]*3.14/180);
       break;
```

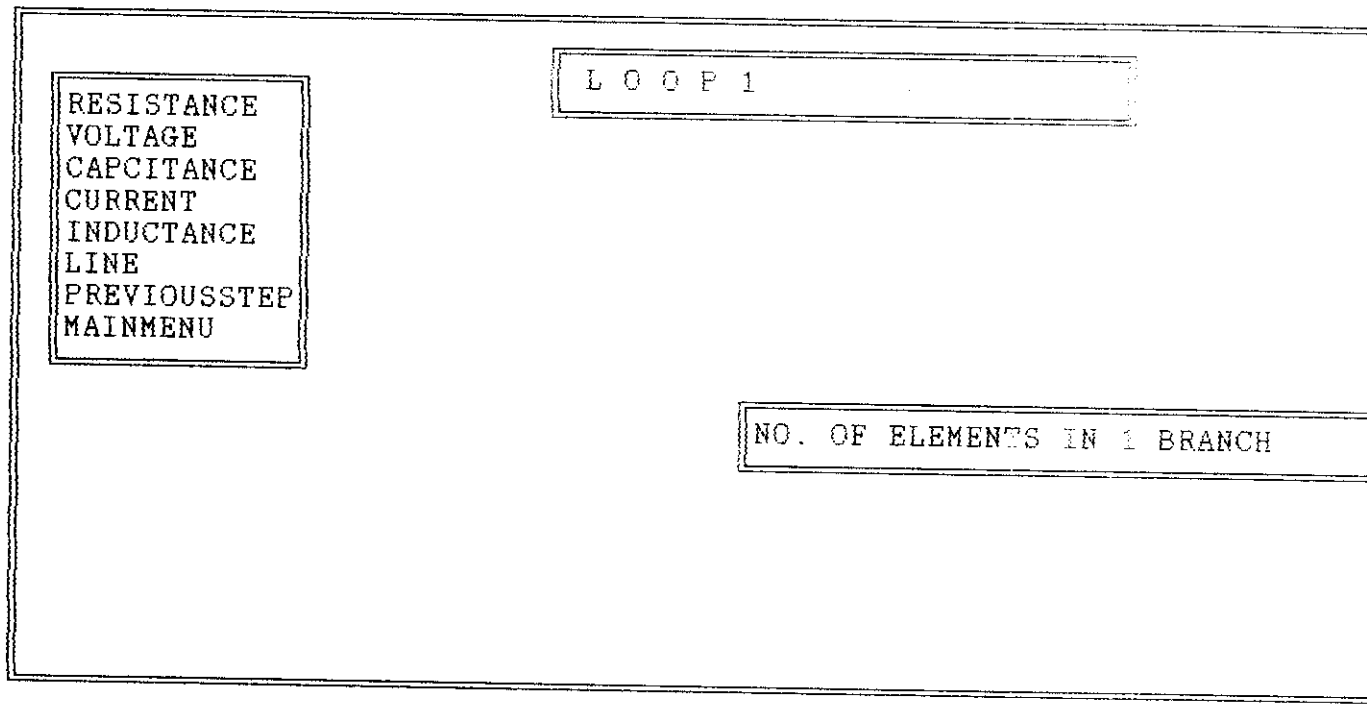
```
    case 'i':
          scanf("%f",&i1[i]);
          v[i]=0;          kk[i]=0;
          scanf("%f",&a1[i]);
          a[i]=0;v1[i]=0;a2[i]=0;
          i2[i]=i1[i]*cos(3.14*a1[i]/180);
          a3[i]=i1[i]*sin(3.14*a1[i]/180);
        break;}
      kk[i]=l1[i]+c7[i];
                }

 fprintf(fpt,"\n%f %f %f %f %f %f ",p1[i].x,p1[i].y,
           v[i],a[i],i1[i],a1[i]);
fprintf(fp,"\n%c ",e1[i][j]);
fprintf(fp,"\n%f %f %f %f %f %f %f %f ",p1[i].x,p1[i].y
          ,l1[i][j],kk[i].v[i].a[i],i1[i],a1[i]);
                }
              }
/*    fprintf(fpt,"\n%d",d);*/

                    fclose(fpt);
                    fclose(fp);

                     delay(100);
                       getch();
                     clear(1,1,319,199,0x1d);
                     closegraph();
                     clear(1,1,25,80,0x1d);

                     if(sat==1
                     {
                     if(n==1)
                     {
                        system("b:s11.exe");
                         system("b:fr1.exe");}

                    if(n==2)
                    {  system("b:s121.exe");
                delay(100);
                     system("b:fre2.exe");}
                   if(n==3)
                    {system("b:s31.exe");
                      system("b:fr3.c");
                     if(n==4)
                     {
                      system("b:s41.exe");
                      system("b:fr4.");}

                     }          /* sat */
```

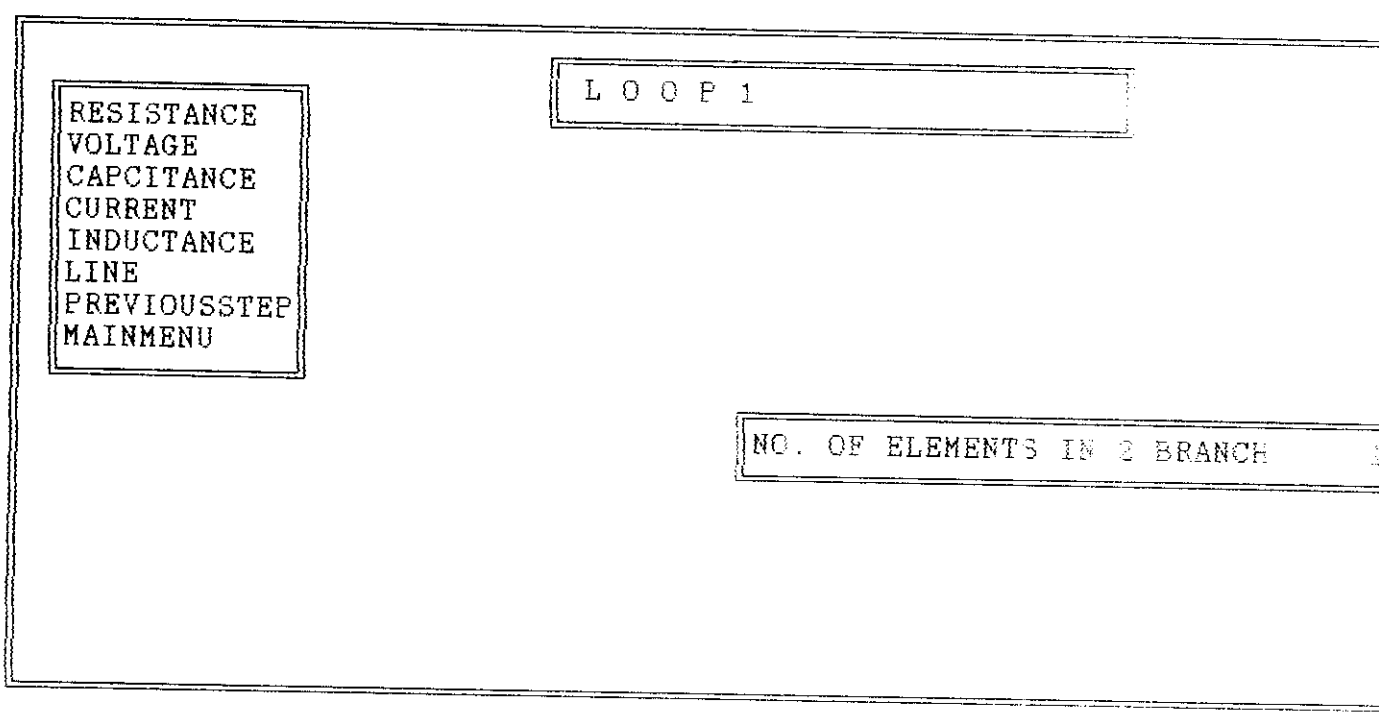
```
                    if(sat==2)
                    {
                    windo(2,2,28,78,'d');
                    windo(4,4,7,75,'3');
                    gotoxy(8,5);
printf(" B R A N C H - - C U R R E N T &&");
printf("&& N O D E --V O L T A G E S");
                     prano'n.fl.v,i(i);  }


                     getch();
                    clear(1,1,25,80,0x1d );
                    goto 15;

     14:

                     clrscr();
                    gotoxy(40,15);
                   printf("GOOD BYE");
                       }
```

Appendix B


HELP
PROGRAM
EXIT


SINGLE LOOP
DOUBLE LOOP
TRIPLE LOOP
QUDRAPLE LOOP
MAIN MEMU
NO. OF LOOPS


RESISTANCE
VOLTAGE
CAPCITANCE
CURRENT
INDUCTANCE
LINE
PREVIOUSSTEP
MAINMENU
L O O P 1
NO. OF ELEMENTS IN 1 BRANCH


RESISTANCE
VOLTAGE
CAPCITANCE
CURRENT
INDUCTANCE
LINE
PREVIOUSSTEP
MAINMENU
L O O P 1
NO. OF ELEMENTS IN 2 BRANCH

RESISTANCE
VOLTAGE
CAPCITANCE
CURRENT
INDUCTANCE
LINE
PREVIOUSSTEP
MAINMENU

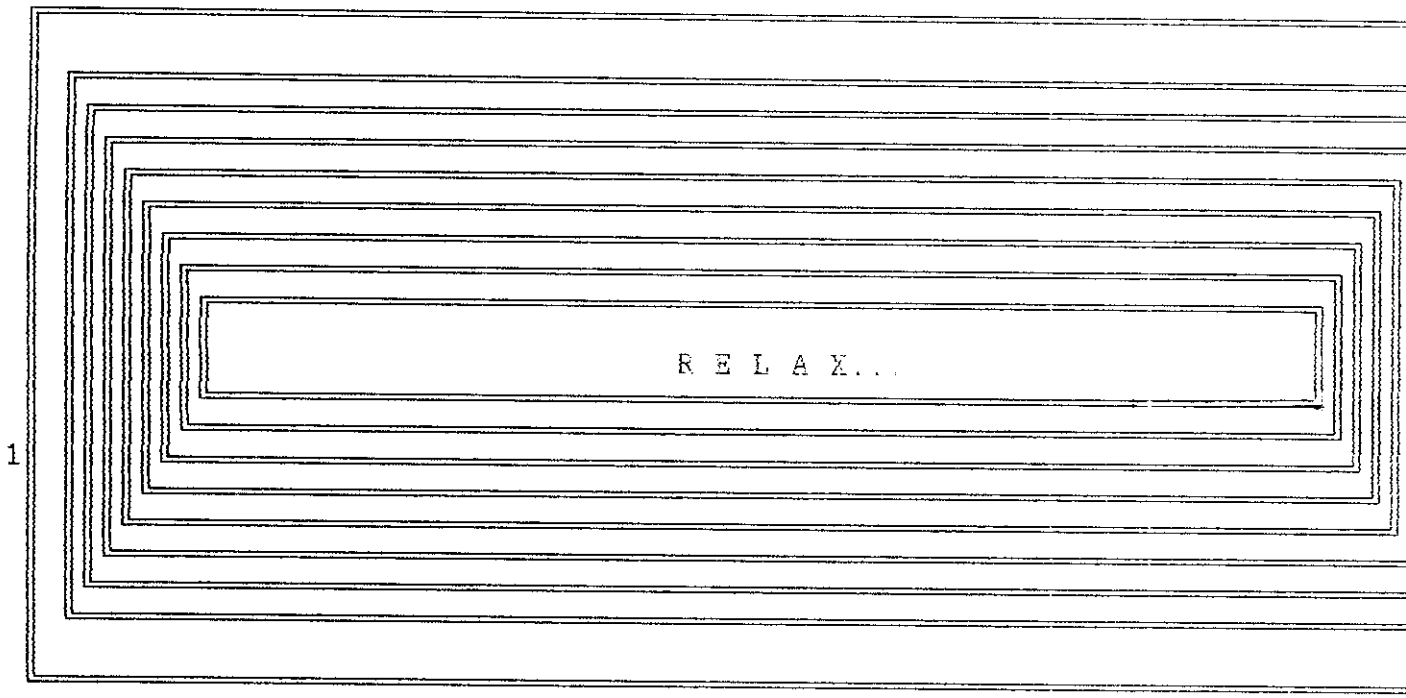
COMMON TO LOOP 1&2

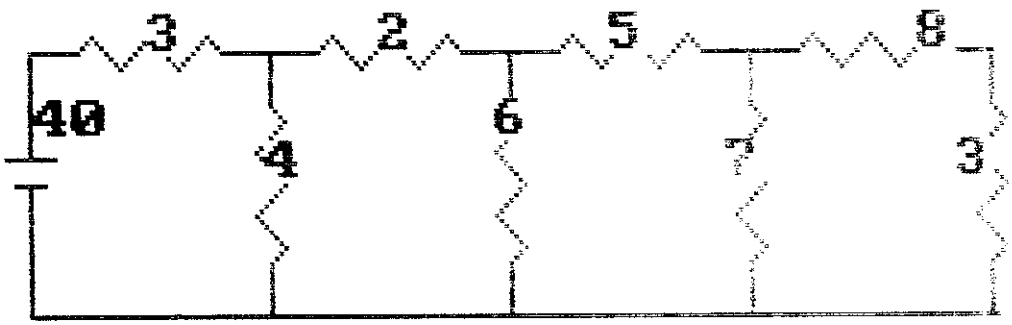
NO. OF ELEMENTS IN 3 BRANCH 1

RESISTANCE
VOLTAGE
CAPCITANCE
CURRENT
INDUCTANCE
LINE
PREVIOUSSTEP
MAINMENU

L O O P 2

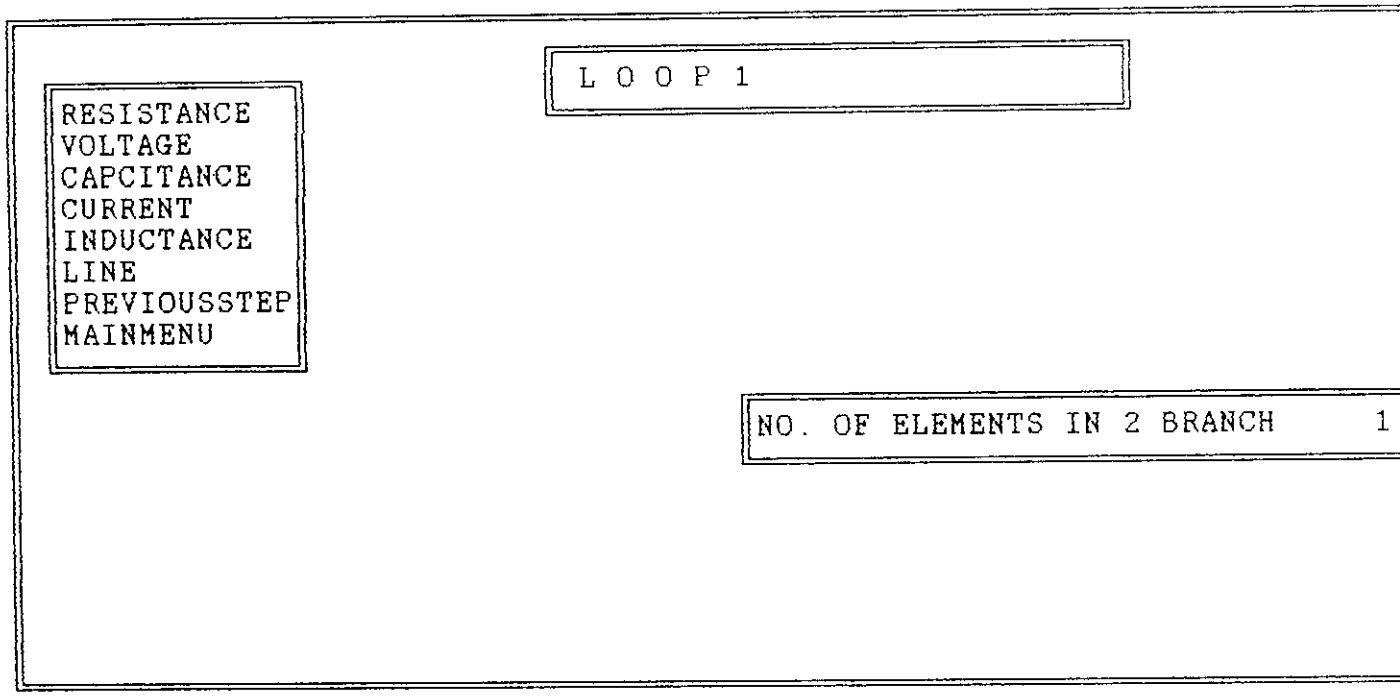
NO. OF ELEMENTS IN 4 BRANCH 1

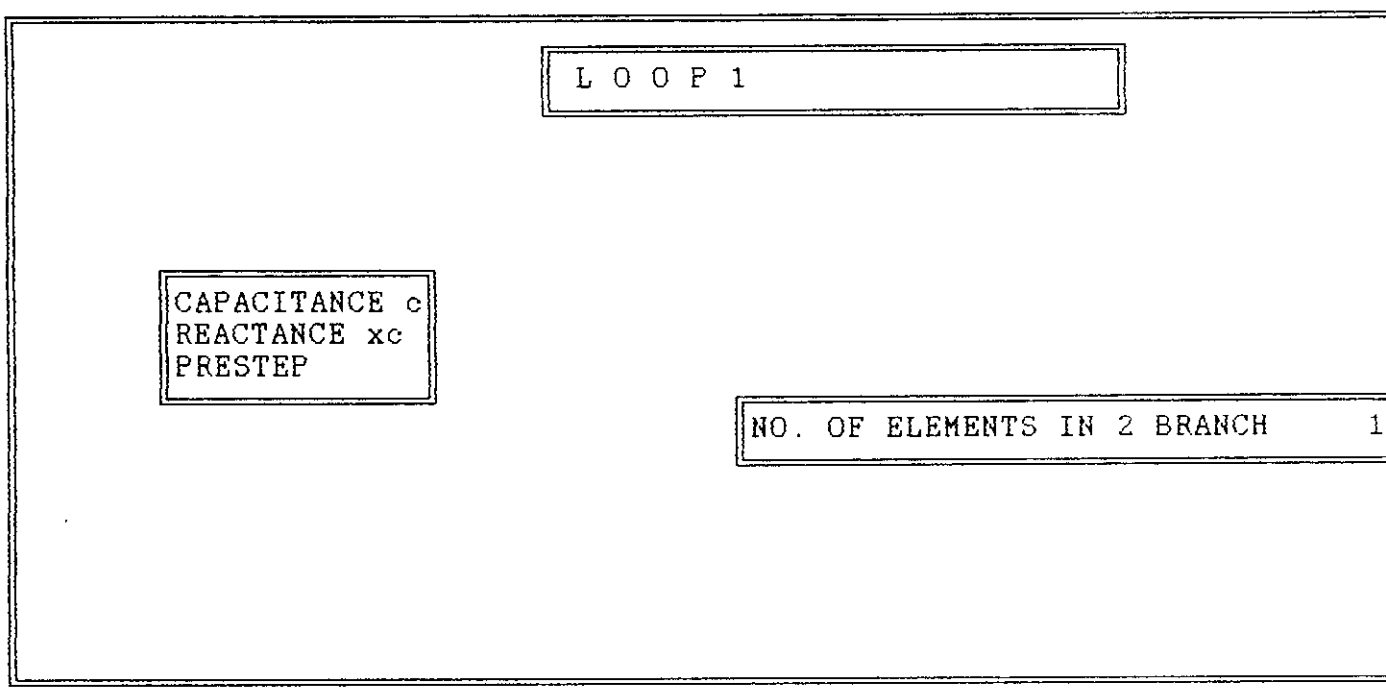

R E L A X...

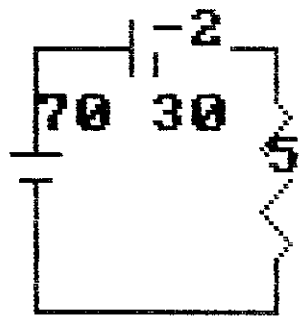

3
2
5
8
40
4
6
1
3

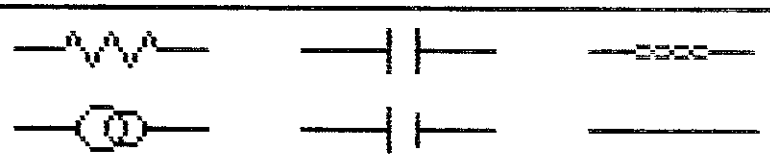
B R A N C H - - C U R R E N T S && N O D E --V O L T A G E S

	VOL. at 2 nd node	26.943003
	VOL. at 3 nd node	15.544040
	VOL. at 4 nd node	1.000000
	CU. in 2 nd branch	4.352338
	CU. in 3 rd branch	6.735751
	CU. in 4 th branch	5.699481
	CU. in 5th branch	2.590673
	CU. in 6 th branch	2.908808
	CU. in 7 th branch	0.090909
	CU. in 8 th branch	0.090909
1 st loop cu.		9.503242
2 nd loop cu.		2.772491
3 rd loop cu.		0.181818
4 th loop cu.		0.090909


L O O P 1
RESISTANCE
VOLTAGE
CAPCITANCE
CURRENT
INDUCTANCE
LINE
PREVIOUSSTEP
MAINMENU
NO. OF ELEMENTS IN 2 BRANCH 1


L O O P 1
CAPACITANCE c
REACTANCE xc
PRESTEP
NO. OF ELEMENTS IN 2 BRANCH 1





CURRENT IN LOOP

12.998673 | __ 51.812469

PRESS ANY KEY TO CONTINUE