FIRST SEMESTER MCA(2020 SCHEME) PRACTICAL EXAMINATION

JUNE-JULY 2021

20MCA135 DATA STRUCTURE LAB

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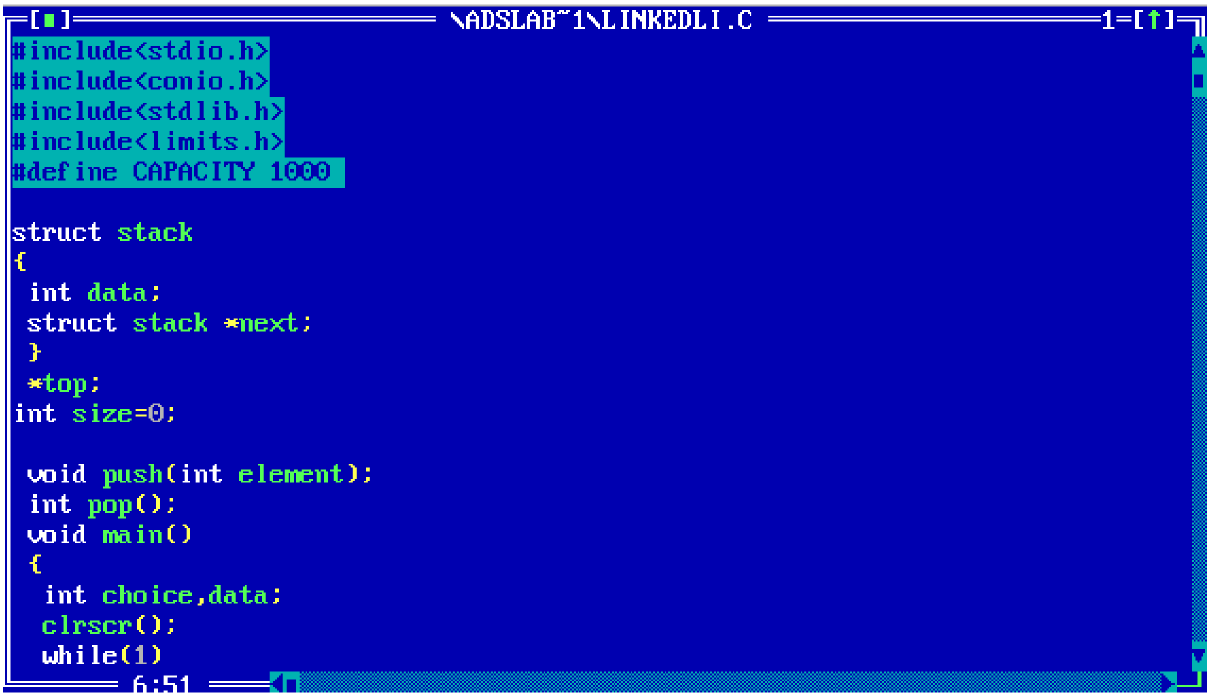
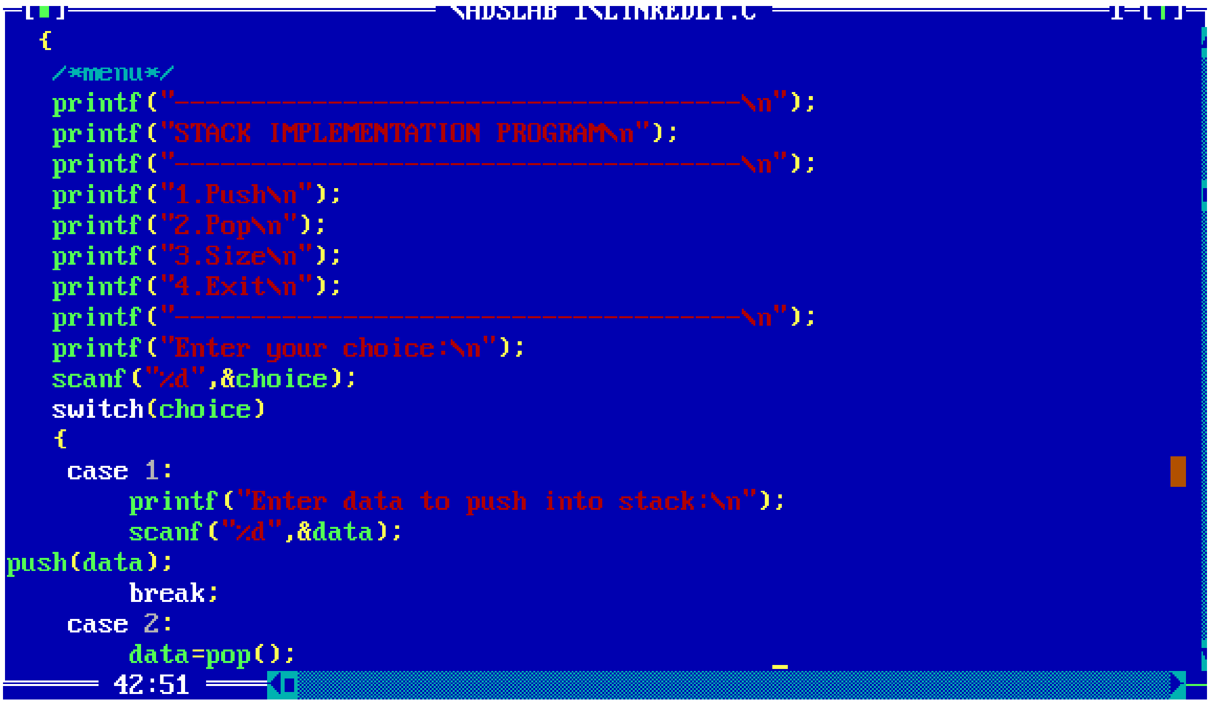
ICE20MCA-2037

1. **Implement linked list?**

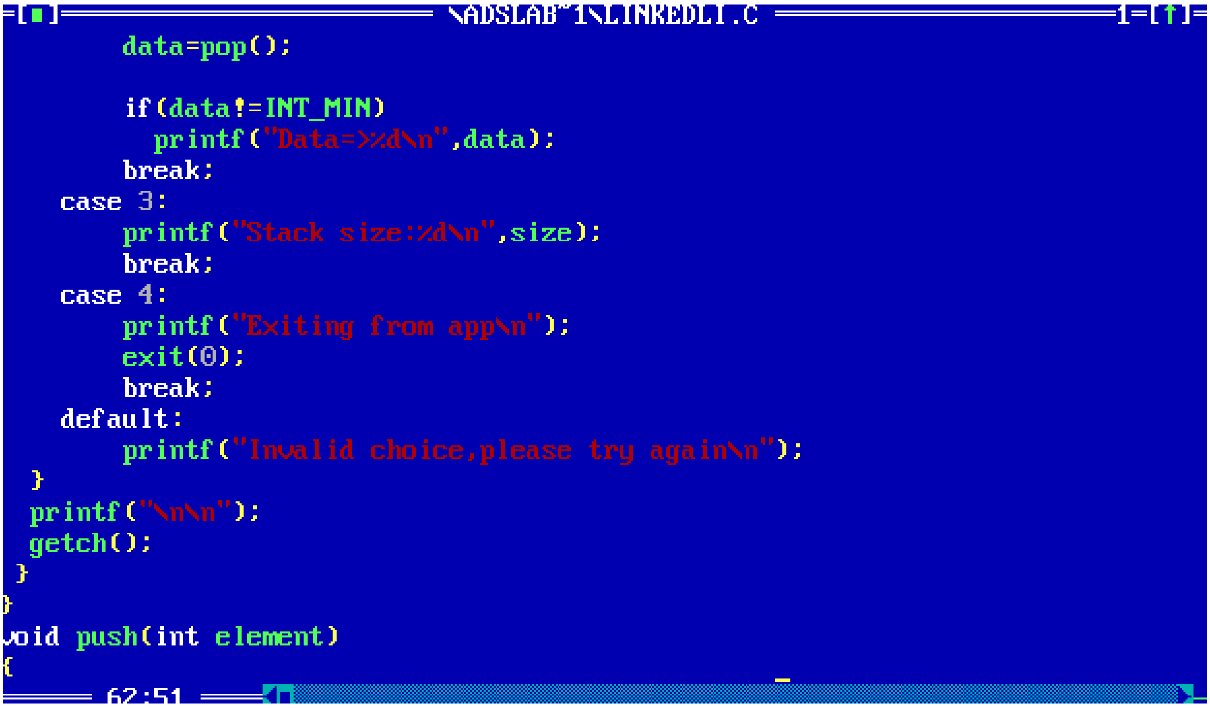
PROGRAM



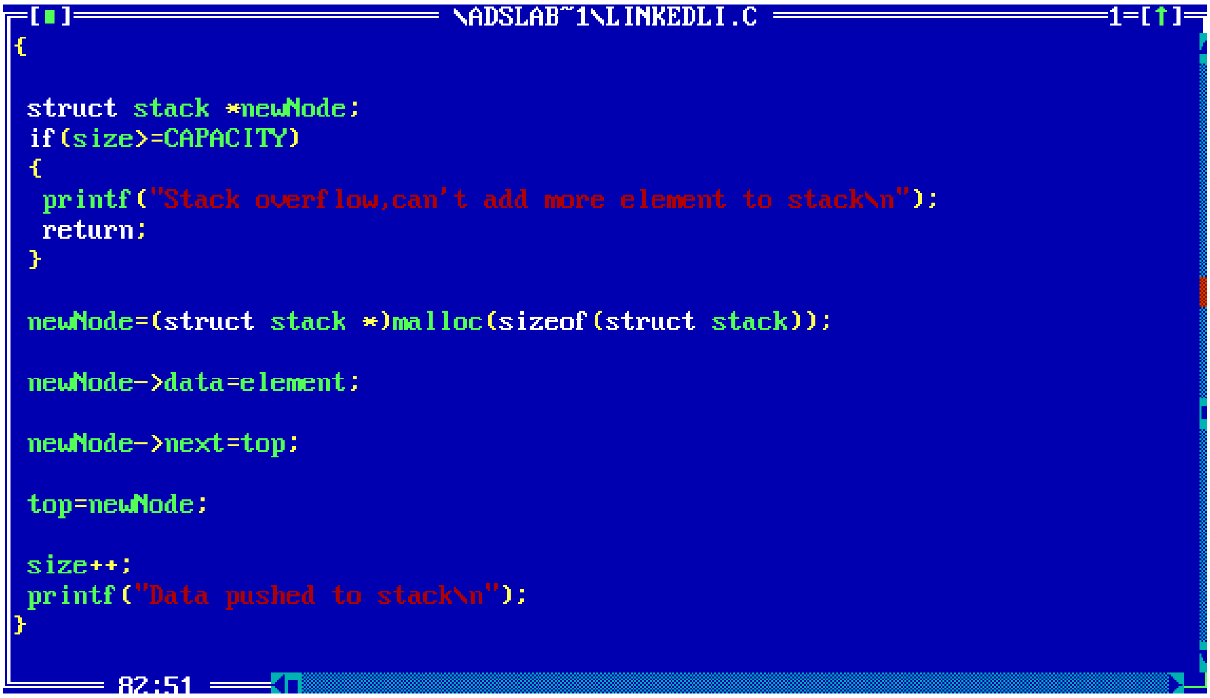
```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#include<limits.h>
#define CAPACITY 1000

struct stack
{
 int data;
 struct stack *next;
 }
 *top;
int size=0;

 void push(int element);
 int pop();
 void main()
 {
  int choice,data;
  clrscr();
  while(1)
```



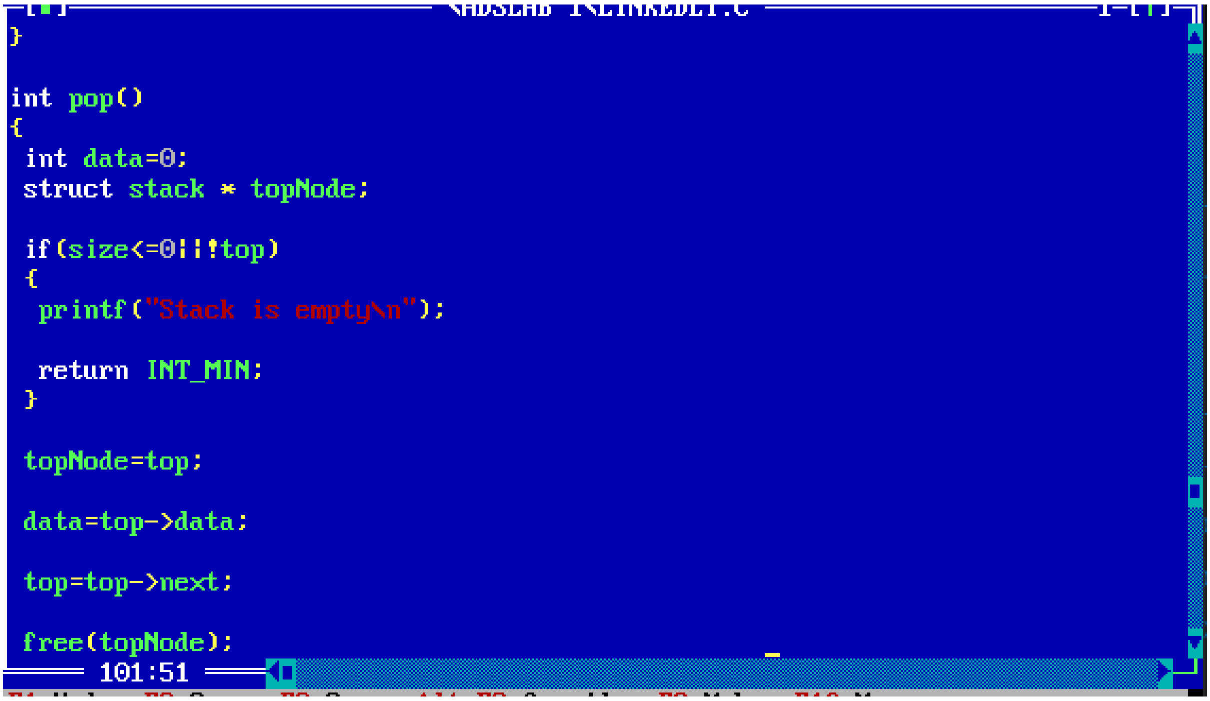
```
  {
   /*menu*/
   printf("-------------------------------------\n");
   printf("STACK IMPLEMENTATION PROGRAM\n");
   printf("-------------------------------------\n");
   printf("1.Push\n");
   printf("2.Pop\n");
   printf("3.Size\n");
   printf("4.Exit\n");
   printf("-------------------------------------\n");
   printf("Enter your choice:\n");
   scanf("%d",&choice);
   switch(choice)
   {
    case 1:
        printf("Enter data to push into stack:\n");
        scanf("%d",&data);
push(data);
        break;
    case 2:
        data=pop();
```



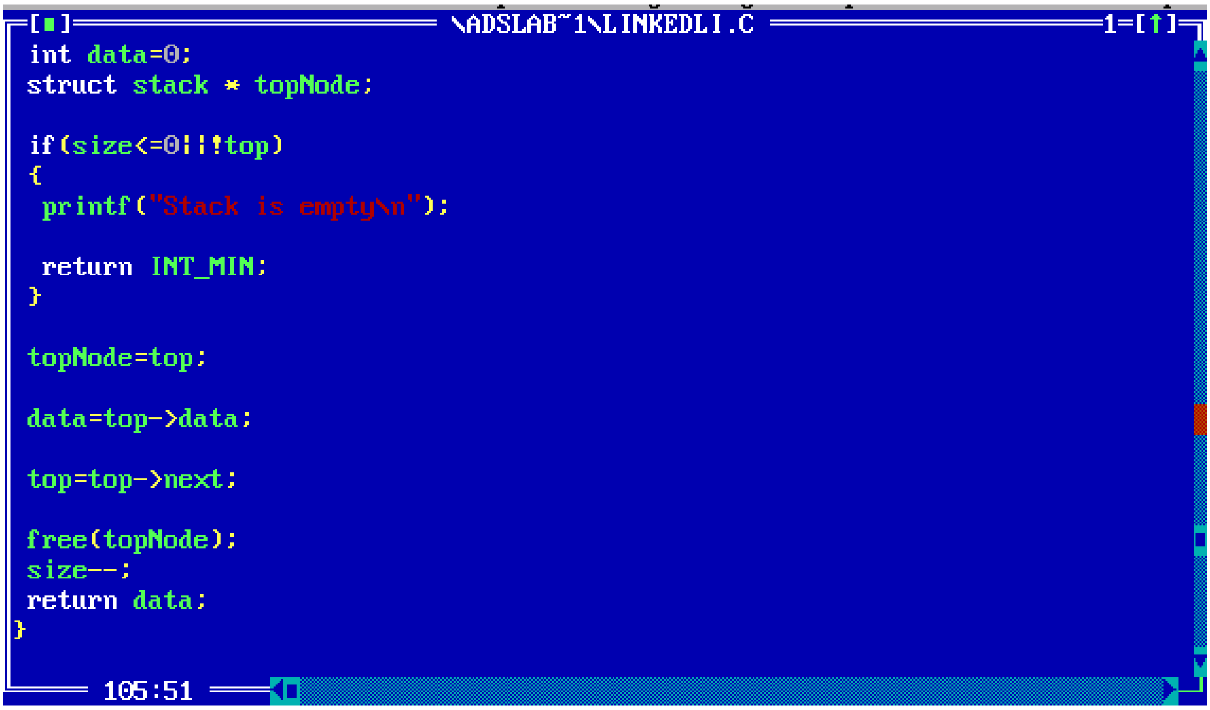
```
        data=pop();

        if(data!=INT_MIN)
          printf("Data=>%d\n",data);
        break;
    case 3:
        printf("Stack size:%d\n",size);
        break;
    case 4:
        printf("Exiting from app\n");
        exit(0);
        break;
    default:
        printf("Invalid choice,please try again\n");
  }
  printf("\n\n");
  getch();
 }
}
void push(int element)
{
```



```
{

 struct stack *newNode;
 if(size>=CAPACITY)
 {
  printf("Stack overflow,can't add more element to stack\n");
  return;
 }

 newNode=(struct stack *)malloc(sizeof(struct stack));

 newNode->data=element;

 newNode->next=top;

 top=newNode;

 size++;
 printf("Data pushed to stack\n");
}
```

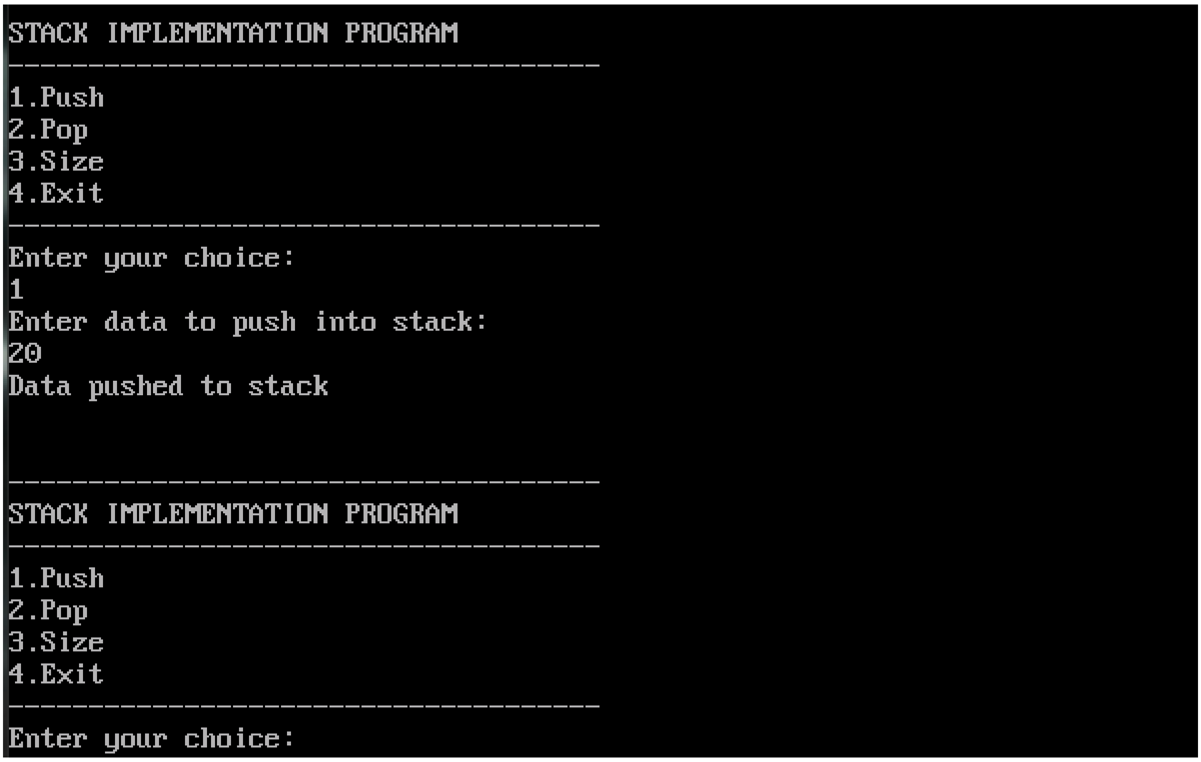


```
}

int pop()
{
 int data=0;
 struct stack * topNode;

 if(size<=0||!top)
 {
  printf("Stack is empty\n");

  return INT_MIN;
 }

 topNode=top;

 data=top->data;

 top=top->next;

 free(topNode);
```

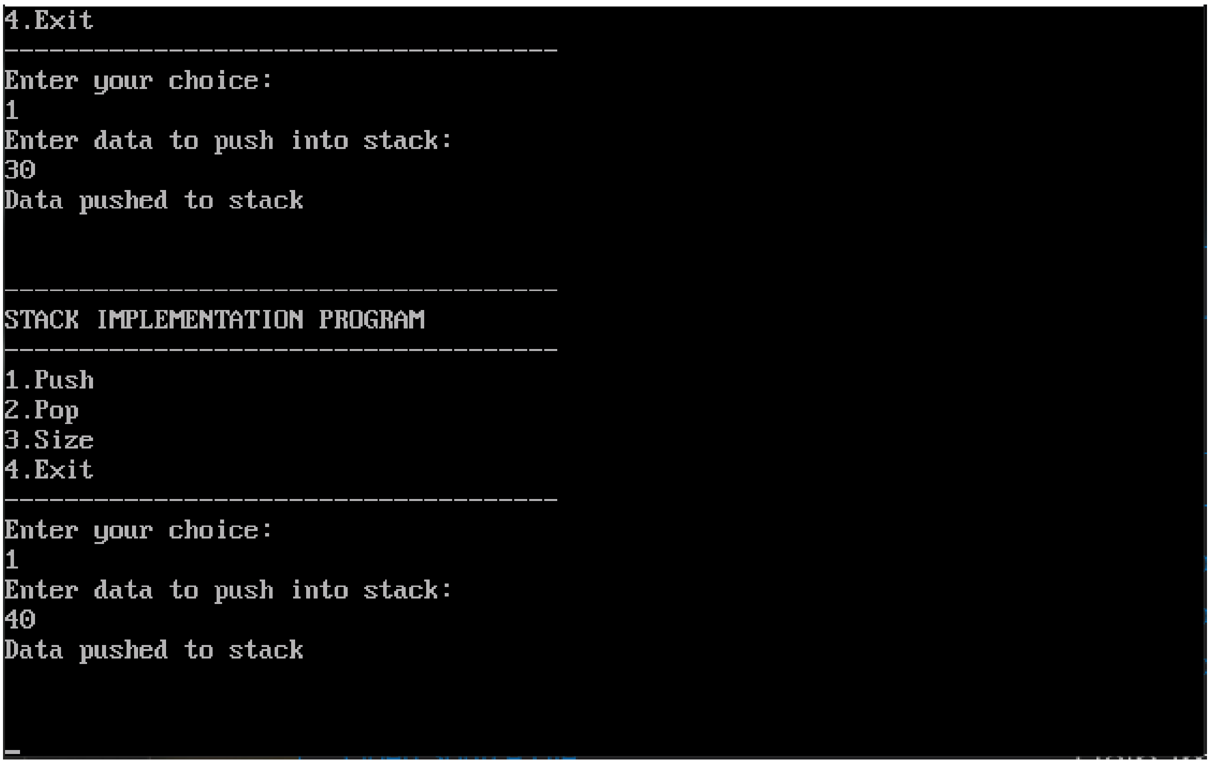


```
 int data=0;
 struct stack * topNode;

 if(size<=0||!top)
 {
  printf("Stack is empty\n");

  return INT_MIN;
 }

 topNode=top;

 data=top->data;

 top=top->next;

 free(topNode);
 size--;
 return data;
}
```

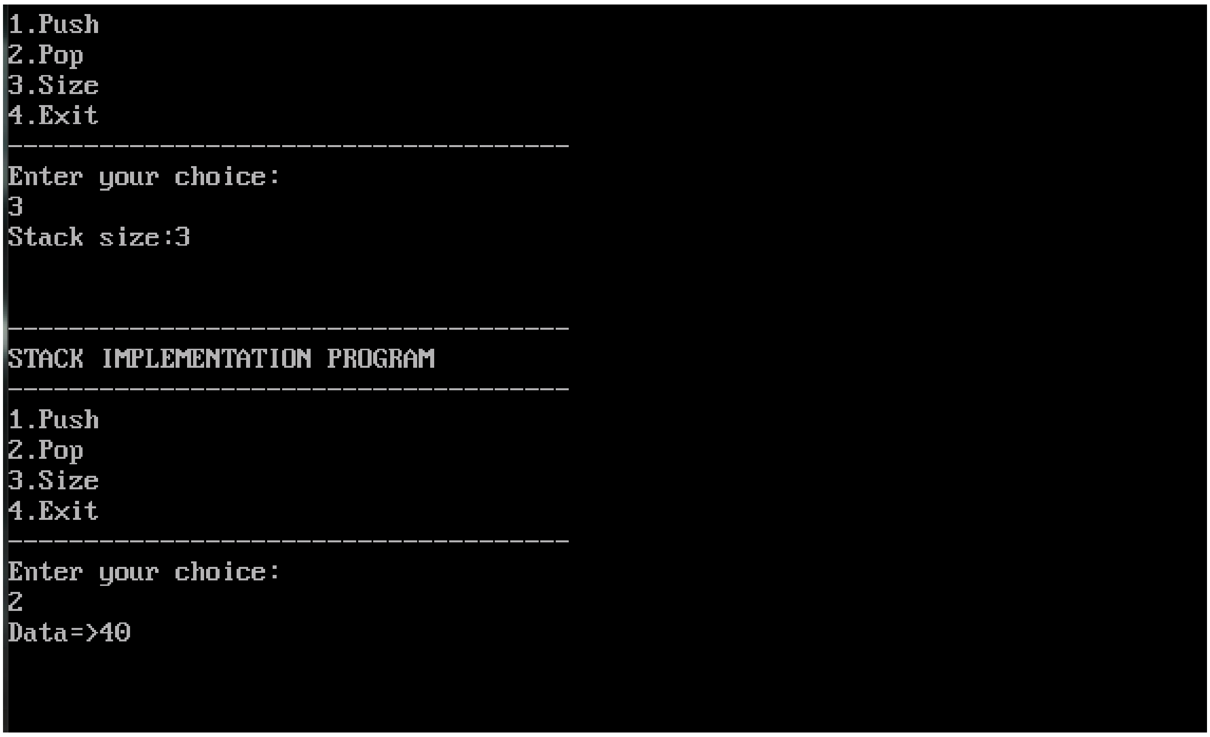
OUTPUT



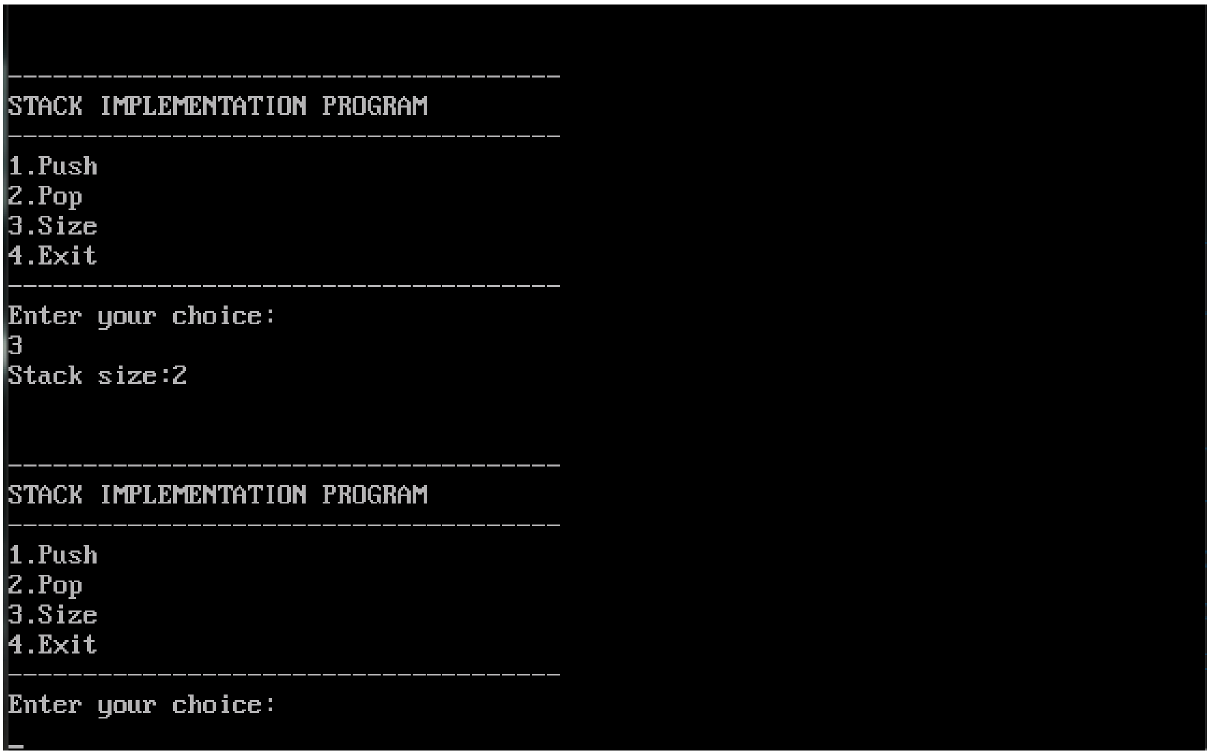
```
STACK IMPLEMENTATION PROGRAM
--------------------------------------
1.Push
2.Pop
3.Size
4.Exit
--------------------------------------
Enter your choice:
1
Enter data to push into stack:
20
Data pushed to stack


--------------------------------------
STACK IMPLEMENTATION PROGRAM
--------------------------------------
1.Push
2.Pop
3.Size
4.Exit
--------------------------------------
Enter your choice:
```



```
4.Exit
--------------------------------------
Enter your choice:
1
Enter data to push into stack:
30
Data pushed to stack


--------------------------------------
STACK IMPLEMENTATION PROGRAM
--------------------------------------
1.Push
2.Pop
3.Size
4.Exit
--------------------------------------
Enter your choice:
1
Enter data to push into stack:
40
Data pushed to stack


_
```



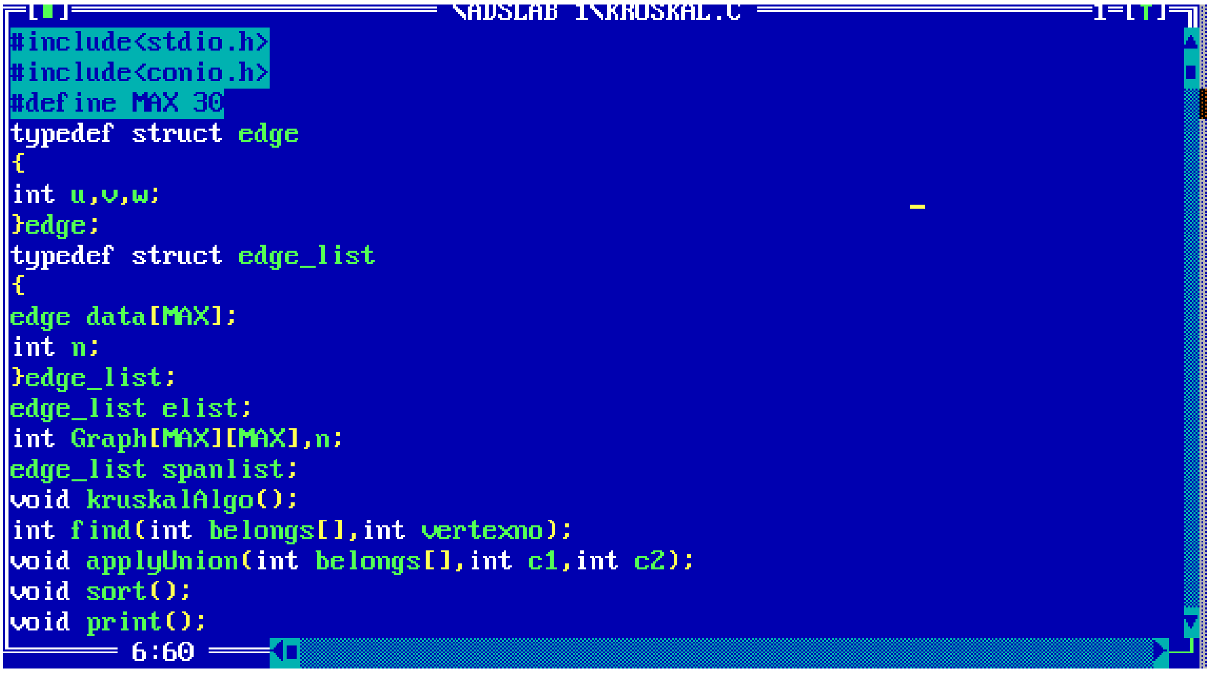
```
1.Push
2.Pop
3.Size
4.Exit
-------------------------------------
Enter your choice:
3
Stack size:3


-------------------------------------
STACK IMPLEMENTATION PROGRAM
-------------------------------------
1.Push
2.Pop
3.Size
4.Exit
-------------------------------------
Enter your choice:
2
Data=>40
```



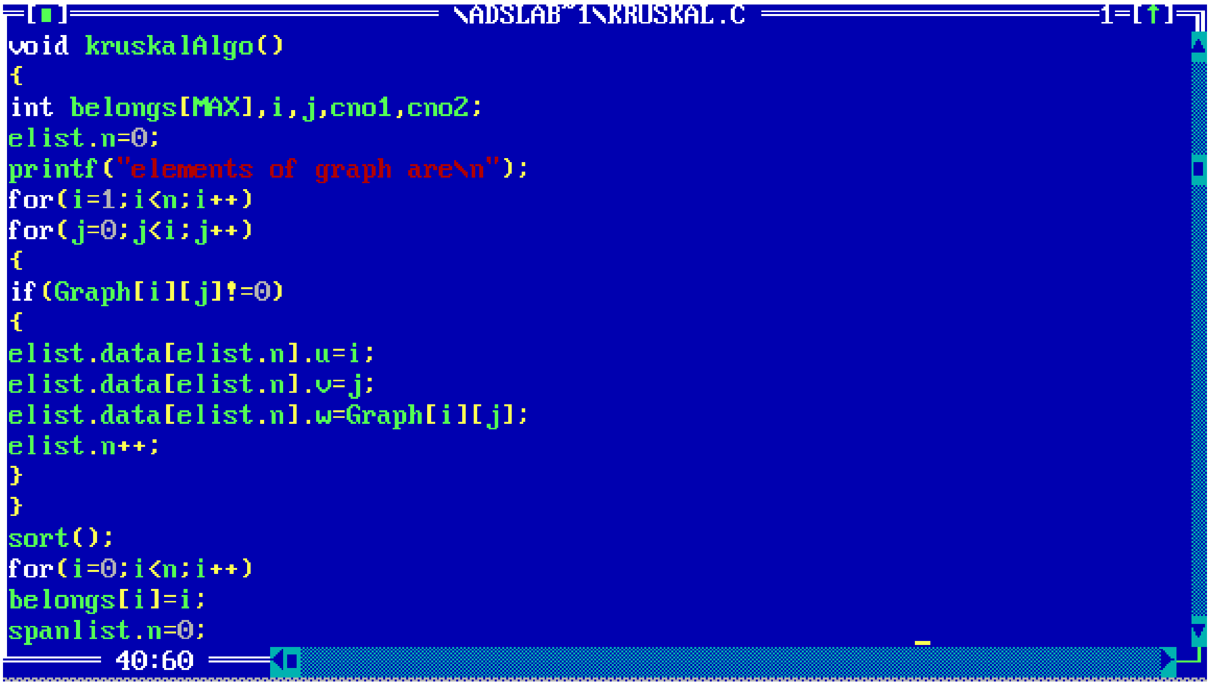
```

------------------------------------
STACK IMPLEMENTATION PROGRAM
------------------------------------
1.Push
2.Pop
3.Size
4.Exit
------------------------------------
Enter your choice:
3
Stack size:2


------------------------------------
STACK IMPLEMENTATION PROGRAM
------------------------------------
1.Push
2.Pop
3.Size
4.Exit
------------------------------------
Enter your choice:
_
```

2. Implement Kruskal’s Algorithm?

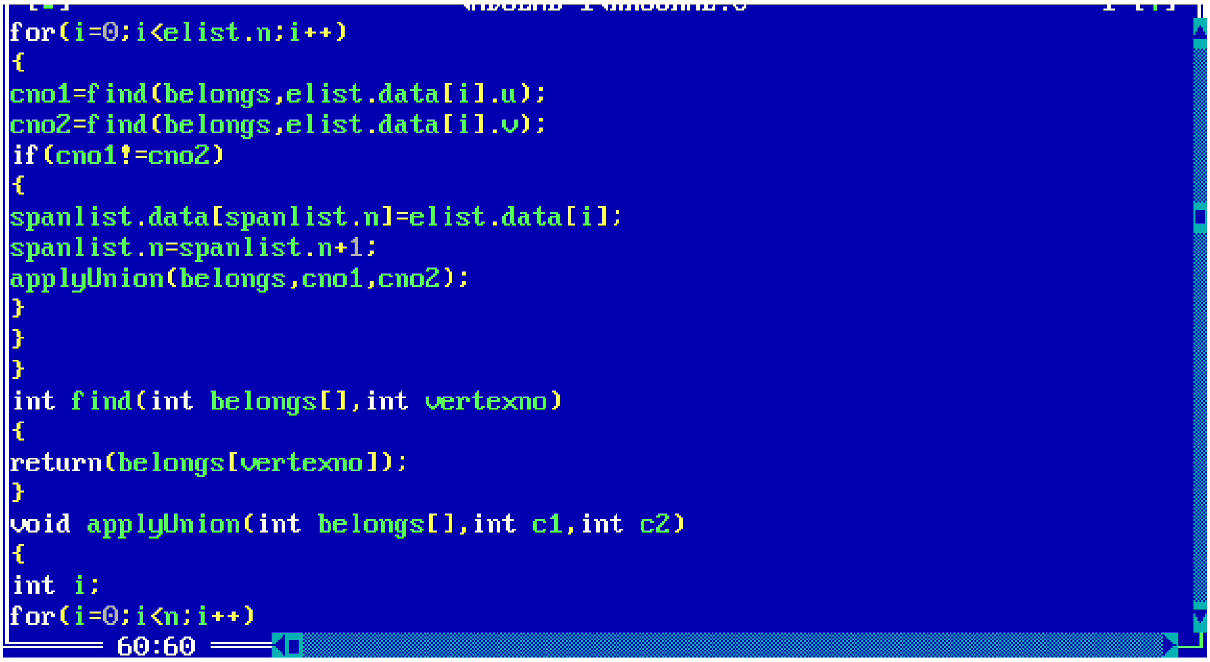
PROGRAM



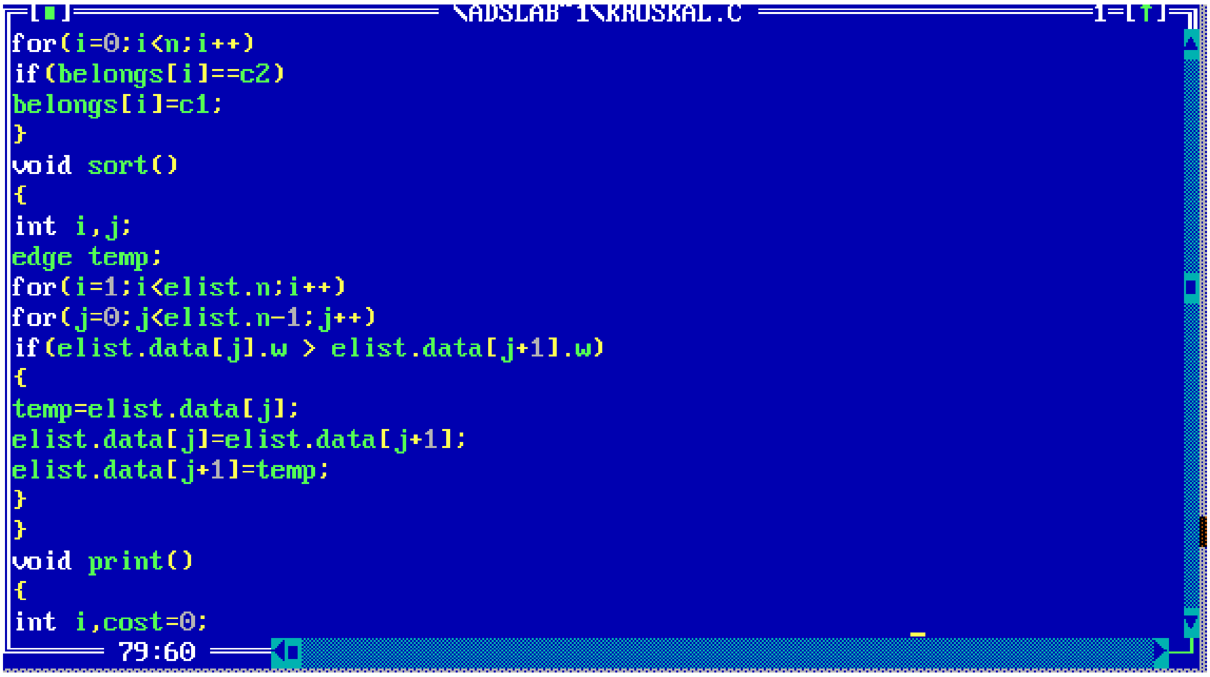
```
#include<stdio.h>
#include<conio.h>
#define MAX 30
typedef struct edge
{
int u,v,w;
}edge;
typedef struct edge_list
{
edge data[MAX];
int n;
}edge_list;
edge_list elist;
int Graph[MAX][MAX],n;
edge_list spanlist;
void kruskalAlgo();
int find(int belongs[],int vertexno);
void applyUnion(int belongs[],int c1,int c2);
void sort();
void print();
```



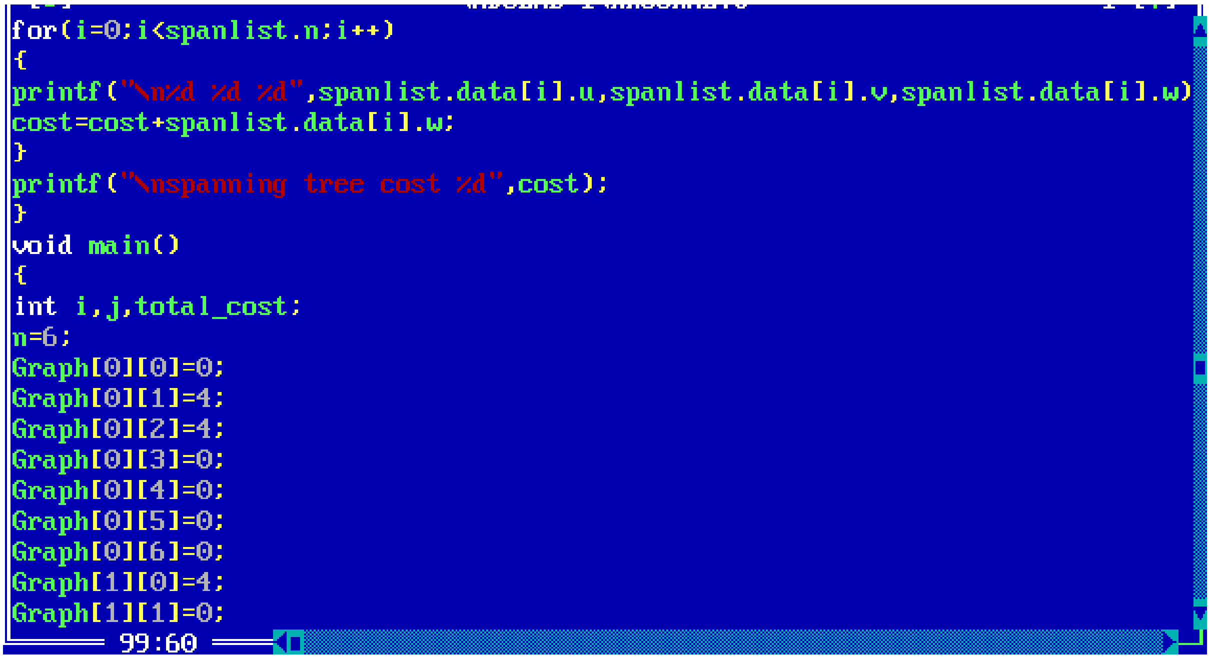
```
void kruskalAlgo()
{
int belongs[MAX],i,j,cno1,cno2;
elist.n=0;
printf("elements of graph are\n");
for(i=1;i<n;i++)
for(j=0;j<i;j++)
{
if(Graph[i][j]!=0)
{
elist.data[elist.n].u=i;
elist.data[elist.n].v=j;
elist.data[elist.n].w=Graph[i][j];
elist.n++;
}
}
sort();
for(i=0;i<n;i++)
belongs[i]=i;
spanlist.n=0;
```



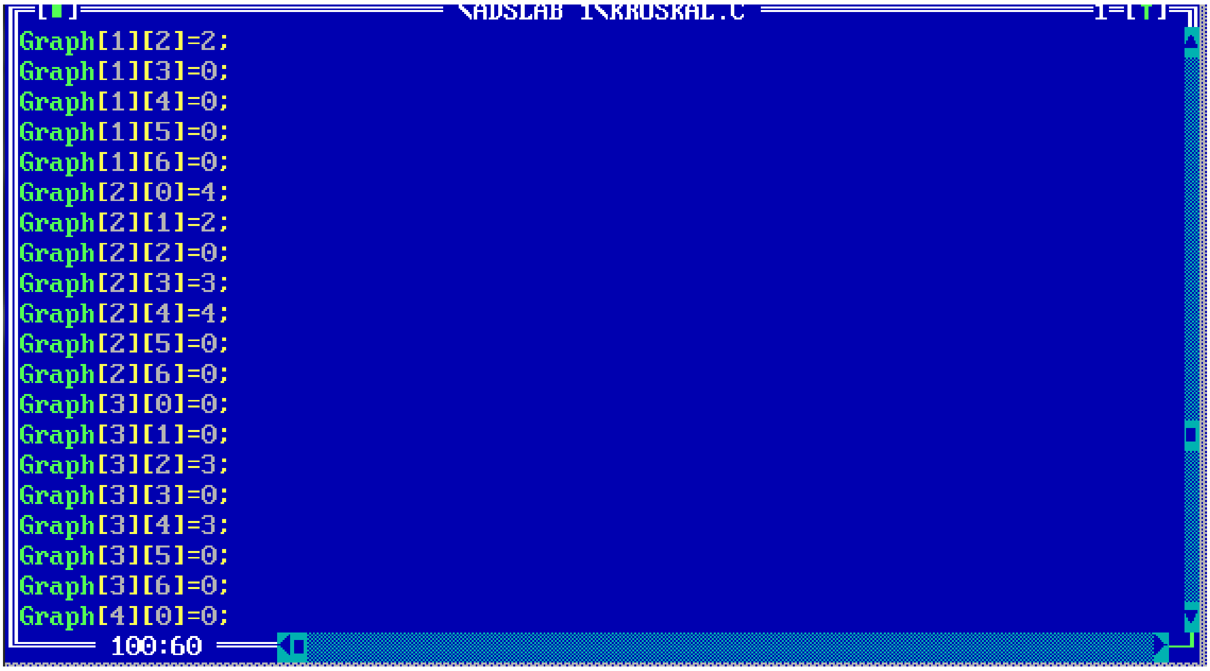
```
for(i=0;i<elist.n;i++)
{
cno1=find(belongs,elist.data[i].u);
cno2=find(belongs,elist.data[i].v);
if(cno1!=cno2)
{
spanlist.data[spanlist.n]=elist.data[i];
spanlist.n=spanlist.n+1;
applyUnion(belongs,cno1,cno2);
}
}
}
int find(int belongs[],int vertexno)
{
return(belongs[vertexno]);
}
void applyUnion(int belongs[],int c1,int c2)
{
int i;
for(i=0;i<n;i++)
```



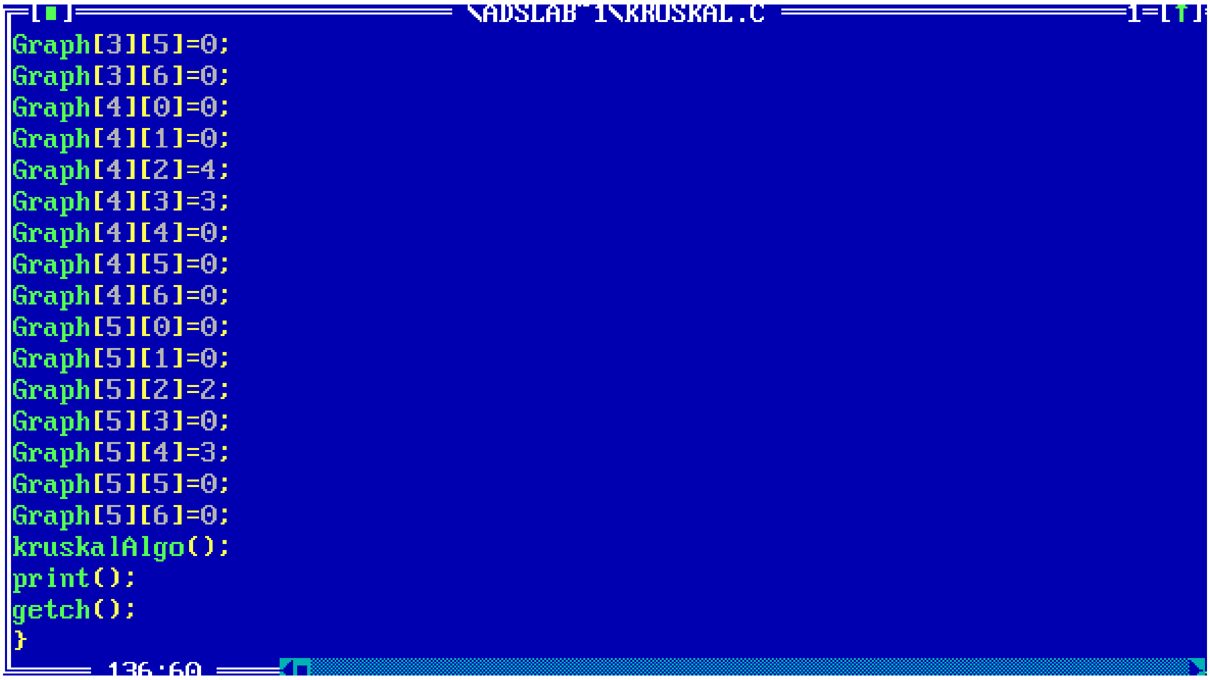
```
for(i=0;i<n;i++)
if(belongs[i]==c2)
belongs[i]=c1;
}
void sort()
{
int i,j;
edge temp;
for(i=1;i<elist.n;i++)
for(j=0;j<elist.n-1;j++)
if(elist.data[j].w > elist.data[j+1].w)
{
temp=elist.data[j];
elist.data[j]=elist.data[j+1];
elist.data[j+1]=temp;
}
}
void print()
{
int i,cost=0;
```



```
for(i=0;i<spanlist.n;i++)
{
printf("\n%d %d %d",spanlist.data[i].u,spanlist.data[i].v,spanlist.data[i].w)
cost=cost+spanlist.data[i].w;
}
printf("\nspanning tree cost %d",cost);
}
void main()
{
int i,j,total_cost;
n=6;
Graph[0][0]=0;
Graph[0][1]=4;
Graph[0][2]=4;
Graph[0][3]=0;
Graph[0][4]=0;
Graph[0][5]=0;
Graph[0][6]=0;
Graph[1][0]=4;
Graph[1][1]=0;
```

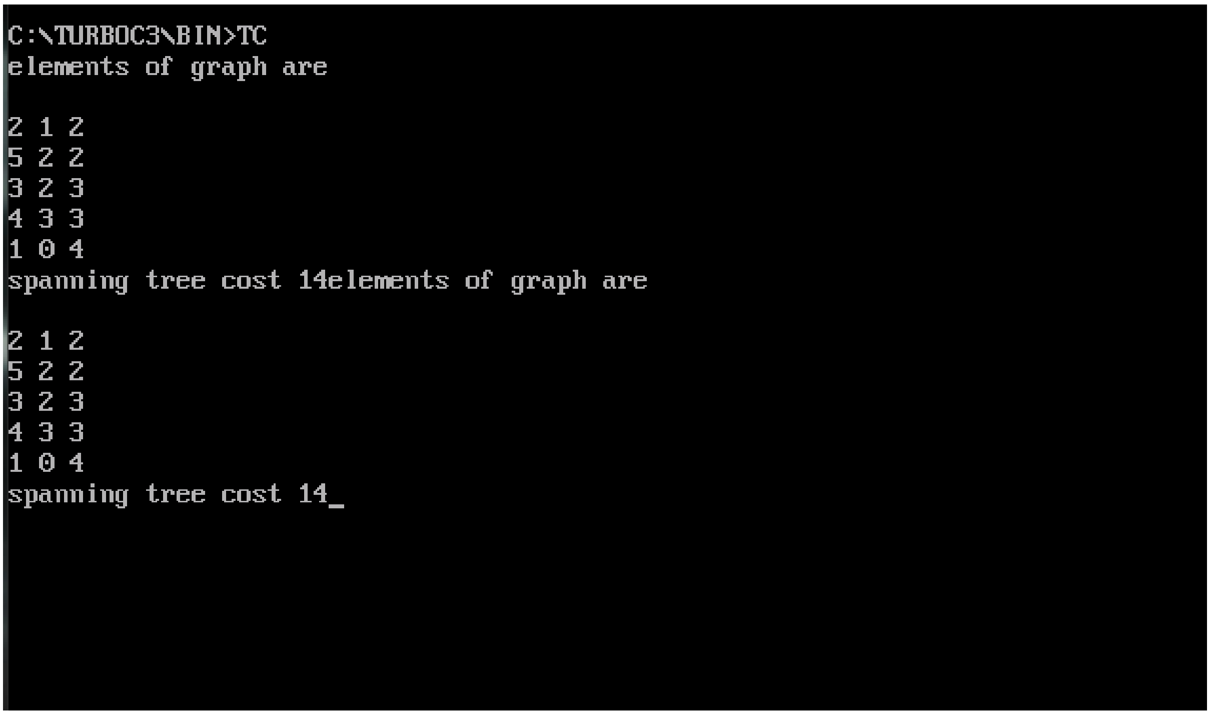


```
Graph[1][2]=2;
Graph[1][3]=0;
Graph[1][4]=0;
Graph[1][5]=0;
Graph[1][6]=0;
Graph[2][0]=4;
Graph[2][1]=2;
Graph[2][2]=0;
Graph[2][3]=3;
Graph[2][4]=4;
Graph[2][5]=0;
Graph[2][6]=0;
Graph[3][0]=0;
Graph[3][1]=0;
Graph[3][2]=3;
Graph[3][3]=0;
Graph[3][4]=3;
Graph[3][5]=0;
Graph[3][6]=0;
Graph[4][0]=0;
```



```
Graph[3][5]=0;
Graph[3][6]=0;
Graph[4][0]=0;
Graph[4][1]=0;
Graph[4][2]=4;
Graph[4][3]=3;
Graph[4][4]=0;
Graph[4][5]=0;
Graph[4][6]=0;
Graph[5][0]=0;
Graph[5][1]=0;
Graph[5][2]=2;
Graph[5][3]=0;
Graph[5][4]=3;
Graph[5][5]=0;
Graph[5][6]=0;
kruskalAlgo();
print();
getch();
}
```

OUTPUT



```
C:\TURBOC3\BIN>TC
elements of graph are

2 1 2
5 2 2
3 2 3
4 3 3
1 0 4
spanning tree cost 14elements of graph are

2 1 2
5 2 2
3 2 3
4 3 3
1 0 4
spanning tree cost 14_
```