1. **Program in C to implement basic set operations: UNION, INTERSECTION and DIFFERENCE**

```
#include <stdio.h>
int main()
{
int i,j,k,p,ch,n1,n2,set1[10],set2[10],set3[20],flag;
printf("Enter size of set1:");
scanf("%d",&n1);
printf("\nEnter elements of set 1:");
for(i=0;i<n1;i++)
{
scanf("%d",&set1[i]);
}
printf("Enter size of set2:");
scanf("%d",&n2);
printf("\nEnter elements of set 2:");
for(i=0;i<n2;i++)
{
scanf("%d",&set2[i]);
}
while(1)
{
printf("\nPress 1 for union:");
printf("\nPress 2 for intersection:");
printf("\nPress 3 for difference:");
printf("\nEnter your choice:");
scanf("%d",&ch);
switch(ch)
{
case 1:
printf("\nThe union is:\n");
k=0;
for(i=0;i<n1;i++)
{
set3[k]=set1[i];
k++;
}
for(i=0;i<n2;i++)
{
flag=1;
for(j=0;j<n1;j++)
{
if(set2[i]==set1[j])
{
flag=0;
break;
}
}
if(flag==1)
{
set3[k]=set2[i];
k++;
}
}
p=k;
for(k=0;k<p;k++)
{
printf("%d\t",set3[k]);
}
break;
case 2:
printf("\nThe intersection is:\n");
```

```
k=0;
for(i=0;i<n2;i++)
{
flag=1;
for(j=0;j<n1;j++)
{
if(set2[i]==set1[j])
{
flag=0;
break;
}
}
if(flag==0)
{
set3[k]=set2[i];
k++;
}
}
p=k;
for(k=0;k<p;k++)
{
printf("%d\t",set3[k]);
}
break;
case 3:
printf("\nThe difference is:\n");
k=0;
for(i=0;i<n1;i++)
{
flag=1;
for(j=0;j<n2;j++)
{
if(set1[i]==set2[j])
{
flag=0;
break;
}
}
if(flag==1)
{
set3[k]=set1[i];
k++;
}
}
p=k;
for(k=0;k<p;k++)
{
printf("%d\t",set3[k]);
}
break;
default:
printf("Invalid choice:");
}
}
return 0;
}
```

**OUTPUT:**

```
Enter size of set1:4

Enter elements of set 1:1 2 3 4
Enter size of set2:3

Enter elements of set 2:3 4 5

Press 1 for union:
Press 2 for intersection:
Press 3 for difference:
Enter your choice:1

The union is:
1       2       3       4       5
Press 1 for union:
Press 2 for intersection:
Press 3 for difference:
Enter your choice:2

The intersection is:
3       4
Press 1 for union:
Press 2 for intersection:
Press 3 for difference:
Enter your choice:3

The difference is:
1       2
Press 1 for union:
Press 2 for intersection:
Press 3 for difference:
Enter your choice:^C
```

2. **Program in C to find the Cartesian product of two sets.**

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a[10],b[10],m,n,i,j;
clrscr();
printf("How many elements do you want in set a?\n");
scanf("%d",&m);
printf("Enter %d elements in set a:",m);
for(i=0;i<m;i++)
{
scanf("%d",&a[i]);
}
printf("How many elements do you want in set b?\n");
scanf("%d",&n);
printf("Enter %d elements in set b:",n);
for(j=0;j<n;j++)
{
scanf("%d",&b[j]);
}
printf("\nCartesian Product:");
printf("{");
for(i=0;i<m;i++)
{
for(j=0;j<n;j++)
{
printf("(%d,%d)",a[i],b[j]);
printf(",");
}}
printf("}");
getch();
}
```

**Output:**

```
How many elements do you want in set a?
3
Enter 3 elements in set a:1 2 3
How many elements do you want in set b?
4
Enter 4 elements in set b:2 3 4 5

Cartesian Product:{(1,2),(1,3),(1,4),(1,5),(2,2),(2,3),(2,4),(2,5),(3,2),(3,3),(3,4),(3,5),}
```

3. **C program to find ceiling and floor value**

```
#include<stdio.h>
#include<math.h>
int main()
{
float val;
float fval,cval;
printf("Enter a float value:");
scanf("%f",&val);
fval=floor(val);
cval=ceil(val);
printf("Floor value =%f \n Ceiling value =%f",fval,cval);
return 0;
}
```

**Output:**

```
Enter a float value:5.6
Floor value =5.000000
Ceiling value =6.000000
```

4. **Write a C program to find to implement fuzzy set operations**

```
#include<stdio.h>
#include<stdlib.h>
float min(float a,float b);
float max(float a,float b);
int main()
{
float fa,fb,fi,fu,fac;
float x = 1.0;
printf("Enter membership function of first set:\n");
scanf("%f",&fa);
printf("Enter membership function of second set:\n");
scanf("%f",&fb);
fi = min(fa,fb);
fu = max(fa,fb);
fac = x-fa;
printf("The membership function of intersection = %0.1f\n",fi);
printf("The membership function of union = %0.1f\n",fu);
printf("The membership function of complement of first set = %0.1f\n",fac);
return 0;
}
float min(float a, float b)
{
if(a<b)
return a;
else
return b;
}
float max(float a, float b)
```

```
{
if(a>b)
return a;
else
return b;
}
```

**Output:**

```
Enter membership function of first set:
5.6
Enter membership function of second set:
3.4
The membership function of intersection = 3.4
The membership function of union = 5.6
The membership function of complement of first set = -4.6
```

**5. C program to implement Boolean matrix operation join.**

```
#include<stdio.h>
int main()
{
int m,n,p,q,i,j,k;
int first[5][5],second[5][5],join[5][5];
printf("Enter the number of rows and columns of first matrix:\n");
scanf("%d%d",&m,&n);
printf("Enter the elements of first matrix:\n");
for(i=0;i<m;i++)
{
for(j=0;j<n;j++)
{
scanf("%d",&first[i][j]);
}
}
printf("Enter the number of rows and columns of second matrix:\n");
scanf("%d%d",&p,&q);
printf("Enter the elements of second matrix:\n");
for(i=0;i<p;i++)
{
for(j=0;j<q;j++)
{
scanf("%d",&second[i][j]);
}
}
printf("The elements of first matrix:\n");
for(i=0;i<m;i++)
{
for(j=0;j<n;j++)
{
printf("%d\t",first[i][j]);
}
printf("\n");
}
printf("The elements of second matrix:\n");
for(i=0;i<p;i++)
{
```

```
for(j=0;j<q;j++)
{
printf("%d\t",second[i][j]);
}
printf("\n");
}
for (i=0;i<m;i++)
{
for(j=0;j<q;j++)
{
join[i][j]=first[i][j]||second[i][j];
}
}
printf("Boolean join of the martices:\n");
for (i=0;i<m;i++)
{
for(j=0;j<q;j++)
{
printf("%d\t",join[i][j]);
}
printf("\n");
}
return 0;
}
```

**Output:**

```
Enter the number of rows and columns of first matrix:
3 3
Enter the elements of first matrix:
1 1 0
0 0 1
1 1 1
Enter the number of rows and columns of second matrix:
3 3
Enter the elements of second matrix:
1 1 1
1 1 1
0 0 0
The elements of first matrix:
1       1       0
0       0       1
1       1       1
The elements of second matrix:
1       1       1
1       1       1
0       0       0
Boolean join of the martices:
1       1       1
1       1       1
1       1       1
```

### 6. C-Program to implement Boolean meet.

```
#include<stdio.h>
int main()
{
int m,n,p,q,i,j,k;
int first[5][5],second[5][5],meet[5][5];
printf("Enter the number of rows and columns of first matrix:\n");
scanf("%d%d",&m,&n);
printf("Enter the elements of first matrix:\n");
for(i=0;i<m;i++)
{
for(j=0;j<n;j++)
```

```
{
scanf("%d",&first[i][j]);
}
}
printf("Enter the number of rows and columns of second matrix:\n");
scanf("%d%d",&p,&q);
printf("Enter the elements of second matrix:\n");
for(i=0;i<p;i++)
{
for(j=0;j<q;j++)
{
scanf("%d",&second[i][j]);
}
}
printf("The elements of first matrix:\n");
for(i=0;i<m;i++)
{
for(j=0;j<n;j++)
{
printf("%d\t",first[i][j]);
}
printf("\n");
}
printf("The elements of second matrix:\n");
for(i=0;i<p;i++)
{
for(j=0;j<q;j++)
{
printf("%d\t",second[i][j]);
}
printf("\n");
}
for (i=0;i<m;i++)
{
for(j=0;j<q;j++)
{
meet[i][j]=first[i][j]&&second[i][j];
}
}
printf("Boolean meet of the martices:\n");
for (i=0;i<m;i++)
{
for(j=0;j<q;j++)
{
printf("%d\t",meet[i][j]);
}
printf("\n");
}
return 0;
}
```

**Output:**

```
Enter the number of rows and columns of first matrix:
3 3
Enter the elements of first matrix:
1 1 1
0 1 0
1 1 1
Enter the number of rows and columns of second matrix:
3 3
Enter the elements of second matrix:
1 0 0
0 0 0
0 0 1
The elements of first matrix:
1       1       1
0       1       0
1       1       1
The elements of second matrix:
1       0       0
0       0       0
0       0       1
Boolean meet of the martices:
1       0       0
0       0       0
0       0       1
```

**7. C-Program to implement Boolean product.**

```
#include<stdio.h>
int main ()
{
int m,n,p,q,i,j,k,sum=0;
int first[5][5],second[5][5],multiply[5][5];
printf("Enter the number of rows and columns of first matrix:\n");
scanf("%d%d",&m,&n);
printf("\nEnter the elements of first matrix:\n");
for(i=0;i<m;i++)
{
for(j=0;j<n;j++)
scanf("%d",&first[i][j]);
}
printf("Enter the number of rows and columns of second matrix:\n");
scanf("%d%d",&p,&q);
if(n!=p)
printf("The matrices cannot be multiplied with each other.\n");
else
{
printf("\nEnter the elements of second matrix:\n");
for(i=0;i<p;i++)
{
for(j=0;j<q;j++)
scanf("%d",&second[i][j]);
}
for(i=0;i<m;i++)
{
for(j=0;j<q;j++)
{
for(k=0;k<p;k++)
{
sum=sum|| first[i][k]&&second[k][j];
}
multiply[i][j]=sum;
sum=0;
}
}
printf("Boolean Product of Matrices is:\n");
for(i=0;i<m;i++)
```

```
{
for(j=0;j<q;j++)
{
printf("%d\t",multiply[i][j]);
}
printf("\n");
}
}
return 0;
}
```

**Output:**

```
Enter the number of rows and columns of first matrix:
3 3

Enter the elements of first matrix:
1 0 1
0 1 0
1 0 1
Enter the number of rows and columns of second matrix:
3 3

Enter the elements of second matrix:
1 1 1
1 1 0
0 0 1
Boolean Product of Matrices is:
1       1       1
1       1       0
1       1       1
```

**8. C program to implement Euclidian algorithms**

```
#include<stdio.h>
int gcd(int a,int b);
int main()
{
int a,b,g;
printf("Enter first number\n");
scanf("%d",&a);
printf("Enter second number\n");
scanf("%d",&b);
g =gcd(a,b);
printf("The gcd of %d and %d = %d\n",a,b,g);
getch();
return 0;
}
int gcd(int a,int b)
{
if(a==0)
return b;
else
return gcd(b%a,a);
}
```

**Output:**

```
Enter first number
24
Enter second number
12
The gcd of 24 and 12 = 12
```

**9. C program to find factorial of number using recursion.**

```
#include <stdio.h>
```

```
int do_factorial(int x);
int main()
{
    int num, factorial;
    printf("Enter the number: ");
    scanf("%d", &num);
    factorial = do_factorial(num);
    printf("Factorial of the number is %d", factorial);
}
int do_factorial(int num)
{
    if (num == 0) // Acts as condition to terminate recursion
    {
        return (1);
    }
    else
    {
        // Function repeatedly calls itself inside 'itself' causing looping effect.
        return (num * do_factorial(num - 1));
    }
}
```

**Output:**

```
Enter the number: 6
Factorial of the number is 720
giver_kdk@giver:~/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete
```

10. **C program to x^y using recursion.**

```
#include <stdio.h>
int power_fx(int num, int pow);
int main()
{
    int number, power, result;
    printf("Enter the value of x and y: ");
    scanf("%d%d", &number, &power);
    result= power_fx(number, power);
    printf("The %d to the power %d is %d", number, power, result);
}
int power_fx(int num, int pow)
{
    if(pow==0)
    {
        return(1);
    }
    else
    {
        return(num* power_fx(num, pow-1));      //Direct recursion causing 'num' to multiply itself.
    }
}
```

**Output:**

```
Property$ cd "/home/giver_kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programm
g++ test.cpp -o test && "/home/giver_kdk/Documents/CODES/C_CPP_Ubuntu/C
perty/"test
Enter the value of x and y: 5 2
The 5 to the power 2 is 25
giver_kdk@giver:~/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete
```

### 11. C program to print truth table of AND Operation

```
#include<stdio.h>
int AND(int a,int b);
int main()
{
int a,b;
printf("A\tB\tA^B\n");
for(a=0;a<=1;a++)
{
for(b=0;b<=1;b++)
{
printf("%d\t%d\t%d\n",a,b,AND(a,b));
}
}
return 0;
}
int AND(int a,int b)
{
if(a==1&&b==1)
return 1;
else
return 0;
}
```

**Output:**

```
giver_kdk@giver:~/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete
kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete Structure Coc
home/giver_kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete St
A       B       A^B
0       0       0
0       1       0
1       0       0
1       1       1
```

### 12. C program to print truth table of OR Operation

```
#include<stdio.h>
int OR(int a,int b);
int main()
{
int a,b;
printf("A\tB\tA V B\n\n");
for(a=0;a<=1;a++)
{
for(b=0;b<=1;b++)
{
printf("%d\t%d\t%d\n\n",a,b,OR(a,b));
}
}
return 0;
}
int OR(int a,int b)
{
if(a==1||b==1)
return 1;
else
return 0;
}
```

**Output:**

```
giver_kdk@giver:~/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete
kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete Structure Cod
home/giver_kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete St
A       B       A V B

0       0       0

0       1       1

1       0       1

1       1       1
```

**13. C program to print truth table of NOT Operation**

```
#include<stdio.h>
int NOT(int a);
int main()
{
int a,b;
printf("A\t~A\n");
for(a=0;a<=1;a++)
{
printf("%d\t%d\n",a,NOT(a));
}
return 0;
}
int NOT(int a)
{
if(a==1)
return 0;
else
return 1;
}
```

**Output:**

```
giver_kdk@giver:~/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete
kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete Structure Cod
home/giver_kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete St
A       ~A
0       1
1       0
```

**14. Program to find the number of ordered arrangemnt without repetition using permutation**

```
#include <stdio.h>
int factorial(int num);
int main()
{
        int n, r, arrangements;
        printf("Enter the number of element: ");
        scanf("%d", &n);
        printf("Enter the number of elements to be arranged: ");
        scanf("%d", &r);
        arrangements = factorial(n) / factorial(n - r);
        printf("Possible number of ordered arrangement without repetition: %d \n",
arrangements);
}
int factorial(int num)
{
```

```
        int fact = 1;
        for(int i = 1; i <= num; i++ )
        {
                fact = fact * i;
        }
        return fact;
}
```

**Output:**

```
giver_kdk@giver:~/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete
kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete Structure Code
home/giver_kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete Str
Enter the number of element: 4
Enter the number of elements to be arranged: 3
Possible number of ordered arrangement without repetition: 24
```

**15. Program to find the number of unordered arrangemnt using combination**

```
#include <stdio.h>

int factorial(int num);

int main()
{
        int n, r, arrangements;
        printf("Enter the number of element: ");
        scanf("%d", &n);
        printf("Enter the number of elements to be arranged: ");
        scanf("%d", &r);
        arrangements = factorial(n) / (factorial(n - r) * factorial(r));
        printf("Possible number of unordered arrangement: %d \n", arrangements);
}
int factorial(int num)
{
        int fact = 1;
        for(int i = 1; i <= num; i++ )
        {
                fact = fact * i;
        }
        return fact;
}
```

**Output:**

```
giver_kdk@giver:~/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete
kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete Structure Code
home/giver_kdk/Documents/CODES/C_CPP_Ubuntu/CPP Programming/Discrete Str
Enter the number of element: 12
Enter the number of elements to be arranged: 5
Possible number of unordered arrangement: 792
```

**16. C-Program to determine the properties of a relation**

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
```

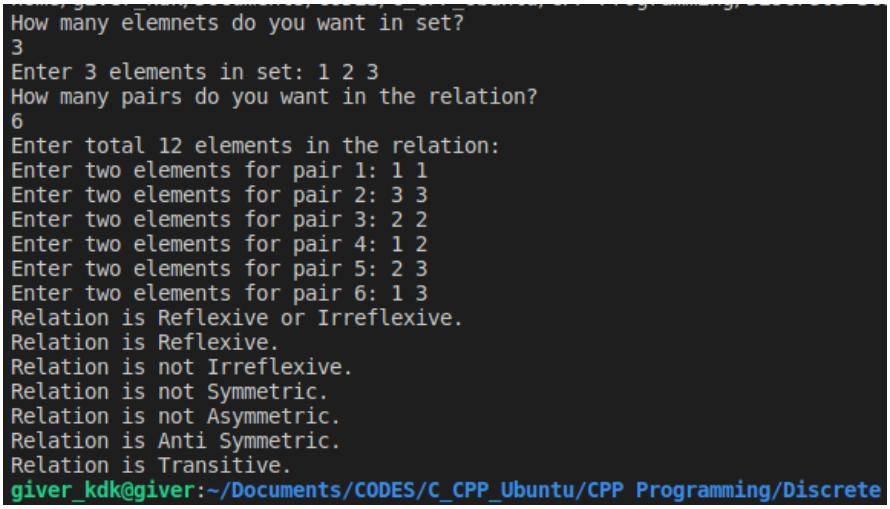
```
	int reflexive = 0, irreflexive = 0, nonReflexive = 0, count = 0, verified = 0;
	int  symmetric = 0, asymmetric = 0, antiSymmetric = 0, transitive = 0, antiCount = 0;

	int i, j, k, l, setA[10], sizeA;
	int relation[100][2], relationSize, pair1[2], pair2[2], pair3[2];
	printf("How many elemnets do you want in set?\n");
scanf("%d", &sizeA);
printf("Enter %d elements in set: ", sizeA);
for (i = 0; i < sizeA; i++)
{
   scanf("%d", &setA[i]);
}
printf("How many pairs do you want in the relation?\n");
scanf("%d", &relationSize);
printf("Enter total %d elements in the relation:\n", relationSize * 2);
	for(i = 0; i < relationSize; i++)
	{
		printf("Enter two elements for pair %d: ", i + 1);
		for (j = 0; j < 2; j++)
		{
			scanf("%d", &relation[i][j]);
		}
	}
	// Relation elements check with respect to set
	for(i = 0; i < relationSize; i++)
	{
		for (j = 0; j < 2; j++)
		{
			for(k = 0; k < sizeA; k++)
			{
				if(setA[k] == relation[i][j])
				{
					verified = 1;
				}
			}
			if(!verified)
			{
				printf("Elements on the relation doesn't belong to the set!\n");
				exit(0);
			}
			else
			{verified = 0;}
		}
	}
	// Reflexivity test
	for (i = 0; i < sizeA; i++)
	{
		for(j = 0; j < relationSize; j++)
		{
			for (k = 0; k < 2; k++)
			{
				pair1[k] = relation[j][k];
			}
			if(pair1[0] == setA[i])
			{
				if(pair1[0] == pair1[1])
```

```
                        {
                                count++;
                                break;
                        }
                }
        }
}
if(count == sizeA)
{
        reflexive = 1;
}
else if(count == 0)
{
        irreflexive = 1;
}
else
{
        nonReflexive =1;
}
count = 0;
// Symmetry test
for(i = 0; i < relationSize; i++)
{
        for (j = 0; j < 2; j++)
        {
                pair1[j] = relation[i][j];
        }
        for(j = 0; j < relationSize; j++)
        {
                for(k = 0; k < 2; k++)
                {
                        pair2[k] = relation[j][k];
                }
                if((pair1[0] == pair2[1]) && (pair1[1] == pair2[0]))
                {
                        count++;
                        if(pair1[0] == pair1[1])
                        {
                                antiCount++;
                        }
                }
        }
}
if(count == antiCount)
{
        antiSymmetric = 1;
}
if(count == relationSize)
{
        symmetric = 1;
}
else if(count == 0)
{
        asymmetric = 1;
}
count = 0;
```

```
        // Transitive test
        for(i = 0; i < relationSize; i++)
        {
                for (j = 0; j < 2; j++)
                {
                        pair1[j] = relation[i][j];
                }
                if(pair1[0] != pair1[1])
                {
                        for(j = 0; j < relationSize; j++)
                        {
                                for(k = 0; k < 2; k++)
                                {
                                        pair2[k] = relation[j][k];
                                }
                                if(pair2[0] != pair2[1])
                                {
                                        if((pair2[0] == pair1[1]) && (pair1[0] != pair2[1]))
                                        {
                                                for(k = 0; k < relationSize; k++)
                                                {
                                                        for(l = 0; l < 2; l++)
                                                        {
                                                                pair3[l] = relation[k][l];
                                                        }
                                                        if(pair3[0] != pair3[1])
                                                        {
                                                                if((pair3[0] == pair1[0]) &&
(pair3[1] == pair2[1]))
                                                                {
                                                                        transitive = 1;
                                                                }
                                                        }
                                                }
                                                if(!transitive)
                                                {
                                                        goto exit;
                                                }
                                        }
                                }
                        }
                }
        }
        exit:
        // Final Description
        printf("Relation is %s", (nonReflexive ? "Non-Reflexive.\n" : "Reflexive or Irreflexive.\n"));
        printf("Relation is %s", (reflexive ? "Reflexive.\n" : "not Reflexive.\n"));
        printf("Relation is %s", (irreflexive ? "Irreflexive.\n" : "not Irreflexive.\n"));
        printf("Relation is %s", (symmetric ? "Symmetric.\n" : "not Symmetric.\n"));
        printf("Relation is %s", (asymmetric ? "Asymmetric.\n" : "not Asymmetric.\n"));
        printf("Relation is %s", (antiSymmetric ? "Anti Symmetric.\n" : "not Anti Symmetric.\n"));
        printf("Relation is %s", (transitive ? "Transitive.\n" : "not Transitive.\n"));
}
```

**Output:**




**17. Program to represent the graph using adjacency matrix.**

```
#include <stdio.h>
#include <stdlib.h>
int dirgraph();
int undirgraph();
int readgraph(int adjmat[50][50], int  n );

int main()
{
int option;
do
{
printf("\n A Program to represent a Graph by using an Adjacency Matrix method \n ");
printf("\n 1. Directed Graph ");
printf("\n 2. Un-Directed Graph ");
printf("\n 3. Exit ");
printf("\n\n Select a proper option : ");
scanf("%d", &option);
switch(option)
{
case 1 :dirgraph();
break;
case 2 :undirgraph();
break;
case 3 : exit(0);
}
}while(1);
}
int dirgraph()
{
int adjmat[50][50];
int  n;
int indeg, outdeg, i, j;
printf("\n How Many Vertices ? : ");
scanf("%d", &n);
readgraph(adjmat, n);

printf("\n Vertex \t InDegree \t OutDegree \t TotalDegree ");
```

```
for (i = 1; i<= n ;i++ )
{
indeg = outdeg = 0;
for ( j = 1 ; j <= n ; j++ )
{
if ( adjmat[j][i] == 1 )
indeg++;
}
for ( j = 1 ; j <= n ; j++ )
if (adjmat[i][j] == 1 )
outdeg++;
printf("\n\n %5d\t\t\t%d\t\t%d\t\t%d\n\n",i,indeg,outdeg,indeg+outdeg);
}
return 0;
}

int undirgraph()
{
int adjmat[50][50];
int deg, i, j, n;
printf("\n How Many Vertices ? : ");
scanf("%d", &n);
readgraph(adjmat, n);
printf("\n Vertex \t Degree ");
for ( i = 1 ; i<= n ; i++ )
{
deg = 0;
for ( j = 1 ; j <= n ; j++ )
if ( adjmat[i][j] == 1)
deg++;
printf("\n\n %5d \t\t %d\n\n", i, deg);
}
return 0;
}

int readgraph( int adjmat[50][50], int  n )
{
int i, j;
char reply;
for ( i = 1 ; i<= n ; i++ )
{
for ( j = 1 ; j <= n ; j++ )
{
if ( i == j )
{
adjmat[i][j] = 0;
continue;
}
printf("\n Vertices %d & %d are Adjacent ? (Y/N) :",i,j);
fflush(stdin);
scanf("%c", &reply);

if ( reply == 'y' || reply == 'Y' )
adjmat[i][j] = 1;
else
adjmat[i][j] = 0;
}
}
```

return 0;
}
**Output:**

```
A Program to represent a Graph by using an Adjacency Matrix method

1. Directed Graph
2. Un-Directed Graph
3. Exit

Select a proper option : 1

How Many Vertices ? : 2

Vertices 1 & 2 are Adjacent ? (Y/N) :y

Vertices 2 & 1 are Adjacent ? (Y/N) :n

Vertex          InDegree        OutDegree       TotalDegree

    1                 0              1              1



    2                 1              0              1


A Program to represent a Graph by using an Adjacency Matrix method

1. Directed Graph
2. Un-Directed Graph
3. Exit
```

## 18. C-Program to implement Kruskal's Algorithm for MST.

```
#include<stdio.h>
int i,j,k,a,b,u,v,n,ne=1;
int min,mincost=0,cost[9][9],parent[9];
int find(int);
int uni(int,int);
int main()
{
printf("\n Implementation of Kruskal's algorithm\n");
printf("\n Enter no of vertices:");
scanf("%d",&n);
printf("\nEnter the cost of adjacency matrix \n");
for(i=1;i<=n;i++)
{
for(j=1;j<=n;j++)
{
scanf("%d",&cost[i][j]);
if(cost[i][j]==0)
cost[i][j]=999;
}
}
printf("The edges of minimum spanning tree are \n");
while(ne<n)
{
for(i=1,min=999;i<=n;i++)
{
for(j=1;j<=n;j++)
{
```

```
if(cost [i][j]<min)
{
min=cost[i][j];
a=u=i;
b=v=j;
}
}//end for
}//end for
u=find(u);
v=find(v);
if(uni(u,v))
{
printf("%d edge(%d,%d)=%d\n",ne++,a,b,min);
mincost+=min;
}
cost[a][b]=cost[b][a]=999;
}//end while
printf("\n\tMinimal cost=%d\n",mincost);
return 0;
}
int find(int i)
{
while(parent[i])
i=parent[i];
return i;
}
int uni(int i,int j)
{
if(i!=j)
{
parent[j]=i;
return 1;
}
return 0;
}
```

**Output:**