C LANGUAGE 50 PROGRAMS

PROGRAMMING CONCEPT AND CODING

Sumanta Pramanick

1) Write a program to compute the average of three given numbers.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int n1,n2,n3;
        float avg;
        clrscr();
        printf("\nENTER THREE NUMBERS: " );
        scanf("%d %d %d",&n1,&n2,&n3);
        avg=(n1+n2+n3)/3;
        printf("\nAVERAGE: %0.2f",avg);
        getch();
}
```

2) Write a program to compute the seconds from a given age.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        long unsigned age,sec;
        clrscr();
        printf("\nENTER YOUR AGE: ");
        scanf("%lu",&age);
        sec=age*365*24*60*60;
        printf("\nAGE IN SECONDS: %lu",sec);
        getch();
}
```

3) Write a program to compute simple interest and compound interest from the given principal, time period and interest rate.

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

```
#include <math.h>
void main()
{
        int p,t;
        float si,ci,r,i;
        clrscr( );
        printf("\nENTER PRINCIPAL: ");
        scanf("%d",&p);
        printf("\nENTER TIME PERIOD: ");
        scanf("%d",&t);
        printf("\nENTER RATE OF INTEREST: ");
        scanf("%f",&r);
        si=(p*t*r)/100;
        i=r/100;
        ci=p*pow((1+i),t);
        printf("\nSIMPLE INTEREST: %0.2f",si);
        printf("\n\nCOMPOUND INTEREST: %0.2f",ci);
        getch();
}
```

Note: - To use the pow() function <math.h> header file must be included.

4) Write a program to compute the area of a circle from the given radius.
Hint: -Area of the circle= □ x (radius)^2.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        float pi=3.14,rad,area;
        clrscr();
        printf("\nENTER THE RADIUS OF THE CIRCLE: ");
        scanf("%f",&rad);
        area=pi*rad*rad;
        printf("\nTHE AREA OF THE CIRCLE IS: %0.2f",area);
```

```
        getch();
}
```

5) Write a program to swap the values of two variables.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int a,b,c;
        clrscr();
        printf("\nENTER TWO NUMBERS FOR a AND b:\n");
        scanf("%d %d",&a,&b);
        printf("\nBEFORE SWAPING THE VALUE OF a=%d AND
b=%d",a,b);
        c=a;
        a=b;
        b=c;
        printf("\nAFTER SWAPING THE VALUE OF a=%d AND b=%d",a,b);
        getch();
}
```

6) Write a program to swap the values of two variables without using a third variable.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int a,b;
        clrscr();
        printf("\nENTER TWO NUMBERS FOR a AND b:\n");
        scanf("%d %d",&a,&b);
        printf("\nBEFORE SWAPING THE VALUE OF a=%d AND
```

```
b=%d",a,b);
        a=a+b;
        b=a-b;
        a=a-b;
        printf("\nAFTER SWAPING THE VALUE OF a=%d AND b=%d",a,b);
        getch();
}
```

Control Statements

A) Conditional Control Statements

1) If Conditions

1) Write a program to compute net amount from the given quantity purchased and rate per quantity. Discount @10% is allowed if quantity purchased exceeds 100.

Net Amount = (Quantity Purchased x Rate Per Quantity) – Discount.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int qty,rate;
        float disc=0.0,net;
        clrscr();
        printf("\nENTER QUANTITY: ");
        scanf("%d",&qty);
        printf("\nENTER RATE: ");
        scanf("%d",&rate);
        if (qty>100)
        disc=qty*rate*10/100;
        net=(qty*rate)-disc;
        printf("\nNET AMOUNT: %0.2f",net);
        getch();
}
```

2) Find out the highest number from three given numbers.

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

```
void main()
{
	int a,b,c,h;
	clrscr();
	printf("\nENTER THREE NUMBERS:\n");
	scanf("%d %d %d",&a,&b,&c);
	h=a;
	if(b>h)
	h=b;
	if(c>h)
	h=c;
	printf("\nHIGHEST NUMBER IS %d",h);
	getch();
}
```

Alternative Method

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int a,b,c;
	clrscr();
	printf("\nENTER THREE NUMBERS:\n");
	scanf("%d %d %d",&a,&b,&c);
	if(a>b && a>c)
	printf("\nHIGHEST NUMBER IS %d",a);
	if(b>c && b>a)
	printf("\nHIGHEST NUMBER IS %d",b);
	if(c>a && c>b)
	printf("\nHIGHEST NUMBER IS %d",c);
	getch();
}
```

3) Find out the lowest number from three given numbers.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int a,b,c,l;
	clrscr();
	printf("\nENTER THREE NUMBERS:\n");
	scanf("%d %d %d",&a,&b,&c);
	l=a;
	if(b<l)
	l=b;
	if(c<l)
	l=c;
	printf("\nLOWEST NUMBER IS %d",l);
	getch();
}
```

Alternative Method

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int a,b,c;
	clrscr();
	printf("\nENTER THREE NUMBERS:\n");
	scanf("%d %d %d",&a,&b,&c);
	if(a<b && a<c)
	printf("\nLOWEST NUMBER IS %d",a);
	if(b<c && b<a)
	printf("\nLOWEST NUMBER IS %d",b);
	if(c<a && c<b)
	printf("\nLOWEST NUMBER IS %d",c);
	getch();
}
```

4) Write a program to check a given number is odd or even.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int a;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&a);
	if(a%2==0)
	printf("\nTHE NUMBER IS AN EVEN NUMBER");
	else
	printf("\nTHE NUMBER IS AN ODD NUMBER");
	getch();
}
```

5) Write a program to find out a person is insured or not. The person is insured if following conditions are satisfied: -

i) If the person is married.
ii) If the person is unmarried, male & above 30 years of age.
iii) If the person is unmarried, female & above 25 years of age.

In all other cases the person is not insured.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char ms,sex;
	int age;
	clrscr();
	printf("\nEnter Marital Status [M/U],Sex [M/F],Age: ");
```

```
        scanf("%c %c %d",&ms,&sex,&age);
       if((ms=='M') || (ms=='U' && age>30 && sex=='M') || (ms=='U' &&
       age>25 && sex=='F'))
        printf("\nTHE EMPLOYEE IS INSURED");
        else
        printf("\nTHE EMPLOYEE IS NOT INSURED");
        getch();
}
```

6) Write a program to find out the gross amount from the given basic pay.

Gross = Basic + DA + HRA

DA & HRA can be calculated as follows: -

If Basic Pay is greater than or equal to 8000 DA is 20% of Basic Pay & HRA is 25% of Basic Pay, otherwise DA is 15% of Basic Pay & HRA is 20% of Basic Pay.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        float basic,da,hra,gross;
        clrscr();
        printf("\nENTER BASIC PAY: ");
        scanf("%f",&basic);
        if(basic>=8000)
          {
        da=basic*20/100;
        hra=basic*25/100;
        }
        else
          {
        da=basic*15/100;
        hra=basic*20/100;
```

```
        }
        gross=basic+da+hra;
        printf("\nGROSS AMOUNT: %0.2f",gross);
        getch();
}
```

7) Write a program to compute the division from the given marks of 5 subjects. The division can be calculated as follows: -

Average Mark	Division
>=60	First
>=50	Second
>=40	Third
<40	Fail

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int m1,m2,m3,m4,m5,per;
        clrscr();
        printf("\nENTER THE MARKS OF THE SUBJECTS:\n");
        scanf("%d %d %d %d %d",&m1,&m2,&m3,&m4,&m5);
        per=(m1+m2+m3+m4+m5)/5;
        if(per>=60)
        printf("\nFIRST DIVISION");
        else
          {
        if(per>=50)
        printf("\nSECOND DIVISION");
```

```
        else
                {
        if(per>=40)
        printf("\nTHIRD DIVISION");
        else
        printf("\nFAIL");
        }
        }
        getch();
}
```

8) Write a program to check whether a given year is leap year or not.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int year,n;
        clrscr();
        printf("\nENTER A YEAR: ");
        scanf("%d",&year);
        if(year%4==0 && year%100 !=0 || year%400==0)
        printf("\n%d IS A LEAP YEAR",year);
        else
        printf("\n%d IS NOT A LEAP YEAR",year);
        getch();
}
```

2) Switch Case

1) Write a program to ask the user to enter a number. If the number is 1 print "One", if the number is 2 print "Two", if the number is 3 print "Three", otherwise print "Other than One, Two or Three.

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

```
void main()
{
	int i;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&i);
	switch(i)
	  {
	case 1:
	printf("\nNUMBER IS ONE");
	break;
	case 2:
	printf("\nNUMBER IS TWO");
	break;
	case 3:
	printf("\nNUMBER IS THREE");
	break;
	default:
		printf("\nNUMBER IS OTHER THAN ONE, TWO OR
		THREE");
	}
	getch();
}
```

2) Write a program to ask the user to enter a character. If the user enter 'a' or 'A' print "The Character is a or A", if the user enter 'b' or 'B' print "The Character is b or B", if the user enter 'c' or 'C' print "The Character is c or C", otherwise print "Other than a, b, c, A, B, C.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char ch;
	clrscr();
	printf("\nEnter A Character: ");
```

```
        scanf("%c",&ch);
        switch(ch)
          {
        case 'a':
        case 'A':
        printf("\nCharacter Is a Or A");
        break;
        case 'b':
        case 'B':
        printf("\nCharacter Is b Or B");
        break;
        case 'c':
        case 'C':
        printf("\nCharacter Is c or C");
        break;
        default:
        printf("\nCharacter Is Other Than a,b,c,A,B,C");
        }
        getch();
}
```

B) Loop Control Statements

1) While Loop

1) Write a program to print natural numbers up to a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int i=1,n;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        printf("\nNATURAL NUMBERS UPTO %d ARE:\n",n);
```

```
        while(i<=n)
          {
        printf("%d ",i);
        i=i+1;
        }
        getch();
}
```

2) Write a program to ask the user to enter a series of marks of a student. If the user enters –1, come out of the loop and print the average mark.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int mark,num=0;
        float sum,avg=0.0;
        clrscr();
        printf("\nEnter Mark Or -1 To Quit: \n");
        scanf("%d",&mark);
        while(mark!=-1)
          {
        sum+=mark;
        num+=1;
        scanf("%d",&mark);
        }
        avg=sum/num;
        printf("\nAverage Mark: %0.2f",avg);
        getch();
}
```

3) Write a program to ask the user for a number. Print the square of the number and ask a confirmation from the user whether the user want to continue or not.

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

```
#include <conio.h>
void main()
{
        char ch='y';
        int num;
        clrscr();
        while (ch=='y'|| ch=='Y')
          {
        printf("\nENTER A NUMBER: ");
        scanf("%d",&num);
        printf("\nITS SQUARE IS: %d\n",num*num);
        printf("\nDO YOU WANT TO CONTINUE [Y/N]: ");
        ch=getche();
        }
        getch();
}
```

2) Do While Loop

1) Write a program to print the sum of digit of a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int digit;
        unsigned long num,sum=0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%lu",&num);
        do
          {
        digit=num%10;
        num=num/10;
```

```
        sum=sum+digit;
        }
        while(num!=0);
        printf("\nSUM OF THE DIGITS IS %lu",sum);
        getch();
}
```

2) Write a program to print the reverse of a given number.

<u>Example: -</u> Reverse of 2565 is 5652.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        unsigned long num,rev;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%lu",&num);
        printf("\nTHE REVERSE OF THE NUMBER %lu IS ",num);
        do
          {
        rev=num%10;
        num=num/10;
        printf("%lu",rev);
        }
        while(num!=0);
        getch();
}
```

3) <u>For Loop</u>

1) Write a program to print the odd numbers within a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
```

```
{
        int i,n;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        printf("\nODD NUMBERS BETWEEN 1 AND %d ARE: \n",n);
        for(i=1;i<=n;i+=2)
          {
        printf("%d ",i);
        }
        getch();
}
```

2) Write a program to print the even numbers within a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int i,n;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        printf("\nEVEN NUMBERS BETWEEN 1 AND %d ARE: \n",n);
        for(i=2;i<=n;i+=2)
          {
        printf("%d ",i);
        }
        getch();
}
```

3) Write a program to add the odd numbers within a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
```

```
{
        int i,n;
        unsigned long sum=0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        for(i=1;i<=n;i+=2)
        {
        sum=sum+i;
        }
       printf("\nSUM OF THE ODD NUMBERS BETWEEN 1 TO %d IS
       %lu",n,sum);
        getch();
}
```

4) Write a program to add the even numbers within a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int i,n;
        unsigned long sum=0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        for(i=2;i<=n;i+=2)
        {
        sum=sum+i;
        }
       printf("\nSUM OF THE EVEN NUMBERS BETWEEN 1 TO %d IS
       %lu",n,sum);
        getch();
}
```

5) Write a program to print the multiplication table of a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int n,i;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&n);
	printf("\nMULTIPLICATION TABLE OF %d\n",n);
	for(i=1;i<=10;i++)
	{
	printf("\n%2d x %2d = %3d",n,i,n*i);
	}
	getch();
}
```

6) Write a program to print the ASCII chart within a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int n,i;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&n);
	for(i=0;i<=n;i++)
	printf("%d=%c ",i,i);
	getch();
}
```

7) Write a program to evaluate x^n.

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

```
#include <conio.h>
void main()
{
        int num,temp,power,i;
        unsigned long res=1;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&num);
        printf("\nENTER THE POWER: ");
        scanf("%d",&power);
        temp=num;
        for(i=1;i<=power;i++)
          {
        res=res*num;
        }
        printf("\nTHE %d POWER OF %d IS %lu",power,temp,res);
        getch();
}
```

8) Write a program to evaluate $^{1}/_{3} + ^{2}/_{5} + ^{3}/_{7} \ldots + ^{n}/_{((n*2)+1)}$.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        float n,i,sum=0.0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%f",&n);
        for(i=1;i<=n;i++)
        sum=sum+(i/((i*2)+1));
        printf("\nTHE SUMMATION IS: %0.2f",sum);
        getch();
}
```

9) Write a program to compute the factorial of a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int i=1,n;
	unsigned long fact=1;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&n);
	for(i=1;i<=n;i+=1)
	{
	fact=fact*i;
	}
	printf("\nFACTORIAL OF %d IS %lu",n,fact);
	getch();
}
```

10) Write program to print the fibonacci series up to a given number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int num,i;
	unsigned long n1=0,n2=1,s;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&num);
	printf("\nFIBONACCI SERIES UPTO %d NUMBERS IS: \n",num);
	printf("%lu %lu",n1,n2);
	for(i=1;i<=num-2;i++)
	{
	s=n1+n2;
	printf(" %lu",s);
```

```
        n1=n2;
        n2=s;
        }
        getch();
}
```

11) Write a program to evaluate $^{1}/_{1\ \text{Factorial}} + {}^{2}/_{2\ \text{Factorial}} + {}^{n}/_{n\ \text{Factorial}}$.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        float n,i,j,sum=0.0,fact=1.0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%f",&n);
        for(i=1;i<=n;i++)
        {
        fact=1.0;
        for(j=1;j<=i;j++)
        {
        fact=fact*j;
        }
        sum=sum+(i/fact);
        }
        printf("\nTHE SUMMATION IS: %0.2f",sum);
        getch();
}
```

C) Combination of Loop & Conditional Statements

1) Write a program to print the prime numbers within a given number.

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

```
main()
{
	int n,i,j,c;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&n);
	printf("\nPRIME NUMBERS WITHIN %d\ ARE:\n",n);
	for(i=1;i<=n;i++)
	{
	c=0;
	for(j=1;j<=i;j++)
	{
	if(i%j==0)
	c++;
	}
	if(c==2)
	printf("%d ",i);
	}
	getch();
}
```

2) Write a program to check a given number is prime or not.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	int n,i,c=0;
	clrscr();
	printf("\nENTER A NUMBER: ");
	scanf("%d",&n);
	for(i=1;i<=n;i++)
	{
	if(n%i==0)
	c++;
	}
```

```
        if(c==2)
        printf("\n%d IS A PRIME NUMBER",n);
        else
        printf("\n%d IS NOT A PRIME NUMBER",n);
        getch();
}
```

Alternative Method

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int n,i,flag=0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        for(i=2;i<n;i++)
        {
        if(n%i!=0)
        flag=1;
        }
        if(flag==0)
        printf("\n%d IS A PRIME NUMBER",n);
        else
        printf("\n%d IS NOT A PRIME NUMBER",n);
        getch();
}
```

3) Write a program to check a given number is Palindrome or not. A number is said to be Palindrome if the reverse of the number is equal to the number.

```
#include <stdio.h>
#include <conio.h>
void main()
```

```
{
        unsigned long num,temp,pal,sum=0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%lu",&num);
        temp=num;
        do
          {
        pal=num%10;
        num=num/10;
        sum=(sum*10)+pal;
        }
        while(num!=0);
        if(temp==sum)
        printf("\n%lu IS A PALINDROM NUMBER",temp);
        else
        printf("\n%lu IS NOT A PALINDROM NUMBER",temp);
        getch();
}
```

4) Write a program to check a given number is Armstrong or not. A number is said to be Armstrong if sum of the cube of the individual digit is equal to the number.

Example: - $153 = (1)^3 + (5)^3 + (3)^3$.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int num,num1,digit,arm=0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&num);
        num1=num;
```

```
        do
          {
        digit=num%10;
        num=num/10;
        arm=arm+(digit*digit*digit);
        }
        while(num!=0);
        if(arm==num1)
        printf("\n%d IS AN AMSTORNG NUMBER",num1);
        else
        printf("\n%d IS NOT AN AMSTRONG NUMBER",num1);
        getch();
}
```

Triangles

1) Write a program to print a triangle like the following: -

```
1
1 1
1 1 1
1 1 1 1
1 1 1 1 1
```

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int num,i,j;
        clrscr();
        printf("\nENTER THE NUMBER OF LINES: ");
        scanf("%d",&num);
        for(i=1;i<=num;i++)
          {
        for(j=1;j<=i;j++)
```

```
                {
        printf("1 ");
        }
        printf("\n");
        }
        getch();
}
```

2) Write a program to print a triangle like the following: -

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int num,i,j;
        clrscr();
        printf("\nENTER THE NUMBER OF LINES: ");
        scanf("%d",&num);
        for(i=1;i<=num;i++)
          {
        for(j=1;j<=i;j++)
                {
        printf("%d ",j);
        }
        printf("\n");
        }
        getch();
}
```

3) Write a program to print a triangle like the following: -

1
2 3
4 5 6
7 8 9 10
11 12 13 14

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int num,i,j,k=1;
        clrscr();
        printf("\nENTER THE NUMBER OF LINES: ");
        scanf("%d",&num);
        for(i=1;i<=num;i++)
        {
        for(j=1;j<=i;j++)
        {
        printf("%d ",k);
        k++;
        }
        printf("\n");
        }
        getch();
}
```

4) Write a program to print a triangle like the following: -

```
                1
              1 1 1
            1 1 1 1 1
          1 1 1 1 1 1 1
        1 1 1 1 1 1 1 1 1
```

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

```
#include <conio.h>
void main()
{
        int num,i,j,k,s=40;
        clrscr();
        printf("\nENTER THE NUMBER OF LINES: ");
        scanf("%d",&num);
        for(i=1;i<=num;i++)
          {
        for(j=1;j<=s;j++)
        printf(" ");
        for(k=1;k<=i;k++)
        printf("1");
        for(k=i-1;k>0;k--)
        printf("1");
        printf("\n");
        s--;
        }
        getch();
}
```

5) Write a program to print a triangle (Floyd's Triangle) like the following: -

```
                1
              1 2 1
            1 2 3 2 1
          1 2 3 4 3 2 1
        1 2 3 4 5 4 3 2 1
```

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int num,i,j,k,s=40;
        clrscr();
        printf("\nENTER THE NUMBER OF LINES: ");
```

```
        scanf("%d",&num);
        for(i=1;i<=num;i++)
          {
        for(j=1;j<=s;j++)
        printf(" ");
        for(k=1;k<=i;k++)
        printf("%d",k);
        for(k=i-1;k>0;k--)
        printf("%d",k);
        printf("\n");
        s--;
        }
        getch();
}
```

Arrays

1) Write a program to create an array. Print the values and addresses of each elements of the array.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int a[5];
        int i,n=5;
        clrscr();
        for(i=0;i<n;i++)
        {
        printf("\nENTER THE NUMBER-%d: ",i+1);
        scanf("%d",&a[i]);
        }
        for(i=0;i<n;i++)
              printf("ARRAY ELEMENT-%d: VALUE=%d,
              ADDRESS=%u\n",i+1,a[i],&a[i]);
```

```
        getch();
}
```

2) Write a program to create an array of student's ages. Print the average age.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int age[10],i ;
        float avg,sum=0.0;
        clrscr();
        for(i=0;i<10;i++)
          {
        printf("\nENTER AGE-%d: ",i+1);
        scanf("%d",&age[i]);
        sum=sum+age[i];
        }
        printf("\nINPUT AGES ARE: ");
        for(i=0;i<10;i++)
        printf("%d ",age[i]);
        avg=sum/10;
        printf("\nTHE AVERAGE AGE IS: %0.2f",avg);
        getch();
}
```

3) Write a program to create an array. Print the highest and lowest number in the array.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int val[5],h,l,i;
        clrscr();
        for(i=0;i<5;i++)
```

```
    {
    printf("\nENTER VALUE-%d: ",i+1);
    scanf("%d",&val[i]);
    }
    l=val[0];
    h=val[0];
    for(i=0;i<5;i++)
    {
    if(val[i]>h)
    h=val[i];
    else
            {
    if(val[i]<l)
    l=val[i];
    }
    }
    printf("\nHIGHEST VALUE IS %d",h);
    printf("\nLOWEST VALUE IS %d",l);
    getch();
}
```

4) Write a program to insert a given number in the array in a given position.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a[5],i,j=5,k,val,pos;
    clrscr();
    for(i=0;i<5;i++)
    {
    printf("\nENTER NUMBER-%d: ",i+1);
    scanf("%d",&a[i]);
    }
    printf("\nENTER VALUE TO INSERT: ");
    scanf("%d",&val);
```

```
        printf("\nENTER POSITION TO INSERT: ");
        scanf("%d",&pos);
        j++;
        for(k=j;k>=pos;k--)
          {
        a[k]=a[k-1];
        }
        a[--pos]=val;
        printf("\nTHE ARRAY IS: ");
        for(i=0;i<j;i++)
          {
        printf("\n%d",a[i]);
        }
        getch();
}
```

5) Write a program to create an array. Compute the Mean, Variance & Standard Deviation of the array.

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
void main()
{
        int a[10],i,n=5;
        float mean,temp,var,sd,sum=0.0;
        clrscr();
        for(i=0;i<n;i++)
          {
        printf("\nENTER NUMBER-%d: ",i+1);
        scanf("%d",&a[i]);
        sum=sum+a[i];
        }
        mean=sum/n;
        sum=0.0;
        for(i=0;i<n;i++)
```

```
    {
    temp=a[i]-mean;
    sum=sum+(temp*temp);
    }
    var=sum/n;
    sd=sqrt(var);
    printf("\nMEAN = %0.2f",mean);
    printf("\nVARIANCE = %0.2f",var);
    printf("\nSTANDARD DAVIATION = %0.2f",sd);
    getch();
}
```

Note: - To use the sqrt() function <math.h> header file must be included.

6) There are 5 groups of employees in an organization. Write a program to draw a histogram showing given number of employees in each group.

```
#include <stdio.h>
#include <conio.h>
#define n 5
void main()
{
    int g[n],i,j;
    clrscr();
    for(i=0;i<n;i++)
    {
        printf("\nENTER HOW MANY EMPLOYEES ARE IN GROUP-
        %d: ",i+1);
    scanf("%d",&g[i]);
    }
    printf("\n");
    for(i=0;i<n;i++)
    {
    printf("GROUP-%d",i+1);
    printf("%c",221);
    for(j=0;j<=g[i];j++)
```

```
        {
        printf("%c",220);
        }
        printf(" %d",g[i]);
        printf("\n");
        }
        getch();
}
```

Matrix

1) Write a program to create a matrix and display a matrix.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int a[2][3],i,j;
        clrscr();
        printf("\nENTER VALUES FOR THE MATRIX:\n");
        for(i=0;i<2;i++)
        for(j=0;j<3;j++)
        scanf("%d",&a[i][j]);
        printf("\nTHE VALUES OF THE MATRIX ARE:\n");
        for(i=0;i<2;i++)
       {
        for(j=0;j<3;j++)
        printf("%5d",a[i][j]);
                printf("\n");
        }
        getch();
}
```

2) Write a program to create two matrixes. Add the values of the two matrixes and store it in another matrix. Display the new matrix.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int a[2][3],b[2][3],c[2][3],i,j;
        clrscr();
        printf("\nENTER VALUES FOR MATRIX A:\n");
        for(i=0;i<2;i++)
        for(j=0;j<3;j++)
        scanf("%d",&a[i][j]);
        printf("\nENTER VALUES FOR MATRIX B:\n");
        for(i=0;i<2;i++)
        for(j=0;j<3;j++)
        scanf("%d",&b[i][j]);
        for(i=0;i<2;i++)
        for(j=0;j<3;j++)
        c[i][j]=a[i][j]+b[i][j];
        printf("\nTHE VALUES OF MATRIX C ARE:\n");
        for(i=0;i<2;i++)
          {
        for(j=0;j<3;j++)
        printf("%5d",c[i][j]);
        printf("\n");
        }
        getch();
}
```

3) Write a program to create two matrixes. Multiply the values of the two matrixes and store it in another matrix. Display the new matrix.

```
#include <stdio.h>
#include <conio.h>
#define max 3
void main()
{
```

```
int a[max][max],b[max][max],c[max][max],i,j,k;
printf("\nENTER VALUES FOR MATRIX-A\n");
for(i=0;i<max;i++)
{
for(j=0;j<max;j++)
{
printf("ENTER VALUE FOR A(%d,%d): ",i+1,j+1);
scanf("%d",&a[i][j]);
}
}
printf("\nENTER VALUES FOR MATRIX-B\n");
for(i=0;i<max;i++)
{
for(j=0;j<max;j++)
{
printf("ENTER VALUE FOR B(%d,%d): ",i+1,j+1);
scanf("%d",&b[i][j]);
}
}
for(i=0;i<max;i++)
{
for(j=0;j<max;j++)
{
c[i][j]=0;
for(k=0;k<max;k++)
{
c[i][j]+=a[i][k]*b[k][j];
}
}
}
printf("\nVALUES OF MATRIX-A\n");
for(i=0;i<max;i++)
{
for(j=0;j<max;j++)
{
printf("%d ",a[i][j]);
```

```
        }
        printf("\n");
        }
        printf("\nVALUES OF MATRIX-B\n");
        for(i=0;i<max;i++)
        {
        for(j=0;j<max;j++)
        {
        printf("%d ",b[i][j]);
        }
        printf("\n");
        }
        printf("\nVALUES OF MATRIX-C\n");
        for(i=0;i<max;i++)
        {
        for(j=0;j<max;j++)
        {
        printf("%d ",c[i][j]);
        }
        printf("\n");
        }
        getch();
}
```

4) Write a program to create a matrix. Add the diagonal elements of the matrix.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int a[3][3],trace=0,i,j;
        clrscr();
        printf("\nENTER VALUES OF THE MATRIX:\n");
        for(i=0;i<3;i++)
        for(j=0;j<3;j++)
        scanf("%d",&a[i][j]);
```

```
        printf("\nTHE VALUES OF THE MATRIX ARE:\n");
        for(i=0;i<3;i++)
          {
        for(j=0;j<3;j++)
        printf("%5d",a[i][j]);
        printf("\n");
        }
        for(i=0;i<3;i++)
        trace+=a[i][i];
       printf("THE SUMMATION OF THE DIAGONAL ELEMENTS OF THE
       MATRIX IS %d",trace);
        getch();
}
```

String or Array of Characters

1) Write a program which will accept Name, Age, Sex and Qualification and display the same.

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
        int i,j;
        char label[5][20]={"NAME","AGE","SEX","QUALIFICATION"},a[5]
[10];
        clrscr();
        for(i=0;i<4;i++)
          {
        printf("\nENTER YOUR %s: ",label[i]);
        gets(a[i]);
        }
        for(i=0;i<4;i++)
        printf("\n%s IS YOUR %s\n",a[i],label[i]);
```

```
	getch();
}
```

2) Write a program to find out the length of a given string without using the library function strlen().

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char str[50];
	int len;
	clrscr();
	printf("\nENTER A STRING: ");
	gets(str);
	for(len=0;str[len]!=NULL;len++);
	printf("\nTHE LENGTH OF THE STRING IS %d",len);
	getch();
}
```

3) Write a program to print the reverse of a given string.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char ch[100];
	int i,len;
	clrscr();
	printf("\nENTER A STRING: ");
	gets(ch);
	len=strlen(ch);
	printf("\nTHE STRING IN THE REVERSE ORDER: ");
	for(i=len-1;i>=0;i--)
	printf("%c",ch[i]);
	getch();
```

```
}
```

4) Write a program to check if a given string is palindrome or not. A string is said to be palindrome if the reverse of the string is equal to the string.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char a[100];
	int i,len,flag=0;
	clrscr();
	printf("\nENTER A STRING: ");
	gets(a);
	len=strlen(a);
	for(i=0;i<len;i++)
	{
	if(a[i]==a[len-i-1])
	flag=flag+1;
	}
	if(flag==len)
	printf("\nTHE STRING IS PALINDROM");
	else
	printf("\nTHE STRING IS NOT PALINDROM");
	getch();
}
```

5) Write a program to count the number of words including spaces and excluding spaces in a given string. Two words are separated by single space.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char a[100];
	int len,i,sp=0;
```

```
        clrscr();
        printf("\nENTER A STRING: ");
        gets(a);
        for(len=0;len<=a[len];len++);
        for(i=0;i<len;i++)
        {
        if(a[i]==' ')
        sp=sp+1;
        }
        printf("\nNUMBER OF WORDS INCLUDING SPACES: %d",len);
        printf("\nNUMBER OF WORDS EXCLUDING SPACES: %d",len-sp);
        getch();
}
```

6) Write a program to count the number of vowels in a given string.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        char a[100];
        int len,i,vow=0;
        clrscr();
        printf("\nENTER A STRING: ");
        gets(a);
        len=strlen(a);
        for(i=0;i<len;i++)
        {
              if(a[i]=='a' || a[i]=='A' || a[i]=='e' || a[i]=='E' || a[i]=='i' || a[i]=='I' ||
              a[i]=='o' || a[i]=='O' || a[i]=='u' || a[i]=='U')
        vow=vow+1;
        }
        printf("\nTHERE ARE %d VOWELS IN THE STRING",vow);
        getch();
}
```

7) Write a program to count the number of words in a given string. Two words are separated by one or more blank spaces.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char a[100];
	int len,i,word=1;
	clrscr();
	printf("\nENTER A STRING: ");
	gets(a);
	len=strlen(a);
	for(i=0;i<len;i++)
	{
	if(a[i]!=' ' && a[i+1]==' ')
	word=word+1;
	}
	printf("\nTHERE ARE %d WORDS IN THE STRING",word);
	getch();
}
```

8) Write a program to print a given string in lower case.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	char s[100];
	int len,i;
	clrscr();
	printf("\nENTER A SENTENSE: ");
	gets(s);
	len=strlen(s);
	printf("\n");
	for(i=0;i<len;i++)
```

```
        {
        if(s[i]>=65 && s[i]<=90)
        printf("%c",s[i]+32);
        else
        printf("%c",s[i]);
        }
        getch();
}
```

9) Write a program to print a given string in upper case.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        char s[100];
        int len,i;
        clrscr();
        printf("\nENTER A SENTENSE: ");
        gets(s);
        len=strlen(s);
        printf("\n");
        for(i=0;i<len;i++)
        {
        if(s[i]>=97 && s[i]<=122)
        printf("%c",s[i]-32);
        else
        printf("%c",s[i]);
        }
        getch();
}
```

10) Write a program to print the string in first case.

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

```
void main()
{
	char s[100];
	int len,i;
	clrscr();
	printf("\nENTER A SENTENSE: ");
	gets(s);
	len=strlen(s);
	printf("\n");
	for(i=0;i<len;i++)
	{
		if((i==0 && s[i]>=97 && s[i]<=122) || (s[i-1]==32 && s[i]>=97
		&& s[i]<=122))
	printf("%c",s[i]-32);
	else
	{
	if(i!=0 && s[i-1]!=32 && s[i]>=65 && s[i]<=90)
	printf("%c",s[i]+32);
	else
	printf("%c",s[i]);
	}
	}
	getch();
}
```

Number System

1) Write a program to convert a decimal number to its equivalent binary number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	unsigned long dec;
```

```
        int a[25],c=0,i;
        clrscr();
        printf("\nENTER A DECIMAL NUMBER: ");
        scanf("%lu",&dec);
        printf("\n%lu IN BINARY FORMAT: ",dec);
        while(dec>0)
        {
        a[c]=dec%2;
        dec=dec/2;
        c++;
        }
        for(i=c-1;i>=0;i--)
        printf("%d",a[i]);
        getch();
}
```

2) Write a program to convert a decimal number to its equivalent octal number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        unsigned long dec;
        int a[25],c=0,i;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%lu",&dec);
        printf("\n%lu IN OCTAL FORMAT: ",dec);
        while(dec>0)
        {
        a[c]=dec%8;
        dec=dec/8;
        c++;
        }
        for(i=c-1;i>=0;i--)
        printf("%d",a[i]);
```

```
	getch();
}
```

3) Write a program to convert a decimal number to its equivalent hexadecimal number.

```
#include <stdio.h>
#include <conio.h>
void main()
{
	unsigned long dec;
	int a[25],c=0,i;
	clrscr();
	printf("\nENTER A DECIMAL NUMBER: ");
	scanf("%lu",&dec);
	printf("\n%lu IN HEXADECIMAL FORMAT: ",dec);
	while(dec>0)
	{
	a[c]=dec%16;
	dec=dec/16;
	c++;
	}
	for(i=c-1;i>=0;i--)
	{
	if(a[i]>=10)
	printf("%c",a[i]+55);
	else
	printf("%d",a[i]);
	}
	getch();
}
```

4) Write a program to convert a binary number to its equivalent decimal number.

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

```
#include <conio.h>
void main()
{
        unsigned long num;
        int digit,i,pos=0,pow=1,dec=0;
        clrscr();
        printf("\nENTER A BINARY NUMBER: ");
        scanf("%lu",&num);
        printf("\nDECIMAL EQUIVALANT OF %lu IS ",num);
        while(num!=0)
        {
        pow=1;
        digit=num%10;
        num=num/10;
        for(i=1;i<=pos;i++)
        pow=pow*2;
        pos++;
        dec=dec+(pow*digit);
        }
        printf("%d",dec);
        getch();
}
```

Function

1) Write a program to print “Hello World” in the main function and “Welcome To C” in another function.

```
#include <stdio.h>
#include <conio.h>
void message(void);
main()
{
        clrscr();
        printf("\nHELLO WORLD");
```

```
        message();
        getch();
}
void message()
{
        printf("\nWELCOME TO C");
}
```

2) Write a program to add three given numbers using function.

```
#include <stdio.h>
#include <conio.h>
sum(int,int,int);
void main()
{
        int a,b,c,d;
        clrscr();
        printf("\nACCEPT VALUE FOR a,b,c:\n");
        scanf("%d %d %d",&a,&b,&c);
        d=sum(a,b,c);
        printf("\nSUM OF %d,%d and %d IS %d",a,b,c,d);
        getch();
}
sum(int x,int y,int z)
{
        int temp;
        temp=x+y+z;
        return(temp);
}
```

3) Write a program to calculate the tax of n given number of employees. Use a separate function to calculate the tax. Tax is 20% of basic if basic is less than 9000 otherwise tax is 25% of basic.

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

```
void cal(void);
void main()
{
        int i,n;
        clrscr();
        printf("\nENTER THE NUMBER OF THE EMPLOYEES: ");
        scanf("%d",&n);
        for(i=1;i<=n;i++)
        cal();
        getch();
}
void cal()
{
        int basic;
        float tax;
        printf("\nENTER THE AMOUNT OF BASIC: ");
        scanf("%d",&basic);
        if(basic<9000)
        tax=basic*20/100;
        else
        tax=basic*25/100;
        printf("\nTHE AMOUNT OF TAX IS %0.2f\n",tax);
}
```

4) Write a program to compute the root of a number using function.

```
#include <stdio.h>
#include <conio.h>
unsigned long root(int);
void main()
{
        int x;
        unsigned long res;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&x);
```

```
        res=root(x);
        printf("\nROOT OF %d IS %lu",x,res);
        getch();
}
unsigned long root(int a)
{
        unsigned long b;
        b=a*a;
        return(b);
}
```

5) Write a program to evaluate a^b using function.

```
#include <stdio.h>
#include <conio.h>
unsigned long power(int,int);
void main()
{
        int num,pow;
        unsigned long res;
        clrscr();
        printf("\nENTER THE NUMBER: ");
        scanf("%d",&num);
        printf("\nENTER THE POWER: ");
        scanf("%d",&pow);
        res=power(num,pow);
        printf("\n%d TO THE POWER %d IS %lu",num,pow,res);
        getch();
}
unsigned long power(int a,int b)
{
        int i;
        unsigned long prod=1;
        for(i=1;i<=b;i++)
        prod=prod*a;
```

```
        return(prod);
}
```

6) Write a program to print the following series using function.

        9 25 57 121 249 505 1017 2041…

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int num=9,i;
        clrscr();
        printf("%d ",num);
        for(i=4;i<=10;i++)
        {
        num=num+pow(2,i);
        printf("%d ",num);
        }
        getch();
}
pow(int a,int b)
{
        int prod=1,j;
        for(j=1;j<=b;j++)
        prod=prod*a;
        return(prod);
}
```

7) Write a program to check a number is prime or not using function.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int num,res=0;
```

```
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&num);
        res=prime(num);
        if(res==0)
        printf("\n%d IS A PRIME NUMBER",num);
        else
        printf("\n%d IS NOT A PRIME NUMBER",num);
        getch();
}
int prime(int n)
{
        int i;
        for(i=2;i<=n/2;i++)
        {
        if(n%i!=0)
        continue;
        else
        return 1;
        }
        return 0;
}
```

8) Write a program to find out the maximum number in an array using function.

```
#include <stdio.h>
#include <conio.h>
max(int [],int);
void main()
{
        int a[]={10,5,45,12,19};
        int n=5,m;
        clrscr();
        m=max(a,n);
        printf("\nMAXIMUM NUMBER IS %d",m);
        getch();
```

```
}
max(int x[],int k)
{
        int t,i;
        t=x[0];
        for(i=1;i<k;i++)
          {
        if(x[i]>t)
        t=x[i];
        }
        return(t);
}
```

9) Write a program to evaluate 1/Factorial of 1 + 2/Factorial of 2 … + n/Factorial of n using function.

```
#include <stdio.h>
#include <conio.h>
fact(float);
void main()
{
        float i,sum=0.0,n;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%f",&n);
        for(i=1;i<=n;i++)
        sum=sum+(i/fact(i));
        printf("\nTHE SUMMATION IS: %0.2f",sum);
        getch();
}
fact(float x)
{
        if(x==1)
        return(1);
        else
        return(x*fact(x-1));
```

```
}
```

Recursion

1) Write a recursive function to print the factorial of a number.

```
#include <stdio.h>
#include <conio.h>
unsigned long fact(int);
void main()
{
        unsigned long f;
        int n;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        f=fact(n);
        printf("\nFACTORIAL OF %d IS %ld",n,f);
        getch();
}
unsigned long fact(int a)
{
        unsigned long fac;
        if(a==1)
        return(1);
        else
        fac=a*fact(a-1);
        return(fac);
}
```

2) Write a recursive function to print the fibonacci series up to a given number.

```
#include <stdio.h>
#include <conio.h>
unsigned long fib(int);
```

```
void main()
{
        int n,i;
        unsigned long f;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&n);
        printf("\nTHE FIBONNACI SERIES UPTO %d NUMBERS IS:\n",n);
        for(i=0;i<n;i++)
        {
        f=fib(i);
        printf("%lu ",f);
        }
        getch();
}
unsigned long fib(int x)
{
        unsigned long res;
        if(x==0)
        return(0);
        else
        if(x==1)
        return(1);
        else
        {
        res=fib(x-1)+fib(x-2);
        return(res);
        }
}
```

3) Write a recursive function to print a given number in reverse order.

```
#include <stdio.h>
#include <conio.h>
int reverse(unsigned long);
void main()
```

```
{
        unsigned long num;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%lu",&num);
        printf("\nREVERSE OF %lu IS ",num);
        reverse(num);
        getch();
}
int reverse(unsigned long n)
{
        int dig;
        if(n==0)
        return 1;
        else
        {
        dig=n%10;
        n=n/10;
        printf("%d",dig);
        reverse(n);
        }
}
```

4) Write a recursive function to evaluate x^y.

```
#include <stdio.h>
#include <conio.h>
pow(int,int);
void main()
{
        int x,y,pow;
        clrscr();
        printf("\nENTER A NUMBER FOR x: ");
        scanf("%d",&x);
        printf("\nENTER A NUMBER FOR y: ");
```

```
        scanf("%d",&y);
        pow=power(x,y);
        printf("\nx TO THE POWER y IS: %d",pow);
        getch();
}
power(int a,int b)
{
        int prod;
        if(b==0)
        return(1);
        else
        {
        prod=a*power(a,b-1);
        return(prod);
        }
}
```

5) Write a program to implement Tower Of Hanoi.

```
#include <stdio.h>
#include <conio.h>
void hanoi(char,char,char,int);
void main()
{
        int num;
        clrscr();
        printf("\nENTER NUMBER OF DISKS: ");
        scanf("%d",&num);
        printf("\nTOWER OF HANOI FOR %d NUMBER OF DISKS:\n", num);
        hanoi('A','B','C',num);
        getch();
}
void hanoi(char from,char to,char other,int n)
{
        if(n<=0)
        printf("\nILLEGAL NUMBER OF DISKS");
```

```
        if(n==1)
        printf("\nMOVE DISK FROM %c TO %c",from,other);
        if(n>1)
        {
        hanoi(from,other,to,n-1);
        hanoi(from,to,other,1);
        hanoi(to,from,other,n-1);
        }
}
```

Sorting

1) Write a program to sort an array using Bubble Sort Algorithm.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int a[15],i,j,n=10,temp;
        clrscr();
        printf("\nENTER VALUES FOR THE ARRAY:\n");
        for(i=0;i<n;i++)
        scanf("%d",&a[i]);
        for(i=0;i<n-1;i++)
        {
        for(j=i+1;j<n;j++)
        {
        if(a[i]>a[j])
        {
        temp=a[i];
        a[i]=a[j];
        a[j]=temp;
        }
        }
        }
```

```
        printf("\nTHE SORTED ARRAY IS:\n");
        for(i=0;i<n;i++)
        printf("%d ",a[i]);
        getch();
}
```

2) Write a program to sort an array using Quick Sort Algorithm.

```
#include <stdio.h>
#include <conio.h>
void qsort();
int n;
void main()
{
        int a[100],i,l,r;
        clrscr();
        printf("\nENTER THE SIZE OF THE ARRAY: ");
        scanf("%d",&n);
        for(i=0;i<n;i++)
        {
        printf("\nENTER NUMBER-%d: ",i+1);
        scanf("%d",&a[i]);
        }
        printf("\nTHE ARRAY ELEMENTS BEFORE SORTING: \n");
        for(i=0;i<n;i++)
        {
        printf("%5d",a[i]);
        }
        l=0;
        r=n-1;
        qsort(a,l,r);
        printf("\nTHE ARRAY ELEMENTS AFTER SORTING: \n");
        for(i=0;i<n;i++)
        printf("%5d",a[i]);
        getch();
}
```

```
void qsort(int b[],int left,int right)
{
        int i,j,p,tmp,finished,k;
        if(right>left)
        {
        i=left;
        j=right;
        p=b[left];
        finished=0;
        while (!finished)
        {
        do
        {
        ++i;
        }
        while ((b[i]<=p) && (i<=right));
        while ((b[j]>=p) && (j>left))
        {
        --j;
        }
        if(j<i)
        finished=1;
        else
        {
        tmp=b[i];
        b[i]=b[j];
        b[j]=tmp;
        }
        }
        tmp=b[left];
        b[left]=b[j];
        b[j]=tmp;
        qsort(b,left,j-1);
        qsort(b,i,right);
        }
        return;
```

```
}
```

Searching

1) Write a program to search a key number in an array using Sequential Search Method.

```
#include <stdio.h>
#include <conio.h>
main()
{
        int arr[]={12,23,78,98,67,56,45,19,65,9},key,i,flag=0;
        clrscr();
        printf("\nENTER A NUMBER: ");
        scanf("%d",&key);
        for(i=0;i<10;i++)
        {
        if(key==arr[i])
        flag=1;
        }
        if(flag==1)
        printf("\nTHE NUMBER %d EXISTS IN THE ARRAY",key);
        else
              printf("\nTHE NUMBER %d DOES NOT EXIST IN THE
              ARRAY",key);
        getch();
}
```

2) Write a program to search a key number in an array using Binary Search Method or Dictionary Search Method.

```
#include <stdio.h>
#include <conio.h>
void sort(int *);
int search(int *,int);
```

```
void main()
{
	int a[10],i,j,temp,key,flag;
	clrscr();
	for(i=0;i<10;i++)
	{
	printf("\nENTER NUMBER-%d: ",i+1);
	scanf("%d",&a[i]);
	}
	sort(a);
	printf("\nTHE SORTED ARRAY IS: ");
	for(i=0;i<10;i++)
	printf("%d ",a[i]);
	printf("\nENTER A NUMBER TO SEARCH: ");
	scanf("%d",&key);
	flag=search(a,key);
	if(flag==1)
	printf("\nTHE NUMBER %d EXISTS",key);
	else
		printf("\nTHE NUMBER %d DOES NOT EXIST ARRAY",key);
	getch();
}
void sort(int *x)
{
	int i,j,temp;
	for(i=0;i<10;i++)
	{
	for(j=i+1;j<10;j++)
	{
	if(x[i]>x[j])
	{
	temp=x[i];
	x[i]=x[j];
	x[j]=temp;
	}
	}
```

```
        }
}
int search(int *x,int k)
{
        int low=0,high=10,mid,res=0;
        while(high>=low)
        {
        mid=(high+low)/2;
        if(k==x[mid])
        {
        res=1;
        break;
        }
        else
        {
        if(k>x[mid])
        low=mid+1;
        else
        high=mid-1;
        }
        }
        return res;
}
```

Pointers

1) Write a program to give examples & (Address Of) and * (Value At Address) operator.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int i=3,*j;
        clrscr();
```

```
        j=&i;
        printf("\nVALUE OF i IS [i]: %d",i);
        printf("\nVALUE OF i IS [*(&i)]: %d",*(&i));
        printf("\nADDRESS OF i IS [&i]: %u",&i);
        printf("\nVALUE OF j IS [*(&j)]: %u",*(&j));
        printf("\nADDRESS OF j IS [&j]: %u",&j);
        printf("\nADDRESS OF i IS [j]: %u",j);
        getch();
}
```

2) Write a program to swap the address of two variables.

```
#include <stdio.h>
#include <conio.h>
void swap(int *,int *);
void main()
{
        int a=10,b=20;
        clrscr();
        printf("\nVALUES OF a AND b BEFORE SWAPING ARE %d
%d",a,b);
        swap(&a,&b);
        printf("\nVALUES OF a AND b AFTER SWAPING ARE %d %d",a,b);
        getch();
}
void swap(x,y)
int *x,*y;
{
        int t;
        t=*x;
        *x=*y;
        *y=t;
}
```

3) Write a program to compute the average of n given numbers using pointers.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int n,*p,sum=0,i;
        float avg;
        clrscr();
        printf("\nHOW MANY NUMBERS: ");
        scanf("%d",&n);
        p=(int *) malloc(n*2);
        if(p==NULL)
        {
        printf("\nMEMORY ALLOCATION UNSUCCCESSFUL");
        exit();
        }
        for(i=0;i<n;i++)
        {
        printf("\nENTER NUMBER %d: ",i+1);
        scanf("%d",(p+i));
        }
        for(i=0;i<n;i++)
        sum=sum+*(p+i);
        avg=(float)sum/n;
        printf("\nTHE AVERAGE OF THE NUMBERS IS %0.2f",avg);
        getch();
}
```

4) Write a program to sort n given numbers using pointers.
   Hint: - Use Bubble Sort Algorithm.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
void main()
{
        int n,*p,i,j,temp;
```

```
        clrscr();
        printf("\nHOW MANY NUMBER: ");
        scanf("%d",&n);
        p=(int *) malloc(n*2);
        if(p==NULL)
        {
        printf("\nMEMORY ALLOCATION UNSUCCESSFUL");
        exit();
        }
        for(i=0;i<n;i++)
        {
        printf("\nENTER NUMBER %d: ",i+1);
        scanf("%d",p+i);
        }
        for(i=0;i<n;i++)
        {
        for(j=0;j<n;j++)
        {
        if(*(p+i)<*(p+j))
        {
        temp=*(p+i);
        *(p+i)=*(p+j);
        *(p+j)=temp;
        }
        }
        }
        printf("\nTHE SORTED NUMBERS ARE:\n");
        for(i=0;i<n;i++)
        printf("%d ",*(p+i));
        getch();
}
```

5) Write a program to concatenate two given string without using the library function strcat().

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

```
#include <conio.h>
void strconc(char *,char *);
char *s3;
void main()
{
        char *str1,*str2;
        clrscr();
        printf("\nENTER THE FIRST STRING: ");
        gets(str1);
        printf("\nENTER THE SECOND STRING: ");
        gets(str2);
        strconc(str1,str2);
        printf("\nTHE NEW STRING IS: %s",s3);
        getch();
}
void strconc(char *s1,char *s2)
{
        int ls1,ls2,i;
        ls1=strlen(s1);
        ls2=strlen(s2);
        s3=s1;
        for(i=0;i<ls2;i++)
        {
        s3[ls1++]=s2[i];
        }
        s3[ls1++]=NULL;
}
```

6) Write a program to find the maximum number within n given numbers using pointers.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        int n,*p,i,h=0;
```

```
        clrscr();
        printf("\nHOW MANY NUMBERS: ");
        scanf("%d",&n);
        p=(int *) malloc(n*2);
        if(p==NULL)
        {
        printf("\nMEMORY ALLOCATION UNSUCCCESSFUL");
        exit();
        }
        for(i=0;i<n;i++)
        {
        printf("\nENTER NUMBER %d: ",i+1);
        scanf("%d",(p+i));
        }
        h=*p;
        for(i=1;i<n;i++)
        {
        if(*(p+i)>h)
        h=*(p+i);
        }
        printf("\nTHE HIGHEST NUMBER IS %d",h);
        getch();
}
```

7) Write a program to search a given key number within n given numbers using pointers. If the key number exists print found otherwise print not found.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
void main()
{
        int n,*p,i,num,flag=0;
        clrscr();
        printf("\nHOW MANY NUMBER: ");
        scanf("%d",&n);
```

```
        p=(int *) malloc(n*2);
        if(p==NULL)
        {
        printf("\nMEMORY ALLOCATION UNSUCCESSFUL");
        exit();
        }
        for(i=0;i<n;i++)
        {
        printf("\nENTER NUMBER %d: ",i+1);
        scanf("%d",p+i);
        }
        printf("\nENTER A NUMBER TO SEARCH: ");
        scanf("%d",&num);
        for(i=0;i<n;i++)
        {
        if(num==*(p+i))
        flag=1;
        }
        if(flag==1)
        printf("\nTHE NUMBER %d IS FOUND",num);
        else
        printf("\nTHE NUMBER %d DOES NOT EXIST",num);
        getch();
}
```

8) Write a program to reverse a string using pointers.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        char *s;
        int len,i;
        clrscr();
        printf("\nENTER A STRING: ");
        gets(s);
```

```
        len=strlen(s);
        printf("\nTHE REVERSE OF THE STRING IS:");
        for(i=len;i>=0;i--)
        printf("%c",*(s+i));
        getch();
}
```

9) Write a program to find out whether a given string is palindrome or not using pointers.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        char *a;
        int i,len,flag=0;
        clrscr();
        printf("\nENTER A STRING: ");
        gets(a);
        len=strlen(a);
        for(i=0;i<len;i++)
        {
        if(a[i]==a[len-i-1])
        flag=flag+1;
        }
        if(flag==len)
        printf("\nTHE STRING IS PALINDROM");
        else
        printf("\nTHE STRING IS NOT PALINDROM");
        getch();
}
```

10) Write a program to sort n given numbers of cities using pointers.

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

```
#define items 5
void main()
{
	char *str[items],*temp;
	int i,j;
	clrscr();
	for(i=0;i<items;i++)
	{
	printf("\nENTER CITY-%d: ",i+1);
	gets(str[i]);
	}
	for(i=0;i<items;i++)
	{
	for(j=i+1;j<items;j++)
	{
	if(strcmp(str[i],str[j])>0)
	{
	strcpy(temp,str[i]);
	strcpy(str[i],str[j]);
	strcpy(str[j],temp);
	}
	}
	}
	printf("\nCITIES IN SORTED ORDER:\n");
	for(i=0;i<items;i++)
	printf("\n%s",str[i]);
	getch();
}
```

11) Write a program to reverse the order of each word of the string using pointers.

Example: - INPUT: Orissa Computer Application Centre

OUTPUT: Centre Application Computer Orissa

```
#include <stdio.h>
#include <conio.h>
void main()
{
        char *s;
        int len,i,j,sp=0,start,end;
        clrscr();
        printf("\nENTER A STRING: ");
        gets(s);
       printf("\nTHE STRING AFTER CHANGING THE ORDER OF EACH
       WORD:\n");
        len=strlen(s);
        end=len-1;
        for(i=len-1;i>=0;i--)
        {
        if(s[i]==32 || i==0)
        {
        if(i==0)
        start=0;
        else
        start=i+1;
        for(j=start;j<=end;j++)
        printf("%c",s[j]);
        end=i-1;
        printf(" ");
        }
        }
        getch();
}
```

Structure

1) Write a program to create a book structure having name, author, page and price.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        struct book
        {
        char name[20];
        char auth[20];
        int page;
        float price;
        };
        struct book b;
        clrscr();
        printf("\nENTER THE NAME OF THE BOOK: ");
        gets(b.name);
        printf("\nENTER THE NAME OF THE AUTHOR: ");
        gets(b.auth);
        printf("\nENTER THE NUMBER OF PAGES: ");
        scanf("%d",&b.page);
        printf("\nENTER THE PRICE OF THE BOOK: ");
        scanf("%f",&b.price);
        printf("\nNAME OF THE BOOK: %s",b.name);
        printf("\nNAME OF THE AUTHOR: %s",b.auth);
        printf("\nNUMBER OF PAGES: %d",b.page);
        printf("\nPRICE OF THE BOOK: %0.2f",b.price);
        getch();
}
```

Link List

1) Write a program to create a singly link list.

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

```
struct linklist
{
        int number;
        struct linklist *next;
};
typedef struct linklist node;
void create(node *);
void display(node *);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        getch();
}
void create(node *list)
{
        char conf='y';
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->number);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
        printf("\nTHE VALUES OF THE LINK LIST ARE:\n");
```

```
        while(disp!=NULL)
        {
        printf("%d ",disp->number);
        disp=disp->next;
        }
}
```

2) Write a program to count the number of nodes in a link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct linklist
{
        int number;
        struct linklist *next;
};
typedef struct linklist node;
void create(node *);
void count(node *);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        printf("\n");
        count(head);
        getch();
}
void create(node *list)
{
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->number);
```

```
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void count(node *first)
{
        int i=0;
        while(first!=NULL)
        {
        first=first->next;
        i++;
        }
        printf("THERE ARE %d NODES IN THE LINK LIST",i);
}
```

3) Write a program to insert a node before the first node of a link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct link
{
        int num;
        struct link *next;
};
typedef struct link node;
void create(node *);
void insert(node *);
void display(node *);
```

```
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        insert(head);
        display(head);
        getch();
}
void create(node *list)
{
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->num);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
        printf("\nTHE VALUES OF THE LINK LIST ARE:\n");
        while(disp!=NULL)
        {
        printf("%d ",disp->num);
        disp=disp->next;
        }
```

```
}
void insert(node *ins)
{
        node *newnode;
        int newnum;
        printf("\n\nENTER A NUMBER YOU WANT TO INSERT: ");
        scanf("%d",&newnum);
        newnode=(node *) malloc(sizeof(node));
        newnode->num=newnum;
        newnode->next=ins;
        head=newnode;
}
```

4) Write a program to insert a node after the last node of a link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct link
{
        int num;
        struct link *next;
};
typedef struct link node;
void create(node *);
void insert(node *);
void display(node *);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        insert(head);
        display(head);
```

```
        getch();
}
void create(node *list)
{
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->num);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
        printf("\nTHE VALUES OF THE LINK LIST ARE:\n");
        while(disp!=NULL)
        {
        printf("%d ",disp->num);
        disp=disp->next;
        }
}
void insert(node *ins)
{
        node *newnode;
        int newnum;
        while(ins->next!=NULL)
        {
        ins=ins->next;
        }
```

```
        printf("\n\nENTER A NUMBER YOU WANT TO INSERT: ");
        scanf("%d",&newnum);
        newnode=(node *) malloc(sizeof(node));
        newnode->num=newnum;
        newnode->next=NULL;
        ins->next=newnode;
}
```

5) Write a program to insert a node before a given key value of a link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct link
{
        int num;
        struct link *next;
};
typedef struct link node;
void create(node *);
void insert(node *);
void display(node *);
node *find(node *,int);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        insert(head);
        display(head);
        getch();
}
void create(node *list)
{
```

```
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->num);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
        printf("\nTHE VALUES OF THE LINK LIST ARE:\n");
        while(disp!=NULL)
        {
        printf("%d ",disp->num);
        disp=disp->next;
        }
}
void insert(node *ins)
{
        node *newnode,*n1;
        int newnum,key;
        printf("\n\nENTER A NUMBER YOU WANT TO INSERT: ");
        scanf("%d",&newnum);
        printf("\nENTER THE VALUE OF KEY NUMBER: ");
        scanf("%d",&key);
        if(ins->num==key)
        {
        newnode=(node *) malloc(sizeof(node));
        newnode->num=newnum;
```

```
        newnode->next=ins;
        head=newnode;
        }
        else
        {
        n1=find(ins,key);
        if(n1==NULL)
        printf("\nKEY VALUE NOT FOUND IN THE LIST\n");
        else
        {
        newnode=(node *) malloc(sizeof(node));
        newnode->num=newnum;
        newnode->next=n1->next;
        n1->next=newnode;
        }
        }
}
node *find(node *list,int key)
{
        if(list->next->num==key)
        return(list);
        else
        if(list->next->next==NULL)
        return(NULL);
        else
        find(list->next,key);
}
```

6) Write a program to delete the first node of a link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct link
{
        int num;
```

```
        struct link *next;
};
typedef struct link node;
void create(node *);
void delet(node *);
void display(node *);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        delet(head);
        printf("\n");
        display(head);
        getch();
}
void create(node *list)
{
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->num);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
```

```
{
        printf("\nTHE VALUES OF THE LINK LIST ARE:\n");
        while(disp!=NULL)
        {
        printf("%d ",disp->num);
        disp=disp->next;
        }
}
void delet(node *del)
{
        head=del->next;
        free(del);
}
```

7) Write a program to delete the last node of a link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct link
{
        int num;
        struct link *next;
};
typedef struct link node;
void create(node *);
void delet(node *);
void display(node *);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        delet(head);
```

```
        printf("\n");
        display(head);
        getch();
}
void create(node *list)
{
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->num);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
        printf("\nTHE VALUES OF THE LINK LIST ARE:\n");
        while(disp!=NULL)
        {
        printf("%d ",disp->num);
        disp=disp->next;
        }
}
void delet(node *del)
{
        while(del!=NULL)
        {
        if(del->next->next==NULL)
        {
```

```
        del->next=NULL;
        free(del->next->next);
        }
        del=del->next;
        }
}
```

8) Write a program to delete a node having the given key value of a link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct link
{
        int num;
        struct link *next;
};
typedef struct link node;
void create(node *);
void delet(node *);
void display(node *);
node *find(node *,int);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        delet(head);
        display(head);
        getch();
}
void create(node *list)
{
        char conf='y';
```

```
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->num);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
        printf("\nTHE VALUES OF THE LINK LIST ARE:\n");
        while(disp!=NULL)
        {
        printf("%d ",disp->num);
        disp=disp->next;
        }
}
void delet(node *del)
{
        node *newnode,*n1;
        int key;
        printf("\n\nENTER THE VALUE OF KEY NUMBER: ");
        scanf("%d",&key);
        if(del->num==key)
        {
        head=del->next;
        free(del);
        }
        else
        {
```

```
        n1=find(del,key);
        if(n1==NULL)
        printf("\nKEY VALUE NOT FOUND IN THE LIST\n");
        else
        {
        newnode=n1->next->next;
        free(n1->next);
        n1->next=newnode;
        }
        }
}
node *find(node *list,int key)
{
        if(list->next->num==key)
        return(list);
        else
        if(list->next->next==NULL)
        return(NULL);
        else
        find(list->next,key);
}
```

9) Write a program to create a doubly link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct linklist
{
        struct linklist *prev;
        int num;
        struct linklist *next;
};
typedef struct linklist node;
void create(node *);
void display(node *);
```

```
void main()
{
        node *head;
        clrscr();
        head=(node *) malloc(sizeof(node));
        head->prev=NULL;
        create(head);
        printf("\n");
        display(head);
        getch();
}
void create(node *list)
{
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->num);
        list->next->prev=list;
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
        list->next=NULL;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
       printf("THE ADDRESS-PREVIOUS ADDRESS-VALUE-NEXT
       ADDRESS OF THE LINK LIST ARE:\n");
        while(disp!=NULL)
        {
        printf("%u-%u-%u-%u\n",disp,disp->prev,disp->num,disp->next);
```

```
        disp=disp->next;
        }
}
```

10) Write a program to create a circular link list.

```
#include <stdio.h>
#include <conio.h>
#include <alloc.h>
struct linklist
{
        int number;
        struct linklist *next;
};
typedef struct linklist node;
void create(node *);
void display(node *);
node *head;
void main()
{
        clrscr();
        head=(node *) malloc(sizeof(node));
        create(head);
        display(head);
        getch();
}
void create(node *list)
{
        char conf='y';
        int i;
        printf("\nENTER A NUMBER: ");
        scanf("%d",&list->number);
        printf("\nWANT TO CONTINUE[Y/N]: ");
        conf=getche();
        printf("\n");
        if(conf=='n' || conf=='N')
```

```
        list->next=head;
        else
        {
        list->next=(node *) malloc(sizeof(node));
        create(list->next);
        }
}
void display(node *disp)
{
       printf("\nTHE ADDRESS-VALUE-NEXT ADDRESS OF THE LINK
       LIST ARE:\n");
        while(disp->next!=head)
        {
        printf("%u-%u-%u\n",disp,disp->number,disp->next);
        disp=disp->next;
        }
        printf("%u-%u-%u",disp,disp->number,disp->next);
}
```

File

1) Write a program to read a text file print it on the screen.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        FILE *fp;
        char s;
        clrscr();
        fp=fopen("text.txt","r");
        if(fp==NULL)
        {
        printf("\nCAN NOT OPEN FILE");
        getch();
```

```
        exit();
        }
        do
          {
        s=getc(fp);
        printf("%c",s);
        }
        while(s!=EOF);
        fclose(fp);
        getch();
}
```

2) Write a program to enter a sentence from the keyboard and store it in a text file.

```
#include <stdio.h>
#include <conio.h>
void main()
{
        FILE *fp;
        char ch[50];
        clrscr();
        fp=fopen("output.txt","w");
        printf("\nENTER YOUR LINES: (PRESS ^Z TO EXIT)\n");
        while(strlen(gets(ch))!=0)
        {
        fputs(ch,fp);
        fputs("\n",fp);
        }
        fclose(fp);
        getch();
}
```

3) Write a program to copy a file. Use command line arguments to specify the source file and target file.

```
#include <stdio.h>
#include <conio.h>
void main(int argc,char *args[])
{
        FILE *fpr,*fpw;
        char ch;
        fpr=fopen(args[1],"r");
        fpw=fopen(args[2],"w");
        do
        {
        ch=getc(fpr);
        putc(ch,fpw);
        }
        while(ch!=EOF);
        fclose(fpr);
        fclose(fpw);
        printf("\nFILE COPIED\n");
}
```

4) Write a program to read a file and print the number of vowels and number of words in the file. Assume that a word is a sequence of letters ending with a blank, or a tab, or an end of line marker or end of file or punctuation symbols such as “,”, ”.”, ”!” and “?”.

```
#include <stdio.h>
#include <conio.h>
void count(char[]);
void main()
{
        FILE *fp;
        char str[100],s;
        int word=0,vow=0;
        clrscr();
        fp=fopen("text.txt","r");
        if(fp==NULL)
        {
```

```
        printf("\nCAN NOT OPEN FILE");
        getch();
        exit();
        }
        do
          {
        s=getc(fp);
              if(s==32 || s=='\t' || s=='\n' || s==EOF || s==',' || s=='.' || s=='!' || s=='?')
        word++;
              if(s=='a' || s=='e' || s=='i' || s=='o' || s=='u' || s=='A' || s=='E' || s=='I' ||
              s=='O'|| s=='U')
        vow++;
        }
        while(s!=EOF);
        printf("\nNUMBER OF WORDS IN THE STRING ARE %d",word);
        printf("\nNUMBER OS VOWELS IN THE STRING ARE %d",vow);
        fclose(fp);
        getch();
}
```