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Q1) Program to illustrate formatted input and output concept

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

void main()
{
    int x=12345;
    long y=987654;
    clrscr();
    printf("%-10d",x);
    printf("\n%10d",x);
    printf("\n%010d",x);
    printf("\n%-10d",x);
    printf("\n%10ld",y);
    printf("\n%-10ld",-y);
    getch(); }
```

OUTPUT:

```
12345
      12345
0000012345
12345
      987654
-987654
```

Q2) Program using operators and expressions

```
#include <stdio.h>

#include<conio.h>

void main()
{
clrscr();

    int a = 9,b = 4, c;

    c = a+b;

    printf("a+b = %d \n",c);

    c = a-b;

    printf("a-b = %d \n",c);

    c = a*b;

    printf("a*b = %d \n",c);

    c=a/b;

    printf("a/b = %d \n",c);

    c=a%b;

    printf("Remainder when a divided by b = %d \n",c);

    //increment-decrement operators

    int x = 10, y = 100;

    float z = 10.5, d = 100.5;

    printf("++x = %d \n", ++x);

    printf("--y = %d \n", --y);

    printf("++z = %f \n", ++z);

    printf("--d = %f \n", --d);

    //assignment operators

    int m = 5, n;

    n = m;

    printf("c = %d \n", c);
```

```

n += m; // n = n+m

printf("n = %d \n", n);

n -= m; // n = m-a

printf("n = %d \n", n);

n *= m; // n = m*a

printf("n = %d \n", n);

n /= m; // n = m/a

printf("n = %d \n", n);

n %= m; // n = n%m

printf("n = %d \n", n);

getch();

}

```

OUTPUT:

```

a+b = 18
a-b = 4
a*b = 77
a/b = 1
Remainder when a divided by b = 4
++x = 11
--y = 99
++z = 11.500000
--d = 99.500000
c = 4
n = 10
n = 5
n = 25
n = 5
n = 0
-

```

Q3) Program to swap 2 numbers

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

void main()
{
    int a,b,temp;

    clrscr();

    printf("Enter two numbers:");

    scanf("%d%d",&a,&b);

    printf("\nNumber 1: %d\nNumber 2: %d",a,b);

    temp=a;


    a=b;

    b=temp;

    printf("\n\nNumbers are swapped!\nNumber 1: %d \nNumber 2: %d",a,b);

    getch(); }
```

OUTPUT:



```
Enter two numbers:4 6

Number 1: 4
Number 2: 6

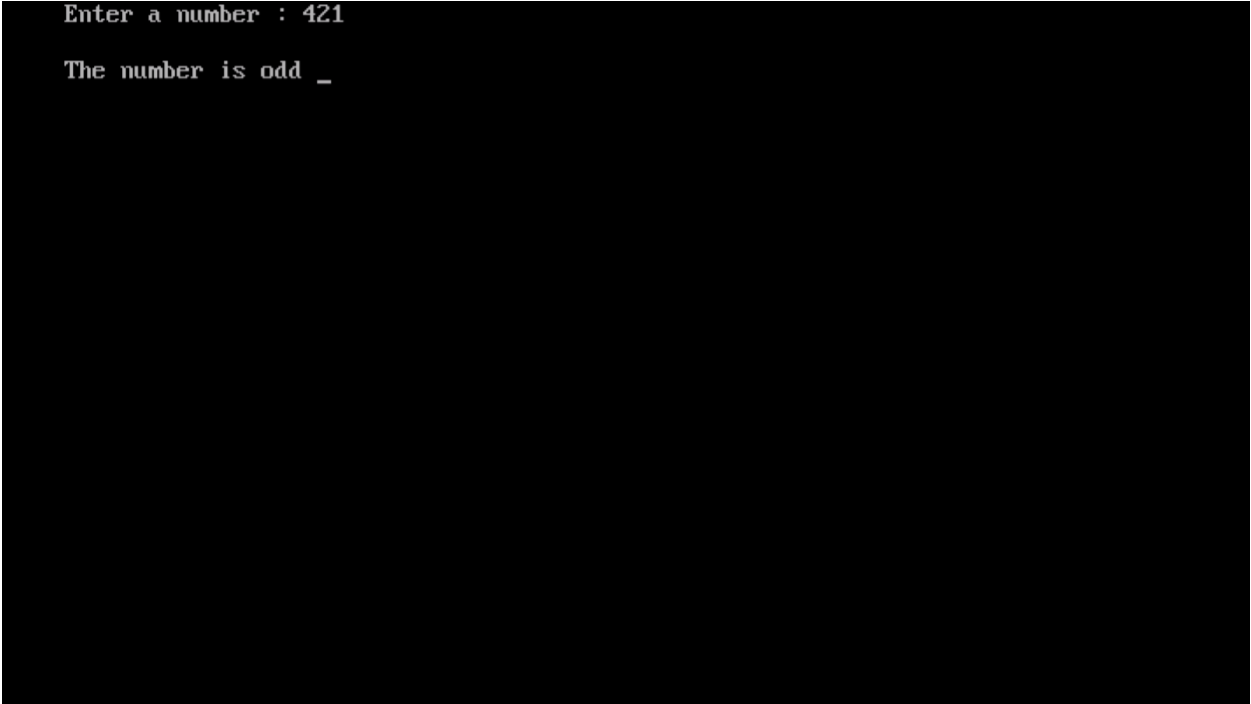
Numbers are swapped!
Number 1: 6
Number 2: 4
```

Q4) Program to find even and odd numbers.

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

void main()
{
    clrscr();
    int a;
    printf("Enter a number : ");
    scanf("%d",&a);
    if(a%2==0)
        printf("\nThe number is even ");
    else
        printf("\nThe number is odd ");
    getch();
}
```

OUTPUT:



```
Enter a number : 421
The number is odd _
```

Q5) Program to find whether a character is vowel or consonant.

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

char ch;

printf("\n Enter a character: ");

scanf("%c",&ch);

switch(ch)

{

case 'a':

case 'A':

case 'e':

case 'E':

case 'i':

case 'I':

case 'o':

case 'O':

case 'u':

case 'U':printf("\nIt is a Vowel.");

        break;

default:printf("\n It is a consonant.");

}

getch();

}
```


OUTPUT:

```
Enter a character: E
```


```
It is a Vowel._
```

Q6) Program to find largest of 3 numbers

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

void main()
{
    int a,b,c;
    clrscr();
    printf("Enter three numbers : ");
    scanf("%d%d%d",&a,&b,&c);
    if(a>b&&a>c)
        printf("%d is the greatest integer",a);
    else if(b>c&&b>a)
        printf("%d is the greatest integer",b);
    else
        printf("%d is the greatest integer",c);
    getch(); }
```

OUTPUT:

A screenshot of a terminal window with a black background and white text. The text shows the program's output: "Enter three numbers : 123 324 13" followed by "324 is the greatest integer".

```
Enter three numbers : 123 324 13
324 is the greatest integer
```

Q7) Program to check leap year.

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int y;

printf("\nEnter a year: ");

scanf("%d",&y);

if(y%4==0)

{

if(y%100==0)

{

if(y%400==0)

printf("\nIt is a leap year!!");

else

printf("\nIt is not a leap year!!");

}

else

printf("\nIt is a leap year!!");

}

else

printf("\nIt is not a leap year!!");

getch();

}
```

OUTPUT:

```
Enter a year: 1988
```


```
It is a leap year!!
```

Q8) Program to calculate sum of all natural numbers

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

void main()
{
//while loop prg
clrscr();
int sum=0,n,i=0;
printf("Enter a number : ");
scanf("%d",&n);
while(i<=n)
{ sum+=i;
i++; }
printf("\nThe sum of numbers till %d is : %d ",n,sum);
getch(); }
```

OUTPUT:

A screenshot of a terminal window with a black background and white text. The first line shows the prompt 'Enter a number : 6'. The second line shows the output 'The sum of numbers till 6 is : 21 _', where the underscore represents the cursor.


```
Enter a number : 6
The sum of numbers till 6 is : 21 _
```

Q9) Program to find factorial of a number

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

void main()
{
clrscr();
int n,f=1;
printf("Enter a number : ");
scanf("%d",&n);
for(int i=n;i>0;i--)
{
f*=i;
}
printf("\n Factorial of %d is : %d",n,f);
getch(); }
```

OUTPUT:

A screenshot of a terminal window with a black background and white text. The first line shows the prompt 'Enter a number : 5'. The second line shows the result 'Factorial of 5 is : 120'.

```
Enter a number : 5
Factorial of 5 is : 120
```

Q10) Program to generate a multiplication table.

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int n=12,m=12;

printf("\nMultiplication table\n");

for(int i=1;i<=n;i++)

{

for(int j=1;j<=m;j++)

printf(" %4d",i*j);

printf("\n");

}

getch(); }
```

OUTPUT:

```

Multiplication table
 1   2   3   4   5   6   7   8   9  10  11  12
 2   4   6   8  10  12  14  16  18  20  22  24
 3   6   9  12  15  18  21  24  27  30  33  36
 4   8  12  16  20  24  28  32  36  40  44  48
 5  10  15  20  25  30  35  40  45  50  55  60
 6  12  18  24  30  36  42  48  54  60  66  72
 7  14  21  28  35  42  49  56  63  70  77  84
 8  16  24  32  40  48  56  64  72  80  88  96
 9  18  27  36  45  54  63  72  81  90  99 108
10  20  30  40  50  60  70  80  90 100 110 120
11  22  33  44  55  66  77  88  99 110 121 132
12  24  36  48  60  72  84  96 108 120 132 144
```

Q11)Program to print fibonacci series

```
#include<stdio.h>

#include<conio.h>

void main()

{ clrscr();

int x=0,y=1,z,n;

printf("Enter the number of terms required : ");

scanf("%d",&n);

printf("\n Fibonacci Series : \n");

printf(" %d %d",x,y);

for(int i=2;i<n;i++)

{ z=x+y;

printf(" %d",z);

x++;

y++; }

getch(); }
```

OUTPUT:

```
Enter the number of terms required : 7

Fibonacci Series :
0 1 1 3 5 7 9
```


Q12) Program to find reverse of a number

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int x,y=0,n;

printf("Enter a number : ");

scanf("%d",&n);

x=n;

while(x>0)

{

y=(y*10)+(x%10);

x=x/10; }

printf("\nOriginal Number : %d\nReversed Number : %d",n,y);

getch(); }
```

OUTPUT:

```
Enter a number : 4356

Original Number : 4356
Reversed Number : 6534_
```

Q13) Program to find whether a number is palindrome or not

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int n,x,y=0;

printf("Enter a number : ");

scanf("%d",&n);

x=n;

while(x>0)

{

y+=x%10;

x=x/10;

if(x>0)

y*=10;

}

if(y==n)

printf("\nThe number is a Palindrome!");

else

printf("\nThe number is not a Palindrome");

getch();

}
```

OUTPUT:

```
Enter a number : 1221
```

```
The number is a Palindrome!_
```

Q14) Program print half and full pyramid

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

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

```
void main()
```

```
{
```

```
clrscr();
```

```
int i,j,space, rows, k=0;
```

```
for(i=1;i<=6;i++)
```

```
{
```

```
for(j=1;j<=i;j++)
```

```
printf("%3d",i);
```

```
printf("\n");
```

```
}
```

```
printf("\nEnter number of rows: ");
```

```
scanf("%d",&rows);
```

```
for(i=1; i<=rows; ++i, k=0)
```

```
{
```

```
for(space=1; space<=rows-i; ++space)
```

```
{
```

```
printf(" ");
```

```
}
```

```
while(k != 2*i-1)
```

```
{
```

```
printf("* ");
```

```
++k;
```

```
}
```

```
printf("\n");
```

```
}
```

```
getch(); }
```

OUTPUT:

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
6 6 6 6 6 6
```

Enter number of rows: 4

```
  *
 * * *
* * * * *
* * * * * * *
```

—

Q15) Program for a Simple Calculator

```
#include<stdio.h>

#include<conio.h>

void main()

{

int ch,sum,dif,mul,a,b;

float div;

clrscr();

printf("\n\nEnter two numbers : ");

scanf("%d %d",&a,&b);

do

{

clrscr();

printf("\n\t\t***** MENU
*****\n\t1.Addition\n\t2.Subtraction\n\t3.Multiplication\n\t4.Division\n\t5.Exit");

printf("\n\tChoose an option : ");

scanf("%d",&ch);

switch(ch)

{

case 1: sum=a+b;

printf("\nAddition is : %d",sum);

getch();

break;

case 2: dif=a-b;

printf("\nDifference is : %d",dif);

getch();

break;

case 3: mul=a*b;

printf("\nMultiplication is : %d",mul);
```

```

        getch();
        break;
case 4: div=(float)a/b;
        printf("\nDivision is : %f",div);
        getch();
        break;
case 5: break;
default: printf("\n\tWRONG OPTION!! ENTER AGAIN!");
}
}
while(ch!=5);
getch();
}

```

OUTPUT:

```

Enter two numbers : 6 8

                        ***** MENU *****
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
Choose an option : 3

Multiplication is : 48

                        ***** MENU *****
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
Choose an option : 1

Addition is : 14_

```

Q16) A simple program using Array

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int a[10],sum=0;

printf("Enter 5 numbers : ");

for(int i=0;i<5;i++)

scanf("%d",&a[i]);


for(int j=0;j<5;j++)

sum+=a[j];

printf("\nSum of 5 numbers is : %d",sum);

getch();

}
```

OUTPUT:A screenshot of a terminal window with a black background and green text. The first line shows the prompt 'Enter 5 numbers : ' followed by the input '1 2 3 4 5'. The second line shows the output 'Sum of 5 numbers is : 15'.

```
Enter 5 numbers : 1 2 3 4 5

Sum of 5 numbers is : 15
```


Q17) Program to find largest element from an array

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int a[50],b=0,n;

printf("Enter no. of elements in array : ");

scanf("%d",&n);

printf("Enter %d numbers \n",n);

for(int c=0;c<n;c++)

scanf("%d",&a[c]);

for(int i=0;i<n;i++)

{

if(b<a[i])

b=a[i];

}

printf("\nGreatest Integer is : %d",b);

getch();

}
```

OUTPUT:

```
Enter no. of elements in array : 5
Enter 5 numbers
38 21 53 12 9

Greatest Integer is : 53
```

Q18) Program to sort an array

```
#include<stdio.h>

#include<conio.h>

void main()
{
    clrscr();

    int array[10];

    int i, j, num, temp;

    printf("Enter size of array \n");
    scanf("%d", &num);

    printf("Enter the elements: \n");
    for (i = 0; i < num; i++)
    {
        scanf("%d", &array[i]);
    }

    printf("Input array is : \n");
    for (i = 0; i < num; i++)
    {
        printf("%d ", array[i]);
    }

    for (i = 0; i < num; i++)
    {
        for (j = 0; j < (num - i - 1); j++)
        {
            if (array[j] > array[j + 1])
            {
                temp = array[j];
                array[j] = array[j + 1];
                array[j + 1] = temp;
            }
        }
    }
}
```

```
        }  
    }  
    printf("\nSorted array is...\n");  
    for (i = 0; i < num; i++)  
    {  
        printf("%d ", array[i]);  
    }  
    getch();  
}
```

OUTPUT:

```
Enter size of array  
4  
Enter the elements:  
321 21 23 53  
Input array is : 321 21 23 53  
Sorted array is...  
21 23 53 321 _
```

Q19) A simple program using 2D arrays

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int a[10][10],n,m,i,j;

printf("Enter no. of rows and coloums of 2D matrix : ");

scanf("%d %d",&n,&m);

printf("\nEnter elements of matrix : ");

for(i=0;i<n;i++)

for(j=0;j<n;j++)

scanf("%d",&a[i][j]);

printf("\nThe Matrix is : \n");

for(i=0;i<n;i++)

{

for(j=0;j<n;j++)

printf("%4d",a[i][j]);

printf("\n");

}

getch();

}
```

OUTPUT:

```
Enter no. of rows and coloums of 2D matrix : 2 2
```

```
Enter elements of matrix : 1 2 3 4
```

```
The Matrix is :
```

```
1 2  
3 4
```

Q20) Program to perform matrix addition

```
#include<stdio.h>

#include<conio.h>

void main()

{

int a[20][20],b[20][20],c[20][20],n,m,x,y,i,j;

clrscr();

printf("\nEnter the no. of rows and cols of Matrix A : ");

scanf("%d %d",&n,&m);

printf("Enter the elements of Matrix A : ");

for(i=0;i<n;i++)

{

for(j=0;j<m;j++)

scanf("%d",&a[i][j]);

}

printf("\nEnter the no. of rows and cols of Matrix B : ");

scanf("%d %d",&x,&y);

printf("Enter the elements of Matrix B : ");

for(i=0;i<x;i++)

for(j=0;j<y;j++)

scanf("%d",&b[i][j]);

if(x==n&y==m)

{

for(i=0;i<n;i++)

for(j=0;j<m;j++)

c[i][j]=a[i][j]+b[i][j];

}

else

printf("\nOrder of Matrices are not equal!!");
```

```
printf("\nAddition of the 2 matrices is : \n");  
for(i=0;i<n;i++)  
{  
for(j=0;j<m;j++)  
printf("%d ",c[i][j]);  
printf("\n");  
}  
getch();  
}
```

OUTPUT:

```
Enter the no. of rows and cols of Matrix A : 2 2  
Enter the elements of Matrix A : 1 2 3 4  
  
Enter the no. of rows and cols of Matrix B : 2 2  
Enter the elements of Matrix B : 5 6 7 8  
  
Addition of the 2 matrices is :  
6 8  
10 12
```


Q21) Program to perform matrix multiplication

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int a[10][10],b[10][10],c[10][10],n,m,x,y,i,j,k,s;

printf("\nEnter Size of Array A : ");

scanf("%d %d",&m,&n);

printf("Enter the elements : ");

for(i=0;i<m;i++)

for(j=0;j<n;j++)

scanf("%d",&a[i][j]);

printf("Contents of Array A are : \n");

for(i=0;i<m;i++)

{

for(j=0;j<n;j++)

{

printf("%3d",a[i][j]);

}

printf("\n");

}

printf("\nEnter Size of Array B : ");

scanf("%d %d",&x,&y);

printf("Enter the elements : ");

for(i=0;i<x;i++)

for(j=0;j<y;j++)

scanf("%d",&b[i][j]);

printf("Contents of Array B are : \n");

for(i=0;i<x;i++)
```

```
{
    for(j=0;j<y;j++)
    {
        printf("%3d",b[i][j]);
    }
    printf("\n");
}
if(m==y)
{
    printf("\nPerforming Matrix Multiplication....Enter any key to continue\n");
    getch();
    for(i=0;i<m;i++)
    {
        for(j=0;j<y;j++)
        {
            c[i][j]=0;
            for(k=0;k<m;k++)
                c[i][j]+=a[i][k]*b[k][j];
        }
    }
    for(i=0;i<m;i++)
    {
        for(j=0;j<y;j++)
        {
            printf("%3d",c[i][j]);
        }
        printf("\n");
    }
}
```

```
getch();  
}
```

OUTPUT:

```
Enter Size of Array A : 2 2  
Enter the elements : 1 2 3 4  
Contents of Array A are :  
  1  2  
  3  4  
  
Enter Size of Array B : 2 2  
Enter the elements : 1 2 3 4  
Contents of Array B are :  
  1  2  
  3  4  
  
Performing Matrix Multiplication....Enter any key to continue  
  7 10  
 15 22  
_
```

Q22) Program to find transpose of a matrix

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int a[10][10],n,m,i,j;

printf("Enter no. of rows and coloums of 2D matrix : ");

scanf("%d %d",&n,&m);

printf("\nEnter elements of matrix : ");

for(i=0;i<n;i++)

for(j=0;j<n;j++)

scanf("%d",&a[i][j]);

printf("\nThe Matrix is : \n");

for(i=0;i<n;i++)

{

for(j=0;j<n;j++)

printf("%d ",a[i][j]);

printf("\n");

}

printf("Transpose is : \n");

for(i=0;i<n;i++)

{

for(j=0;j<n;j++)

printf("%d ",a[j][i]);

printf("\n");

}

getch();

}
```

OUTPUT:

```
Enter no. of rows and coloums of 2D matrix : 3 3
```

```
Enter elements of matrix : 1 2 3 4 5 6 7 8 9
```

```
The Matrix is :
```

```
1 2 3
```

```
4 5 6
```

```
7 8 9
```

```
Transpose is :
```

```
1 4 7
```

```
2 5 8
```

```
3 6 9
```

Q23) Program to perform length of a string

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

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

```
#include<string.h>
```

```
void main()
```

```
{
```

```
clrscr();
```

```
char a[100];
```

```
printf("Enter the string : ");
```


```
gets(a);
```

```
printf("Length of string is : %d",strlen(a));
```

```
getch();
```

```
}
```

OUTPUT:

A screenshot of a terminal window with a black background and white text. The first line shows the prompt 'Enter the string : ' followed by the input 'Hello World'. The second line shows the output 'Length of string is : 11'.

```
Enter the string : Hello World  
Length of string is : 11
```

Q24) Program to concatenate two strings

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
void main()
{
clrscr();
char a[100],b[100];
printf("Enter the first string : ");
gets(a);
printf("Enter the second string : ");
gets(b);
strcat(a,b);
printf("String after concatenation : %s",a);
getch();
}
```

OUTPUT:

```
Enter the first string : Hi
Enter the second string : Hello
String after concatenation : HiHello
```

Q25) Program to copy two strings using strcpy()

```
#include<stdio.h>

#include<conio.h>

#include<string.h>

void main()

{

clrscr();

char a[100],b[100];

printf("Enter the first string : ");

gets(a);

printf("Enter the second string : ");

gets(b);

printf("\nFirst string is : %s ",a);

printf("\nSecond string is : %s ",b);

printf("\n\nCopying first string to second string...\n");

strcpy(b,a);

printf("\nFirst string is : %s ",a);

printf("\nSecond string is : %s ",b);

getch();

}
```


OUTPUT:

```
Enter the first string : Hi
Enter the second string : Hello

First string is : Hi
Second string is : Hello

Copying first string to second string...

First string is : Hi
Second string is : Hi
```

Q26) A simple program using functions

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

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

```
int sub(int a,int b)
```

```
{
```

```
int c;
```

```
if(a>b)
```

```
c=a-b;
```

```
else
```

```
c=b-a;
```

```
return c;
```

```
}
```

```
void main()
```

```
{
```

```
clrscr();
```

```
int x,y;
```

```
printf("\nEnter two numbers : ");
```

```
scanf("%d %d",&x,&y);
```

```
printf("Difference is : %d",sub(x,y));
```

```
getch();
```

```
}
```

OUTPUT:

```
Enter two numbers : 7 5  
Difference is : 2_
```

Q27) Program to illustrate call by value and call by reference

```
#include<stdio.h>

#include<conio.h>

void ref(int *x)
{
    *x+=10;

    printf("\nChanging the value inside the function: %d",*x);
}

void val(int y)
{
    printf("\nChanging the value inside the function: %d",y+10);
}

void main()
{ clrscr();

    int a;

    printf("Enter value for 'a': ");

    scanf("%d",&a);

    printf("\nCALL BY VALUE");

    printf("\nBefore Call by Value function call: a = %d",a);

    val(a);

    printf("\nAfter Call by Value function call: a = %d",a);

    printf("\n\nCALL BY REFERENCE");

    printf("\nBefore Call by Reference function call: a =%d",a);

    ref(&a);

    printf("\nAfter Call by Reference function call: a =%d",a);

    getch();
}
```

OUTPUT:

```
Enter value for 'a': 3
```

CALL BY VALUE

```
Before Call by Value function call: a = 3
```

```
Changing the value inside the function: 13
```

```
After Call by Value function call: a = 3
```

CALL BY REFERENCE

```
Before Call by Reference function call: a =3
```

```
Changing the value inside the function: 13
```

```
After Call by Reference function call: a =13
```

Q28) Program to pass arrays to function as an argument

```
#include<stdio.h>

#include<conio.h>

void read(int x[10][10],int y,int z);

void display(int x[10][10],int y,int z);

void main()

{

clrscr();

int a[10][10],n,m;

printf("\nEnter size of 2D array : ");

scanf("%d %d",&n,&m);

read(a,n,m);

display(a,n,m);

getch();

}

void read(int x[10][10],int y,int z)

{

printf("\nEnter the elements of array : ");

for(int i=0;i<y;i++)

for(int j=0;j<z;j++)

scanf("%d",&x[i][j]);

}

void display(int x[10][10],int y,int z)

{

printf("\nThe contents of array are : \n");

for(int i=0;i<y;i++)

{

for(int j=0;j<z;j++)

{
```

```
    printf("%3d",x[i][j]);  
    }  
    printf("\n");  
}  
}
```

OUTPUT:

```
Enter size of 2D array : 2 2  
  
Enter the elements of array : 1 2 3 4  
  
The contents of array are :  
  1  2  
  3  4
```

Q29) Program to find factorial using recursion

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

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

```
int factorial(int x)
```

```
{
```

```
int fact;
```

```
if(x==1)
```

```
return 1;
```

```
else
```

```
fact=x*factorial(x-1);
```

```
return fact;
```

```
}
```

```
void main()
```

```
{
```

```
clrscr();
```

```
int n;
```

```
printf("\nEnter the number: ");
```

```
scanf("%d",&n);
```

```
printf("Factorial of %d is : %d",n,factorial(n));
```

```
getch();
```

```
}
```


OUTPUT:

```
Enter the number: 6
Factorial of 6 is : 720_
```

Q30) Program to find sum of natural numbers using recursion

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

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

```
int sum(int x)
```

```
{
```

```
int s;
```

```
if(x==1)
```

```
return 1;
```

```
else
```

```
s=x+sum(x-1);
```

```
return s;
```

```
}
```

```
void main()
```

```
{
```

```
clrscr();
```

```
int a;
```

```
printf("Enter a number : ");
```

```
scanf("%d",&a);
```

```
printf("\nThe sum of %d natural numbers is = %d",a,sum(a));
```

```
getch();
```

```
}
```

OUTPUT:

```
Enter a number : 6
```

```
The sum of 6 natural numbers is = 21_
```

Q31) Program to find GCD of two numbers using recursion

```
#include<stdio.h>

#include<conio.h>

int gcd(int a,int b);

void main()
{ clrscr();

  int x,y;

  printf("\nEnter the 2 integers : ");

  scanf("%d %d",&x,&y);

  gcd(x,y);

  printf("GCD OF %d AND %d IS %d.",x,y,gcd(x,y));

  getch();
}

int gcd(int a,int b)
{ if(b!=0)

  return gcd(b,a%b);

  else

  return a;

}
```

OUTPUT:

```
Enter the 2 integers : 36 60
GCD OF 36 AND 60 IS 12._
```

Q32) Program to store information of students using structures

```
#include<stdio.h>

#include<conio.h>

struct student

{

int roll;

char name[20];

};

void main()

{

clrscr();

struct student s1,s2;

printf("\nEnter Roll No. of Student 1:");

scanf("%d",&s1.roll);

printf("Enter Name of Student 1:");

scanf("%s",s1.name);

printf("\nEnter Roll No. of Student 2:");

scanf("%d",&s2.roll);

printf("Enter Name of Student 2:");

scanf("%s",s2.name);

printf("\n\nDetails of Student 1\nRoll No : %d Name : %s",s1.roll,s1.name);

printf("\n\nDetails of Student 2\nRoll No : %d Name : %s",s2.roll,s2.name);

getch();

}
```

OUTPUT:

```
Enter Roll No. of Student 1:3  
Enter Name of Student 1:Ayaan
```

```
Enter Roll No. of Student 2:4  
Enter Name of Student 2:Somya
```

```
Details of Student 1  
Roll No : 3 Name : Ayaan
```

```
Details of Student 2  
Roll No : 4 Name : Somya
```

Activate Windows
Go to Settings to activate Windows.

Q33) Program using array of structures

```
#include<stdio.h>

#include<conio.h>

struct Book

{

char title[20];

char author[20];

int pages, price;

};

void main()

{

struct Book x[20];

clrscr();

int n,i;

printf("\nEnter number of Books : ");

scanf("%d",&n);

for(i=0;i<n;i++)

{

printf("\nEnter details for Book %d",i+1);

scanf("%s %s %d %d",x[i].title,x[i].author,&x[i].pages,&x[i].price);

}

printf("\nThe records are :\n");

for(i=0;i<n;i++)

printf("\nBook %d : \nTitle: %s Author: %s Pages: %d Price: %d",i+1,x[i].title,x[i].author,x[i].pages,x[i].price);

getch();

}
```


OUTPUT:

Enter number of Books : 3

Enter details for Book 1

Math Shraddha 500 700

Enter details for Book 2

Chemistry Chaitanya 400 600

Enter details for Book 3

Java Ayaan 600 800

The records are :

Book 1 :

Title: Math Author: AShraddha Pages: 500 Price: 700

Book 2 :

Title: Chemistry Author: Chaitanya Pages: 400 Price: 600

Book 3 :

Title: Java Author: Ayaan Pages: 600 Price: 800

Q34) Program using pointer to array

```
#include<stdio.h>

#include<conio.h>

void main()

{

clrscr();

int x[5]={5,4,3,2,1};

int *ptr;

ptr=x;

for(int i=0;i<5;i++)

{

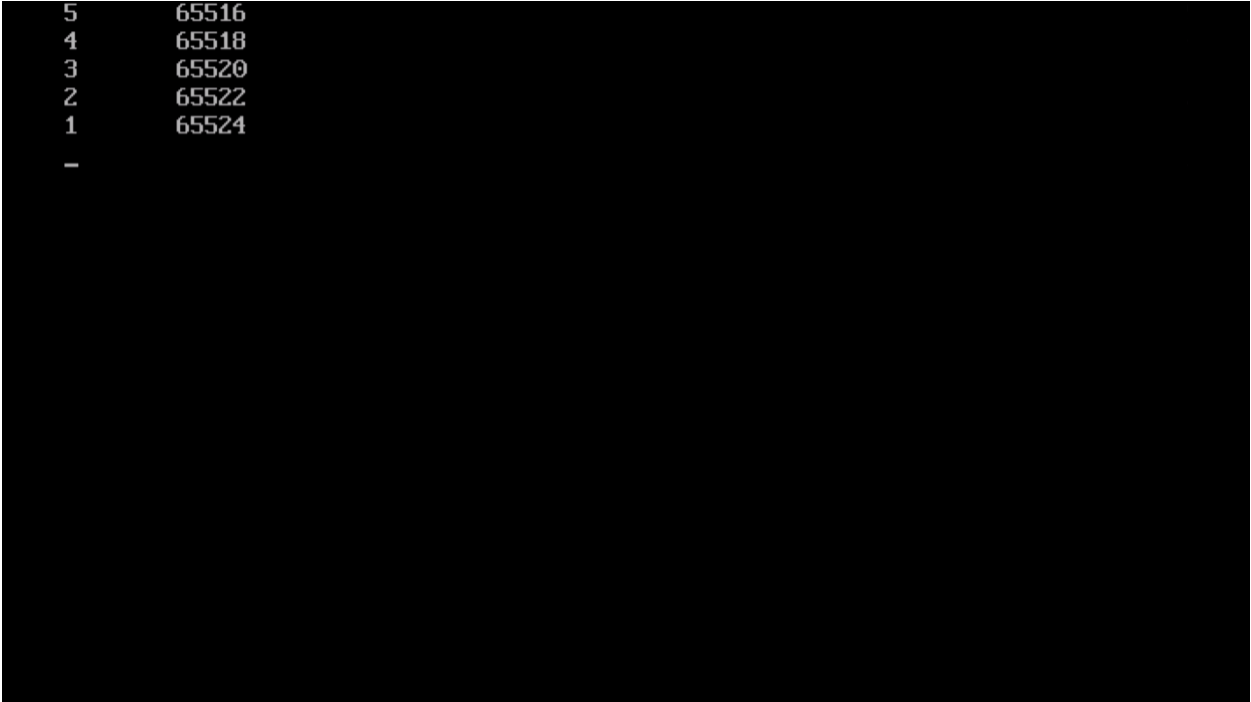
printf("%d\t%u\n",*ptr,ptr);

ptr++;

}

getch();

}
```

OUTPUT:

```
5      65516
4      65518
3      65520
2      65522
1      65524
-
```

Q35) Program to perform arithmetic operations using pointers

```
#include<stdio.h>

#include<conio.h>

int add(int *x,int *y)

{

int z=*x+*y;

return z;

}

int diff(int *x,int *y)

{

int z=*x-*y;

return z;

}

int mul(int *x,int *y)

{

int z=*x**y;

return z;

}

void main()

{

clrscr();

int a,b,res;

printf("\nEnter two values : ");

scanf("%d %d",&a,&b);

res=add(&a,&b);

printf("\nAddition : %d",res);

res=diff(&a,&b);

printf("\nDifference: %d",res);

res=mul(&a,&b);
```

```
printf("\nMultiplication: %d",res);  
getch();  
}
```

OUTPUT:

```
Enter two values : 5 7  
  
Addition : 12  
Difference: -2  
Multiplication: 35
```

Q36) Program using pointers for call by reference and call by value

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

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

```
void swap(int *a, int*b)
```

```
{
```

```
    int temp;
```

```
    temp=*a;
```

```
    *a=*b;
```

```
    *b=temp;
```

```
    printf("AFTER (CALL BY REFERENCE) SWAPPING VALUES ARE :\n");
```

```
    printf("X = %d\n",*a);
```

```
    printf("Y = %d\n",*b);
```

```
}
```

```
void swap(int a, int b)
```

```
{
```

```
    int temp;
```

```
    temp=a;
```

```
    a=b;
```

```
    b=temp;
```

```
    printf("AFTER (CALL BY VALUE)SWAPPING VALUES ARE :\n");
```

```
    printf("X = %d\n",a);
```

```
    printf("Y = %d\n",b);
```

```
}
```

```
void main()
```

```
{
```

```
    clrscr();
```

```
    int x=10,y=5;
```

```
    printf("BEFORE SWAPPING VALUES ARE :\n");
```

```
    printf("X = %d\n",x);
```

```
printf("Y = %d\n",y);  
swap(&x,&y);  
swap(x,y);  
getch();  
}
```

OUTPUT:

```
BEFORE SWAPPING VALUES ARE :  
X = 10  
Y = 5  
AFTER (CALL BY REFERENCE) SWAPPING VALUES ARE :  
X = 5  
Y = 10  
AFTER (CALL BY VALUE)SWAPPING VALUES ARE :  
X = 10  
Y = 5  
—
```

Q37) Program to search an element in an array

```
#include<stdio.h>

#include<conio.h>

void search(int [],int, int);

void main()

{

clrscr();

int n[50],m,x,item;

printf("\nEnter size of array: ");

scanf("%d",&m);

printf("\nEnter elements of array: ");

for(int i=0;i<m;i++)

{

scanf("%d",&n[i]);

}

printf("\nEnter element to be searched: ");

scanf("%d",&item);

search(n,m,item);

getch();

}

void search(int n[50],int m,int item)

{

int f=0,l=m-1;

int mid,k;

while(f<=l)

{

mid=(f+l)/2;

if(item==n[mid])

{
```

```

        k=1;
        break;
    }
    else
    {
        if(item>n[mid])
            f=mid+1;
        else
            l=mid-1;
    }
}
if(k==1)
    printf("\nElement found at psition : %d ",mid+1);
else
    printf("\nElement not found!!");
}

```

OUTPUT:

```

Enter size of array: 5
Enter elements of array: 4 2 1 9 3
Enter element to be searched: 9
Element found at psition : 4

```


Q38) Program for bubble sort

```
#include<stdio.h>

#include<conio.h>

int a[25],n;

void bsort(int [],int );

void main()

{

    clrscr();

    printf("Enter size of array : ");

    scanf("%d",&n);

    printf("\nEnter elements of array : ");

    for(int i=0;i<n;i++)

        scanf("%d",&a[i]);

    bsort(a,n);

    printf("\n\nFinal sorted array: ");

    for(i=0;i<n;i++)

        printf(" %d",a[i]);

    getch();

}

void bsort(int a[],int n)

{

    int temp;

    for(int i=0;i<n;i++)

    {
```

```

for (int j=0;j<n-1;j++)
{
    if(a[j]>a[j+1])
    {
        temp=a[j];
        a[j]=a[j+1];
        a[j+1]=temp; }
    }

    printf("\nArray after loop %d : ",i+1);

    for(int k=0;k<n;k++)

        printf(" %d",a[k]);

} }

```

OUTPUT:

```

Enter size of array : 9

Enter elements of array : 9 8 7 6 5 4 3 2 1

Array after loop 1 : 8 7 6 5 4 3 2 1 9
Array after loop 2 : 7 6 5 4 3 2 1 8 9
Array after loop 3 : 6 5 4 3 2 1 7 8 9
Array after loop 4 : 5 4 3 2 1 6 7 8 9
Array after loop 5 : 4 3 2 1 5 6 7 8 9
Array after loop 6 : 3 2 1 4 5 6 7 8 9
Array after loop 7 : 2 1 3 4 5 6 7 8 9
Array after loop 8 : 1 2 3 4 5 6 7 8 9
Array after loop 9 : 1 2 3 4 5 6 7 8 9

Final sorted array: 1 2 3 4 5 6 7 8 9_

```

Q39) Program for insertion sort

```
#include<stdio.h>

#include<conio.h>

void isort();

void display(int a[],int n);

int a[25],n;

void main()

{

    clrscr();

    printf("\nEnter size of array : ");

    scanf("%d",&n);

    printf("\n Enter the elements of array : ");

    for(int i=0;i<n;i++)

        scanf("%d",&a[i]);

    isort();

    printf("\n\nFinal Sorted Array : ");

    for(i=0;i<n;i++)

        printf(" %d",a[i]);

    getch();

}

void isort()

{

    int i,j,temp;

    for(i=1;i<n;i++)
```

```

{
temp=a[i];

j=i-1;

while(j>=0&& a[j]>temp)

{

a[j+1]=a[j];

j=j-1;

}

a[j+1]=temp;

printf("\nArray after loop %d : ",i+1);

for(int k=0;k<n;k++)

printf(" %d",a[k]);

}

```

OUTPUT:

```

Enter size of array : 9

Enter the elements of array : 9 8 7 6 5 4 3 2 1

Array after loop 1 : 9 8 7 6 5 4 3 2 1
Array after loop 2 : 8 9 7 6 5 4 3 2 1
Array after loop 3 : 7 8 9 6 5 4 3 2 1
Array after loop 4 : 6 7 8 9 5 4 3 2 1
Array after loop 5 : 5 6 7 8 9 4 3 2 1
Array after loop 6 : 4 5 6 7 8 9 3 2 1
Array after loop 7 : 3 4 5 6 7 8 9 2 1
Array after loop 8 : 2 3 4 5 6 7 8 9 1
Array after loop 9 : 1 2 3 4 5 6 7 8 9

Final Sorted Array : 1 2 3 4 5 6 7 8 9_

```

Q40) Program for selection sort

```
#include<stdio.h>

#include<conio.h>

void ssort();

int a[25],n;

void main()

{

    clrscr();

    printf("\n\t\t\t*****SELECTION SORT*****");

    printf("\nEnter size of array : ");

    scanf("%d",&n);

    printf("\n Enter the elements of array : ");

    for(int i=0;i<n;i++)

        scanf("%d",&a[i]);

    ssort();

    printf("\n\nFinal Sorted Array : ");

    for(i=0;i<n;i++)

        printf(" %d",a[i]);

    getch();

}

void ssort()

{

    int i,j,min,temp;

    for(i=0;i<n;i++)

    {

        min=i;

        for(j=i+1;j<n;j++)

        {

            if(a[j]<a[min])
```

```

min=j;
}
temp=a[min];
a[min]=a[i];
a[i]=temp;
printf("\nArray after loop %d : ",i+1);
for(int k=0;k<n;k++)
printf(" %d",a[k]);
}
}

```

OUTPUT:

```

*****SELECTION SORT*****
Enter size of array : 9

Enter the elements of array : 9 8 7 6 5 4 3 2 1

Array after loop 1 : 1 8 7 6 5 4 3 2 9
Array after loop 2 : 1 2 7 6 5 4 3 8 9
Array after loop 3 : 1 2 3 6 5 4 7 8 9
Array after loop 4 : 1 2 3 4 5 6 7 8 9
Array after loop 5 : 1 2 3 4 5 6 7 8 9
Array after loop 6 : 1 2 3 4 5 6 7 8 9
Array after loop 7 : 1 2 3 4 5 6 7 8 9
Array after loop 8 : 1 2 3 4 5 6 7 8 9
Array after loop 9 : 1 2 3 4 5 6 7 8 9

Final Sorted Array : 1 2 3 4 5 6 7 8 9_

```