ARRAY

- ARRAY

An array is a collection of similar data types, i.e. Array can hold series of data of similar types placed in contiguous memory locations. Array is also called linear data structure.

Array declaration

< data type>< array name>[size];

Example

int A[7];

Defines an integer type array, array name A and size of the array is 7. Computer reserves 7 storage locations to hold similar integer type data.

5) i. Write a C program to find the maximum element from given input array elements

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a[20];/* a is an integer array and it maximum size is 20*/
int size,i,b;
clrscr();
printf("\nEnter how many number you want to store (less than 20)---->");
scanf("%d",&size);
for(i=0;i<size;i++)
{
printf("\nEnter the a[%d] no. element---->",i);
scanf("%d",&a[i]);
}
printf("\nThe displayed Array\n ");
for(i=0;i<size;i++)
{
printf("\na[%d]----->%d",i,a[i]);
}
b=a[0];
for(i=0;i<size;i++)
{
if(b<a[i])
b=a[i];
}
printf("\nThe maximum element ----->%d",b);
getch();
}
```

Output

Enter how many number you want to store (less than 20)---->5

Enter the a[0] no. element---->20
Enter the a[1] no. element---->10
Enter the a[2] no. element---->50
Enter the a[3] no. element---->40
Enter the a[4] no. element---->30

The displayed Array
a[0]----->20
a[1]----->10
a[2]----->50
a[3]----->40
a[4]----->30
The maximum element ----->50

5) ii. Write a C program to sort the array elements using BUBBLE SORT in ascending order.

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a[20];/* a is an integer array and it maximum size is 20*/
int size,i,j,temp=0;
clrscr();
printf("\nEnter how many number you want to store (less than 20)---->");
scanf("%d",&size);
for(i=0;i<size;i++)
{
printf("\nEnter the a[%d] no. element---->",i);
scanf("%d",&a[i]);
}
printf("\nThe displayed Array\n ");
for(i=0;i<size;i++)
{
printf("\na[%d]----->%d",i,a[i]);
}
for(i=0;i<size;i++)
{
 for(j=0;j<(size-1)-i;j++)
  {
```

```
if(a[j]>a[j+1])
{
temp=a[j];
a[j]=a[j+1];
a[j+1]=temp;
}
}
}
printf("\nAfter Bubble Sort\n");
for(i=0;i<size;i++)
{
printf("\na[%d]----->%d",i,a[i]);
}
getch();
}
```

Output

```
Enter how many number you want to store (less than 20)---->5

Enter the a[0] no. element---->5
Enter the a[1] no. element---->3
Enter the a[2] no. element---->2
Enter the a[3] no. element---->6
Enter the a[4] no. element---->1
The displayed Array
a[0]----->1
a[1]----->2
a[2]----->3
a[3]----->5
a[4]----->6
After Bubble Sort
a[0]----->1
a[1]----->2
a[2]----->3
a[3]----->5
a[4]----->6
```

** Add elements of Two One Dimensional Array using C program

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

```
int main()
{
int a[10],b[10],c[10],i,n;
printf("\nEnter how many number you want to store (less than 20) in array1---->");
scanf("%d",&n);
for(i=0;i<n;i++)
{
printf("\nEnter the a[%d] no. element---->",i);
scanf("%d",&a[i]);
}
printf("\nThe displayed Array 1\n ");
for(i=0;i<n;i++)
{
printf("\n a[%d]----->%d",i,a[i]);
}
printf("\nEnter how many number you want to store (less than 20) in array2---->");
scanf("%d",&n);
for(i=0;i<n;i++)
{
printf("\nEnter the b[%d] no. element---->",i);
scanf("%d",&b[i]);
}
printf("\nThe displayed Array 2\n ");
for(i=0;i<n;i++)
{
printf("\n b[%d]----->%d",i,b[i]);
}
printf("\n addition of two 1D array is\n ");
for(i=0;i<n;i++)
{
c[i]=a[i]+b[i];
printf("addition is \n c[%d]----->%d",i, c[i]);
}
return 0;
 }
```

**** Linear Search**

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

```
{
int a[20],i,ele,n;
printf(“Enter the number of elements");
scanf("%d",&n);
printf("Enter array elements");
for(i=0;i<n;++i)
{
scanf("%d",&a[i]);
}
printf("Enter element to search:");
scanf("%d",&ele);
for(i=0;i<n;++i)
{
if(a[i]==ele)
break;
}
if(i<n)
printf("Element found at index %d",i);
else
printf("Element not found");
return 0;
}
```

- **MULTI-DIMENSIONAL ARRAYS**

C supports multidimensional array. The simplest form of the multidimensional array is the two-dimensional. The multidimensional is useful particularly in numerical applications related with matrix, determinant and two dimensional co-ordinate system.

** **Display elements in 2D array**

```
#include <stdio.h>
#include<conio.h>
int main()
{
int r, c, a[100][100], i, j;
printf("Enter the number of rows (between 1 and 100): ");
scanf("%d", &r);
printf("Enter the number of columns (between 1 and 100): ");
scanf("%d", &c);
printf("\nEnter elements of 1st matrix:\n");
for (i = 0; i < r; ++i)
for (j = 0; j < c; ++j)
{
```

```
scanf("%d", &a[i][j]);
}
printf("\n matrix elements are: \n");
for (i = 0; i < r; ++i)
{
for (j = 0; j < c; ++j)
{
printf("%d   ", a[i][j]);
}
printf("\n\n");
}
return 0;
}
```

** Addition of two matrix in C

```
#include <stdio.h>
#include<conio.h>
int main()
{
int r,c1,i,j,a[10][10],b[10][10],c[10][10];
printf("Enter the number of rows and columns of matrix 1 \n");
scanf("%d%d", &r, &c1);
printf("Enter the elements of first matrix \n");
for (i = 0; i < r; i++)
for (j = 0; j < c1; j++)
scanf("%d", &a[i][j]);
printf("Enter the elements of second matrix\n");
for (i = 0; i < r; i++)
for (j = 0 ; j < c1; j++)
scanf("%d", &b[i][j]);
printf("Sum of entered matrices:-\n");
for (i = 0; i < r; i++)
{
for (j = 0 ; j < c1; j++)
{
c[i][j] = a[i][j] + b[i][j];
printf("%d\t", c[i][j]);
}
printf("\n");
}
return 0;
}
```

Multiplication of two n X m order matrices.

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
int a[10][10],b[10][10],c[10][10],r1,c1,i,j,k;
printf("enter the number of row=");
scanf("%d",&r1);
printf("enter the number of column=");
scanf("%d",&c1);
printf("enter the first matrix element=\n");
for(i=0;i<r1;i++)
{
for(j=0;j<c1;j++)
{
scanf("%d",&a[i][j]);
}
}
printf("enter the second matrix element=\n");
for(i=0;i<r1;i++)
{
for(j=0;j<c1;j++)
{
scanf("%d",&b[i][j]);
}
}
printf("multiply of the matrix=\n");
for(i=0;i<r1;i++)
{
for(j=0;j<c1;j++)
{
c[i][j]=0;
for(k=0;k<c1;k++)
{
c[i][j]+=a[i][k]*b[k][j];
}
}
}
//for printing result
for(i=0;i<r1;i++)
{
```

```
for(j=0;j<c1;j++)
{
printf("%d\t",c[i][j]);
}
printf("\n");
}
return 0;
}
```