ARRAYS

Definition

- An array is a fixed-size sequenced collection of elements of the same data type ie, a grouping of like-type data that share a common name.
- It can be used to represent a list of number or names.

- Since an array can represent a list of items, the individual values of the items are referred to as elements. Example Salary[10] represent the tenth element (10th employee salary in a list of organization employees salaries).

- We can use the arrays to represent not only a simple list of values but also tables of data in two and three dimensions.

One-Dimensional Arrays

- A list of items can be given one variable name using only one subscript and such a variable is called a single-subscripted variable or a one-dimensional array.

Declaration of One-Dimensional Arrays.

- Arrays must be declared like other variable before they are used so that the computer can allocate space for them in memory. The declaration takes the following form;

  type *variable-name[size]*

- Type specifies the type of elements that will be contained in the array such as int, float, char etc.
- Size indicates the maximum number of elements that can be stored inside the array.

examples

float height[5];

- **d**eclares an array height to contain 5 real (floating point) numbers
- C language treats character strings simply as arrays of characters.

  e.g. **char name[9]**

- To represent 35, 40, 20, 57, 19 by an array variable number, the array variable number is declared as **int number[5];** the computer will reserve five storage spaces as;

  Number[0]

  Number[1]

  Number[2]

  Number[3]

  Number[5]

Initialization of One-Dimensional Arrays.

Format:

- **type *array-name[size] = { list of value };***
- The values in the list are separated by commas
  Example int num[3] = {0,0,0};

or to initialize array number[5] with the following values 35, 40, 20, 57, 19 :

Number[0] = 35;

Number[1] = 40;

Number[2] = 20;

Number[3] = 57;

Number[5] = 19;

- These elements may be used in programs just like any other C variable. Example

  number[4] = number[2] + number[3];

Working with arrays

- Arrays just like any other variable allows inputs via keyboard, processing of data stored in arrays and display array content.

  Declare int number[5];
- Input an array element e.g:

  scanf(“%d”, &number[0]);
- Display array element e.g.:

  printf(“%d”, number[0]);
- Process array element:

  tot=tot+number[1];

Working with arrays

- The for statement enhances processing of array elements in sequence from the first element to the last element.
- E.g. to input elements to an array number[5]:

```
for (i=0;i<5;i++)
 scanf("%d",&number[i]);
```

- E.g. to output elements from array number[5]:

```
for (i=0;i<5;i++)
 printf ("%d",number[i]);
```

examples

1. Write a program to input a name and display the name in reverse.

2. Write a program to input 8 numbers to an array and calculate their total value.

3. Write a program to input 8 numbers to an array and display the smallest and the largest number.

program to input a name and display the name in reverse.

```
int main()
{
int i; char name[10];
printf(“enter name:”);
for(i=0;i<10;i++)
scanf(“%c”,&name[i]);
printf(“name in reverse:”);
for(i=9;i>=0;i--)
printf(“%c”,name[i]);
}
```

program to input 8 numbers to an array and calculate their total value.

```
# include<stdio.h>
int main()
{ int i,num[8],tot;
   tot=0;
for(i=0;i<8;i++){
printf(“enter numbers:”);
    scanf(“%d”,&num[i]);
    tot=tot+num[i];
    }
    printf(“total is %d”,tot);
  }
```

```
# include <stdio.h>
int main()
{ int i,num[8],low,high;
   low=1000; high=0;
for(i=0;i<8;i++){
printf(“enter numbers:);
    scanf(“%d”,&num[i]);
If(num[i]>high) high=num[i];
If(num[i]<low) low=num[i];
    }
    printf(“Biggest number %d”,high);
    printf(“Smallest number %d”,low);

  }
```

2-dimensional arrays

- Two dimensional arrays can be used to store a table of values.
- The table can be thought of as a Matrix containing rows and columns.
- Two dimensional arrays are declared as follows;

  Type array_name[row_ size][column_size];

Program to input numbers to a 3 by 4 array and display the result

Program to input numbers to a 3 by 4 array and display the result

```
int main()
{  int I,j; int num[3][4];
Printf(“Enter values”);
 for(i=0;i<3;i++)
   {
    for(j=0;j<4;j++)
       scanf(“%d”,&num[I][j]);
   }
```

```
Printf(“ Array elements display”);
for(i=0;i<3;i++)
  {    for(j=0;j>4;j++)
       {
       printf(“%d”,num[I][j]);
       }
     printf(‘\n”);
  }
}
```