LECTURE NOTE 21

ARRAYS USING FUNCTIONS

1-d arrays using functions

Passing individual array elements to a function

We can pass individual array elements as arguments to a function like other simple variables.

Example:

```
#include<stdio.h>
void check(int);
void main()
{
 int a[10],i;
 clrscr();
 printf("\n enter the array elements:");
for(i=0;i<10;i++)
{
 scanf("%d",&a[i]);
 check(a[i]);
}
 void check(int num)
{
if(num%2==0)
  printf("%d is even\n",num);
else
   printf("%d is odd\n",num);
}
```

Output:
enter the array elements:

1 2 3 4 5 6 7 8 9 10

1 is odd

2 is even

3 is odd

4 is even

5 is odd

6 is even

7 is odd

8 is even

9 is odd

10 is even

Example:

C program to pass a single element of an array to function

```
#include <stdio.h>
 void display(int a)
   {
    printf("%d",a);
   }
int main()
{
    int c[]={2,3,4};
    display(c[2]);  //Passing array element c[2] only.
   return 0;
}
```

Output

2 3 4

Passing whole 1-D array to a function

We can pass whole array as an actual argument to a function the corresponding formal arguments should be declared as an array variable of the same type.

Example:

```
#include<stdio.h>
main()
{
int i, a[6]={1,2,3,4,5,6};
 func(a);
 printf("contents of array:");
for(i=0;i<6;i++)
        printf("%d",a[i]);
 printf("\n");
}
func(int val[])
{
int sum=0,i;
 for(i=0;i<6;i++)
{
        val[i]=val[i]*val[i];
        sum+=val[i];
}
printf("the sum of squares:%d", sum);
}
```

Output

contents of array: 1 2 3 4 5 6

the sum of squares: 91

Example.2:

Write a C program to pass an array containing age of person to a function. This function should find average age and display the average age in main function.

```
#include <stdio.h>
 float average(float a[]);
int main()
{
    float avg, c[]={23.4, 55, 22.6, 3, 40.5, 18};
    avg=average(c);   /* Only name of array is passed as argument. */
    printf("Average age=%.2f",avg);
   return 0;
 }
float average(float a[])
{
   int i;
   float avg, sum=0.0;
  for(i=0;i<6;++i)
         {
               sum+=a[i];
       }
    avg =(sum/6);
   return avg;
}
```

Output

Average age= 27.08

Solved Example:

1. Write a program to find the largest of n numbers and its location in an array.

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

```
#include<conio.h>
void main()
{
  int array[100], maximum, size, c, location = 1;
clrscr();
printf("Enter the number of elements in array\n");
scanf("%d", &size);
printf("Enter %d integers\n", size);

 for (c = 0; c < size; c++)
    scanf("%d", &array[c]);
maximum = array[0];

  for (c = 1; c < size; c++)
  {
    if (array[c] > maximum)
    {
       maximum  = array[c];
       location = c+1;
    }
  }
  printf("Maximum element is present at location %d and it's value is %d.\n", location,
maximum);
  getch();
}
```

Output:

Enter the number of elements in array
5
Enter 5 integers
2
4
7
9
1

Maximum element is present at location 4 and it's value is 9

2. Write a program to enter n number of digits. Form a number using these digits.

```
# include<stdio.h>
#include<conio.h>
#include<math.h>
void  main()
{
 int     number=0,digit[10],     numofdigits,i;
clrscr();
printf("\n Enter the number of digits:");
scanf("%d", &numofdigits);
for(i=0;i<numofdigits;i++)
     {
         printf("\n Enter the %d th digit:", i);
        scanf("%d",&digit[i]);
      }
i=0;
while(i<numofdigits)
{
  number= number + digit[i]* pow(10,i)
  i++;
}
printf("\n The number is : %d",number);
getch();
}
```

Output:

Enter the number of digits: 3
Enter the 0^{th} digit: 5
Enter the 1th digit: 4
Enter the 2th digit: 3
The number is: 543

3. Matrix addition:

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

```
  int m, n, c, d, first[10][10], second[10][10], sum[10][10];
clrscr();
  printf("Enter the number of rows and columns of matrix\n");
  scanf("%d%d", &m, &n);
  printf("Enter the elements of first matrix\n");
  for ( c = 0 ; c < m ; c++ )
for ( d = 0 ; d < n ; d++ )
      scanf("%d", &first[c][d]);

  printf("Enter the elements of second matrix\n");

for ( c = 0 ; c < m ; c++ )
for ( d = 0 ; d < n ; d++ )
        scanf("%d", &second[c][d]);

  for ( c = 0 ; c < m ; c++ )
    for ( d = 0 ; d < n ; d++ )
      sum[c][d] = first[c][d] + second[c][d];

  printf("Sum of entered matrices:-\n");

  for ( c = 0 ; c < m ; c++ )
  {
    for ( d = 0 ; d < n ; d++ )
      printf("%d\t", sum[c][d]);

    printf("\n");
  }

  getch();
}
```

Output:

Enter the number of rows and columns of matrix

2

2

Enter the elements of first matrix

1 2

3 4

Enter the elements of second matrix

5 6

2 1
Sum of entered matrices:- 6
8
5 5

Exercise

1. Compute sum of elements of an array in a program?
2. Write a program for histogram printing using an array?
3. Write a program for dice-rolling using an array instead of switch?
4. Sorting an array with bubble sort?
5. Write a program for binary search using an array?
6. Write a program to interchange the largest and the smallest number in the array.
7. Write a program to fill a square matrix with value 0 on the diagonals, 1 on the upper right triangle, and -1 on the lower left triangle.
8. Write a program to read and display a 2x2x2 array.
9. Write a program to calculate the number of duplicate entries in the array.
10. Given an array of integers, calculate the sum, mean, variance and standard deviation of the numbers in the array.
11. Write a program that reads a matrix and displays the sum of the elements above the main diagonal.
12. Write a program to calculate XA + YB where A and B are matrices and X=2, and Y=3