DEPARTMENT OF COMPUTER ENGINEERING

CMPE112: Programming Fundamentals

EXPERIMENT 4

Introduction to C Programming: 1-D and 2-D dimensional arrays

Objectives:

1) Understand how to edit, compile and execute C computer codes.
2) Understand C programming: 1-D and 2-D dimensional arrays.

Note: Before writing a computer code, you should do the following steps: 1) **understand** and **analyze** the problem, 2) develop an **algorithm** and/or **flowchart** and 3) convert the **algorithm** and/or the **flowchart** into a C **code**.

Task I: Trace section

Show the contents of the following array declarations.

a)
```
int N1[5], N2[5];
N1[2] = 4;
N1[0] = N1[2];
N2[4] = N1[0];
```

b)
```
float prices[5]={1.25, 3.50, 1.20, 2.99, 0.75};
```

c)
```
float prices[5]={1.25, 3.50};
```

d)
```
int months[ ]={1,2,3,4,5,6,7,8,9,10,11,12};
```

e)
```
int x[2][3]={1,2,3,3,2,1};
```

f)
```
int y[2][3]={{1,2,3},{3,2,1}};
```

what is the output of

g)
```
#include <stdio.h>
void main()
{int a[3][3] = {1,3,5,7,9};
 int i=0,j,sum=0;

 for(j=0; j < 3; j++)
   sum += a[1][j];
 printf("%d\n",sum);

 for(j=0; j < 3; j++)
   sum += a[j][i++];
 printf("%d\n",sum);
 }
```

Task II: Programming tasks

1) Consider the following code that finds the sum of elements of the integer array A:

```
#include<stdio.h>
#include<math.h>
#define MAX 5
int main(){
int A[MAX],i,Sum=0;

cout << "Enter the element of the array A (5 elements): ";
for (i = 0; i < MAX; i++)
     scanf("%d",&A[i]);
```

```
Sum = 0;
for (i = 0; i < MAX; i++)
     Sum += A[i];

printf("The sum is %d\n",sum);

return 0;}
```

a) Edit, compile and execute this code. Use the following input values for array A elements: 3 2 4 1 5.

b) Modify the given code to find the average of the array A. **Note:** The average is computed by as sum of elements/number of elements

A sample run of the program must be as follows:

*** Program to claculate find the average of elements of an integer array ***
Enter the elements of the array A: 3 2 4 1 5
The average of the array A is 3.0.

2) Write one C program to do the following tasks:

a) Read the grades of 10 students from the keyboard. Store the grades in a one-dimensional array called "grade" of type integer.

b) Find the average of the grades

c) Find and print the maximum grade

d) Add to each students grades the following Bonus value: 100-maximum

e) Print from the monitor the students new grades

3) Write a code that will do

a) Reads the elements of two matrices M1 and M2 with the size of two rows and three columns. And then finds the sum of the two matrices, i.e., C=M1+M2. Use the following input values for M1 and M2:

$$M1=\begin{pmatrix} 1 & -5 & 3 \\ 2 & -1 & -3 \end{pmatrix}, M2=\begin{pmatrix} 3 & 2 & 4 \\ -2 & -3 & 7 \end{pmatrix}$$

b) Find and print the maximum element row of the matrix C?

c) Find and print the average of each row of the matrix Result?

4) Exercise - Write a C code that will read the age of 10 students in a one dimensional array and then order the array in ascending order.

Use the following input: 23, 25, 18, 23, 16, 19, 22, 21, 27, and 18