10/18/2021

Department Of Computer Science

Subject: Data Structure and Algorithm **Instructor:** Ma'am Zainab Malik

Lab No: 1 **Date:** 18-10-2021

Class: BSCS-3B

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Lab Repot 1

Task 1:

Declare an array of size 10

Take input from the user to initialize that array

Take index number from the user and print the value stored at that index.

Description:

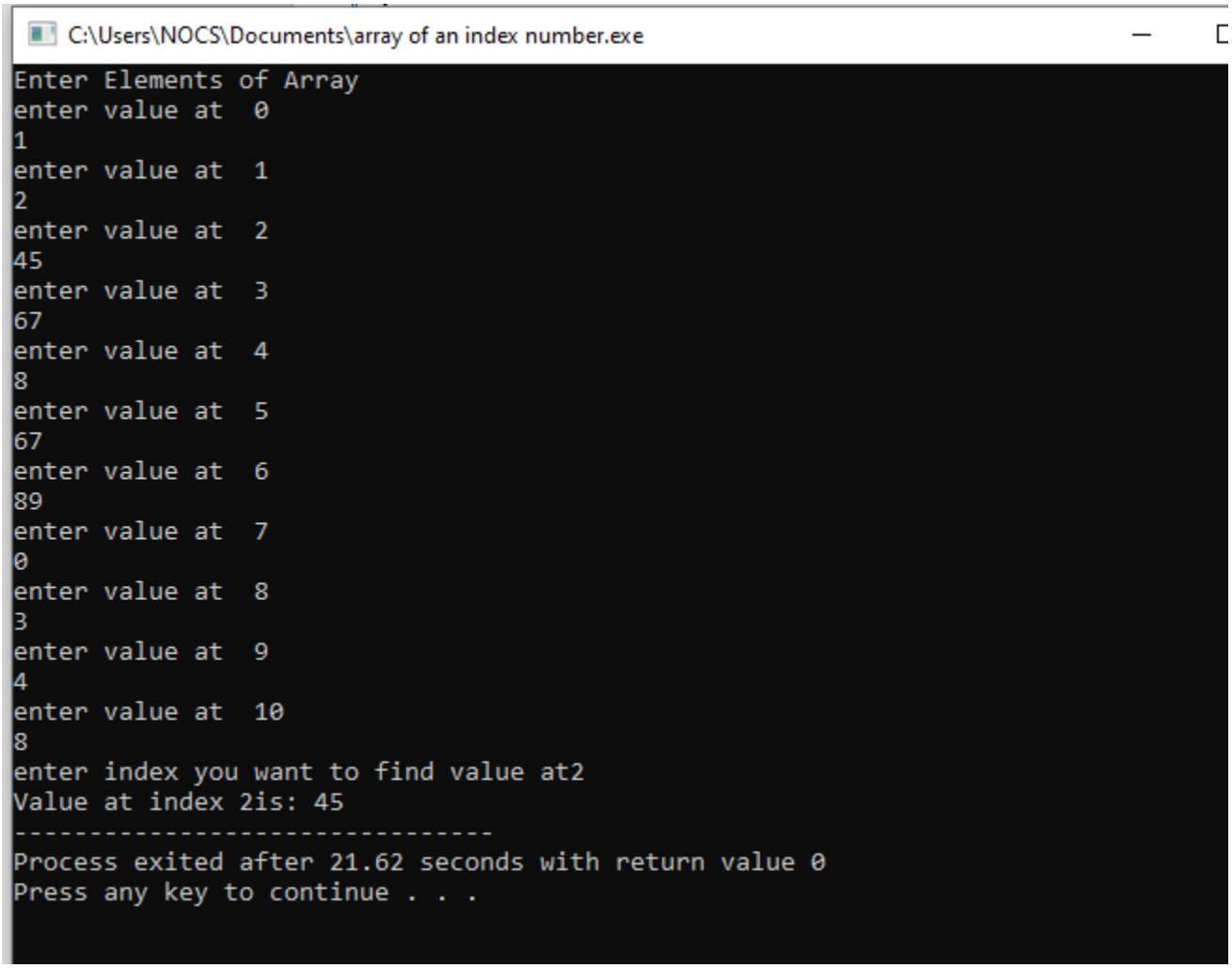
The given below code is illustrating how to get a value at a particular index number in a dynamic array. To carry out this task, firstly we will declare an array of type integer and a variable (to store a index a value). Here, we will use loop to get a values for our array .For the next phase, we will ask user to enter a index number of his/her own choice. Lastly, we will print a value of the index number ,entered by the user.

Code:

```
#include<iostream>
using namespace std;
int main()
{
    int arr[10]; // declaring an array
    int ind;
    cout<<"Enter Elements of Array \n";
    for(int i=0; i<=10; i++)  // using For loop to get and print values for an array
    {
        cout<<"enter value at  "<<i<<endl;
        cin>>arr[i];  // Getting values for an  array
    }
    cout<<"enter index you want to find value at";
    cin>>ind;  // getting index number to print value at that particular index
```

```
        cout<<"Value at index "<<ind<<"is: "<<arr[ind];
        return 0;
}
```

Output:



Task 2:

Declare two 2D static arrays of type int.

Multiply the content of these arrays as matrix multiplication (for this you need to keep in mind the constraints/conditions for matrix multiplication).

Description:

Here's our program is demonstrating how to multiply two matrices.

Firstly, we will initialize three arrays of maximum size ten (Our two matrices will store two input matrix values by taking values from user and the other will store their multiplication).We have declare four variables r1,c1 ,r2 and c2 to take number of rows and columns for every individual matrix.Then, we will move towards our most crucial step to check whether our two matrices are valid for multiplication or nor. Our condition is defined as:

In order for matrix multiplication to be defined, the number of columns in the first matrix must be equal to the number of rows in the second matrix.

If our condition is false; our program will terminate. However; if our condition get satisfied we will move next steps which is to taking values from user for matrix (a and b) using for loop . Follow up further, we will use three for loops to multiply two matrices and storing each individual multiplication in a variable sum, we had declared before. After, our program outermost loop execute, we will display our two matrix and their multiplication using for loop for individual matrix.

Code:

```
#include<iostream>

#include<math.h>

using namespace std;

int main()

{
```

```
        int a[10][10],b[10][10],ab[10][10],i,j,k;
        // intiliazing array a,b and c and their maximun sixe is 10
        int r1,c1,r2,c2;
        int sum=0;
        cout<<"Enter no.of rows and columns for martrix a"<<endl;
        cin>>r1>>c1; // taking size of array a
        cout<<"Enter no.of rows and columns for martrix b"<<endl;
        cin>>r2>>c2;  // taking size of array a

        // In order for matrix multiplication to be defined, the number of columns in the
first
        // matrix must be equal to the number of rows in the second matrix.
         //here's we will check our condition
        if(c1=r2)
        {
                cout<<"correct  order...."<<endl;
        }
        else
        {
                cout<<"Incorrect order----"<<endl;
                exit(0); // if the condition is not satisfied ,our program will terminate from
here
        }
        // Storing elements of first matrix
        cout<<"Enter elements for first mateix :";
        for(i=0;i<r1;i++)
        {   // taking values for first matrix
                for(j=0;j<c1;j++)
```

```
        {
                cin>>a[i][j];
        }
}
        // taking values for second matrix
        cout<<"Enter elements for second mateix :";
for(i=0;i<r2;i++)
{
        for(j=0;j<c2;j++)
        {
                cin>>b[i][j];
        }
}
        // multiplying matrix a and b and  then store  them in an array  ab
        for(i=0;i<r1;i++)
{
        for(j=0;j<c2;j++)
        {
                sum =0;
                for(k=0;k<c1;k++)
                {
                        sum = sum + a[i][k] * b[k][j];
                }
                ab[i][j] =sum;
        }
```

```
}
// Displaying of  first matrix
cout<<"First  Matrix :"<<endl;
for(i=0;i<3;i++)
        {
                for(j=0;j<3;j++)
                {
                        cout<<a[i][j]<<" ";
                }
                cout<<endl;
        }
// Displaying of  second matrix
        cout<<"Second  Matrix :"<<endl;
for(i=0;i<3;i++)
        {
                for(j=0;j<3;j++)
                {
                        cout<<b[i][j]<<" ";
                }
                cout<<endl;
        }

// Displaying of  our multiplication matrix result
        cout<<"Multipliction :"<<endl;
for(i=0;i<3;i++)
        {
                for(j=0;j<3;j++)
```

```
            {
                cout<<ab[i][j]<<" ";
            }
            cout<<endl;
        }
        return 0;
}
```

Output:

```
56
7
8
90
2
Enter elements for second mateix :9
8
7
6
54
3
2
2
1
First  Matrix :
1 2 3
4 56 7
8 90 2
Second  Matrix :
9 8 7
6 54 3
2 2 1
Multipliction :
27 122 16
386 3070 203
616 4928 328

--------------------------------
Process exited after 21.63 seconds with return value 0
Press any key to continue . . .
```

THANKS