

CSE102L Computer Programming Lab

LAB # 9



2020

Submitted to:

Engr. Abdullah Hamid

Submitted by:

TAYYABA

Registration No :

19PWCSE1854

Semester: 2nd

Class Section: C

“On my honor, as student of University of Engineering and Technology,
I have neither given nor received unauthorized assistance on this
academic work.”

August , 5, 2020

Department of Computer Systems Engineering
University of Engineering and Technology, Peshawar

Pointer and References in Arrays and Functions

Objectives: To understand pointer role in arrays and functions.

Task 1

Title:

Write a C++ program where you make an array of 10 elements and get all elements value from user and display all elements using pointers.

Code:

```
#include<iostream>
using namespace std;
main()
{
int a[10], *ptr;
ptr = &a[0];
for(int i = 0; i<10 ; i++)
{
cout<<"Please Enter value of Element "<<i+1<<" : ";
cin>>*(ptr + i);
}
for(int n = 0; n<10 ; n++)
{
cout<<"Value of Element "<<n+1<<" : "<<*(ptr + n)<<endl;
}}

```

Output:

```
C:\Users\Pc\Documents\CPP Lab pactice\ptint_nums_using_pointers.exe
Please Enter value of Element 1 : 1
Please Enter value of Element 2 : 2
Please Enter value of Element 3 : 3
Please Enter value of Element 4 : 4
Please Enter value of Element 5 : 5
Please Enter value of Element 6 : 6
Please Enter value of Element 7 : 7
Please Enter value of Element 8 : 8
Please Enter value of Element 9 : 9
Please Enter value of Element 10 : 99
Value of Element 1 : 1
Value of Element 2 : 2
Value of Element 3 : 3
Value of Element 4 : 4
Value of Element 5 : 5
Value of Element 6 : 6
Value of Element 7 : 7
Value of Element 8 : 8
Value of Element 9 : 9
Value of Element 10 : 99
-----
Process exited after 6.198 seconds with return value 0
Press any key to continue . . .
```

Task 2

Title:

Write a C++ program where you create a 12 elements array and take user from input and then display them (3 elements in a row) using pointers.

Code:

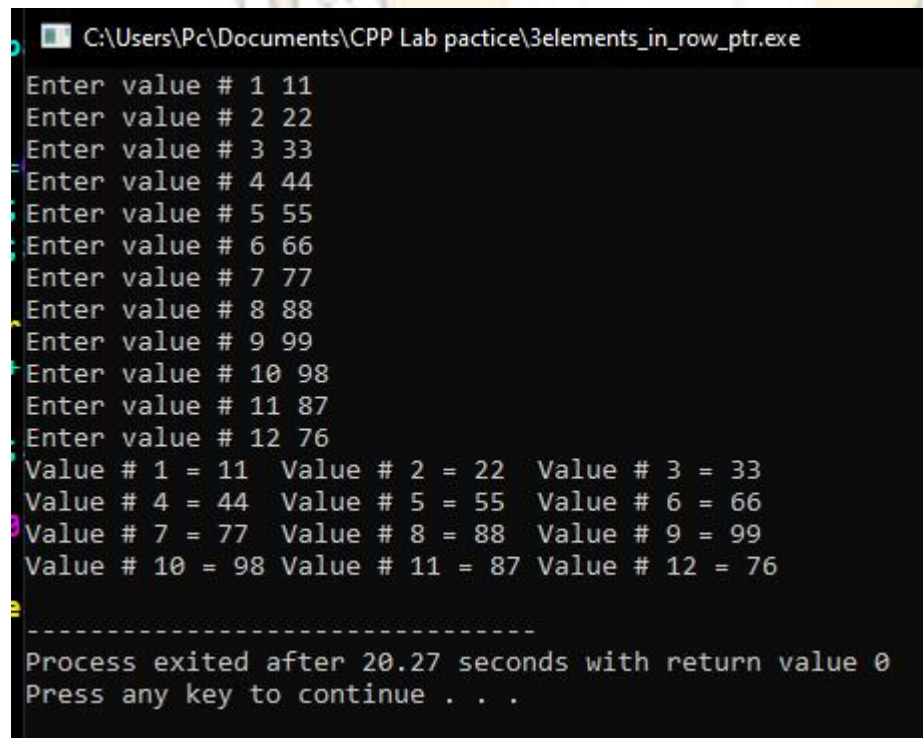
```
#include<iostream>

using namespace std;

main()
{
    int x[12],h=0,*ptr;
    ptr = &x[0];
```

```
for(int i=0;i < 12;i++)
{
cout<<"Enter value # "<<i+1<<" ";
cin>>*(ptr + i);
}
for(int i=1;i < 5;i++)
{
for(int j=0;j<3;j++)
{
cout<<"Value # "<<h+1<<" = "<<*(ptr + h)<<"\t";
h++;
}
cout<<endl;
}}
```

Output:

A screenshot of a Windows command prompt window showing the execution of a C++ program. The title bar reads 'C:\Users\Pc\Documents\CPP Lab pactice\3elements_in_row_ptr.exe'. The program prompts for 12 values, which are entered as 11, 22, 33, 44, 55, 66, 77, 88, 99, 98, 87, and 76. Then, it displays these values in groups of three, indexed from 1 to 12. The output shows 'Value # 1 = 11', 'Value # 2 = 22', 'Value # 3 = 33', 'Value # 4 = 44', 'Value # 5 = 55', 'Value # 6 = 66', 'Value # 7 = 77', 'Value # 8 = 88', 'Value # 9 = 99', 'Value # 10 = 98', 'Value # 11 = 87', and 'Value # 12 = 76'. At the bottom, it states 'Process exited after 20.27 seconds with return value 0' and 'Press any key to continue . . .'.

```
C:\Users\Pc\Documents\CPP Lab pactice\3elements_in_row_ptr.exe
Enter value # 1 11
Enter value # 2 22
Enter value # 3 33
Enter value # 4 44
Enter value # 5 55
Enter value # 6 66
Enter value # 7 77
Enter value # 8 88
Enter value # 9 99
Enter value # 10 98
Enter value # 11 87
Enter value # 12 76
Value # 1 = 11 Value # 2 = 22 Value # 3 = 33
Value # 4 = 44 Value # 5 = 55 Value # 6 = 66
Value # 7 = 77 Value # 8 = 88 Value # 9 = 99
Value # 10 = 98 Value # 11 = 87 Value # 12 = 76
-----
Process exited after 20.27 seconds with return value 0
Press any key to continue . . .
```

Task 3

Title:

Write a C++ program where user enters values for 5 element array and then displays its sum.

Code:

```
#include<iostream>
using namespace std;
main()
{
int a[5], *ptr = &a[0] , sum = 0;
for(int i = 0 ; i < 5 ; i++)
{
cout<<"Please Enter Value Of Element "<<i+1<<" : ";
cin>>*(ptr + i);
}
for(int i = 0 ; i < 5 ; i++)
{
sum =sum + *(ptr + i);
}
cout<<"Total sum of all element entered in array is : "<<sum;
}
```

Output:

```
C:\Users\Pc\Documents\CPP Lab pactice\sum_of_array_ptr.exe
Please Enter Value Of Element 1 : 1
Please Enter Value Of Element 2 : 2
Please Enter Value Of Element 3 : 3
Please Enter Value Of Element 4 : 4
Please Enter Value Of Element 5 : 5
Total sum of all element entered in array is : 15
-----
Process exited after 3.672 seconds with return value 0
Press any key to continue . . .
```

Task 4

Title:

Write a C++ program where you create a 5 element array (hard code values) and then call a function average which takes pointer to the beginning of array and size of that array as its parameters and computes average.

Code:

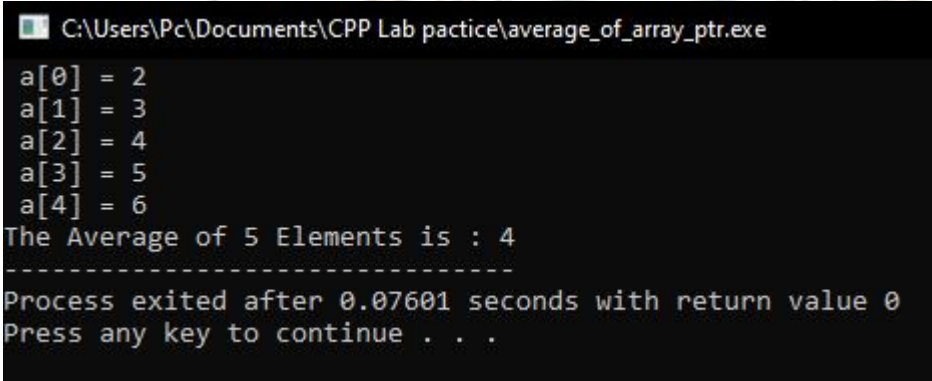
```
#include<iostream>

using namespace std;
void average(int* , int);
main()
{
    int a[5]={2,3,4,5,6};
    for(int i = 0 ; i<5 ; i++)
    {
        cout<<" a["<<i<<" ] = "<<a[i]<<endl;
    }
    average(a, 5);
}

void average(int *x, int size)
```

```
{
int sum=0;
for(int i = 0 ; i<5 ; i++)
{
sum = sum + *(x + i);
}
cout<<"The Average of 5 Elements is : "<<(float(sum)/size);
}
```

Output:

A screenshot of a Windows command prompt window. The title bar shows the file path: C:\Users\Pc\Documents\CPP Lab pactice\average_of_array_ptr.exe. The output of the program is displayed in a monospaced font. It shows the initialization of an array 'a' with 5 elements: a[0] = 2, a[1] = 3, a[2] = 4, a[3] = 5, and a[4] = 6. Below this, it prints 'The Average of 5 Elements is : 4'. A dashed line separates this from the final output: 'Process exited after 0.07601 seconds with return value 0' and 'Press any key to continue . . .'.

```
C:\Users\Pc\Documents\CPP Lab pactice\average_of_array_ptr.exe
a[0] = 2
a[1] = 3
a[2] = 4
a[3] = 5
a[4] = 6
The Average of 5 Elements is : 4
-----
Process exited after 0.07601 seconds with return value 0
Press any key to continue . . .
```

Task 5

Title:

Write a C++ program where user enters values into a 5 element array using pointers and then enters two separate variables which indicates the indices of elements that need to be added in function that only accepts pointers and parameters.

Code:

```
#include<iostream>
```

```
using namespace std;
```

```
main()
```

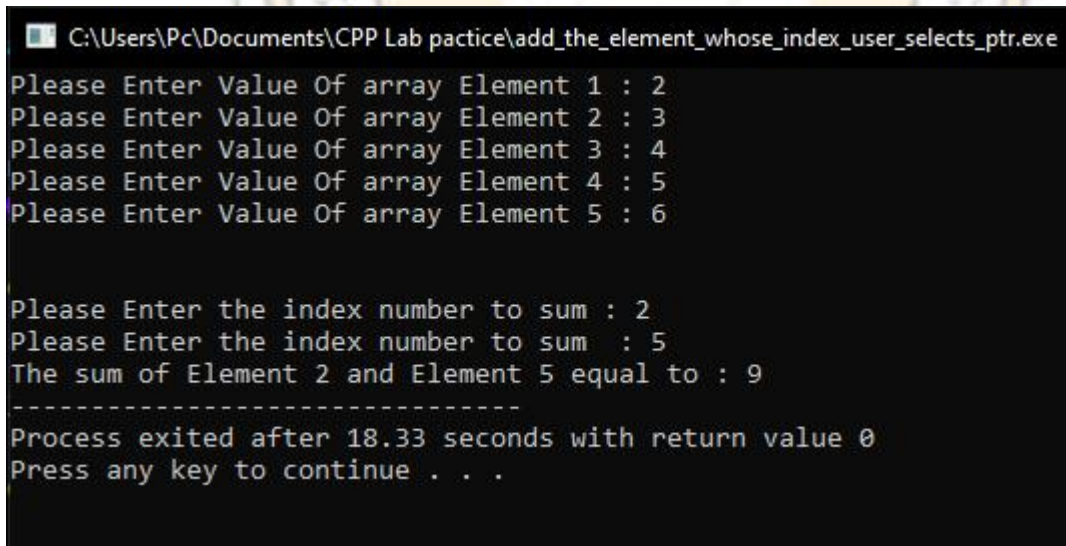


```

{
int a[5],*ptr = &a[0], n, m, sum = 0;
for(int i = 0 ; i<5 ; i++)
{
cout<<"Please Enter Value Of array Element "<<i+1<<" : ";
cin>>*(ptr + i);
}
cout<<"\n\nPlease Enter the index number to sum : ";
cin>>n;
cout<<"Please Enter the index number to sum : ";
cin>>m;
sum = *(ptr+ (n-1)) + *(ptr + (m-1));
cout<<"The sum of Element "<<n<<" and Element "<<m<<" equal to : "<<sum;
}

```

Output:



The screenshot shows a terminal window with the following output:

```

C:\Users\Pc\Documents\CPP Lab pactice\add_the_element_whose_index_user_selects_ptr.exe
Please Enter Value Of array Element 1 : 2
Please Enter Value Of array Element 2 : 3
Please Enter Value Of array Element 3 : 4
Please Enter Value Of array Element 4 : 5
Please Enter Value Of array Element 5 : 6

Please Enter the index number to sum : 2
Please Enter the index number to sum : 5
The sum of Element 2 and Element 5 equal to : 9
-----
Process exited after 18.33 seconds with return value 0
Press any key to continue . . .

```

Task 6

Title:

A program which has four functions (addition, subtraction, division and multiplication) and a calculate function which takes two numbers and a pointer to function. Calculate passes these numbers to appropriate function.

Code:

```
#include<iostream>

using namespace std;

float addition(int *a, int *b);
float subtraction(int *a, int *b);
float division(int *a, int *b);
float multiplication(int *a, int *b);
float calculate(int *a, int *b, float((*function)(int*, int*)));

int main()
{
    int a,b,c;
    cout<<"Enter First number: ";
    cin>>a;
    cout<<"Enter Second number: ";
    cin>>b;

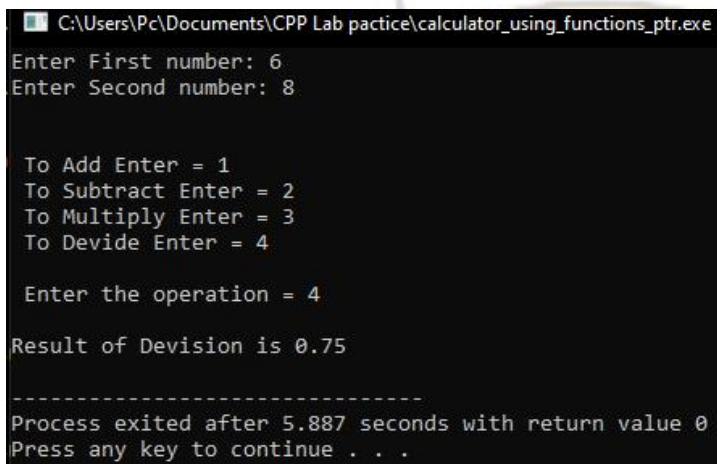
    cout<<" \n\n To Add Enter = 1 \n To Subtract Enter = 2 \n To Multiply Enter = 3 \n To Devide Enter = 4 \n\n Enter the operation = ";

    cin>>c;
    switch(c)
    {
        case 1:
            cout<<"\nResult of Addition is "<<calculate(&a, &b,addition)<<endl;
            break;
        case 2:
```

```
cout<<"\nResult of Subtraction is "<<calculate(&a, &b,subtraction)<<endl;
break;
case 3:
cout<<"\nResult of Multiplication is "<<calculate(&a, &b,multiplication)<<endl;
break;
case 4:
cout<<"\nResult of Devision is "<<calculate(&a, &b,division)<<endl;
break;
default:
cout<<"Wrong Entry";
break;
}
}
float calculate(int *a, int *b, float((*function)(int*, int*)))
{
return function(a, b);
}
float addition(int *a, int *b)
{
return *a + *b;
}
float subtraction(int *a, int *b)
{
return *a - *b;
}
float multiplication(int *a, int *b)
{
return *a * *b;
```

```
}  
float division(int *a, int *b)  
{  
return ((float) *a) / *b;  
}
```

Output:



```
C:\Users\Pc\Documents\C++ Lab practice\calculator_using_functions_ptr.exe  
Enter First number: 6  
Enter Second number: 8  
  
To Add Enter = 1  
To Subtract Enter = 2  
To Multiply Enter = 3  
To Devide Enter = 4  
  
Enter the operation = 4  
Result of Devision is 0.75  
-----  
Process exited after 5.887 seconds with return value 0  
Press any key to continue . . .
```