CS 100 Lab 11

Computational Problem Solving

(CS100)

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Lab 11 Objectives:

- Functions and arrays

Lab Guidelines

1. Make sure you get your work graded before the lab time ends.
2. You put all your work onto the LMS folder designated for the lab (i.e. “Lab11”) before the time the lab ends.
3. Talking to each other is NOT permitted. If you have a question, ask the lab assistants.
4. If you are a hot-shot C++ expert, you are still not allowed to use any feature of C++ that has not been covered in class or in the lab.
5. The object is not simply to get the job done, but to get it done in the way that is asked for in the lab.

CS 100 Lab 11

Pass by Value and Pass by Reference

When we pass a variable to a function by reference, we are handing in our only copy of the variable to the function, and the function directly modifies that variable (when we modify the value of the parameter in the function the original value of the variable, that was sent to the function, is changed) , whereas when we pass a variable to a function by value, we only copy the value of the variable to the parameter of the function (so basically, when we modify the value of the parameter in the function no change is made to the variable that was sent to the function).

Declaring a pass by value function:

```
Foo(int Variable)
{

}
```

Declaring a pass by reference function:

```
Foo(int& Variable)
{

}
```

Warning:

- Values can only be passed by reference if they are stored in a variable. For example:

  Foo(Value1,Value2) is a valid function call but Foo(12,20) is not

- Arguments passed to the functions by reference do not automatically change their type, I.e type conversion does not apply to functions that use pass by reference.

CS 100 Lab 11

Task 1A: Swap

Write a void function in C++ that takes in two integers (a and b) as input and swaps their values.

Your code should run something like this

```
Cout<<A<<"    "<<B<<endl;
Swap(A,B);
Cout<<A<<"    "<<B<<endl;

Output:

3   5
5   3
```

Task 1B: Average

Write a void function in C++ that takes an array and an Integer as input and calculates the average of the values of the integer array and stores it in the variable.

Your code should run something like this

```
//generic array named Arr made here with values 1,3,5,7,9
Int Avg=0;
Average(Arr,Avg);
Cout<<Avg;
```

```
Output:
5
```

STOP AND SHOW YOUR WORK TO THE TA

Task 2: Insert at Index

Write a program that asks the user to type an integer VALUE and an integer INDEX between 0 and 9 as input. The program must put the VALUE at the INDEX in the array, shifting each element after the index to right and dropping off the last element..

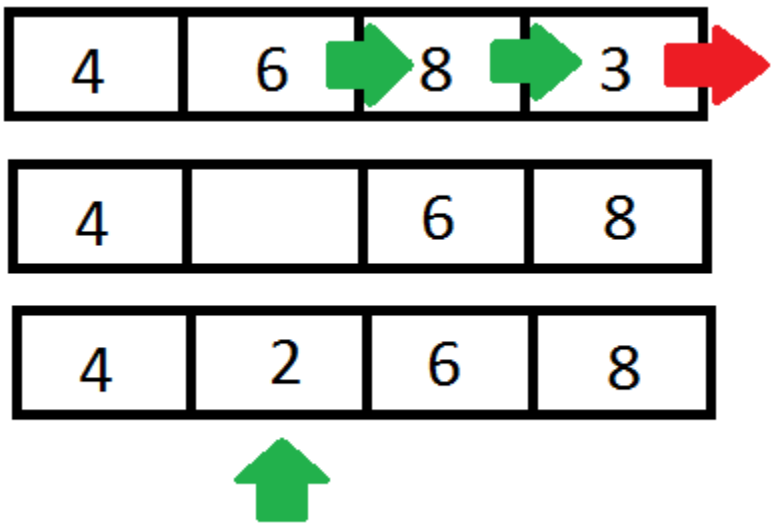
To do this, make a function that takes as input an array, an Index, and a Value. Use this function and take continuous input from the user until -1 is entered as the index value.

Program should follow this sequence

```
//Take input
//Call Function
//Display modified array

//Exit if -1 entered.
```

Here's visualization if the function is called like this Insert(MyArray,1,2) . Here 1 is the index and 2 is the value to be inserted and MyArray is the name of the array



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Task 3: Reverse

Write a function that takes in an array and its size as input and reverses the array. Your Function should work for any array size.

Int MyArray[9]={1,3,5,7,9,11,13,15,17};

MyArray=

1	3	5	7	9	11	13	15	17

```
Flip(MyArray);
```

MyArray=

17	15	13	11	9	7	5	3	1

STOP AND SHOW YOUR WORK TO THE TA