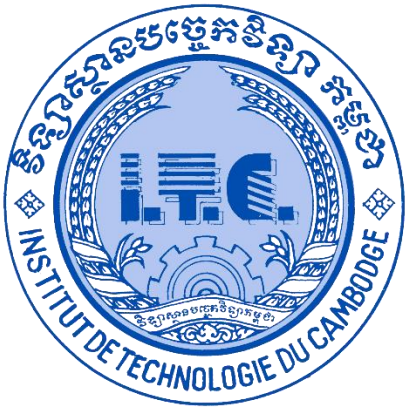

វិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា

Institute of Technology of Cambodia

TP-08

Working with Array in C++

Academic Year: 2020 - 2021

1. C++ Arrays

Array is a variable that can store multiple values of the same type.

To declare an array, define the variable type, specify the name of the array followed by **square brackets** and specify the number of elements it should store:

Syntax : `dataType arrayName[arraySize];`

Example:

```
string cars[4];
string cars[4] = {"Volvo", "BMW", "Ford", "Mazda"};
string cars[] = {"Volvo", "BMW", "Ford"};
int myNum[3] = {10, 20, 30};
```

2. Displaying Array Elements

In C++, each element in an array is associated with a number. The number is known as an array index. We can access elements of an array by using those indices.

Example:

```
#include <iostream>
using namespace std;

int main() {
    int numbers[5] = {7, 5, 6, 12, 35};

    cout << "The numbers are: ";

    //  Printing array elements
    // using range based for loop
    for (const int &n : numbers) {
        cout << n << "  ";
    }


    cout << "\nThe numbers are: ";

    //  Printing array elements
    // using traditional for loop
    for (int i = 0; i < 5; ++i) {
        cout << numbers[i] << "  ";
    }

    return 0;
}
```

Output

```
The numbers are: 7  5  6  12  35
The numbers are: 7  5  6  12  35
```

3. Inputs from User and Store in Array

We have used a for loop to iterate from **i = 0** to **i = 4**. In each iteration, we took an input from the user and stored it in **numbers[i].**

Example:

```cpp
#include <iostream>
using namespace std;

int main() {
    int numbers[5];

    cout << "Enter 5 numbers: " << endl;

    //  store input from user to array
    for (int i = 0; i < 5; ++i) {
        cin >> numbers[i];
    }

    cout << "The numbers are: ";

    //  print array elements
    for (int n = 0; n < 5; ++n) {
        cout << numbers[n] << "  ";
    }

    return 0;
}
```

Output

```
Enter 5 numbers:
11
12
13
14
15
The numbers are: 11  12  13  14  15
```

4. Sum and Average of Array Elements

We have used a for loop to iterate from **i = 0** to **i = 4**. In each iteration, we took an input from the user and stored it in **numbers[i].**

Example:

```cpp
#include <iostream>
using namespace std;

int main() {

    // initialize an array without specifying size
    double numbers[] = {7, 5, 6, 12, 35, 27};

    double sum = 0;
    double count = 0;
    double average;

    cout << "The numbers are: ";

    //  print array elements
    // use of range-based for loop
    for (const double &n : numbers) {
        cout << n << "  ";

        //  calculate the sum
        sum += n;

        // count the no. of array elements
        ++count;
    }

    // print the sum
    cout << "\nTheir Sum = " << sum << endl;

    // find the average
    average = sum / count;
    cout << "Their Average = " << average << endl;

    return 0;
}
```

Output

```
The numbers are: 7  5  6  12  35  27
Their Sum = 92
Their Average = 15.3333
```

Problem1:

Write a program in C++ to ask a user for 10 numbers and store in an array. Display all numbers in array.

Problem2:

Write a program in C++ to store 7 numbers in an array called a1. Create a new array call a2. Make a2 has the data as same as a1 (copy a1 to a2). Display numbers in a2 from back to forth.

E.g: for(k...)
a2[k] = a1[k]

Store 7 number in a1 (a1: 6 4 5 9 0 1 3)
Create a new array a2 (same data as a1)
(a2: 6 4 5 9 0 1 3)

=> Output:
Display a2 (3 1 0 9 5 4 6)

Problem3:

Write a program in C++ to store 5 numbers in an array (ask input from user). Find sum of all numbers in array and also average. Display sum and average on screen.

E.g: Input: 3 7 -1 9 7

=> Output:
Sum=25, Average=5.0

Problem4:

Write a program in C++ program to store data of 5 students. Each student has name, score, email and phone number. The program ask user for info of these 5 students. Display all students' information on screen.

E.g: Input: John 75 john@gamil.com 012433443

=> Output:
#Student1
John
75
john@gmailcom
012

#Student2
Johny
85
johny@gmailcom
011

……

Problem5:

Same as problem#4. Find average score. The program display info of all students who got scores more than average.

Input data
Find average score (5 students, sum/5)
Display students who score>= average
