Pharos University
Faculty of Computer Science and Artificial intelligence

Data Structures and Algorithms (CS201)

Lab: 1

(variable – if condition – loops)

Dr/ Soha A. Mohmed
Eng/ Haidy

Fall 2022 - 2023

Data Structures and Algorithms (CS201)

What is C++

- C++ is a cross-platform language that can be used to create high-performance applications.
- C++ can be found in today's operating systems, Graphical User Interfaces, and embedded systems.
- C++ is an object-oriented programming language which gives a clear structure to programs and allows code to be reused

C++ syntax

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

int main() {


  return 0;
}
```

Line 1: `#include <iostream>` is a **header file library** that lets us work with input and output objects, such as `cout` (used in line 5). Header files add functionality to C++ programs.

Line 2: `using namespace std` means that we can use names for objects and variables from the standard library.

Line 3: Another thing that always appear in a C++ program, is `int main()`. This is called a **function**. Any code inside its curly brackets `{}` will be executed.

Line 4: `return 0` ends the main function.

Declaring (Creating) Variables

To create a variable, specify the type and assign it a value:

```
Type variableName =value
```

Create a variable called **myNum** of type `int` and assign it the value **15**:

```
int myNum = 15;
cout << myNum; ------------> to print value of myNum
```

datatype of variables:

```
int myNum = 5;               // Integer
double myFloatNum = 5.99;
char myLetter = 'D';         // Character
string myText = "Hello";     // String (text)
bool myBoolean = true;       // Boolean (true or false)
```

to display variables Cout<<

```
int myAge = 35;
cout << "I am " << myAge << " years old.";
```

C++ User Input cin>>

```
int x;
cout << "Type a number: "; // Type a number and press enter
cin >> x;
```

The if Statement

```
if (condition) {
  // block of code to be executed if the condition is true
}
```

```
if (condition1) {
  // if condition1 is true
} else if (condition2) {
  // if the condition1 is false and condition2 is true
} else {
  // if the condition1 is false and condition2 is false
}
```

Example

```
int x = 20;
int y = 18;
if (x > y) {
  cout << "x is greater than y";
}
```

```
int time = 22;
if (time < 10) {
  cout << "Good morning.";
} else if (time < 20) {
```

```
  cout << "Good day.";
} else {
  cout << "Good evening.";
}
```

Short Hand If...Else (Ternary Operator)

```
variable = (condition) ? expressionTrue : expressionFalse;
```

Example

```
int time = 20;
string result = (time < 18) ? "Good day." : "Good evening.";
cout << result;
```

Switch

```
switch(expression) {
  case x:
    // code block
    break;
  case y:
    // code block
    break;
  default:
    // code block
}
```

loops

While	Do while	For
`while (condition) { // code block to be executed }` **as long as a specified condition is `true`:**	`do { // code block to be executed } while (condition);`	`for (st1; cond.; st2) { // code block to be executed }`

Example

`int i = 0;`
`while (i < 5) {`
`  cout << i << "\n";`
`  i++;`
`}`
	`int i = 0;`
	`do {`
	`  cout<<i<< "\n";`
	`  i++;`
	`}`
	`while (i < 5);`
		`for (int i = 0; i < 5; i++) {`
		`  cout << i << "\n";`
		`}`

Data Structures and Algorithms (CS201)

Sheet 1

1- Create a program that adds two integers using variables

2- Write a program in C++ to swap two numbers.

3- Write a program in C++ to find the Area and Perimeter of a Rectangle.

```
area=(lngth*width);
peri=2*(lngth+width);
```

4- Write a program in C++ to check whether a number is positive, negative or zero.

5- Write a program in C++ that takes a number as input and prints its multiplication table upto 10.