**ITCS 1212L**

**Pre-lab 2**

**You are going to practice on the following topics:**

Sequence, Flowcharts, Identifiers, Fundamental data types, Declaration of variables, Initialization of variables, assignment operators, arithmetic operators, compound assignments, increase and decrease, standard input and output.

**Learning Objectives:**

* **Learn how to declare variables**
* **Make use of the arithmetic and the assignment operators**
* **Read input, generate output, make use of a logical sequence and flowcharts**

**Read the hand out named Lab-lessons2.pdf.**

1. **Answer the following questions based on what you learnt in lab lesson 2:**
2. Explain why in a program you need variables?
3. Person’s name to a person is similar to \_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_ in a computer program.
4. What are the identifiers in the following statements?
   1. x = 5;
   2. y = 2;
   3. r = x- y
5. How do you declare variables?
6. Give different examples of declaring variables of different data types.
7. What do we mean by variable assignment? Give an example for it.
8. Explain how does this operation work in details?
9. Starting from the basic definition and functionality of a computer system, explain the concept of ‘logical sequence’?
10. List the basic arithmetic operators.
11. What do we mean by operator precedence? How do we calculate k in the following cases?

k = (( a + c ) – d) \* a

k = a + c – d \* a

1. For the above formula, develop step-by-step algorithms for calculating k.
2. The data type that holds only whole numbers with no fractional component is called a(n) \_\_\_\_\_\_\_\_\_\_\_\_.
3. \_\_\_\_\_\_\_\_ is a data type that holds numbers with fractional components.
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an arithmetic operator that gives the remainder of a division problem.
5. \_\_\_\_\_\_\_\_\_\_\_\_\_ data types only have two values: true and false.
6. In C++, why do we use // or /\* \*/ ?
7. Flowchart is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ representation of program logic.
8. How do you specify the sequence in a flowchart?
9. Calculate the results of the following operations? (order of precedence)
   1. -16
   2. -21 + 5
   3. 15 – 36 + 5
   4. 15 – 72/2 + 5
   5. 15 – 12 \* 6/2 + 5
10. For the following part, try to execute each of the following programs on the paper and find the outputs.
11. int numberA = 3.5 \* 5;

cout << numberA;

1. int numberB = 3.1 + 5 \* 3 – 1;

cout << numberB;

1. float numberC = 4/5 + 2;

cout << numberC;

1. int numberD = 2 \* 6 + 5/3 \* 8;

cout << numberD;

1. Calculate and compare the value of a for each of the following cases:

Case 1)

a = 3;

a = ++b;

Case 2)

a = 3;

a = b++;

1. What is the output when the following code fragment is executed? try to execute it in paper also add comments to this code.

#include <iostream> // Write your comment here

using namespace std; // Write your comment here

main() // Write your comment here

{

int i = 5, j = 6, k = 7, n = 3; // Write your comment here

cout << i + j \* k-k % n << endl; // Write your comment here

cout << i /n << endl; // Write your comment here

return 0; // Write your comment here

}

6. Consider a case that a person uses a coupon to purchase a cookie. Thus he can get some discount on the original price and pay less amount of money. To simulate this case, the following program gets the price of an item and the quantity of the purchased item and the discount percent from the user and calculates the final purchase price. Trace the program line by line and comment what it does in each line.

#include <iostream>

#include <cmath>

using namespace std;

int main()

{

double itemPrice;

double discountRate;

double finalPrice;

double quantity;

double discount;

cout<<"enter the item price:";

cin>> itemPrice;

cout<< "enter the quantity of item:";

cin>> quantity;

cout <<"enter the discount rate :";

cin>> discountRate;

discount= itemPrice \* quantity \* discountRate \* 0.01

finalPrice = itemPrice \* quantity - discount;

cout<< "The final price is :" ;

cout << finalPrice <<endl;

return 0;

}