

# Homework 1

## Group A

- 1- Formulate an algorithm and write a C++ program to calculate the area of a triangle. Given that  $\text{area} = 0.5 * \text{base} * \text{height}$
- 2- Formulate an algorithm and write a C++ program to calculate and printout the area and perimeter of a circle given the radius.
- 3- Formulate an algorithm and write a C++ program to calculate and print out the area of a square given its side length.
- 4- Formulate an algorithm and write a C++ program to transform a given angle measure in degrees to radians given that:  
 $\text{rad} = \text{deg} * 3.14 / 180.$
- 5- Formulate an algorithm and write a C++ program to transform a given degree of temperature from Celsius to Fahrenheit given that:  $F = 5/9 C + 32.$
- 6- Formulate an algorithm and write a C++ program to input three integers and calculate their average.

## Group B

- 1- Determine the error in the following Declarations:  
`int first =22, last =99, long = 44, short = 66;`
- 2- Evaluate each of the following expressions if true or determine why it's wrong
  - a.  $37/(5\%2)$   
 $= 37/1 = 37$
  - b.  $37/5/2$      **incorrect** precedence must be determined by parentheses  
 $37/(5/2) = 18$       $(37/5)/2 = 3$
  - c.  $37(5/2)$      **incorrect** no operator after 37
  - d.  $37\%(5\%2)$   
 $= 37\%1 = 0$
  - e.  $37\%5\%2$      **incorrect** precedence must be determined by parentheses  
 $37\%(5\%2) = 0$       $(37\%5)\%2 = 0$

- f.  $37-5-2 = 30$   
 g.  $(37-5)2$  incorrect no operator before 2

**3- Evaluate each of the following expressions if  $m=24$  ,  $n=7$**

- a.  $m = n-3$        $m=7-3$     $m=4$   
 b.  $m-8-n$        $24-8-7 = 9$   
 c.  $m\%n$        $24\%7 = 3$   
 d.  $m\%n++$        $24\%7 = 3$        $n=8$   
 e.  $m\%++n$        $24\%8 = 0$   
 f.  $++m - n--$        $25-7 = 18$        $n=6$   
 g.  $m +=n$        $m=m+n$        $m=24+7 = 31$

**4- Write four different statements to decrease an integer n by 1.**

**5- Write a single statement to subtract the sum of x and y from z then increase y by 1.**

**6- If  $m=5$  and  $n=2$  find the values of m and n after executing each statement of the following:**

- a.  $m*=n++;$        $m*= 2$     $m=5*2$     $m=10$   
 b.  $m+=--n;$        $m+=1$     $m=m+1$     $m=6$

## Group C

**1- What is the difference between a variable, an identifier and a data type?**

■ **Variable:** Location in memory where value can be stored. The value of a variable could be changed while the program is running.

■ **Identifier:** A variable name is any valid identifier that is not a keyword.

Series of characters - letters, digits, underscores ( \_ )

Cannot begin with digit

Case sensitive

Choosing meaningful identifiers helps make a program self-documenting.

■ **Data types: Kind of data to be assigned to the variable  
(fundamental, primitive or built-in)**

**int – integer numbers : 1, 2, 4,....**

**char – characters : 'a', 'c', ...**

**float, double – floating point numbers: 2.5, 4.96**