COM4013 – Introduction to Software Development
Week 11 – Supplemental

Worksheet Key

A diamond bullet point is an action or a task. Other bullets are information:

- ♦ *A task to perform*
- \- *A point of information*

 Important  In-depth detail  Advanced optional task

Always refer to the lecture notes for examples and guidance.
***Also look at your previous work, many exercises are similar* - – Do them in Python or C++ whatever you're comfortable with**

 **About this worksheet**

- ♦ This is a supplemental lab worksheet for the introduction to the module. *If you have completed the main worksheet then this provides some more practice.*
- ♦ The tasks do not just provide practice with C++ syntax. The tasks also involve some problem analysis.
- ♦ A couple of the tasks are maths based. I would like you to try them out, but if you really feel you can't cope then skip them. You could also ask for help from the practical tutor.

Programming Exercise 1

Read integer values from the keyboard values until you encounter a zero. Print out the sum (an integer) and the average (a float).

Programming Exercise 2

Write a program (using a while loop) that repeatedly requests two numbers to be entered by the user and then adds the numbers together. If, at any time, the sum of the numbers is greater than 100 then the program stops.

Programming Exercise 3: Bicycle Gears

The gear for a pedal cycle is calculated as:

wheel radius * teeth on front sprocket / teeth on rear sprocket

Write a program to read 3 floating point numbers:

the wheel radius

the number of teeth on the front sprocket

the number of teeth on the rear sprocket

Then calculate and subsequently print to screen the gear.

Example input: 27.00 52 22

Calculation: gear = 27.00 * 52.00 / 22.00

Example output: gear is 63.8182 inches

Although the last two numbers are read in as integers you will need to do a floating point calculation. Why? What happens if the calculation is an integer calculation?

Programming Exercise 4: larger and lowest value

Write a program that asks the user for five numbers. Tell the user what the highest number was and what the lowest number was.

Advanced Tasks

Programming Exercise 5

A builder needs to measure the height of a wall. Unfortunately, they have left their ladders at home. Luckily, they do have a long tape measure and a long piece of wood. The wood is always guaranteed to be longer than the height of the wall.

The length of the sides of a right-angled triangle are given using the equation: $a^2 = b^2 + c^2$, where a, b and c are the three lengths of the triangle. How would the builder calculate the height of the wall?.

Test with:

Distance from wall to wood=5m Length of wood=13m

This should give you a height of the wall as 12m

Programming Exercise 2

Write a program that will generate tables question such as:

What is 5 x 7?

If the user enters 35 they are told they are correct otherwise they are incorrect. The

user should be given the option to “Answer another question? (Y/N)”. If ‘Y’ is entered, the process should be repeated.

You will need a way to generate random numbers. The function given below will generate a random number between

```
// Returns a random number in the range 1 .. 10
// Note that I am using casting to convert one data type to another
int Random( int top )
{
	return static_cast<int>( static_cast<double> (rand()) /
(RAND_MAX + 1) * 10.0f + 1 );
}
```