CSC102: Programming Techniques
Assignment One: Selection Structures
Due Date/Time: 1st September 2021, 09:00AM
Submit a soft copy of your solution on the e-learning platform

1. Convert the following pseudocodes into both Python and C++ programs

   (a)
   ```
   1 Write "Enter total cost:"
   2 Input Cost
   3 Write "Enter total revenue:"
   4 Input Revenue
   5 Set Amount = Revenue - Cost
   6 If Amount > 0 Then
   7  Set Profit = Amount
   8   Write "The profit is GHC" + Profit
   9 Else
   10  Set Loss  =Amount
   11  Write "The loss is GHC" + Loss
   12 End If
   ```

   (b)
   ```
   1 If (PayRate < 10) AND (Hours > 40) Then
   2 Set OvertimeHours = Hours - 40
   3 Set OvertimePay = OvertimeHours * 1.5 * PayRate
   4 Set TotalPay = 40 * PayRate + OvertimePay
   5 Else
   6 Set TotalPay = Hours * PayRate
   7 End If
   ```

2. Write and test a program(Python and C++) that solves quadratic equations. A quadratic equation is an equation of the form $ax^2 + bx + c = 0$, where a, b, and 4 are given coefficients and x is the unknown. The coefficients are real number inputs, so they should be declared of type float or double. Since quadratic equations typically have two solutions, use x_1 and x_2 for the solutions to be output. These should be declared of type double to avoid inaccuracies from round-off error.

   Hint: Use the *quadratic formula*:

   $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

3. Write a program in both python and C=+ that randomly generates a random number which is not shown to the user (some sort of secret number). The random number should specifically be an integer between 1 and 99. The user is then asked to guess a number within the given range (1 to 99). If the

user's guess is higher than the one guessed by the program, the user should be prompted to try again as their guess is too high. If the user's guess is lower than the one guessed by the program, the user should be prompted to guess again as their number is too low. The process should be repeated until the user guesses the number correct.

Sample output:

```
I am thinking of a number between 1 and 99
Enter a guess: 10
Your Guess is TOO LOW
Try again
Enter a guess: 87
Your Guess is TOO LOW
Try again
Enter a guess: 90
Your Guess is TOO LOW
Try again
Enter a guess: 95
Your Guess is TOO LOW
Try again
Enter a guess: 98
Your Guess is TOO HIGH
Try again
Enter a guess: 97
Congrat! The number was: 97
```