Question 1. (Basic if/elif statements)

The area of a rectangle is the length multiplied by width. Write a program that asks for the length and width of two rectangles. The program should tell the user which rectangle has the greater area or if the areas are the same.

Question 2. (Nested if Statements and Logical Operators)

A development company will only employ an individual if they have a minimum of 4 years of commercial software development experience, a Microsoft certification and a first class honours undergraduate computing degree.

(i)   Write a program that will use <u>nested if statements</u> to determine if a user is sufficiently qualified to be employed. The first if statement should check if the user has 4 years of commercial software development experience, the second nested if statement should check if they have a Microsoft certification and the final nested if statement should check if the user has a first class honours undergraduate computing degree.

If the user does not satisfy one of the conditions the program should inform the user that they not eligible and should also inform the user of the requirement they have failed. The program should then exit.

> How many years of commercial software development experience do you have: 5
> Do you hold a Microsoft certification y/n: n
> You are not eligible. You need to hold a Microsoft certification.

(ii)   Rewrite the above program so you only use only a single if statement to check that the user satisfies the above conditions to be employed (you will need to use an *and* logical operator). Please note this version of the program will ask the user to enter all relevant information first and will then inform the user if they are eligible

or not. Note it doesn't need to inform the user of the specific reasons as to why they were not accepted.

<div style="border: 1px solid black; padding: 10px;">

How many years of commercial software development experience do you have: 3
Do you hold a Microsoft certification y/n: y
Do you have a first class honours primary degree y/n: y
You are not eligible for this position.

</div>

Question 3. (if elif Statements)

A software company sells a package that retails for €99. Quantity discounts are given according to the following table.

Quantity	Discount
1 – 9	0%
10 – 19	20%
20 – 49	30%
50 – 99	40%
100 or more	50%

Write a program that will ask the user to enter the number of packages purchased. The program should display the amount of the discount (if any) and the total amount of the purchase after the discount. Please note that if a user indicates a negative quantity then they should be told that the quantity value should be greater than zero.

Please use if elif statements to solve this problem and note that your solution to this problem should make use of the *and* logical operator where possible.

Question 3. (for loops and functions)

(i)

You should write a function that will print out the 'times' table for a number up to a specific limit. The function should take in two parameters. The first value, *num*, is the number that we will multiply by 0, 1, 2, 3, etc. The second number, *limit*, is the number at which we will stop multiplying.

So if the user enters 3 as the value of *num* and 5 as the value of *limit* then the program will output the 3 times table from 0 to 5 as shown below.
- 3*0

- 3*1
- 3*2
- 3*3
- 3*4
- 3*5

The following is a sample output:

Please enter time tables for printing: 6
Please enter upper limit for multiplication: 4
6*0 = 0
6*1 = 6
6*2 = 12
6*3 = 18
6*4 = 24

(ii)

Implement a function called printNumTriangle. The function should ask the user to enter a single integer. It should then print a triangle of that size specified by the integer so that each row in the triangle is made up of the integer displayed.

The following is a sample output

Please enter an integer for triangle size: 5
1
22
333
4444
55555

Question 4.

Write a program that asks the user to enter the rainfall for the first X months of the year into a list, where X is an int value between 1 and 12. (Obtaining the rainfall input from the user should be done using a loop).

The program should calculate and display:
- The average monthly rainfall
- The highest rainfall value received
- The lowest rainfall value received

The following is a sample output of this program.

How many months of data do you wish to enter: 6
Please enter rainfall for month1 83.6
Please enter rainfall for month2 46.6
Please enter rainfall for month3 97.1
Please enter rainfall for month4 46.4
Please enter rainfall for month5 61.4
Please enter rainfall for month6 164.5
Highest rainfall value: 164.5
Lowest rainfall value: 46.4
Average is 83.2666666667

Question 5.

The Fibonacci numbers are the numbers in the following integer sequence:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ...

By definition, the first two numbers in the Fibonacci sequence are 0 and 1, and each subsequent number is the sum of the previous two.

Create a program that creates a list and will populate it with the first 40 Fibonacci numbers (this can be done with just three lines of code).

The program should then ask the user to enter an integer value between 1 and 40 to indicate which number in the Fibonacci series they would like to see and the application should display that number. For example, if the user enters 13, the 13th number is 144.

Solutions:

```
# -*- coding: utf-8 -*-
"""
Solution for Week 2 Labs

@author: Haithem.afli@cit.ie
"""


# Question 1
r1Length = int(input("Please enter length of rectangle 1: "))
r1Width = int(input("Please enter width of rectangle 1: "))
r2Length = int(input("Please enter length of rectangle 2: "))
r2Width = int(input("Please enter width of rectangle 2: "))
```

```python
r1Area = r1Length*r1Width
r2Area = r2Length*r2Width

if r1Area > r2Area:
    print("Rectangle 1 is larger than rectangle 2")
elif r1Area < r2Area:
    print("Rectangle 2 is larger than rectangle 1")
else:
    print("Area of rectangle 1 is the same as rectangle 2")



# Question 2(i)

numYearSoft = int(input("How many years of commercial software development experience do you have: "))

if numYearSoft >=4:
    msCert = input("Do you hold a Microsoft Certification Y/N: ")

    if msCert == "Y":
        honsDegree = input("Do you have a first class honours undergraduate computing degree Y/N: ")

        if honsDegree == "Y":
            print ("Congratulations you are eligable")
        else:
            print("You need a first class honours degree in Computing to be eligable")
    else:
        print ("You need to have a Microsoft Certification to be eligable")

else:
    print ("You need a minimum of four years experience to be eligable")



# Question 2 (ii)

numYearSoft = int(input("How many years of commercial software development experience do you have: "))
msCert = input("Do you hold a Microsoft Certification Y/N: ")
honsDegree = input("Do you have a first class honours undergraduate computing degree Y/N: ")

if numYearSoft >=4 and msCert == "Y" and honsDegree == "Y":
    print ("Congratulations your are eligable")
else:
    print ("Unfortunatley you are not eligable for this position")
```

```python
# Question 4

numUnits = int(input("How many units did you sell: "))
unitPrice = 99
discount = 0

if numUnits >= 10 and numUnits <= 19:
    discount = 0.2
elif numUnits >= 20 and numUnits <= 49:
    discount = 0.3
elif numUnits >= 50 and numUnits <= 99:
    discount = 0.4
elif numUnits >= 100:
    discount = 0.5

totalCost = numUnits*unitPrice
print ("Total Discount is ", totalCost*discount)
print ("Final Cost (Less Discount) : ", totalCost - (totalCost*discount))



# Question 5

num1 = float(input("Enter number 1 : "))
num2 = float(input("Enter number 2 : "))
num3 = float(input("Enter number 3 : "))

if (num1 >= num2) and (num1 >= num3):
    largest = num1
elif (num2 >= num1) and (num2 >= num3):
    largest = num2
else:
    largest = num3

print("The largest number between",num1,",",num2,"and",num3,"is",largest)
```