Exercise 3 – Conditional Statements

Part I:

1. Try to evaluate the following numerical expressions in your head, then use the Python interpreter to check your results:

    1. `>>> 5 % 2`
    2. `>>> 9 % 5`
    3. `>>> 15 % 12`
    4. `>>> 12 % 15`
    5. `>>> 6 % 6`
    6. `>>> 0 % 7`
    7. `>>> 7 % 0`

2. Enter the following expressions into the Python shell:

```python
True or False
True and False
not(False) and True
True or 7
False or 7
True and 0
False or 8
"happy" and "sad"
"happy" or "sad"
"" and "sad"
"happy" and ""
```

Analyze these results. What observations can you make about values of different types and logical operators? Can you write these observations in the form of simple *rules* about `and` and `or` expressions?

3. What will be the output of the following?

```python
if "Ni!":
    print ("We are the Knights who say, "Ni!"")
else:
    print ("Stop it! No more of this!")

if 0:
    print ("And now for something completely different...")
else:
    print ("What's all this, then?")
```

Explain what happened and why it happened.

Part II: Write the following programs and save them in your Handin folder, in a folder called

Exercise 3.

1. Write a program to find the larger of two numbers input by the user. Save your program as 'maximum.py'.
   The condition you will be checking is the_first_number > the_second_number. If this is true you will put this number into a variable and display "The larger number is *variablename*". If this is not true, then put the second number into the variable and display the message.

2. Check your Maximum program for the situation where you enter two numbers that are the <u>same</u>. Change you programming code to account for this situation. Print "The two numbers are equal." Leave the program name as 'maximum.py'.

3. Write a program to determine how much to tip the waiter in a fine restaurant. The tip should be 13 percent of the bill, with a minimum of $5. If the bill is less than $5, do not tip the waiter. Save the program as 'tip.py'.

4. A computer store sells compact discs at 50 cents each for small orders or at 30 cents for orders of 25 compact disks or more. Write a program that requests the number of compact discs ordered and displays the total cost. (Test the program for purchases of 5, 25 and 35 compact discs.) Save the program as 'compactDiscs.py'.

5. A copying center charges 5 cents per copy for the first 100 copies and 3 cents per copy for each additional copy. Write a program that requests the number of copies as input and displays the total cost. After the total cost there should be a line for the amount of HST charged (13% of the total cost) and then a line with the grand total cost. Save the program as 'copyCenter.py'.

6. Federal income tax is to be levied in stages on taxable income. On the first $47,630 you pay 15%, on the next $47,629 (on the portion of taxable income from $47,630 to up to $95,259) you pay 20.5%, on the next $52,408 (on the portion of taxable income over $95,259 up to $147,667) you pay 26%, on the next $62,704 (on the portion of taxable income over $147,667 up to $210,371) you pay 29% and on the rest (income over $210,371), you pay 33%. Write a program to read in a taxable income and compute the federal tax payable to the nearest cent. Save your program as 'fedTax.py'.
   (Federal tax rates for 2019 http://www.cra-arc.gc.ca/tx/ndvdls/fq/txrts-eng.html#federal)