COSC2429 Intro to Programming

Lab 5: Selections

Objective: At the end of this lab, you will be able to use selections in Python.

1. Write a function called **is_even(n)** that takes an integer as a parameter and returns **True** if the parameter is an **even number** and **False** if it is **odd**. This function is stored in the file **even.py**.

2. Write the function **is_odd(n)** that returns **True** when n is odd and **False** otherwise. This function is stored in the file **odd.py**.

3. Modify **is_odd** so that it calls the function **is_even** to determine if its parameter is an odd integer.

4. Write a function **is_right_angled** which, given the length of three sides of a triangle as parameters, will determine whether the triangle is right-angled. Assume that the third parameter to the function is always the longest side. It will return **True** if the triangle is right-angled, or **False** otherwise.

   Hint: floating point arithmetic is not always exactly accurate, so it is not safe to test floating point numbers for equality. If a good programmer wants to know whether x is equal or close enough to y, they would probably code it up as

```python
if abs(x - y) < 0.001:        # if x is approximately equal to y

   ...
```

5. Extend the above function so that the sides can be given to the function in any order.

6. A year is a **leap year** when it is divisible by 4 except when it is also divisible by 100 but not divisible by 400. Write a function that takes a year as a parameter and determines if it is a leap year. The function returns **True** if the year is a leap year and **False** otherwise.

7. Write a function, **is_prime**, that takes a single integer parameter and returns **True** when the argument is a *prime number* and **False** otherwise. *(Hint: use a web search to find out what a prime number is and how to determine if an integer is a prime number).* After that, apply divide-and-conquer strategy by using the above function to write a program that prints all the prime numbers, which are smaller than an integer value provided by the user.