CP2410 Practical 01 - Introduction

1. (R-1.1) Write a short Python function, **is_multiple**(*n, m*), that takes two integer values and returns True if n is a multiple of m, that is, *n* = *mi* for some integer i, and False otherwise.

2. (R-1.11) Demonstrate how to use Python's list comprehension syntax to produce the list [1, 2, 4, 8, 16, 32, 64, 128, 256].

3. (C-1.15) Write a Python function that takes a sequence of numbers and determines if all the numbers are different from each other (that is, they are distinct).

4. The n-th harmonic number is the sum of the reciprocals of the first n natural numbers. For example, $H_3 = 1 + ½ + ⅓ = 1.833$. A simple Python function for creating a list of the first n harmonic numbers follows:

   ```
   def harmonic_list(n):
       result = []
       h = 0
       for i in range(1, n + 1):
           h += 1 / i
           result.append(h)
       return result
   ```

   Convert this function into a generator **harmonic_gen(n)** that **yields** each harmonic number.