COMP0015 Exercises: Lists

These exercises are taken from Chapter 7, Building Python Programs, A Back to Basics Approach by Stuart Reges, Marty Stepp, and Allison Obourn. **ISBN-10:** 0135205980, **ISBN-13:** 978-0135205983.

1. Write a function called `list_range` that returns the range of values in a list of integers. The range is defined as 1 more than the difference between the maximum and minimum values in the list. For example, if a list called `lis` contains the values `[36, 12, 25, 19, 46, 31, 22]`, the call of `list_range(lis)` should return 35. You may assume that the list has at least one element.

2. Write a function called `contains` that accepts two lists of integers a1 and a2 as parameters and that returns a Boolean value indicating whether or not the sequence of elements in `a2` appears in `a1` (`True` for yes, `False` for no). The sequence must appear consecutively and in the same order. For example, consider the following lists:

   ```
   list1 = [1, 6, 2, 1, 4, 1, 2, 1, 8]
   list2 = [1, 2, 1]
   ```

   The call of `contains(list1, list2)` should return `True` because the sequence of values in `list2` `[1, 2, 1]` is contained in `list1` starting at index 5. If list2 had stored the values `[2, 1, 2]`, the call of `contains(list1, list2)` would return `False`. Any two lists with identical elements are considered to contain each other. Every list contains the empty list, and the empty list does not contain any lists other than the empty list itself.

3. Write a function called `is_magic_square` that accepts a two-dimensional list of integers as a parameter and returns `True` if it is a magic square. A square matrix is a magic square if all of its row, column and diagonal sums are equal. For example, `[[2, 7, 6], [9, 5, 1], [4, 3, 8]]` is a square matrix because all eight of the sums are exactly 15. Another example of a magic square is: `[[16, 3, 2, 13], [5, 10, 11, 8], [9, 6, 7, 12], [4, 15, 14, 1]]`.

Further problems can be found at:

Code step by step and Codingbat Python

Note: you do not have to create accounts on these websites if you do not wish to.