Practice Exercise 6

1. Given the list `bank_holidays_in_month = [1, 0, 1, 1, 2, 0, 0, 1, 0, 0, 0, 2]`, where each element represent the number of bank holiday in a month, for example, in January there is 1, in February 0, March there is 1, etc. Write a function called "`bank_holiday()`", that takes a number to represent the month and returns the number of bank holidays in that month. Example: `bank_holiday(5)` → `2`. ❑

2. Without using the sort() function that is defined on a list, write a function called "`my_sort()`", that takes an unsorted list and returns the sorted list ❑

3. Define a function called "`add_hello()`", that takes any list and appends the word "hello" to the list. ❑

4. Define a function called "`discount_ten()`", that takes a list of floating-point numbers and returns a list with each element having a 10 per cent discount. ❑

5. Define a function called "`remove_five()`", that takes a list as input and removes all occurrences of 5 in the list. Write the function in such a way that you will not receive an error if there are no 5s in the list. ❑

6. A word is a palindrome if it reads the same in both directions. For example, "civic", "radar", "level", "redder", "madam" are all palindromes. Write a function called "`is_palindrome()`", that takes a word and returns "True" if the word is a palindrome or "False" if otherwise. ❑

7. Define a function called "`unique_elements()`" that takes a list and returns a list that only contains unique elements. The program should take repeated elements but only return one value of the element. For example, in the list [1,2,2,3,3,4], it should return the list [1,2,3,4]. ❑

8. Define a function called "`backways()`", that takes a list and returns it in reverse order. ❑

9. Define a function called "`sum_list()`", that takes a list as input and returns the sum of all the elements in the list. ❑

10. Define a function called "`mean_list()`", that takes a list as input and returns the mean of the list. The mean is the sum of all the elements divided by the number of elements, you can use the function above defined in Question 9. ❑

11. Define a function called "`list_of_deviation()`", that takes a list as input and returns a list that represents how much each element deviates from the mean. ❑

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12. Define a function called "*standard_deviation()*" that returns the standard deviation of a list. Feel free to use the functions defined in Questions 10 and 11 above. We can use the following steps to find the standard deviation: ❑
    a. Find the mean
    b. List of deviation
    c. Squares of the deviation
    d. Sum of the squares of deviation
    e. Divided by one less than the number of items
    f. Square root of this number → use sqrt(), which is defined in the maths module

Example of how to calculate standard deviation:

Given [1, 4, 5, 7, 9, 20]
Mean (1 + 4 + 6 + 8 + 9 + 20) /6 = 8
List of deviations [-7, -4, -2, 0, 1, 12]
Squares of the deviation [49, 16, 4, 0, 1, 144]
Sum of the squares of the deviation = 214
Divided by one less than the number of items in the list 214/5 = 42.8
Now the square root of 42.8 = 6.54
Standard deviation is about 6.54