Week 10 Assignment 10

1. Write a Python code to implement the following function:

   def sum_of_squares(n):
       return sum([i**2 for i in range(1, n+1)])

2. Implement a class `Person` with the following attributes:
   - name
   - age
   - address

   Include methods for:
   - **get_details()** to return a string with details
   - **set_name(name)** to set the name
   - **set_age(age)** to set the age
   - **set_address(address)** to set the address

3. A公司 and B公司 are two companies. A公司 has 100 employees, and B公司 has 200 employees. A公司's average salary is $50,000, and B公司's average salary is $60,000. Calculate the total salary paid by each company.

4. Consider the following sequence of numbers: 1, 2, 3, 4, 5. Write a function that returns the sum of all even numbers in the sequence.

5. Write a Python script that reads a file containing a list of numbers and calculates the average of those numbers.

6. Write a Python function to check if a year is a leap year. A leap year is divisible by 4, but not by 100 unless it is also divisible by 400.

7. Create a dictionary that maps each letter of the alphabet to its position in the alphabet. For example, 'a' maps to 1, 'b' maps to 2, and so on.

8. Write a Python function that takes a list of numbers and returns the maximum difference between any two numbers in the list.

9. Implement a function that calculates the factorial of a number. The factorial of a number is the product of all positive integers less than or equal to that number.

10. Write a Python script that reads a file containing a list of words and counts the frequency of each word. For example, if the input file contains:
    
    the quick brown fox jumps over the lazy dog
    
    The output should be:
    
    the: 2
    quick: 1
    brown: 1
    fox: 1
    jumps: 1
    over: 1
    lazy: 1
    dog: 1

11. Consider the following array: [1, 2, 3, 4, 5]. Write a function that returns the sum of the products of all possible pairs of numbers from the array.

12. Write a Python function that takes a string and returns a new string with all vowels replaced by the letter 'x'.

13. Implement a function that checks if a given year is a perfect square. A perfect square is an integer that is the square of an integer.

14. Write a Python script that reads a file containing a list of numbers and returns the median of those numbers.

15. Consider the following list of numbers: [1, 2, 3, 4, 5]. Write a function that returns the sum of the products of all possible pairs of numbers from the list.

16. Write a Python function that takes a string and returns a new string with all consonants replaced by the letter 'x'.

17. Implement a function that checks if a given year is a prime number. A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself.

18. Write a Python script that reads a file containing a list of numbers and returns the mode of those numbers.

19. Consider the following list of numbers: [1, 2, 3, 4, 5]. Write a function that returns the sum of the products of all possible pairs of numbers from the list.