Assignment 8

The task due for submission for this assignment has passed.

Due on 2020-04-09, 2019/VT

1. Given a list of classes, implement a function to determine if the classes are disjoint. A class is disjoint if it does not share any students with any other class.
   ```python
   def disjoint_classes(classes):
       if len(classes) == 1:
           return True
       else:
           for i in range(len(classes) - 1):
               for j in range(i + 1, len(classes)):
                   if classes[i].students & classes[j].students:
                       return False
       return True
   ```

2. Write a function to calculate the number of days between two dates.
   ```python
   from datetime import date

   def days_between_dates(date1, date2):
       return (date2 - date1).days
   ```

3. Implement a function to check if a number is prime.
   ```python
   def is_prime(n):
       if n <= 1:
           return False
       for i in range(2, int(n ** 0.5) + 1):
           if n % i == 0:
               return False
       return True
   ```

4. Create a class to represent a student, including attributes for name, age, and grades. Implement methods to calculate the average grade and check if the student is above average.
   ```python
   class Student:
       def __init__(self, name, age, grades):
           self.name = name
           self.age = age
           self.grades = grades

       def average_grade(self):
           return sum(self.grades) / len(self.grades)

       def is_above_average(self):
           return self.average_grade() > 80
   ```

5. Write a program to find all factors of a given number.
   ```python
   def factors_of_number(n):
       factors = []
       for i in range(1, n + 1):
           if n % i == 0:
               factors.append(i)
       return factors
   ```

6. Implement a function to reverse a string.
   ```python
   def reverse_string(s):
       return s[::-1]
   ```

7. Create a class to represent a book, including attributes for title, author, and ISBN. Implement methods to print book details and check if the book is available for checkout.
   ```python
   class Book:
       def __init__(self, title, author, ISBN):
           self.title = title
           self.author = author

       def print_details(self):

       def is_available(self):
           return not self.on_loan
   ```

8. Write a function to check if a number is a perfect square.
   ```python
   def is_perfect_square(n):
       return n == int(n ** 0.5) ** 2
   ```

9. Implement a function to calculate the area of a circle given the radius.
   ```python
   import math

   def area_of_circle(radius):
       return math.pi * radius ** 2
   ```

10. Create a class to represent a circle, including attributes for center (x, y) and radius. Implement methods to calculate the circumference and area.
    ```python
    class Circle:
        def __init__(self, center, radius):
            self.center = center
            self.radius = radius

        def circumference(self):
            return 2 * math.pi * self.radius

        def area(self):
            return math.pi * self.radius ** 2
    ```