Solving simple problems using modular programming

Objectives

Using Python to solve simple problems

- Implement simple programs using Python
- Solve simple problems using read/write instructions, conditional, loops
- Implement functions, use test-driven development
- Use modular programming
- Implement file operations

Requirements

1. Write an application to manage a list of points. Each point is identified by the x and y coordinates (given as integers) managed as a list. Implement the following features:
   a) Determine the distance between 2 points.
   b) Increase all x coordinates by a given value.
   c) Determine the list of top *k* closest points to a given point.
   d) Determine the highest distance between any 2 points.

   Consider at least the following modules:
   - A module for user interface.
   - A module for the logic business functions.
   - A module for utility functions.

2. Extend the application by adding a colour property to each point. The features extend to:
   a) determine the closest 2 points of the same colour
   b) given a point, determine its closest k points of the same colour
   c) determine the points with most neighbouring points of same colour in a circle area of a given size.

3. Add the following features to the application:
   a) Write all points in the list to a file. Each line contains a point in the form "(coord_x, coordy) – colour".
   b) Read all points from a file and create a list.