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

Consider at least the following modules:

- A module for user interface.
- A module for the logic business functions.
- A module for utility functions.

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 two points.
2. Extend the application by adding a colour property to each point. The features extend to:
    a. Determine the closest two 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.

2. 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, coord y) – colour”.

   b. Read all points from a file and create a list.