Discipline of Computer Science and Software Engineering
University of Newcastle

SENG1120/6120 – Semester 2, 2017
Week 4

Note: `#include <cmath>` gives you access to mathematical functions such as `sqrt()` and `pow()`.

1. Create class `point` that stores the x and y coordinates (stored as `double`) of a point in the Cartesian number plane. It should be possible to create instances of `point` with either default values representing the origin, or with user-provided co-ordinates. The class should also provide mutating member functions `set_x()` and `set_y()` that allow separate setting of the x-coordinate, the y-coordinate, and `set_point()` that allows setting of both co-ordinates. The class should provide query functions `get_x()` and `get_y()` that allow the x-coordinate or the y-coordinate to be retrieved. You should also overload the `cout <<` operator to output `point` using the notation (x, y). Demonstrate the behaviour of your new class.

2. Define a function `length()` that takes as parameters two instances of `point` and returns the length of the line interval joining the points. Demonstrate the behaviour of your new function.

3. Define a function `mid_point()` that takes as parameters two instances of `point` and returns the `point` that is the midpoint of the interval joining those points. Demonstrate the behaviour of your new function.

4. When the + operator is applied to a pair of instances of class `point`, the result is a `point` whose x and y coordinates are the sums of the x and y coordinates respectively of the instances. Define the overloaded function that achieves this. Demonstrate the behaviour of your overloaded operator.

5. Define the comparison operators == and != when applied to a pair of instances of class `point`. Demonstrate the behaviour of your overloaded comparison operators.

6. Define the assignment operator += as it applied to instances of class `point`. This member function will have the effect that, if `A` and `B` are instances of class `point`, then `A += B` has the same result as applying `A = A + B`.

Good Luck