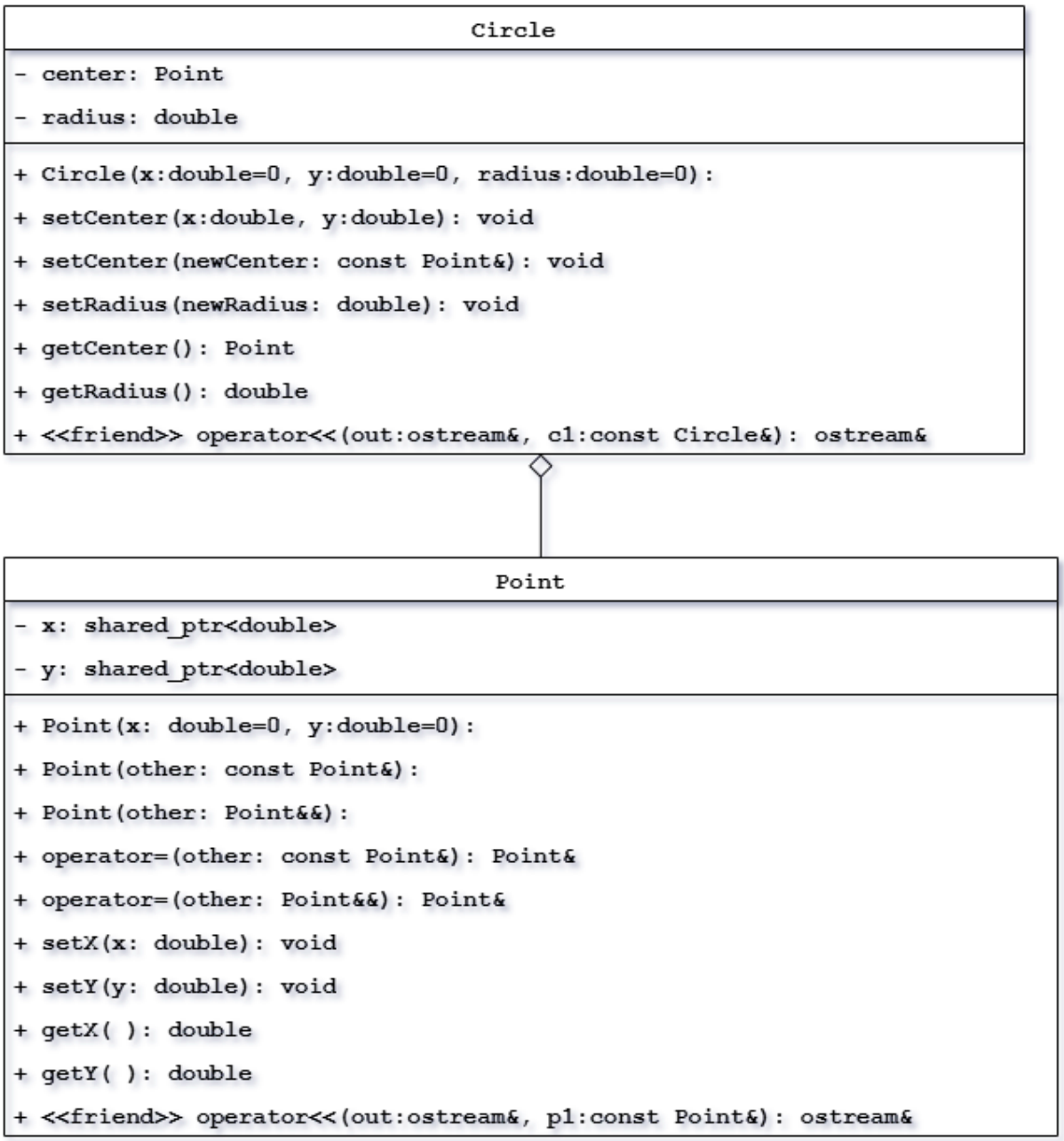
Week 5- Assignment (3 marks)

Note: Try to make the best use of appropriate C++ features.

Objective: This assignment aims to deepen your understanding of advanced C++ class features, including **constructors**, **assignment** operators, **move semantics**, **friend functions**, and **class aggregation**. You will implement two related classes—Circle and Point—to explore their interactions and gain hands-on experience with core object-oriented programming principles in C++.

Description:

- In this assignment, you will implement two C++ classes, Circle and Point, based on the provided UML diagram. And use **the given main function** to produce the output shown below.
- The Point class represents a point in 2D space using x and y coordinates.
- The Circle class models a circle defined by a Point object as its center and a double representing its radius.
- The friend function operator<< in the Point class should print the point's details. If the Point object has been moved and is empty, it should output ***null*** instead of dereferencing an invalid pointer.



Input:

Please use the provided ***run_wa5.cpp*** to test your implementation.

Don't modify the **main** function in the cpp.

Output: (should be like the below)

```
================================================
Output 1:
p1 Point(1, 1)
p2 Point(2, 2)
------------------------------------------------
p1 Point(1, 1)
p2 Point(3, 3)
================================================

Output 2:
p2 Point(null,null)
p3 Point(3, 3)
------------------------------------------------
p1 Point(null,null)
p3 Point(1, 1)
================================================

Output 3:
p3 Point(1, 1)
c1 Circle(center: Point(10, 10), radius: 0)
------------------------------------------------
c1 Circle(center: Point(10, 10), radius: 0)
c2 Circle(center: Point(20, 20), radius: 0)
================================================

Output 4:
c2 Circle(center: Point(20, 20), radius: 0)
c3 Circle(center: Point(30, 30), radius: 0)
------------------------------------------------
c2 Circle(center: Point(null,null), radius: 0)
c3 Circle(center: Point(20, 20), radius: 0)
================================================
```

Submit:

1, **all C++ source code**:

Organizing the source code into separate files **is not mandatory.**

You can consolidate all code into a single cpp file.

2, **WA5.txt**: a txt file contains all the source code.

3, **output.jpg** (or png, bmp): a screenshot of the output by your program

Please refer to the submission page for the Marking Rubric.