HOMEWORK 19
CS 125
due at 11:45am (classtime) on Tuesday, November 3

This assignment requires you to create a `Rectangle` class. Prepare your solutions in a single Python file or Colab notebook. Use comments to clearly label your work. Provide test cases to show that your methods produce the desired output. Submit your file or Colab notebook link to the [Homework 19 assignment on Moodle](#).

1. **Rectangles**: We will specify a rectangle in the plane by its height, width, and the coordinates of its lower-left corner. Create a `Rectangle` class to implement this concept. Use the `Point` class from the text for the coordinates of the lower-left corner. For example, to create a `Rectangle` with height 4, width 6, and lower-left corner (2,3), one would run:

   ```
   Rectangle(4, 6, Point(2, 3))
   ```

2. **Area and perimeter**: Add a method `area` that returns the area of the rectangle. Add another method `perimeter` that returns the perimeter of the rectangle. For example, the following statement sould return the value 24:

   ```
   Rectangle(4, 6, Point(2,3)).area()
   ```

3. **Comparing rectangles**: Suppose that we want two rectangles to be considered equal if they have the same area. Implement the `==` operator for your rectangle class to test whether two rectangles have the same area. Then implement the `<` operator for your `Rectangle` class to determine whether the area of one rectangle is less than the area of another. For example

   ```
   Rectangle(4, 6, Point(2,3)) == Rectangle(4, 6, Point(1,1)) # returns True
   Rectangle(4, 6, Point(2,3)) < Rectangle(4, 5, Point(1,1)) # returns False
   Rectangle(4, 6, Point(2,3)) < Rectangle(4, 7, Point(1,1)) # returns True
   ```

4. **Interior point**: Add a method `contains` that determines whether a rectangle contains a point. The point should be specified by a `Point` object. For example:

   ```
   r = Rectangle(4, 6, Point(2,3))
   r.contains(Point(0,0))  # returns False
   r.contains(Point(5,7))  # returns True
   ```