SE 1108 SELF-STUDY-1

Implement **Point2D** class representing the point P(x,y) in two-dimensional space by storing x and y as two real-valued attributes. Implement at least the following methods in Point2D class

Point2D(…)	Constructor that takes the attributes as parameters
Point2D(…)	Copy constructor
getX(), getY()	Getters for attributes
toString()	A proper string conversion function
distanceTo(Point2D other)	Returns the distance to another point
distanceTo(Line2D line)	Returns the distance to a given line (See Line2D definition below)

Implement **Line2D** class representing the line ***y = mx +n*** in two-dimensional space by storing m and n as as two real-valued attribute. Implement at least the following methods in Line2D class

Line2D(…)	Constructor that takes the attributes as parameters
Line2D(…)	Copy constructor
getM(), getN()	Getters for attributes
toString()	A proper string conversion function (i.e. “y = mx+n“)
isParallel(Line2D other)	Returns true if the line is parallel to given line
intersection(Line2D other)	Returns the point of intersection with the given line as a Point2D object. Returns null if the lines are parallel.

Implement **Path2D** class that represents a path formed by the linear connection of a sequence of points in two-dimensional space by storing the list of points as attribute. Implement at least the following methods in Path2D class.

Path2D(…)	Constructor that takes the attributes as parameters
Path2D(…)	Copy constructor
getPoint(int index)	Getter for a point in the path
toString()	A proper string conversion function (returns a string containing all of the points in the path seperated by “===”)
size()	Returns the number of points in the path
length()	Returns the length of the path
addPoint(Point2D other)	Adds the given point to the end of the path
combine(Path other)	Returns the concatenation of this path with the given path as a new Path object.

Write a **Demo** class that only contains main() function. In the main function demonstrate that you have implemented all of the classes with the listed methods above properly by calling the methods and displaying the outputs of the methods.

Important Note: You can use Math library for mathematical calculations like square root etc. <u>but you can not use existing Point2D, Line2D classes from any library</u>