Lab 4 (Due April 26th)

Implement the divide-and-conquer algorithm you learnt in the class to solve the closest pair of points problem. You could either hard-code or randomly generate points in your solution. The running time of your algorithm should be O($n$log$n$). Sample output of your solution should look like:

Input points:
(2.0,7.0) (4.0,13.0) (5.0,8.0) (10.0,5.0) (14.0,9.0) (15.0,5.0) (17.0,7.0) (19.0,10.0) (22.0,7.0) (25.0,10.0) (29.0,14.0) (30.0,2.0)

Solving Problem: Point[0]...Point[11]
  Dividing at Point[5]
Solving Problem: Point[0]...Point[5]
  Dividing at Point[2]
Solving Problem: Point[0]...Point[2]
  Dividing at Point[1]
Solving Problem: Point[0]...Point[1]
  Found result: P1: (2.0,7.0), P2: (4.0,13.0), Distance: 6.3
Solving Problem: Point[2]...Point[2]
  Found result: INF
Combining Problems: Point[0]...Point[1] and Point[2]...Point[2]
  Found result: P1: (2.0,7.0), P2: (5.0,8.0), Distance: 3.2
Solving Problem: Point[3]...Point[5]
  Dividing at Point[4]
Solving Problem: Point[3]...Point[4]
  Found result: P1: (10.0,5.0), P2: (14.0,9.0), Distance: 5.7
Solving Problem: Point[5]...Point[5]
  Found result: INF
Combining Problems: Point[3]...Point[4] and Point[5]...Point[5]
  Found result: P1: (14.0,9.0), P2: (15.0,5.0), Distance: 4.1
Combining Problems: Point[0]...Point[2] and Point[3]...Point[5]
  Found result: P1: (2.0,7.0), P2: (5.0,8.0), Distance: 3.2
Solving Problem: Point[6]...Point[11]
  Dividing at Point[8]
Solving Problem: Point[6]...Point[8]
  Dividing at Point[7]
Solving Problem: Point[6]...Point[7]
  Found result: P1: (17.0,7.0), P2: (19.0,10.0), Distance: 3.6
Solving Problem: Point[8]...Point[8]
  Found result: INF
Combining Problems: Point[6]...Point[7] and Point[8]...Point[8]
  Found result: P1: (17.0,7.0), P2: (19.0,10.0), Distance: 3.6
Solving Problem: Point[9]...Point[11]
  Dividing at Point[10]
Solving Problem: Point[9]...Point[10]
  Found result: P1: (25.0,10.0), P2: (29.0,14.0), Distance: 5.7
Solving Problem: Point[11]...Point[11]
  Found result: INF

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Combining Problems: Point[9]...Point[10] and Point[11]...Point[11]
  Found result: P1: (25.0,10.0), P2: (29.0,14.0), Distance: 5.7
Combining Problems: Point[6]...Point[8] and Point[9]...Point[11]
  Found result: P1: (17.0,7.0), P2: (19.0,10.0), Distance: 3.6
Combining Problems: Point[0]...Point[5] and Point[6]...Point[11]
  Found result: P1: (15.0,5.0), P2: (17.0,7.0), Distance: 2.8
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Final result: P1: (15.0,5.0), P2: (17.0,7.0), Distance: 2.8
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