Lab 9 - Practice
Divide and Conquer (p3)

CS208 Algorithm Design and Analysis

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Question: Closest pair of points

Given n points on a two-dimensional plane, find the closest pairs of points.

Input:

5 → # of points

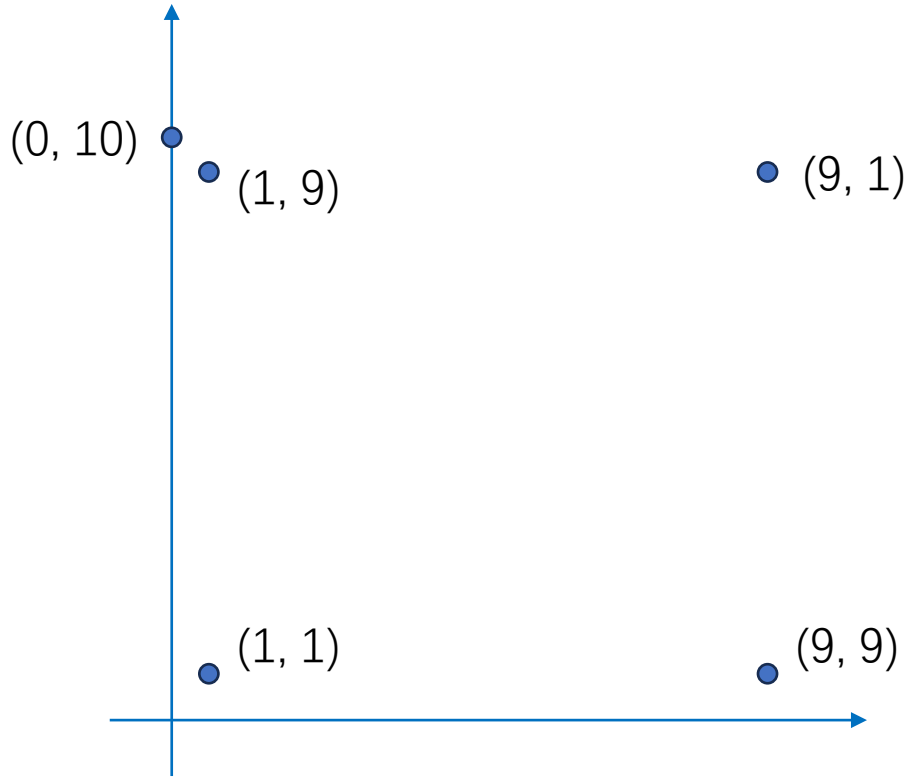
1 1
1 9
9 1
9 9
0 10

(x, y) coordinate for each point

Output:

2

Square of the Euclidean distance between the closest pair of points



Question: Closest pair of points

Textbook p. 230

MIT Book p. 1039

Note: presort all points by x and y coordinates, respectively

```
// A structure to represent a Point in 2D plane
struct Point
{
    int x, y;
};
```

```
// A utility function to find the distance between two points
float dist(Point p1, Point p2)
{
    return sqrt( (p1.x - p2.x)*(p1.x - p2.x) +
                 (p1.y - p2.y)*(p1.y - p2.y)
           );
}
```

```
// Needed to sort array of points according to X coordinate
int compareX(const void* a, const void* b)
{
    Point *p1 = (Point *)a, *p2 = (Point *)b;
    return (p1->x - p2->x);
}
// Needed to sort array of points according to Y coordinate
int compareY(const void* a, const void* b)
{
    Point *p1 = (Point *)a, *p2 = (Point *)b;
    return (p1->y - p2->y);
}
```

Source: https://aaronice.gitbook.io/lintcode/sweep-line/closest-pair-of-points

Grading

- To be graded in a week
- Total point: 1