

Solution 1Solution 2Solution 3

```
1 // Copyright © 2020 AlgoExpert, LLC. All rights reserved.
2
3 package main
4
5 type Coord struct {
6     X, Y int
7 }
8
9 type Direction int
10
11 const (
12     None Direction = iota - 1
13     Up
14     Down
15     Left
16     Right
17 )
18
19 // O(n^2) time | O(n^2) space - where n is the number of coordinates
20 func RectangleMania(coords []Coord) int {
21     coordsTable := getCoordsTable(coords)
22     return getRectangleCount(coords, coordsTable)
23 }
24
25 type CoordSet map[Coord]struct{}
26 type CoordsTable map[Coord]map[Direction]CoordSet
27
28 func getCoordsTable(coords []Coord) CoordsTable {
29     table := CoordsTable{}
30     for _, coord1 := range coords {
31         directions := map[Direction]CoordSet{
32             Up:    CoordSet{},
33             Right: CoordSet{},
34             Down:  CoordSet{},
35             Left:  CoordSet{},
36         }
37         for _, coord2 := range coords {
38             coord2Direction := getCoordDirection(coord1, coord2)
39             if coord2Direction != None {
40                 directions[coord2Direction][coord2] = struct{}{}
41             }
42         }
43         table[coord1] = directions
44     }
45     return table
46 }
47
48 func getCoordDirection(coord1, coord2 Coord) Direction {
49     if coord2.Y == coord1.Y {
50         if coord2.X > coord1.X {
51             return Right
52         } else if coord2.X < coord1.X {
53             return Left
54         }
55     } else if coord2.X == coord1.X {
56         if coord2.Y > coord1.Y {
57             return Up
58         } else if coord2.Y < coord1.Y {
59             return Down
60         }
61     }
62     return None
63 }
64
65 func getRectangleCount(coords []Coord, coordsTable CoordsTable) int {
66     count := 0
67     for _, coord := range coords {
68         count += clockwiseCountRectangles(coord, coordsTable, Up, coord)
69     }
70     return count
71 }
72
73 func clockwiseCountRectangles(coord Coord, coordsTable CoordsTable, direction Direction, origin Coord) int {
74     if direction == Left {
75         if _, found := coordsTable[coord][Left][origin]; found {
76             return 1
77         }
78         return 0
79     }
80     rectangleCount := 0
81     nextDirection := direction.NextClockwise()
82     for nextCoord := range coordsTable[coord][direction] {
83         rectangleCount += clockwiseCountRectangles(nextCoord, coordsTable, nextDirection, origin)
84     }
85     return rectangleCount
86 }
87
88 func (d Direction) NextClockwise() Direction {
89     switch d {
90     case Up:
91         return Right
92     case Right:
93         return Down
94     case Down:
95         return Left
96     case Left:
97         return Up
98     }
99     return None
100 }
101
```

