```
Note that the points are:
pts = [(2, 3), (5, 2), (12, 15), (23, 10), (17, 13), (0, 3), (4, 2), (18, 21)]

Initial Distance Matrix
                      [1]          [2]          [3]          [4]          [5]          [6]          [7]          [8]
          [1]      0.0000       3.1623      15.6205      22.1359      18.0278       2.0000       2.2361      24.0832
          [2]      3.1623       0.0000      14.7648      19.6977      16.2788       5.0990       1.0000      23.0217
          [3]     15.6205      14.7648       0.0000      12.0830       5.3852      16.9706      15.2643       8.4853
          [4]     22.1359      19.6977      12.0830       0.0000       6.7082      24.0416      20.6155      12.0830
          [5]     18.0278      16.2788       5.3852       6.7082       0.0000      19.7231      17.0294       8.0623
          [6]      2.0000       5.0990      16.9706      24.0416      19.7231       0.0000       4.1231      25.4558
          [7]      2.2361       1.0000      15.2643      20.6155      17.0294       4.1231       0.0000      23.6008
          [8]     24.0832      23.0217       8.4853      12.0830       8.0623      25.4558      23.6008       0.0000
The minimum distance is 1.0000 between clusters [2] and [7].
The centroid of the merged cluster [2, 7] is [4.5, 2.0], calculated from (1*(5, 2) + 1*(4, 2))/2.
                      [1]          [3]          [4]          [5]          [6]          [8]       [2, 7]
          [1]      0.0000      15.6205      22.1359      18.0278       2.0000      24.0832       2.6926
          [3]     15.6205       0.0000      12.0830       5.3852      16.9706       8.4853      15.0083
          [4]     22.1359      12.0830       0.0000       6.7082      24.0416      12.0830      20.1556
          [5]     18.0278       5.3852       6.7082       0.0000      19.7231       8.0623      16.6508
          [6]      2.0000      16.9706      24.0416      19.7231       0.0000      25.4558       4.6098
          [8]     24.0832       8.4853      12.0830       8.0623      25.4558       0.0000      23.3077
       [2, 7]      2.6926      15.0083      20.1556      16.6508       4.6098      23.3077       0.0000
The minimum distance is 2.0000 between clusters [1] and [6].
The centroid of the merged cluster [1, 6] is [1.0, 3.0], calculated from (1*(2, 3) + 1*(0, 3))/2.
                      [3]          [4]          [5]          [8]       [2, 7]       [1, 6]
          [3]      0.0000      12.0830       5.3852       8.4853      15.0083      16.2788
          [4]     12.0830       0.0000       6.7082      12.0830      20.1556      23.0868
          [5]      5.3852       6.7082       0.0000       8.0623      16.6508      18.8680
          [8]      8.4853      12.0830       8.0623       0.0000      23.3077      24.7588
       [2, 7]     15.0083      20.1556      16.6508      23.3077       0.0000       3.6401
       [1, 6]     16.2788      23.0868      18.8680      24.7588       3.6401       0.0000
The minimum distance is 3.6401 between clusters [2, 7] and [1, 6].
The centroid of the merged cluster [2, 7, 1, 6] is [2.75, 2.5], calculated from (2*[4.5, 2.0] + 2*[1.0, 3.0])/4.
                      [3]          [4]          [5]       [8][2, 7, 1, 6]
          [3]      0.0000      12.0830       5.3852       8.4853      15.5503
          [4]     12.0830       0.0000       6.7082      12.0830      21.5943
          [5]      5.3852       6.7082       0.0000       8.0623      17.7006
          [8]      8.4853      12.0830       8.0623       0.0000      23.9752
[2, 7, 1, 6]     15.5503      21.5943      17.7006      23.9752       0.0000
The minimum distance is 5.3852 between clusters [3] and [5].
The centroid of the merged cluster [3, 5] is [14.5, 14.0], calculated from (1*(12, 15) + 1*(17, 13))/2.
                      [4]       [8][2, 7, 1, 6]       [3, 5]
          [4]      0.0000      12.0830      21.5943       9.3941
          [8]     12.0830       0.0000      23.9752       7.8262
[2, 7, 1, 6]     21.5943      23.9752       0.0000      16.4412
       [3, 5]      9.3941       7.8262      16.4412       0.0000
```

```
The minimum distance is 7.8262 between clusters [8] and [3, 5].
The centroid of the merged cluster [8, 3, 5] is [15.666666666666666, 16.333333333333332], calculated from (1*(18, 21) + 2*[14.5, 14.0])/3.
                      [4][2, 7, 1, 6]   [8, 3, 5]
         [4]      0.0000     21.5943      9.6896
[2, 7, 1, 6]     21.5943      0.0000     18.9262
   [8, 3, 5]      9.6896     18.9262      0.0000
The minimum distance is 9.6896 between clusters [4] and [8, 3, 5].
The centroid of the merged cluster [4, 8, 3, 5] is [17.5, 14.75], calculated from (1*(23, 10) + 3*[15.666666666666666, 16.333333333333332])/4.
            [2, 7, 1, 6][4, 8, 3, 5]
[2, 7, 1, 6]      0.0000     19.1735
[4, 8, 3, 5]     19.1735      0.0000
The minimum distance is 19.1735 between clusters [2, 7, 1, 6] and [4, 8, 3, 5].
The centroid of the merged cluster [2, 7, 1, 6, 4, 8, 3, 5] is [10.125, 8.625], calculated from (4*[2.75, 2.5] + 4*[17.5, 14.75])/8.
```