

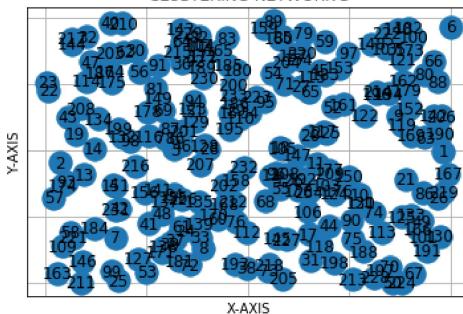
```
PRESS
1 TO CONTINUE
0 TO EXIT AND SAVE :

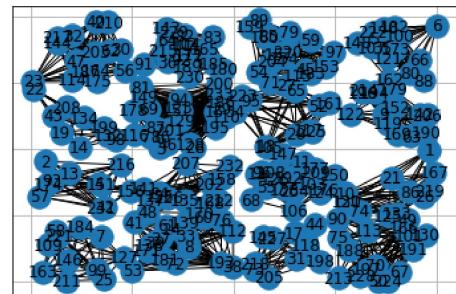
1
ENTER THE DIMENSION OF THE FIELD AS (Length Breadth)
1000 1000
ENTER THE NUMBER OF NODES THAT IS NEEDED TO BE DEPLOYED
234
1000 1000 234
ENTER TYPE OF CLUSTER CREATION:
    1. AREA WISE CLUSTER CREATION
    2. DEFAULT (NOT KNOWS AS OF NOW) :
1
ENTER THE NUMBER OF CLUSTERS YOU WANT TO CREATE :
16
CHOOSE A DEPLOYMENT TYPE AS OPTIONS -
    1. RANDOM DEPLOYMENT
    2. SPIRAL DEPLOYMENT
    3. SQUARE DEPLOYMENT
    4. DEFAULT DEPLOYMENT
```

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1
ENTER THE TIME INTERVAL IN UNITS
78
[[1, [981.35, 497.98], [0], [0]], [2, [35.58, 455.12], [0.3333333333333333], [0]], [3, [319.03, 505.14], [0.6666666666666666], [0]], [4, [167.78, 371.58], [1.0], [0]], [5, [844.71, 920.06], [1
CLUSTER 1 [[7, [174.49, 173.59], [1.999999999999998], [0]], [25, [180.26, 9.38], [7.999999999999996], [0]], [58, [62.0, 191.95], [19.0], [0]], [99, [164.45, 44.96], [32.66666666666662], [0]
CLUSTER 2 [[2, [35.58, 455.12], [0.3333333333333333], [0]], [4, [167.78, 371.58], [1.0], [0]], [13, [96.7, 409.3], [4.0], [0]], [42, [185.25, 280.72], [13.666666666666673], [0]], [57, [21.51,
CLUSTER 3 [[14, [120.25, 507.62], [4.333333333333333], [0]], [19, [74.67, 563.67], [5.999999999999998], [0]], [22, [8.77, 726.4], [6.999999999999997], [0]], [43, [55.62, 627.74], [14.0000000000
CLUSTER 4 [[23, [5.46, 756.55], [7.333333333333333], [0]], [30, [222.89, 878.65], [9.666666666666666], [0]], [32, [103.12, 930.01], [10.33333333333334], [0]], [40, [160.67, 980.9], [13.0000000000
CLUSTER 5 [[8, [389.6, 133.74], [2.333333333333333], [0]], [24, [346.53, 200.61], [7.666666666666663], [0]], [33, [382.95, 173.05], [10.66666666666668], [0]], [37, [320.83, 164.1], [12.0000000000
CLUSTER 6 [[48, [288.21, 262.99], [15.666666666666677], [0]], [84, [317.82, 335.1], [27.666666666666636], [0]], [135, [378.92, 307.74], [44.66666666666671], [0]], [137, [293.61, 308.02], [45.3
CLUSTER 7 [[3, [319.03, 505.14], [0.666666666666666], [0]], [15, [453.61, 642.72], [4.666666666666666], [0]], [16, [323.02, 547.16], [4.999999999999999], [0]], [28, [403.64, 508.32], [8.99999
CLUSTER 8 [[36, [337.57, 829.89], [11.666666666666667], [0]], [64, [336.29, 912.61], [20.999999999999993], [0]], [82, [378.59, 930.29], [26.99999999999997], [0]], [83, [448.87, 924.96], [27.333
CLUSTER 9 [[17, [648.83, 184.06], [5.333333333333332], [0]], [31, [652.66, 86.97], [10.0], [0]], [44, [700.14, 216.24], [14.33333333333341], [0]], [73, [549.95, 45.83], [23.99999999999982],
CLUSTER 10 [[11, [668.51, 453.68], [3.333333333333335], [0]], [12, [556.75, 406.26], [3.666666666666667], [0]], [55, [579.85, 358.56], [18.000000000000004], [0]], [68, [541.57, 310.64], [22.3
CLUSTER 11 [[18, [578.25, 513.53], [5.666666666666665], [0]], [20, [653.15, 558.64], [6.33333333333331], [0]], [27, [630.92, 740.98], [8.66666666666664], [0]], [34, [503.79, 643.84], [11.000
CLUSTER 12 [[45, [677.82, 800.54], [14.66666666666675], [0]], [54, [560.66, 791.71], [17.66666666666667], [0]], [59, [688.37, 913.13], [19.33333333333332], [0]], [71, [588.95, 753.12], [23.3
CLUSTER 13 [[49, [927.7, 235.45], [16.000000000000001], [0]], [50, [855.04, 2.05], [16.33333333333343], [0]], [67, [907.27, 37.62], [21.99999999999999], [0]], [70, [849.15, 62.22], [22.999999
CLUSTER 14 [[1, [981.35, 497.98], [0], [0]], [10, [774.84, 334.87], [3.0], [0]], [21, [886.6, 390.92], [6.66666666666664], [0]], [26, [967.95, 322.29], [8.33333333333333], [0]], [74, [809.63,
CLUSTER 15 [[9, [870.69, 630.71], [2.666666666666665], [0]], [63, [936.0, 550.49], [20.66666666666666], [0]], [119, [878.73, 598.78], [39.33333333333333], [0]], [122, [788.78, 633.23], [40.3
CLUSTER 16 [[5, [844.71, 920.06], [1.333333333333333], [0]], [6, [999.03, 967.19], [1.666666666666665], [0]], [35, [865.14, 884.86], [11.33333333333336], [0]], [66, [957.95, 836.38], [21.66
[['CLUSTER 1', [[7, [174.49, 173.59], [1.999999999999998], [0]], [25, [180.26, 9.38], [7.999999999999996], [0]], [58, [62.0, 191.95], [19.0], [0]], [99, [164.45, 44.96], [32.66666666666662], [0]]]
```

CLUSTERING NETWORK'S

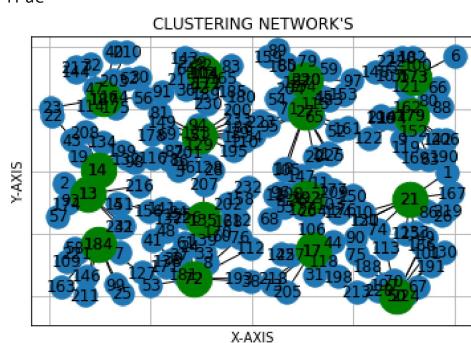




```
#####
[['CLUSTER 1', [[7, [174.49, 173.59], [1.999999999999998], [0]], [25, [180.26, 9.38], [7.999999999999964], [0]], [58, [62.0, 191.95], [19.0], [0]], [99, [164.45, 44.96], [32.66666666666662], [0]]], #####
True
```

```
[['CLUSTER 1', [184, [122.53, 208.94], [61.00000000000156], [0]]], ['CLUSTER 2', [13, [96.7, 409.3], [4.0], [0]]], ['CLUSTER 3', [14, [120.25, 507.62], [4.33333333333333], [0]]], ['CLUSTER 4', 242.21792770148124
#####
True
```

```
CLUSTERING NETWORK'S
```



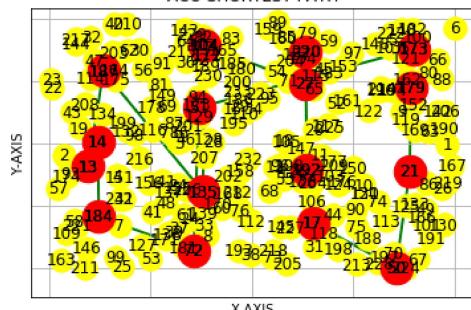
```
shorted_path: [(0, 2), (2, 1), (1, 3), (3, 5), (5, 7), (7, 10), (10, 11), (11, 9), (9, 8), (8, 12), (12, 13), (13, 14), (14, 15), (15, 6), (6, 4), (4, 0)], 2265.1741471242335
1 2507.3920748257146
```

```
242.21792770148124
```

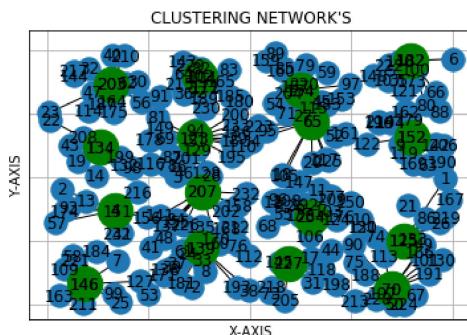
```
0
```

```
TOTAL DISTANCE AFTER ITERATION 1 is 2507.3920748257146
```

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ACO SHORTEST PATH
```



```
[['CLUSTER 1', [146, [92.86, 82.11], [48.333333333334], [0]]], ['CLUSTER 2', [4, [167.78, 371.58], [1.0], [0]]], ['CLUSTER 3', [134, [132.32, 619.6], [44.333333333337], [0]]], ['CLUSTER 4', 123.95576509384306
#####
True
```



```
shorted_path: [(0, 2), (2, 3), (3, 1), (1, 6), (6, 7), (7, 4), (4, 5), (5, 8), (8, 11), (11, 9), (9, 10), (10, 12), (12, 15), (15, 14), (14, 13), (13, 0)], 2275.526190400805)
```

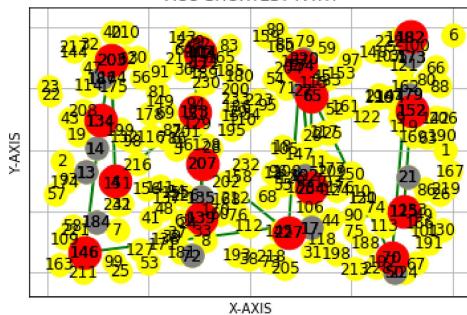
```
2 2399.481955494648
```

```
123.95576509384306
```

```
0
```

```
TOTAL DISTANCE AFTER ITERATION 2 is 2399.481955494648
```

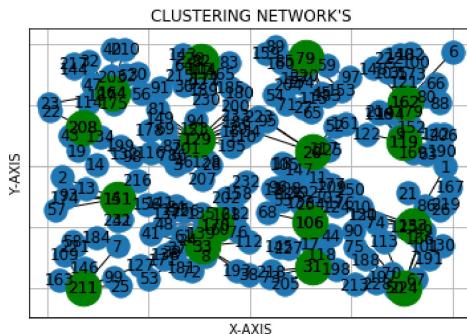
ACO SHORTEST PATH



```
[['CLUSTER 1', [211, [87.98, 3.5], [70.00000000000009], [0]]], ['CLUSTER 2', [151, [173.66, 367.11], [50.00000000000008], [0]]], ['CLUSTER 3', [208, [87.64, 659.21], [69.000000000001], [0]]], 88.04959057258586
```

```
#####
```

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True
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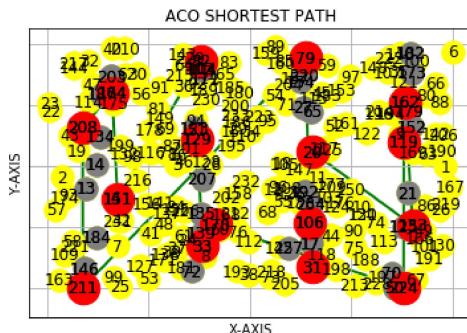
```
shorted_path: [(0, 2), (2, 3), (3, 1), (1, 7), (7, 6), (6, 4), (4, 5), (5, 12), (12, 14), (14, 15), (15, 13), (13, 10), (10, 8), (8, 9), (9, 11), (11, 0)], 2322.9871975540455)
```

```
3 2411.036788126631
```

```
88.04959057258586
```

```
0
```

```
TOTAL DISTANCE AFTER ITERATION 3 is 2411.036788126631
```

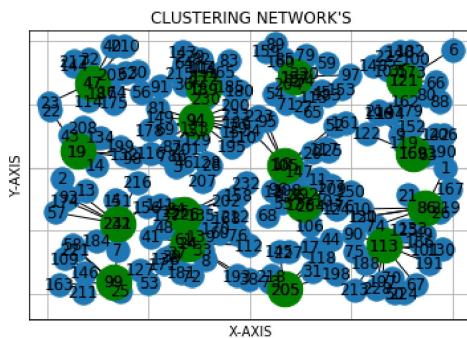


```
[['CLUSTER 1', [99, [164.45, 44.96], [32.66666666666662], [0]]], ['CLUSTER 2', [231, [173.77, 277.48], [76.66666666666666], [0]]], ['CLUSTER 3', [19, [74.67, 563.67], [5.99999999999998], [0]]]
```

170.48520199712348

#####

True



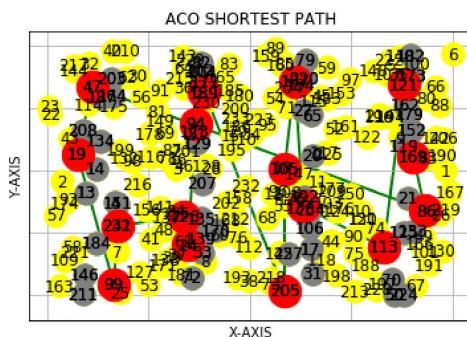
```
shorted_path: [(0, 1), (1, 5), (5, 4), (4, 6), (6, 7), (7, 8), (8, 10), (10, 11), (11, 9), (9, 12), (12, 15), (15, 14), (14, 13), (13, 3), (3, 2), (2, 0)], 2426.1116505222917)
```

4 2596.5968525194153

170.48520199712348

0

TOTAL DISTANCE AFTER ITERATION 4 is 2596.5968525194153

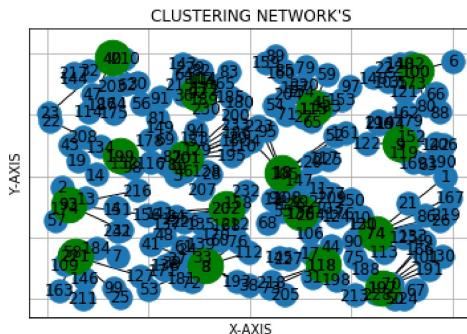


```
[['CLUSTER 1', [221, [68.72, 173.79], [73.3333333333337], [0]]], ['CLUSTER 2', [93, [51.84, 383.64], [30.66666666666625], [0]]], ['CLUSTER 3', [199, [181.42, 582.15], [66.0000000000014], [0]]]
```

186.88339278812336

#####

True



```
shorted_path: [(0, 1), (1, 3), (3, 2), (2, 6), (6, 7), (7, 4), (4, 5), (5, 10), (10, 9), (9, 11), (11, 8), (8, 12), (12, 14), (14, 15), (15, 13), (13, 0)], 2424.584299874929)
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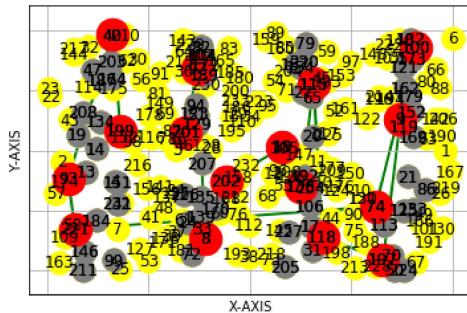
```
5 2611.4676926630523
```

```
186.88339278812336
```

```
0
```

```
TOTAL DISTANCE AFTER ITERATION 5 is 2611.4676926630523
```

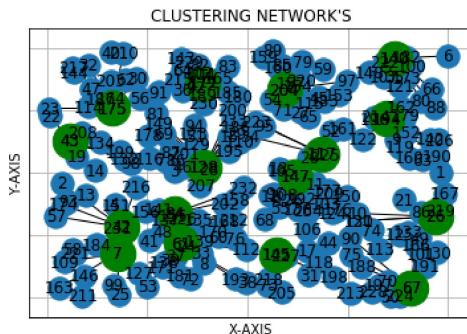
ACO SHORTEST PATH



```
[['CLUSTER 1', [7, [174.49, 173.59], [1.999999999999998], [0]]], ['CLUSTER 2', [42, [185.25, 280.72], [13.666666666666673], [0]]], ['CLUSTER 3', [43, [55.62, 627.74], [14.000000000000007], [0]]], 246.13055113089882
```

```
#####
```

```
True
```



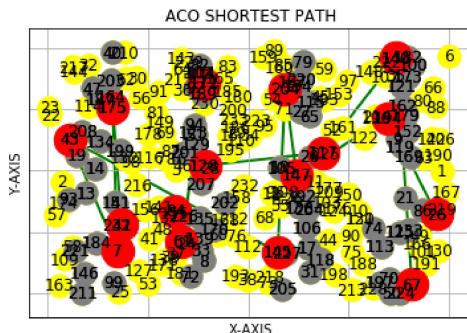
```
shorted_path: [(0, 3), (3, 1), (1, 5), (5, 4), (4, 7), (7, 6), (6, 10), (10, 15), (15, 12), (12, 13), (13, 14), (14, 9), (9, 11), (11, 8), (8, 2), (2, 0)], 2612.2221553305912)
```

```
6 2858.35270646149
```

```
246.13055113089882
```

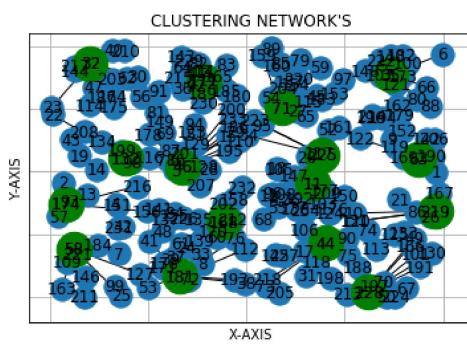
```
0
```

```
TOTAL DISTANCE AFTER ITERATION 6 is 2858.35270646149
```



```
[[ 'CLUSTER 1', [ 58, [ 62.0, 191.95], [ 19.0], [ 0]]], [ 'CLUSTER 2', [ 174, [ 41.88, 370.29], [ 57.66666666666668], [ 0]]], [ 'CLUSTER 3', [ 132, [ 191.53, 552.61], [ 43.66666666666667], [ 0]]], [ 'CLUSTER 4', [ 201.71465613583956, [ 180.26, 9.38], [ 7.999999999999964], [ 0]]]]
```

```
#####
True
```



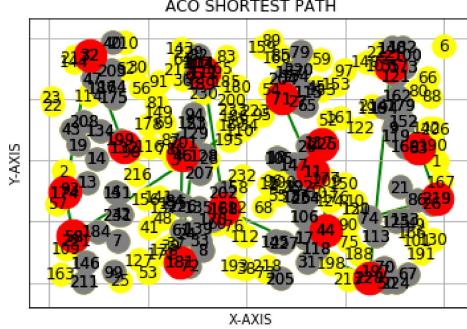
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shorted_path: [( (0, 1), (1, 3), (3, 2), (2, 6), (6, 4), (4, 7), (7, 5), (5, 12), (12, 15), (15, 14), (14, 13), (13, 8), (8, 10), (10, 9), (9, 11), (11, 0)], 2672.835348613902)
```

```
7 2874.5500047497417
```

```
201.71465613583956
```

```
0
```

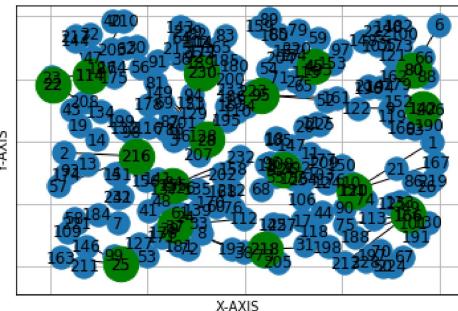
```
TOTAL DISTANCE AFTER ITERATION 7 is 2874.5500047497417
```



```
[[ 'CLUSTER 1', [ 25, [ 180.26, 9.38], [ 7.999999999999964], [ 0]]], [ 'CLUSTER 2', [ 216, [ 222.13, 441.79], [ 71.66666666666673], [ 0]]], [ 'CLUSTER 3', [ 22, [ 8.77, 726.4], [ 6.99999999999997], [ 0]]], [ 180.58388361473, [ 180.26, 9.38], [ 7.999999999999964], [ 0]]]]
```

```
#####
True
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CLUSTERING NETWORK'S



```
shorted_path: [(0, 1), (1, 4), (4, 5), (5, 7), (7, 6), (6, 9), (9, 11), (11, 13), (13, 12), (12, 14), (14, 15), (15, 8), (8, 10), (10, 3), (3, 2), (2, 0)], 2696.0850195793155)
8 2876.5889031940455
```

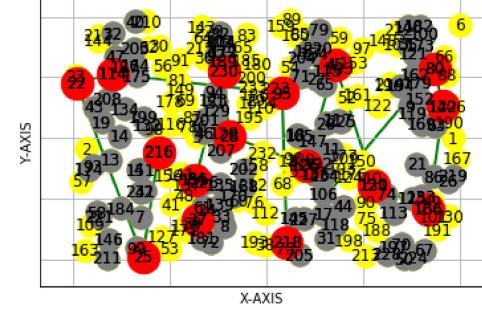
180.50388361473

0

10

ACO SUBTEST PATH

ACO SHORTEST PATH



```
[['CLUSTER 1', [109, [44.38, 139.26], [35.9999999999998], [0]]], ['CLUSTER 2', [2, [35.58, 455.12], [0.333333333333333], [0]]], ['CLUSTER 3', [98, [209.18, 537.7], [32.3333333333286], [0]]], [146.16063765597082
```

#####

False

AFTER

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