```
% Number of nodes
N = 25; % Change this value as per your requirement

% Weights for each edge
weights = rand(N-1, 1) * 10; % Random weights from 0 to 10

% Adjacency matrix
adjMatrix = zeros(N);
for i = 1:N-1
    adjMatrix(i, i+1) = weights(i);
    adjMatrix(i+1, i) = weights(i);
end

G = graph(adjMatrix);

% Visualization
nodeColor = 'red';
figure;
plot(G, 'NodeColor', nodeColor);

% Calculate Degree Centrality
degreeCentrality = centrality(G, 'degree');
disp('Degree Centrality:');
disp(degreeCentrality);

% Calculate ShortestPath
shortestPaths = distances(G);
disp('Shortest Paths:');
disp(shortestPaths);

% Calculate Betweenness Centrality
betweennessCentrality = centrality(G, 'betweenness');
disp('Betweenness Centrality:');
disp(betweennessCentrality);

% Calculate Network Diameter
diameter = max(max(shortestPaths));
disp('Network Diameter:');
disp(diameter);

% Calculate Closeness Centrality
closenessCentrality = centrality(G, 'closeness');
disp('Closeness Centrality:');
disp(closenessCentrality);

% Example groups
group = [1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1];

% Calculate Network Modularity
[Q,Qv] = modularity(adjMatrix,group);
disp('Modularity:');
disp(Q);

% Calculate Network Resilience
resilience = zeros(N, 1);
for i = 1:N
    tempAdjMatrix = adjMatrix;
    tempAdjMatrix(i, :) = 0;  % Remove node i and its connections
    tempAdjMatrix(:, i) = 0;
```

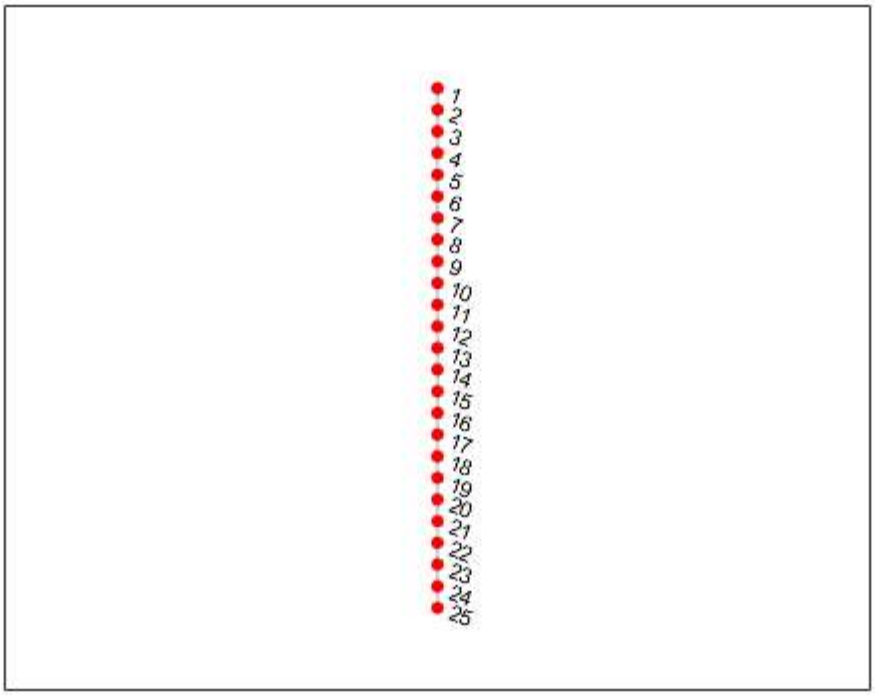
```
    [bins, ~] = conncomp(graph(tempAdjMatrix));
    resilience(i) = max(bins);  % Measure connectivity
end

disp('Resilience Index:');
disp(resilience);
```

```
Degree Centrality:
     1
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     1

Shortest Paths:
  Columns 1 through 7

         0    4.5092    9.9793   12.9425   20.3895   22.2790   29.1468
    4.5092         0    5.4701    8.4333   15.8802   17.7698   24.6375
    9.9793    5.4701         0    2.9632   10.4101   12.2997   19.1674
   12.9425    8.4333    2.9632         0    7.4469    9.3365   16.2042
   20.3895   15.8802   10.4101    7.4469         0    1.8896    8.7573
   22.2790   17.7698   12.2997    9.3365    1.8896         0    6.8678
   29.1468   24.6375   19.1674   16.2042    8.7573    6.8678         0
   30.9819   26.4726   21.0026   18.0393   10.5924    8.7029    1.8351
   34.6667   30.1575   24.6874   21.7242   14.2773   12.3877    5.5200
   40.9229   36.4137   30.9436   27.9804   20.5334   18.6439   11.7761
   48.7252   44.2159   38.7459   35.7827   28.3357   26.4462   19.5784
   49.5364   45.0272   39.5571   36.5939   29.1470   27.2574   20.3897
   58.8303   54.3211   48.8510   45.8878   38.4408   36.5513   29.6835
   66.5874   62.0782   56.6081   53.6449   46.1980   44.3084   37.4407
   71.4553   66.9461   61.4760   58.5128   51.0659   49.1763   42.3086
   75.8139   71.3047   65.8346   62.8714   55.4245   53.5349   46.6672
   80.2818   75.7725   70.3024   67.3392   59.8923   58.0028   51.1350
   83.3453   78.8360   73.3659   70.4027   62.9558   61.0663   54.1985
   88.4303   83.9211   78.4510   75.4878   68.0409   66.1513   59.2836
   93.5381   89.0288   83.5587   80.5955   73.1486   71.2591   64.3913
  101.7143   97.2051   91.7350   88.7718   81.3249   79.4353   72.5676
  109.6627  105.1534   99.6833   96.7201   89.2732   87.3836   80.5159
```

```
116.1058  111.5966  106.1265  103.1633   95.7164   93.8268   86.9591
119.8919  115.3827  109.9126  106.9494   99.5025   97.6129   90.7452
128.0077  123.4985  118.0284  115.0652  107.6183  105.7287   98.8610

Columns 8 through 14

 30.9819   34.6667   40.9229   48.7252   49.5364   58.8303   66.5874
 26.4726   30.1575   36.4137   44.2159   45.0272   54.3211   62.0782
 21.0026   24.6874   30.9436   38.7459   39.5571   48.8510   56.6081
 18.0393   21.7242   27.9804   35.7827   36.5939   45.8878   53.6449
 10.5924   14.2773   20.5334   28.3357   29.1470   38.4408   46.1980
  8.7029   12.3877   18.6439   26.4462   27.2574   36.5513   44.3084
  1.8351    5.5200   11.7761   19.5784   20.3897   29.6835   37.4407
       0    3.6848    9.9410   17.7433   18.5546   27.8484   35.6056
  3.6848         0    6.2562   14.0585   14.8697   24.1636   31.9207
  9.9410    6.2562         0    7.8023    8.6135   17.9074   25.6645
 17.7433   14.0585    7.8023         0    0.8113   10.1051   17.8622
 18.5546   14.8697    8.6135    0.8113         0    9.2939   17.0510
 27.8484   24.1636   17.9074   10.1051    9.2939         0    7.7571
 35.6056   31.9207   25.6645   17.8622   17.0510    7.7571         0
 40.4735   36.7886   30.5324   22.7302   21.9189   12.6250    4.8679
 44.8321   41.1472   34.8910   27.0887   26.2775   16.9836    9.2265
 49.2999   45.6150   39.3589   31.5566   30.7453   21.4515   13.6943
 52.3634   48.6785   42.4224   34.6201   33.8088   24.5150   16.7578
 57.4485   53.7636   47.5074   39.7052   38.8939   29.6000   21.8429
 62.5562   58.8713   52.6152   44.8129   44.0016   34.7078   26.9506
 70.7325   67.0476   60.7914   52.9892   52.1779   42.8840   35.1269
 78.6808   74.9959   68.7397   60.9375   60.1262   50.8324   43.0752
 85.1240   81.4391   75.1829   67.3807   66.5694   57.2755   49.5184
 88.9101   85.2252   78.9690   71.1667   70.3555   61.0616   53.3045
 97.0259   93.3410   87.0848   79.2826   78.4713   69.1774   61.4203

Columns 15 through 21

 71.4553   75.8139   80.2818   83.3453   88.4303   93.5381  101.7143
 66.9461   71.3047   75.7725   78.8360   83.9211   89.0288   97.2051
 61.4760   65.8346   70.3024   73.3659   78.4510   83.5587   91.7350
 58.5128   62.8714   67.3392   70.4027   75.4878   80.5955   88.7718
 51.0659   55.4245   59.8923   62.9558   68.0409   73.1486   81.3249
 49.1763   53.5349   58.0028   61.0663   66.1513   71.2591   79.4353
 42.3086   46.6672   51.1350   54.1985   59.2836   64.3913   72.5676
 40.4735   44.8321   49.2999   52.3634   57.4485   62.5562   70.7325
 36.7886   41.1472   45.6150   48.6785   53.7636   58.8713   67.0476
 30.5324   34.8910   39.3589   42.4224   47.5074   52.6152   60.7914
 22.7302   27.0887   31.5566   34.6201   39.7052   44.8129   52.9892
 21.9189   26.2775   30.7453   33.8088   38.8939   44.0016   52.1779
 12.6250   16.9836   21.4515   24.5150   29.6000   34.7078   42.8840
  4.8679    9.2265   13.6943   16.7578   21.8429   26.9506   35.1269
       0    4.3586    8.8264   11.8899   16.9750   22.0827   30.2590
  4.3586         0    4.4678    7.5313   12.6164   17.7241   25.9004
  8.8264    4.4678         0    3.0635    8.1486   13.2563   21.4326
 11.8899    7.5313    3.0635         0    5.0851   10.1928   18.3691
 16.9750   12.6164    8.1486    5.0851         0    5.1077   13.2840
 22.0827   17.7241   13.2563   10.1928    5.1077         0    8.1763
 30.2590   25.9004   21.4326   18.3691   13.2840    8.1763         0
 38.2073   33.8487   29.3809   26.3174   21.2323   16.1246    7.9483
 44.6505   40.2919   35.8241   32.7606   27.6755   22.5678   14.3915
 48.4366   44.0780   39.6102   36.5467   31.4616   26.3539   18.1776
 56.5524   52.1938   47.7260   44.6625   39.5774   34.4697   26.2934

Columns 22 through 25
```

```
  109.6627  116.1058  119.8919  128.0077
  105.1534  111.5966  115.3827  123.4985
   99.6833  106.1265  109.9126  118.0284
   96.7201  103.1633  106.9494  115.0652
   89.2732   95.7164   99.5025  107.6183
   87.3836   93.8268   97.6129  105.7287
   80.5159   86.9591   90.7452   98.8610
   78.6808   85.1240   88.9101   97.0259
   74.9959   81.4391   85.2252   93.3410
   68.7397   75.1829   78.9690   87.0848
   60.9375   67.3807   71.1667   79.2826
   60.1262   66.5694   70.3555   78.4713
   50.8324   57.2755   61.0616   69.1774
   43.0752   49.5184   53.3045   61.4203
   38.2073   44.6505   48.4366   56.5524
   33.8487   40.2919   44.0780   52.1938
   29.3809   35.8241   39.6102   47.7260
   26.3174   32.7606   36.5467   44.6625
   21.2323   27.6755   31.4616   39.5774
   16.1246   22.5678   26.3539   34.4697
    7.9483   14.3915   18.1776   26.2934
         0    6.4432   10.2293   18.3451
    6.4432         0    3.7861   11.9019
   10.2293    3.7861         0    8.1158
   18.3451   11.9019    8.1158         0

Betweenness Centrality:
     0
    23
    44
    63
    80
    95
   108
   119
   128
   135
   140
   143
   144
   143
   140
   135
   128
   119
   108
    95
    80
    63
    44
    23
     0

Network Diameter:
  128.0077

Closeness Centrality:
    0.0033
    0.0036
    0.0039
```

```
    0.0042
    0.0045
    0.0049
    0.0052
    0.0055
    0.0058
    0.0061
    0.0063
    0.0064
    0.0064
    0.0064
    0.0063
    0.0061
    0.0058
    0.0055
    0.0052
    0.0049
    0.0045
    0.0042
    0.0039
    0.0036
    0.0033

Modularity:
   -0.5000

Resilience Index:
     2
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     3
     2
```



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