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

% Weights for each edge
weights = rand(N, 1) * 10;

% Adjacency matrix
adjMatrix = zeros(N);
for i = 2:N
    adjMatrix(i, 1) = weights(i);
    adjMatrix(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 = ones(1, N);
group(1) = 2;  % The central node is in a different group

%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:
    24
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1
     1

Shortest Paths:
  Columns 1 through 7

         0   7.9428   3.1122   5.2853   1.6565   6.0198   2.6297
    7.9428   0   11.0550   13.2282   9.5993   13.9627   10.5726
    3.1122   11.0550   0   8.3975   4.7686   9.1320   5.7419
    5.2853   13.2282   8.3975   0   6.9418   11.3052   7.9150
    1.6565   9.5993   4.7686   6.9418   0   7.6763   4.2862
    6.0198   13.9627   9.1320   11.3052   7.6763   0   8.6495
    2.6297   10.5726   5.7419   7.9150   4.2862   8.6495   0
    6.5408   14.4836   9.6529   11.8261   8.1973   12.5606   9.1705
    6.8921   14.8350   10.0043   12.1775   8.5486   12.9120   9.5219
    7.4815   15.4244   10.5937   12.7668   9.1380   13.5013   10.1112
    4.5054   12.4483   7.6176   9.7907   6.1619   10.5252   7.1351
    0.8382   8.7811   3.9504   6.1235   2.4947   6.8580   3.4679
    2.2898   10.2326   5.4019   7.5751   3.9463   8.3096   4.9195
    9.1334   17.0762   12.2455   14.4187   10.7899   15.1532   11.7631
    1.5238   9.4666   4.6359   6.8091   3.1803   7.5436   4.1535
    8.2582   16.2010   11.3703   13.5435   9.9147   14.2780   10.8879
    5.3834   13.3263   8.4956   10.6688   7.0399   11.4032   8.0131
    9.9613   17.9042   13.0735   15.2467   11.6178   15.9812   12.5911
    0.7818   8.7246   3.8939   6.0671   2.4382   6.8016   3.4115
    4.4268   12.3696   7.5389   9.7121   6.0833   10.4466   7.0565
    1.0665   9.0094   4.1787   6.3519   2.7230   7.0863   3.6962
```

```
    9.6190    17.5618    12.7311    14.9043    11.2755    15.6388    12.2487
    0.0463     7.9892     3.1585     5.3317     1.7028     6.0662     2.6761
    7.7491    15.6920    10.8613    13.0344     9.4056    13.7689    10.3788
    8.1730    16.1159    11.2852    13.4584     9.8295    14.1929    10.8027


Columns 8 through 14

    6.5408     6.8921     7.4815     4.5054     0.8382     2.2898     9.1334
   14.4836    14.8350    15.4244    12.4483     8.7811    10.2326    17.0762
    9.6529    10.0043    10.5937     7.6176     3.9504     5.4019    12.2455
   11.8261    12.1775    12.7668     9.7907     6.1235     7.5751    14.4187
    8.1973     8.5486     9.1380     6.1619     2.4947     3.9463    10.7899
   12.5606    12.9120    13.5013    10.5252     6.8580     8.3096    15.1532
    9.1705     9.5219    10.1112     7.1351     3.4679     4.9195    11.7631
         0    13.4329    14.0223    11.0462     7.3790     8.8306    15.6742
   13.4329         0    14.3737    11.3976     7.7304     9.1819    16.0255
   14.0223    14.3737         0    11.9869     8.3197     9.7713    16.6149
   11.0462    11.3976    11.9869         0     5.3436     6.7952    13.6388
    7.3790     7.7304     8.3197     5.3436         0     3.1280     9.9716
    8.8306     9.1819     9.7713     6.7952     3.1280         0    11.4231
   15.6742    16.0255    16.6149    13.6388     9.9716    11.4231         0
    8.0646     8.4159     9.0053     6.0292     2.3620     3.8135    10.6572
   14.7990    15.1503    15.7397    12.7636     9.0964    10.5479    17.3915
   11.9242    12.2756    12.8649     9.8888     6.2216     7.6732    14.5168
   16.5021    16.8535    17.4429    14.4668    10.7996    12.2511    19.0947
    7.3225     7.6739     8.2633     5.2872     1.6200     3.0715     9.9151
   10.9676    11.3189    11.9083     8.9322     5.2650     6.7166    13.5602
    7.6073     7.9587     8.5480     5.5719     1.9047     3.3563    10.1999
   16.1598    16.5111    17.1005    14.1244    10.4572    11.9088    18.7524
    6.5871     6.9385     7.5279     4.5518     0.8846     2.3361     9.1797
   14.2899    14.6412    15.2306    12.2545     8.5873    10.0389    16.8825
   14.7138    15.0652    15.6545    12.6784     9.0112    10.4628    17.3064


Columns 15 through 21

    1.5238     8.2582     5.3834     9.9613     0.7818     4.4268     1.0665
    9.4666    16.2010    13.3263    17.9042     8.7246    12.3696     9.0094
    4.6359    11.3703     8.4956    13.0735     3.8939     7.5389     4.1787
    6.8091    13.5435    10.6688    15.2467     6.0671     9.7121     6.3519
    3.1803     9.9147     7.0399    11.6178     2.4382     6.0833     2.7230
    7.5436    14.2780    11.4032    15.9812     6.8016    10.4466     7.0863
    4.1535    10.8879     8.0131    12.5911     3.4115     7.0565     3.6962
    8.0646    14.7990    11.9242    16.5021     7.3225    10.9676     7.6073
    8.4159    15.1503    12.2756    16.8535     7.6739    11.3189     7.9587
    9.0053    15.7397    12.8649    17.4429     8.2633    11.9083     8.5480
    6.0292    12.7636     9.8888    14.4668     5.2872     8.9322     5.5719
    2.3620     9.0964     6.2216    10.7996     1.6200     5.2650     1.9047
    3.8135    10.5479     7.6732    12.2511     3.0715     6.7166     3.3563
   10.6572    17.3915    14.5168    19.0947     9.9151    13.5602    10.1999
         0     9.7819     6.9072    11.4851     2.3055     5.9506     2.5903
    9.7819         0    13.6416    18.2195     9.0399    12.6850     9.3247
    6.9072    13.6416         0    15.3448     6.1652     9.8102     6.4500
   11.4851    18.2195    15.3448         0    10.7431    14.3881    11.0279
    2.3055     9.0399     6.1652    10.7431         0     5.2085     1.8483
    5.9506    12.6850     9.8102    14.3881     5.2085         0     5.4933
    2.5903     9.3247     6.4500    11.0279     1.8483     5.4933         0
   11.1428    17.8772    15.0024    19.5803    10.4007    14.0458    10.6855
    1.5701     8.3045     5.4298    10.0077     0.8281     4.4731     1.1129
    9.2729    16.0073    13.1325    17.7105     8.5309    12.1759     8.8156
    9.6968    16.4312    13.5565    18.1344     8.9548    12.5998     9.2396
```

Columns 22 through 25

```
   9.6190     0.0463     7.7491     8.1730
  17.5618     7.9892    15.6920    16.1159
  12.7311     3.1585    10.8613    11.2852
  14.9043     5.3317    13.0344    13.4584
  11.2755     1.7028     9.4056     9.8295
  15.6388     6.0662    13.7689    14.1929
  12.2487     2.6761    10.3788    10.8027
  16.1598     6.5871    14.2899    14.7138
  16.5111     6.9385    14.6412    15.0652
  17.1005     7.5279    15.2306    15.6545
  14.1244     4.5518    12.2545    12.6784
  10.4572     0.8846     8.5873     9.0112
  11.9088     2.3361    10.0389    10.4628
  18.7524     9.1797    16.8825    17.3064
  11.1428     1.5701     9.2729     9.6968
  17.8772     8.3045    16.0073    16.4312
  15.0024     5.4298    13.1325    13.5565
  19.5803    10.0077    17.7105    18.1344
  10.4007     0.8281     8.5309     8.9548
  14.0458     4.4731    12.1759    12.5998
  10.6855     1.1129     8.8156     9.2396
        0     9.6653    17.3681    17.7920
   9.6653          0     7.7954     8.2194
  17.3681     7.7954          0    15.9221
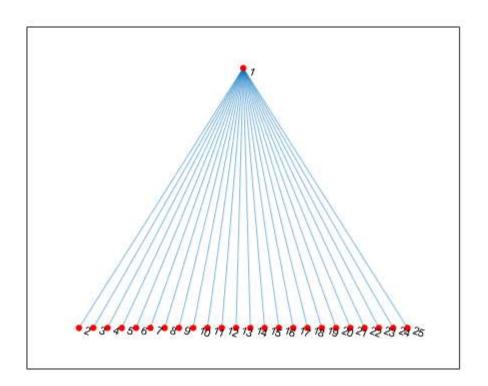  17.7920     8.2194    15.9221          0
```

Betweenness Centrality:

```
  276
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
    0
```

Network Diameter:

```
  19.5803
```

Closeness Centrality:

```
   0.0417
   0.0213
```

```
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
    0.0213
```

Modularity:
   -0.5000

Resilience Index:
    25
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2
     2