

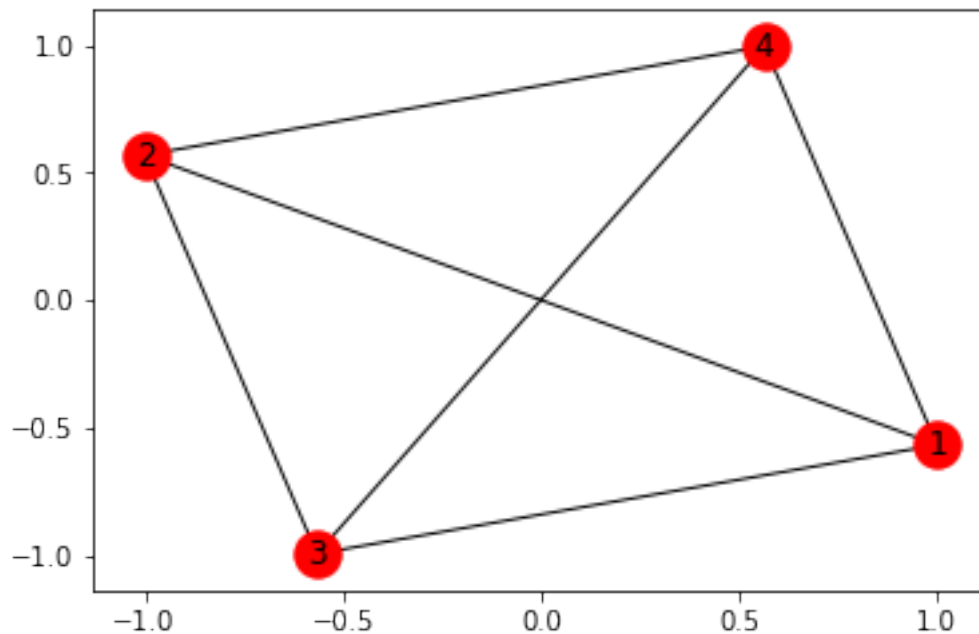
graphs

April 7, 2019

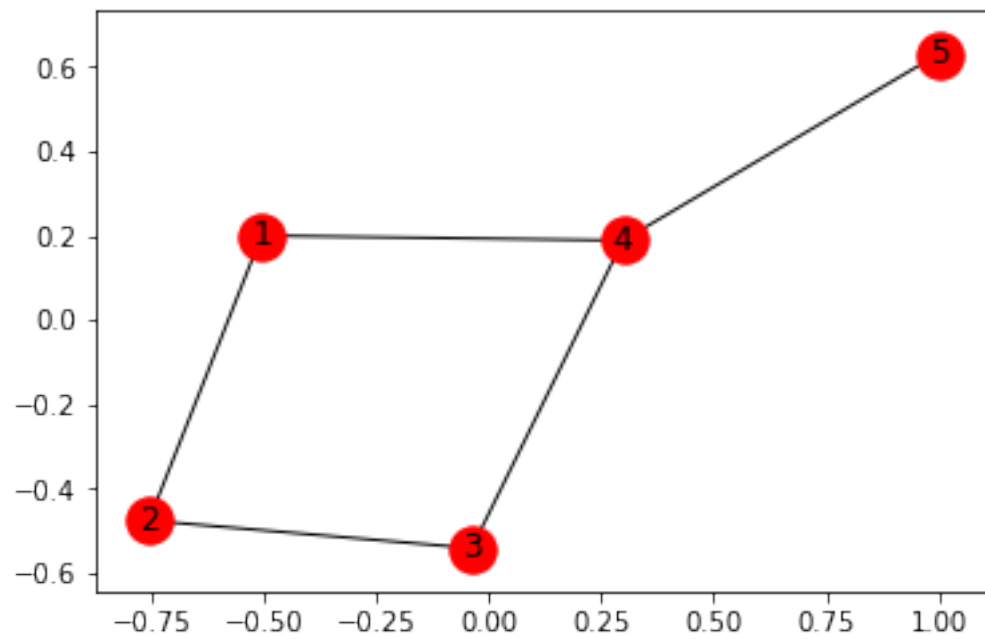
```
In [2]: %matplotlib inline
import matplotlib.pyplot as plt
import networkx as nx
```

```
In [2]: G = nx.Graph()
G.add_edge(1,2)
G.add_edge(2,3)
G.add_edge(3,1)
G.add_edge(3,4)
G.add_edge(4,1)
G.add_edge(4,2)
nx.draw_networkx(G)
plt.show()
```

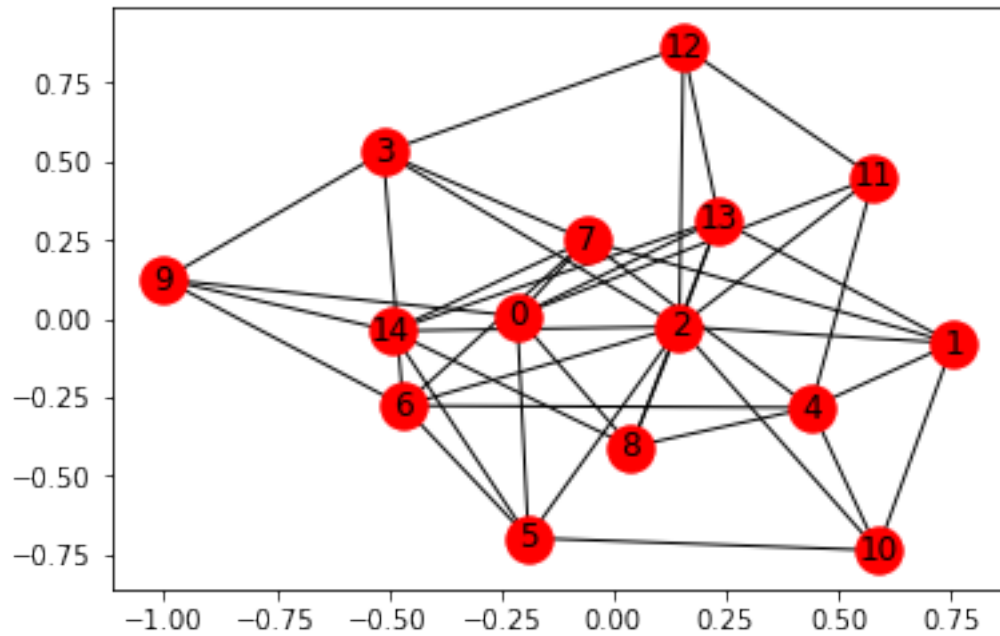
d:\python\lib\site-packages\networkx\drawing\nx_pylab.py:611: MatplotlibDeprecationWarning: is: is deprecated since 1.10, use np.isscalar instead
if cb.is_numlike(alpha):



```
In [3]: G = nx.Graph()
G.add_edges_from([(1,2), (2,3),(3,4), (4,1), (5,4)])
nx.draw_networkx(G)
plt.show()
```

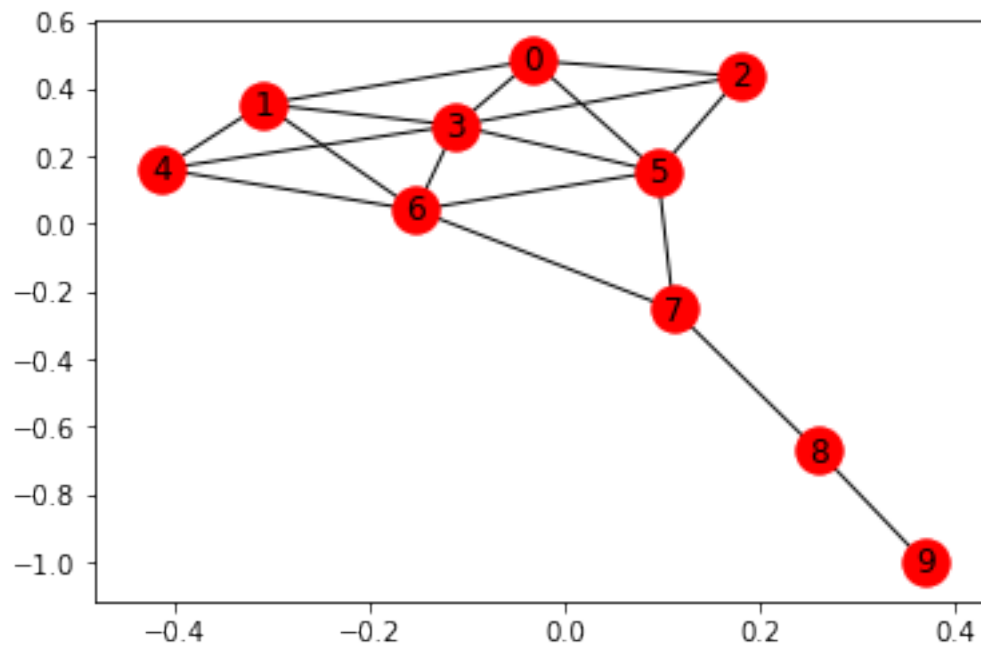


```
In [6]: k = nx.fast_gnp_random_graph(15,0.40)
nx.draw_networkx(k)
plt.show()
```



```
In [8]: G = nx.krackhardt_kite_graph()
        nx.draw_networkx(G)
        plt.show()
```

d:\python\lib\site-packages\networkx\drawing\nx_pylab.py:611: MatplotlibDeprecationWarning: is_ if cb.is_numlike(alpha):



```
In [10]: print(nx.has_path(G, source=1, target=9))
         print(nx.shortest_path(G, source=1, target=9))
         print(nx.shortest_path_length(G, source=1, target=9))
```

True

[1, 6, 7, 8, 9]

4

```
In [14]: all_paths = list(nx.shortest_simple_paths(G, source=1, target=9))
         for path in all_paths:
             print(path)
```

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[1, 6, 5, 7, 8, 9]

[1, 3, 5, 7, 8, 9]

[1, 4, 6, 7, 8, 9]

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[1, 3, 5, 6, 7, 8, 9]

[1, 4, 3, 5, 7, 8, 9]

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[1, 3, 2, 5, 6, 7, 8, 9]

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[1, 4, 6, 3, 2, 0, 5, 7, 8, 9]

```

```

In [11]: paths = nx.all_pairs_shortest_path(G)
         for path in paths:
             print(path)

```

```

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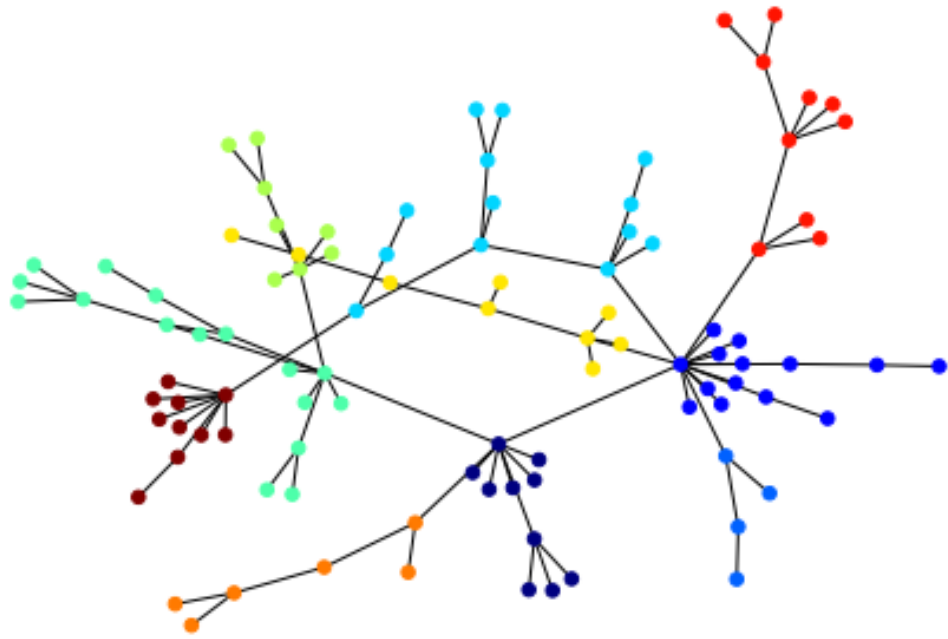
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```
In [14]: import community.community_louvain as community
        #print(dir(community))
        G = nx.powerlaw_cluster_graph(100, 1, .4, seed=101)
        partition = community.best_partition(G)
        for i in set(partition.values()):
            print("Society ",i)
            members = list_nodes = [nodes for nodes in partition.keys() if partition[nodes] == i]
            print(members)
        values = [partition.get(node) for node in G.nodes()]
        nx.draw_spring(G, cmap=plt.get_cmap('jet'), node_color=values, node_size=30, with_labels=True)
        plt.show()
        print("Level of modularity: ", community.modularity(partition, G))
```

```
Society 0
[1, 2, 9, 16, 20, 28, 29, 35, 57, 65, 78, 83, 89, 93]
Society 1
[1, 2, 9, 16, 20, 28, 29, 35, 57, 65, 78, 83, 89, 93]
Society 2
[1, 2, 9, 16, 20, 28, 29, 35, 57, 65, 78, 83, 89, 93]
Society 3
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Society 4
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Society 5
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Society 8
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Society 9
[1, 2, 9, 16, 20, 28, 29, 35, 57, 65, 78, 83, 89, 93]
```

```
d:\python\lib\site-packages\networkx\drawing\nx_pylab.py:611: MatplotlibDeprecationWarning: is_numlike is deprecated and will be removed in a future version. Use np.isscalar or isinstance(value,(int,float)) instead.
    if cb.is_numlike(alpha):
```

Level of modularity: 0.7941026425874911

In []: