footballers_example

October 17, 2018

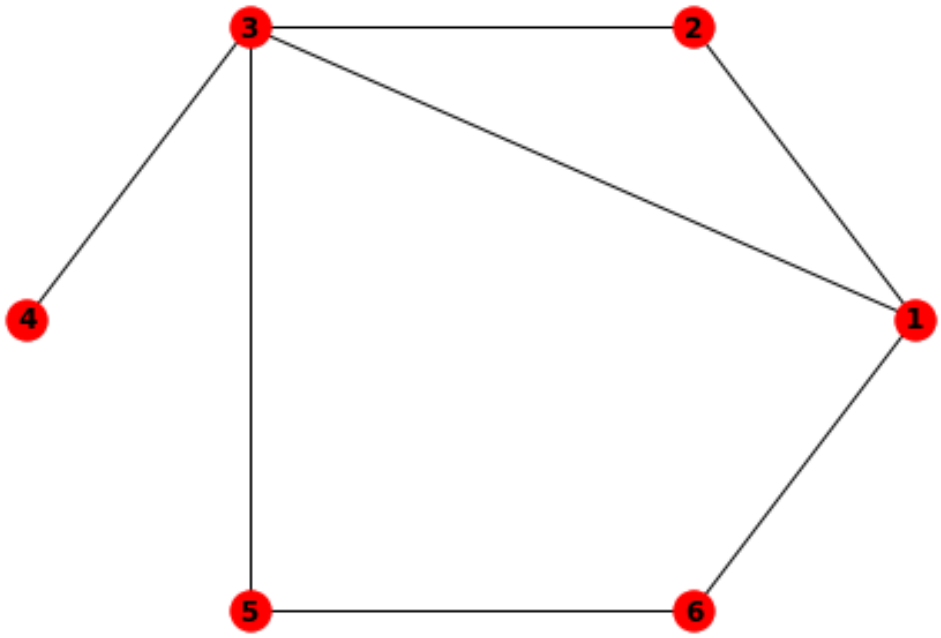
In [1]:
```
"""
Script: application of some concepts of
graph theory to a footballers example
"""
import networkx as nx
import matplotlib.pyplot as plt
```

In [2]:
```
# create a graph
G = nx.Graph()
```

In [3]:
```
# create dictionary of footballers
jugadores = dict()
jugadores['Iker Casillas'] = 1
jugadores['Raúl Albiol'] = 2
jugadores['Gerard Piqué'] = 3
jugadores['Carlos Marchena'] = 4
jugadores['Carles Puyol'] = 5
jugadores['Andrés Iniesta'] = 6
```

In [4]:
```
# add nodes and edges to Graph
G.add_edges_from([(jugadores['Iker Casillas'],
                   jugadores['Raúl Albiol'],{'num_pases':30})])
G.add_edges_from([(jugadores['Iker Casillas'],
                   jugadores['Gerard Piqué'],{'num_pases':2})])
G.add_edges_from([(jugadores['Carlos Marchena'],
                   jugadores['Gerard Piqué'],{'num_pases':3})])
G.add_edges_from([(jugadores['Carles Puyol'],
                   jugadores['Gerard Piqué'],{'num_pases':1})])
G.add_edges_from([(jugadores['Raúl Albiol'],
                   jugadores['Gerard Piqué'],{'num_pases':4})])
G.add_edges_from([(jugadores['Andrés Iniesta'],
                   jugadores['Carles Puyol'],{'num_pases':26})])
G.add_edges_from([(jugadores['Iker Casillas'],
                   jugadores['Andrés Iniesta'],{'num_pases':12})])
```

In [5]:
```
# drawing the graph
nx.draw_shell(G, with_labels=True, font_weight='bold')
```




```
In [6]: # change the order of footballers dictionary
        n_jugadores = {jugadores[x]:x for x in jugadores}
        jugadores = n_jugadores

In [7]: # extract degree centrality
        degree = nx.degree_centrality(G)
        degree = {jugadores[x]:degree[x] for x in degree}
        degree

Out[7]: {'Andrés Iniesta': 0.4,
         'Carles Puyol': 0.4,
         'Carlos Marchena': 0.2,
         'Gerard Piqué': 0.8,
         'Iker Casillas': 0.6000000000000001,
         'Raúl Albiol': 0.4}

In [8]: # extract closeness centrality
        closeness = nx.closeness_centrality(G)
        closeness = {jugadores[x]:closeness[x] for x in closeness}
        closeness

Out[8]: {'Andrés Iniesta': 0.5555555555555556,
         'Carles Puyol': 0.625,
         'Carlos Marchena': 0.5,
```

```
 'Gerard Piqué': 0.8333333333333334,
 'Iker Casillas': 0.7142857142857143,
 'Raúl Albiol': 0.625}
```

In [9]:
```
# extract closeness centrality whit weight
closeness = nx.closeness_centrality(G, distance='num_pases')
closeness = {jugadores[x]:closeness[x] for x in closeness}
closeness
```

Out[9]:
```
{'Andrés Iniesta': 0.06578947368421052,
 'Carles Puyol': 0.17857142857142858,
 'Carlos Marchena': 0.1388888888888889,
 'Gerard Piqué': 0.20833333333333334,
 'Iker Casillas': 0.17857142857142858,
 'Raúl Albiol': 0.125}
```