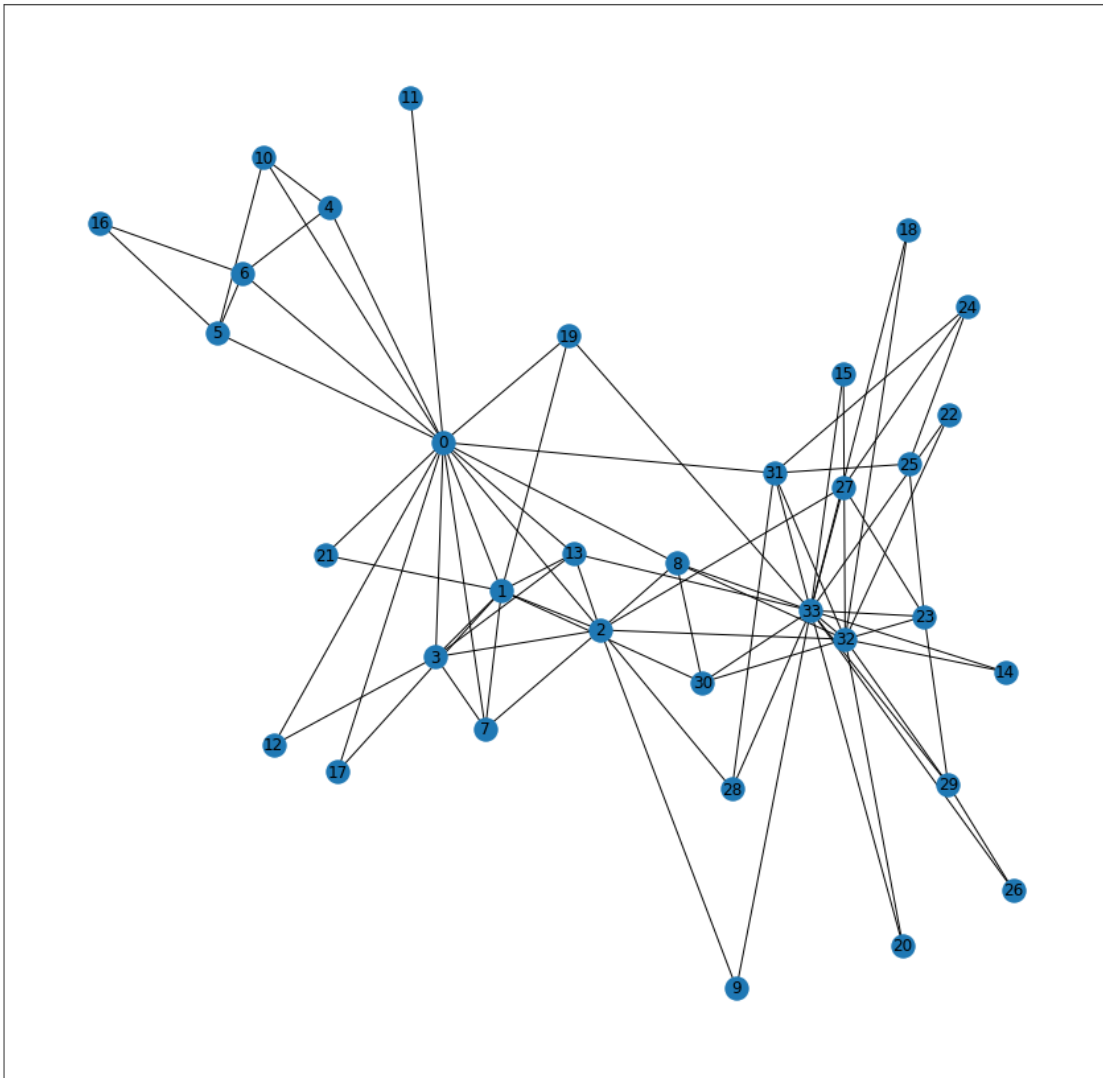


ex5

January 27, 2023

```
[ ]: import matplotlib.pyplot as plt  
import networkx as nx
```

```
[ ]: G = nx.karate_club_graph()  
plt.figure(figsize =(15, 15))  
nx.draw_networkx(G, with_labels = True)
```



```
[ ]: # Centrality_degree_v = d_v/(|N|-1)
deg centrality = nx.degree centrality(G)
print(deg centrality)

{0: 0.48484848484848486, 1: 0.2727272727272727, 2: 0.30303030303030304, 3:
0.18181818181818182, 4: 0.09090909090909091, 5: 0.12121212121212122, 6:
0.12121212121212122, 7: 0.12121212121212122, 8: 0.15151515151515152, 9:
0.06060606060606061, 10: 0.09090909090909091, 11: 0.030303030303030304, 12:
0.06060606060606061, 13: 0.15151515151515152, 14: 0.06060606060606061, 15:
0.06060606060606061, 16: 0.06060606060606061, 17: 0.06060606060606061, 18:
0.06060606060606061, 19: 0.09090909090909091, 20: 0.06060606060606061, 21:
0.06060606060606061, 22: 0.06060606060606061, 23: 0.15151515151515152, 24:
0.09090909090909091, 25: 0.09090909090909091, 26: 0.06060606060606061, 27:
0.12121212121212122, 28: 0.09090909090909091, 29: 0.12121212121212122, 30:
0.12121212121212122, 31: 0.18181818181818182, 32: 0.36363636363636365, 33:
0.5151515151515151}
```

```
[ ]: close centrality = nx.closeness centrality(G)
# G is the Karate Social Graph
print(close centrality)

{0: 0.5689655172413793, 1: 0.4852941176470588, 2: 0.559322033898305, 3:
0.4647887323943662, 4: 0.3793103448275862, 5: 0.38372093023255816, 6:
0.38372093023255816, 7: 0.44, 8: 0.515625, 9: 0.4342105263157895, 10:
0.3793103448275862, 11: 0.36666666666666664, 12: 0.3707865168539326, 13:
0.515625, 14: 0.3707865168539326, 15: 0.3707865168539326, 16:
0.28448275862068967, 17: 0.375, 18: 0.3707865168539326, 19: 0.5, 20:
0.3707865168539326, 21: 0.375, 22: 0.3707865168539326, 23: 0.39285714285714285,
24: 0.375, 25: 0.375, 26: 0.3626373626373626, 27: 0.4583333333333333, 28:
0.4520547945205479, 29: 0.38372093023255816, 30: 0.4583333333333333, 31:
0.5409836065573771, 32: 0.515625, 33: 0.55}
```

```
[ ]: bet centrality = nx.betweenness centrality(G, normalized = True, endpoints =
False)
print(bet centrality)

{0: 0.43763528138528146, 1: 0.053936688311688304, 2: 0.14365680615680618, 3:
0.011909271284271283, 4: 0.0006313131313131313, 5: 0.02998737373737374, 6:
0.029987373737373736, 7: 0.0, 8: 0.05592682780182781, 9: 0.0008477633477633478,
10: 0.0006313131313131313, 11: 0.0, 12: 0.0, 13: 0.04586339586339586, 14: 0.0,
15: 0.0, 16: 0.0, 17: 0.0, 18: 0.0, 19: 0.03247504810004811, 20: 0.0, 21: 0.0,
22: 0.0, 23: 0.017613636363636363, 24: 0.0022095959595959595, 25:
0.0038404882154882154, 26: 0.0, 27: 0.0223345358345358, 28:
0.0017947330447330447, 29: 0.0029220779220779218, 30: 0.014411976911976909, 31:
0.13827561327561325, 32: 0.145247113997114, 33: 0.30407497594997596}
```