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Web Mining Lab 10 Part A using NetworkX library in-built community detection algorithms

a. Zachary karate club network dataset (refer folder A for networkX package implementation)

```python
import matplotlib.pyplot as plt
import networkx as nx
from networkx.algorithms.community.centrality import girvan_newman
import community.community_louvain as community_louvain
import matplotlib.cm as cm
import community

G = nx.karate_club_graph()
communities = girvan_newman(G)  #applying girvan newman algorithm using networkx on G

node_groups = []
for com in next(communities):
  node_groups.append(list(com)) #list of nodes of same community

print(node_groups)

[[0, 1, 3, 4, 5, 6, 7, 10, 11, 12, 13, 16, 17, 19, 21], [2, 8, 9, 14, 15, 18, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33]]

color_map = []
for node in G:
    if node in node_groups[0]:
        color_map.append('cyan')
    else:
        color_map.append('green')
graph = nx.draw_networkx(G,node_size=600,node_color=color_map)
#plotting the graph
plt.show()
```
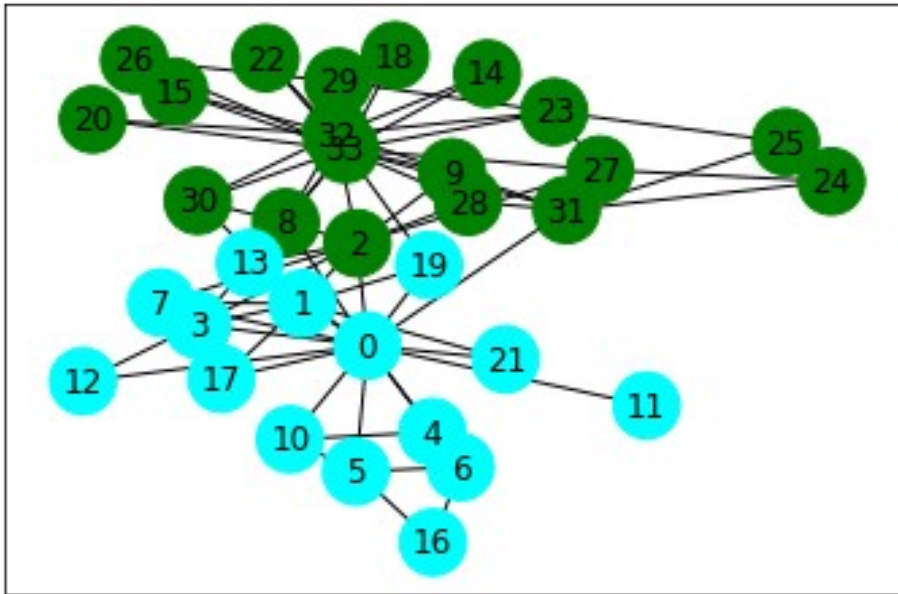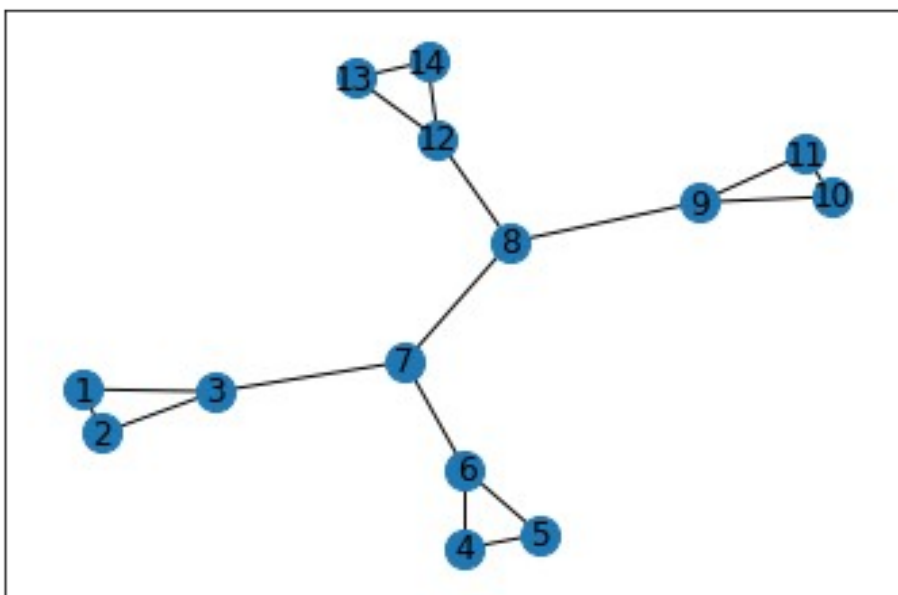
b. Facebook Friend Connection network dataset (using luovian algorithm and networkX library)

```
G2 = nx.Graph()
G2.add_edges_from([(1,2),(1,3),(2,1),(2,3),(3 ,1),(3 ,2),(3 ,7),
(4 ,5),(4 ,6),(5,4),(5,6),(6,4),(6,5),(6,7),(7,3),(7,6)
                ,(7,8),(8,7),(8,9),(8,12),(9,8),(9,11),(9,10),(10,9),
(10,11),(11,9),(11,10),(12,8),(12,14),(12,13),(13,12),(13,14)
                ,(14,13),(14,12)])  #adding edges to graph from edge
list
nx.draw_networkx(G2,node_size=200)
```

```
partition=community_louvain.best_partition(G2) #partitioning nodes in
graph based on modularity
pos = nx.spring_layout(G2) #dictionary of positions keyed by node

cmap = cm.get_cmap('viridis', max(partition.values()) + 1) #colour map
nx.draw_networkx(G2, pos, partition.keys(), node_size=400,
                    cmap=cmap, node_color=list(partition.values()))
plt.show() #plotting the graph
```