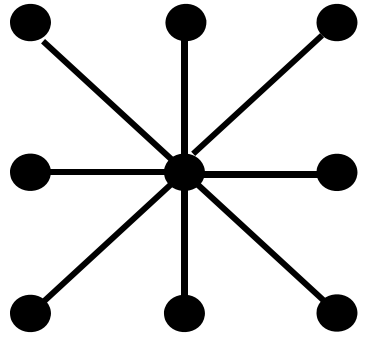
Quiz 2

1. Make a program of counting the number of triangles in “karate club network”. Show the code and its results.
2. Compute the maximum number of triangles in a graph of 9 nodes.
3. Draw a graph of 9 nodes and 12 edges that contains no triangles.

- Submit from Tokyo Tech OCW-i
- Deadline: ??:??(Japan Standard Time) on Dec. 5(Wed)

1. Network data is available in the following sites.
http://www-personal.umich.edu/~mejn/netdata/
http://networkrepository.com/soc-karate.php

2.
3.



```python
import networkx as nx
import matplotlib.pyplot as plt
import numpy as np

G = nx.karate_club_graph()
plt.figure(figsize=(6, 6))
nx.draw_spring(G, node_size=400, node_color='red', with_labels=True, font_weight='bold')

print("n =", nx.number_of_nodes(G))
print("m =", nx.number_of_edges(G))
A= nx.adjacency_matrix(G).todense()
print(A)
print(A*A)

print("sum", np.sum(A))
print("trace", np.trace(A))
```

```
n = 34
m = 78
[[0 1 1 ... 1 0 0]
 [1 0 1 ... 0 0 0]
 [1 1 0 ... 0 1 0]
 ...
 [1 0 0 ... 0 1 1]
 [0 0 1 ... 1 0 1]
 [0 0 0 ... 1 1 0]]
[[16  7  5 ...  0  3  4]
 [ 7  9  4 ...  1  2  3]
 [ 5  4 10 ...  3  1  6]
 ...
 [ 0  1  3 ...  6  1  2]
 [ 3  2  1 ...  1 12 10]
 [ 4  3  6 ...  2 10 17]]
sum 156
trace 0
```