

Assignment #3

For this assignment, I have gotten two large datasets from [SNAP](#), and also I have created one graph and a very simple network which represents the friendship between My friends and I in the university dormitory.

I have also used some predefined functions which have been provided in [NetworkX](#) library.

Here is a piece of code which was common for those three datasets:

```
# Fit the models
n = len(G.nodes())
m = len(G.edges())
p = 2 * m / (n * (n - 1))

ER = nx.erdos_renyi_graph(n, p)
WS = nx.watts_strogatz_graph(n, 3, 0.5)
BA = nx.barabasi_albert_graph(n, 1)
```

First we need to fit those three models which have been mentioned in the lectures.

Based on the results, every time I runned this piece of program the results would be changed.

But the **WS** and **BA** models were more flexible and by changing their input argument values we could get some results closer to the main network.

I have also calculated the below features for both main and artificial graphs:

1. **Degree distribution**
2. **Clustering coefficient**
3. **Transitivity**

In most of the cases the value of artificial networks was less than the main network.

These are the values corresponding to main networks.

	1) Dormitory friendship	2) Wiki vote	3) CA GrQc
Degree distribution	[0, 1, 1, 2, 5, 1]	Too long to be represented	Too long to be represented
Clustering coefficient	0.6933333333333333 4	0.08156344522820935	0.529635811052136
Transitivity	0.765957446808510 6	0.05285122817867548	0.6298424741263426

For the first network both WS and BA had good similarity in the results. For the second and third network none of the models were good enough, but by changing their parameters value the results would be changed too.