Small-world networks and model, Homework #1

You are given three networks in Pajek format (edge list and LNA formats are also available).

* The famous [Zachary karate club network](#) (small)
* [iMDB actors collaboration network](#) (medium)
* A part of [Google web graph](#) (large)

I. Watts-Strogatz small-world graphs

1. **(answer)** Study the algorithm for generating Watts-Strogatz small-world graphs $G(n, k, p)$ introduced in lectures. Does the algorithm generate networks with realistic structure? What is the time complexity of the algorithm?

2. **(code)** Implement the algorithm and generate Watts-Strogatz small-world graphs that best match networks above. *(Set k to $\langle k \rangle$ rounded to the nearest even number and try to find the value of p that best reproduces $\langle C \rangle$.)* Compute their average node clustering coefficient $\langle C \rangle$ and approximate distance between the nodes $\approx \langle d \rangle$. Are the results expected or are they surprising?

II. Homework #1 review

(Write solutions on the blackboard.)