Homework1 Problem3

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1. How to decide on the parameters of ups and erdos renyi?
—- We are told that the number of nodes of the graphs are the same as the graph provided. Therefore, to calculate the number of nodes in the provided graph, we just need to calculate the length of the key list in the graph. To get the number of edges, we can write a function to go through all the neighbors of each node, which are sets representing the values of the keys in the dictionary, and count all the number of elements in total. Divide that number by two. What we get is 1347 nodes and 3112 edges

For upa, we need the number of edges of node. Divide the number of edges by number of nodes. 3112/1347
For erdos-renyi,we need the probability of edges. Divide the number of edges by the number of edges of the complete graph generated by all 1347 nodes, which is $1347 * (1347 - 1)/2$.

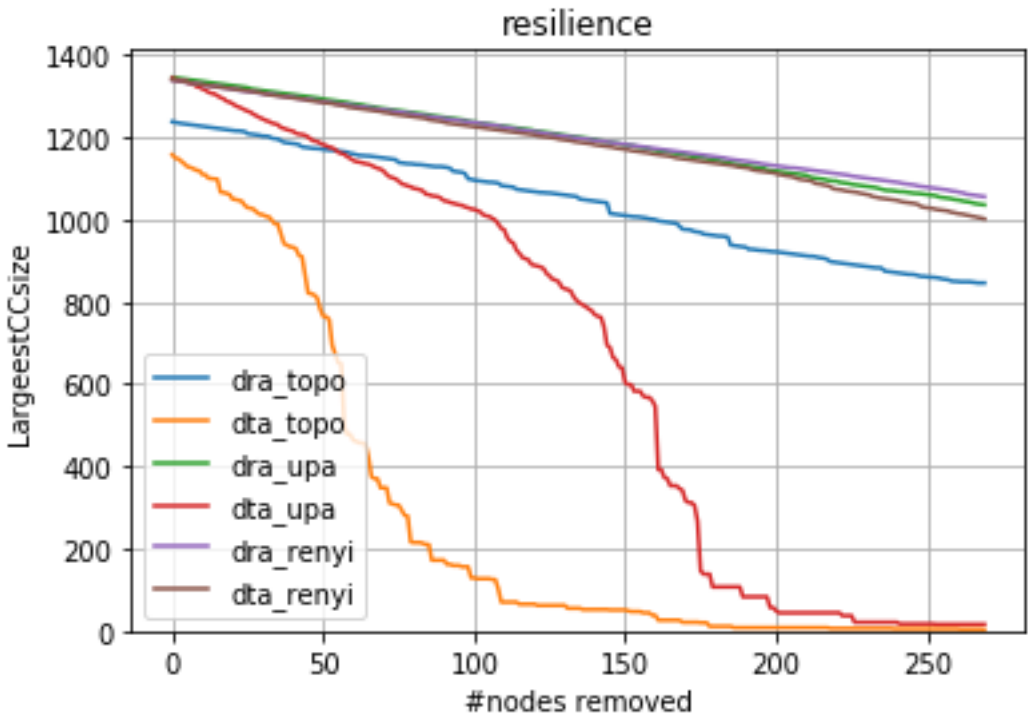
0.1 Discussion

1. Each graph: The real world graph is less resilient than the other two graphs in general. However, it is much more resilient to random attacks than targeted attacks. The upa graph's resilience pattern is similar to the real world graph. It is resilient and maintains a relatively steady Largest CC size with random attacks. It is vulnerable to targeted attacks. The erdos-renyi graph shows a resilience to both random attacks and targeted attacks, with a decrease in targeted attacks.

2. Comparing the two random graphs: The results are indeed expected based on their modelings. The upa graph showed low resilience against targeted attack, showing that it has many highly connected points, hubs. The erdos-renyi graph showed resilience against both types of attacks, showing that the connectivity is more evenly distributed and does not contain many hubs.

3. If I am designing my own topology, I would make the connectiveness evenly distributed instead of creating hubs. This way, it has more resilience against targeted attack.

4. The real world topology is not very well designed in terms of its resilience against targeted attack. However, in the real world not every topology can be evenly distributed. Many ones have hubs and highly connected portions, so it will not be so ideal.



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