Introduction to Complexity (Spring 2013)

11.6 Submit Unit 11 Homework » Unit 11 Homework

Instructions 1

Please download writeup for this homework, and refer to it in order to answer the questions below.

Question 2

See the picture of the first network in the homework writeup. Which of the following is the correct degree distribution for this netwo

- Degree distribution A (see homework writeup).
- Degree distribution B (see homework writeup).
- Degree distribution C (see homework writeup).

Question 3

See the picture of the first network in the homework writeup.

What is the clustering coefficient of this network?

Hint: Find the clustering with respect to each of the 8 nodes, and then take the average.

- 0.5
- 0.67
- 0.75

Question 4

See the picture of the first network in the homework writeup.

How long is the shortest path between Dan and Lily?

- 3 hops
- 4 hops
- 5 hops

Question 5

See the picture of the second network in the homework writeup.

What is Alan's in-degree?

- 2
- 3
- 4
- 5

Question 6

See the picture of the second network in the homework writeup.

What is Alan's out-degree?

- 2
- 3
- 4
- 5

Question 7

Download small-world.nlogo from the Course Materials page and open it. Set *node-count* to 200, *neighbor-count* to 4, and *beta* to 0 **setup**. Record **global-average-distance**. Now change *beta* to 0.05, click setup, and record **global-average-distance.** Do the same f to 0.1, 0.2, and 0.3.

Which change in beta yields the largest decrease in **global-average-distance**?

(E.g., suppose *beta* = 0.2 gave global-average distance = 3.8, and *beta* = 0.3 gave global-average-distance = 3.6. Then the change fron to *beta* = 0.3 would yield decrease 3.8 – 3.6 = 0.2.)

- The change from *beta* = 0 to *beta* = 0.05 yields largest decrease.
- The change from *beta* = 0.05 to *beta* = 0.1 yields largest decrease.
- The change from *beta* = 0.1 to *beta* = 0.2 yields largest decrease.
- The change from *beta* = 0.2 to *beta* = 0.3 yields largest decrease.
- All the decreases were equal.

Question 8

Using small-world.nlogo, compare the value of **global-average-distance** when *beta* is 0.05 (5% of the links rewired) to when *beta* is 1 the links are rewired), both with node count at 200 and neighbor count at 4. By what factor does global-average-distance change? (I (**global average distance** for *beta* = 0.05) divided by (**global average distance** for *beta* = 1.00?)

Choose the answer closest to what you obtained.

- About 50
- About 12
- About 1.5