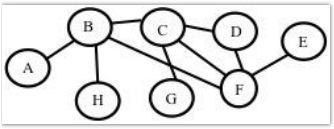
Instructions 1

You may use any course materials, websites, Netlogo models, calculators, etc. for this test. Just don't ask another person for the an share your answers with other people.

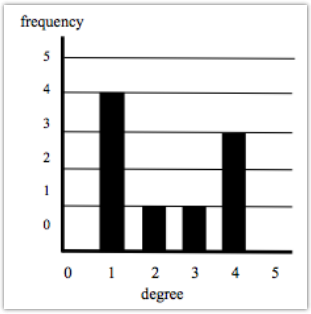
Question 2

Consider the following network.

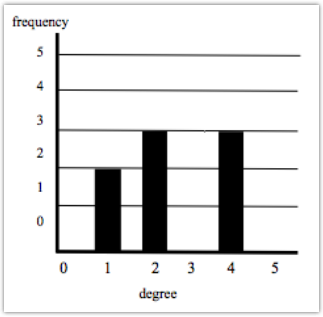


Which of the following is the correct degree distribution for this network?

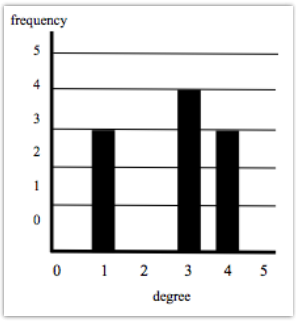
- A.



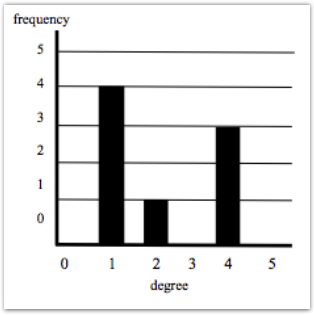
- B.



- C.



- D.



Question 3

For the network given in Question 1, what is the clustering coefficient? [Hint: Find the clustering with respect to each of the 8 nodes take the average. Nodes with only one link coming into them have clustering 0.]

- A. 0.5
- B. 0.67
- C. 0.75
- D. 0.23
- E. 0.46

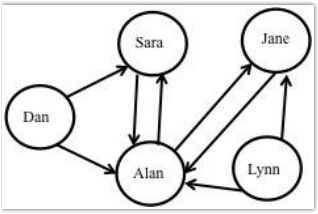
Question 4

For the network given in Question 1, how long is the shortest path between nodes A and E?

- A. 2 hops
- B. 3 hops
- C. 4 hops
- D. 5 hops

Question 5

Consider the network below:



What is Alan's in-degree?

- A. 2
- B. 3
- C. 4
- D. 5

Question 6

For the network given in Question 4, what is Alan's out-degree?

- A. 2
- B. 3
- C. 4
- D. 5

Question 7

Consider the following statements about small-world networks:

I. In a small-world network, every pair of nodes has at most six degrees of separation.

II. In a small-world network, the median path-length between pairs of nodes is 5.

III. In a small-world network, there are relatively few long-distance links, but most pairs of nodes are separated by short paths.

IV. Small-world networks tend to have a lower clustering coefficient than random networks with the same number of nodes and link

V. Small-world networks tend to have a higher clustering coefficient than random networks with the same number of nodes and link

Which of these statements is true?

- A. I
- B. II
- C. II, III, and V
- D. III and IV
- E. III and V

Question 8

Suppose you are presented with data from three different networks: Networks I, II, and III, all with the same number of nodes and li told that one of them is a regular network, one is a small-world network, and one is a random network. For each network you calc average path length and clustering coefficient, and get the following results:

Network	L (average path length)	C (clustering coefficient)
I	3.11	0.01
II	4.35	0.44
III	17	0.6

Which of the following should you conclude?

- A. Network I is the random network, II is the small-world network, and III is the regular network.
- B. Network I is the small-world network, II is the random network, and III is the regular network.
- C. Network I is the random network, II is the regular network, and III is the small-world network.
- D. Network I is the small-world network, II is the regular network, and III is the random network.

Question 9

Which of the following is true concerning scale-free networks?

- A. Any network with a "long-tailed" degree distribution is scale free.
- B. Any network that does not have a *normal* ("bell-curve") degree distribution is scale-free.
- C. Any network with a power-law degree distribution is scale free.
- D. Any network that has many hubs is scale-free

Question 10

Which of the following is true concerning scale-free networks?

- A. Most nodes have high degree.
- B. The degree distribution has a "long tail".
- C. They are robust to hub node failure.
- D. They have normal (bell-curve-shaped) degree distributions.