

Unit 6 - Week 3

Course outline

How does an NPTEL online course work?

Prerequisite Assignment

MATLAB

Week 1

Week 2

Week 3

- 21 - Biological Networks
- 22 - Network Perturbations
- 23 - Community Detection
- 24 - Network Motifs
- 25 - Lab: Cytoscape
- 26 - Lab: Cytoscape
- 27 - Lab: Network Biology
- Quiz : Practice Assignment 3
- Quiz : Assignment 3

Computational Systems Biology : Week 3 Feedback Form

week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

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Assignment 3

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-02-19, 23:59 IST.

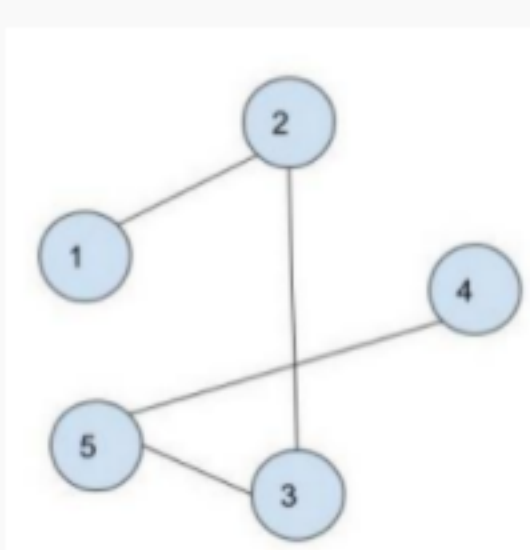
1) The _____ centrality of a node denoted as N_1 , is the reciprocal of the sum of the shortest distances between N_1 and all other nodes 1 point

- Closeness
- Betweenness
- Degree
- None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: Closeness

Answer the Q2 – Q6 using the figure below



2) What is the sparse representation of the adjacency matrix (A) of this network? 1 point

- $$\begin{bmatrix} (1,2) & 1 \\ (2,3) & 1 \\ (3,5) & 1 \\ (4,5) & 1 \end{bmatrix}$$
- $$\begin{bmatrix} (2,1) & 1 \\ (3,2) & 1 \\ (5,3) & 1 \\ (5,4) & 1 \end{bmatrix}$$
- $$\begin{bmatrix} (2,1) & 1 \\ (1,2) & 1 \\ (3,2) & 1 \\ (2,3) & 1 \\ (5,3) & 1 \\ (5,4) & 1 \\ (3,5) & 1 \\ (4,5) & 1 \end{bmatrix}$$
- None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: (2,1) 1 (1,2) 1 (3,2) 1 (2,3) 1 (5,3) 1 (5,4) 1 (3,5) 1 (4,5) 1

3) What is the output for the command: full(A) 1 point

- $$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \end{bmatrix}$$
- $$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$
- $$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 \end{bmatrix}$$
- $$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

No, the answer is incorrect. Score: 0

Accepted Answers:
$$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 \end{bmatrix}$$

4) What is the output for the command: [i, j] = find(A); disp([i,j]) 1 point

- 2 1
- 3 2
- 5 3
- 5 4
- 2 1
- 1 2
- 3 2
- 2 3
- 5 3
- 5 4
- 3 5
- 4 5
- 1 2
- 2 3
- 3 5
- 4 5
- 2 1
- 1 2
- 3 2
- 2 3
- 5 4
- 3 5
- 4 5

No, the answer is incorrect. Score: 0

Accepted Answers: 2 1 1 2 3 2 2 3 5 3 5 4 5

5) What is the command for finding the degrees of each node in the network? 1 point

- degrees = sum(A)
- degrees = nnz(A)
- degrees = nonzeros(A)
- None

No, the answer is incorrect. Score: 0

Accepted Answers: degrees = sum(A)

6) What is the MatlabBGL command for finding the number of edges in the network? 1 point

- 0.5*num_edges(A)
- num_edges(A)
- 0.5*nnz(A)
- None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: 0.5*num_edges(A) 0.5*nnz(A)

7) The number of motifs in a complete undirected graph with 5 vertices is 1 point

- 0
- 1
- 2
- 3

No, the answer is incorrect. Score: 0

Accepted Answers: 0

8) What is the mean clustering coefficient of a regular lattice with 10 nodes and where each node has a degree of 4? Write answers up to 2 decimals 1 point

No, the answer is incorrect. Score: 0

Accepted Answers: (Type: Range) 0.48,0.52

9) Write a program in MATLAB to build an Erdős-Rényi network with 200 nodes and 3000 edges. Calculate its clustering coefficient. Write answers up to 2 decimals 1 point

No, the answer is incorrect. Score: 0

Accepted Answers: (Type: Range) 0.10,0.20

10) Which of the following graphs is the **LEAST** affected by **RANDOM** network perturbations (random deletion of a node)? 1 point

- Random network
- Barabasi-Albert network
- Watts-Strogatz network
- Regular lattice

No, the answer is incorrect. Score: 0

Accepted Answers: Barabasi-Albert network