THE UNIVERSITY OF SYDNEY

COMP5313 Lab 1

Graphs

The goal of this tutorial is to review the notions of network, triadic closure, embeddedness and regions.

Exercise 1: Breadth-First Search

How many links does the network in Figure 1 have?

Is this network directed or undirected?

Is this network connected?

In what order nodes get visited during a breadth-first search starting at node B if neighbors are picked in the lexicographical order of their label?

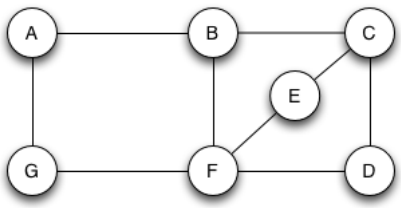


Figure 1: A network of 7 nodes

Duration: 5 min

Exercise 2: Triadic closure

What is the clustering coefficient of node A in the graph represented in Figure 2(a)?

What are the nodes that violate the tradic closure property in the graph of Figure 2(b)? Explain why?

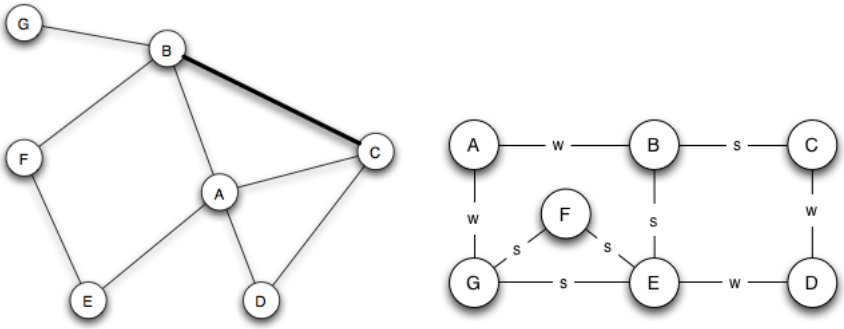
Duration: 10 min

Exercise 3: Embeddedness vs. betweenness

What are the embeddedness and betweenness of edges $\langle A, B\rangle$ and $\langle D, F\rangle$ in the graph of Figure 3?

Is $\langle A, B\rangle$ a bridge or a local bridge? What is its span? Explain.

Duration: 15 min



(a) A sample connected graph

(b) A graph with weak ties and strong ties labelled as 'w' and 's', respectively

Figure 2: Quantifying the triadic closure in a network

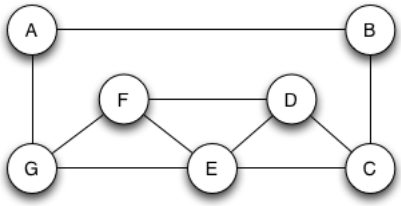


Figure 3: Another sample network of 7 nodes

Exercise 4: Partitioning

What are the regions at level 2 obtained with the Girvan-Newman method applied to the graph in Figure 3? Explain.

Duration: 20 min