# Clustering Coefficient

Introduction to Network Science Carlos Castillo Topic 06



#### Contents

- Local clustering coefficient
- Global clustering coefficient

#### Sources

- Albert László Barabási: Network Science.
  Cambridge University Press, 2016.
  - Follows almost section-by-section chapter 02
- URLs cited in the footer of specific slides

### How many links, maximum?

 Remember, the maximum number of links between k nodes is

$$\frac{k(k-1)}{2}$$

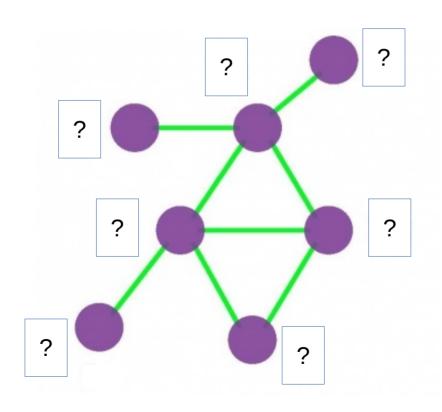
## Local clustering coefficient

- The local clustering coefficient C<sub>i</sub> is a property of a node i
- Let L<sub>i</sub> represent the number of links among neighbors of node i

$$C_i = \frac{L_i}{\frac{k_i(k_i-1)}{2}} = \frac{2L_i}{k_i(k_i-1)}$$
  $C_i \triangleq 0 \text{ if } k_i \leq 1$ 

#### Exercise

What is the local clustering coefficient of each node?



$$C_i = \frac{2L_i}{k_i(k_i - 1)}$$

$$C_i \triangleq 0 \text{ if } k_i \leq 1$$

Draw in Nearpod Draw-It https://nearpod.com/student/Code to be given during class

## Average clustering coefficient

 The average clustering coefficient is a property of the entire graph

$$\langle C \rangle = \frac{1}{N} \sum_{i=1}^{N} C_i$$

Sometimes this is called the *curvature* of a graph

# Summary

## Things to remember

Local and global clustering coefficient

### Practice on your own

 Calculate local clustering coefficient of each node in this graph

