

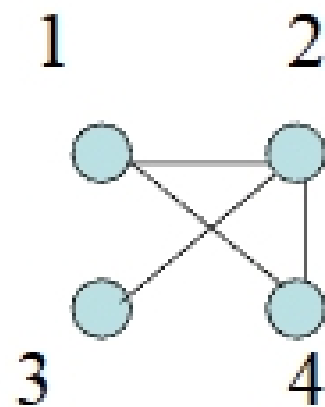
# Basic Network Properties and How to Calculate Them

- Data input
- Number of nodes
- Number of edges
- Symmetry
- Degree sequence
- Average nodal degree
- Degree distribution
- Clustering coefficient
- Average hop distance (simplified average distance)
- Connectedness
- Finding and characterizing connected clusters

# Matlab Preliminaries

- In Matlab everything is an array
- So
  - `a = [ 2 5 28 777]`
  - `for i = a`
  - do something
  - `end`
- Will “do something” for  $i =$  the values in array  $a$
- `[a;b;c]` yields a column containing a b c
- `[a b c]` yields a row containing a b c

# Matrix Representation of Networks



$$\gg A = [0 \ 1 \ 0 \ 1; 1 \ 0 \ 1 \ 1; 0 \ 1 \ 0 \ 0; 1 \ 1 \ 0 \ 0]$$

A =

$$\begin{array}{cccc} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 \end{array}$$

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A is called the adjacency matrix

$A(i, j) = 1$  if there is an arc from  $i$  to  $j$

$A(j, i) = 1$  if there is also an arc from  $j$  to  $i$

In this case  $A$  is symmetric and the graph is undirected