

# Graph Theory

A complex network graph visualization with many nodes and edges. The nodes are represented by small, semi-transparent spheres in various colors including blue, red, yellow, green, white, and grey. The edges are thin, light grey lines connecting the nodes, creating a dense web of connections. The background is dark, making the nodes and edges stand out.

Introduction

# Computational Thinking

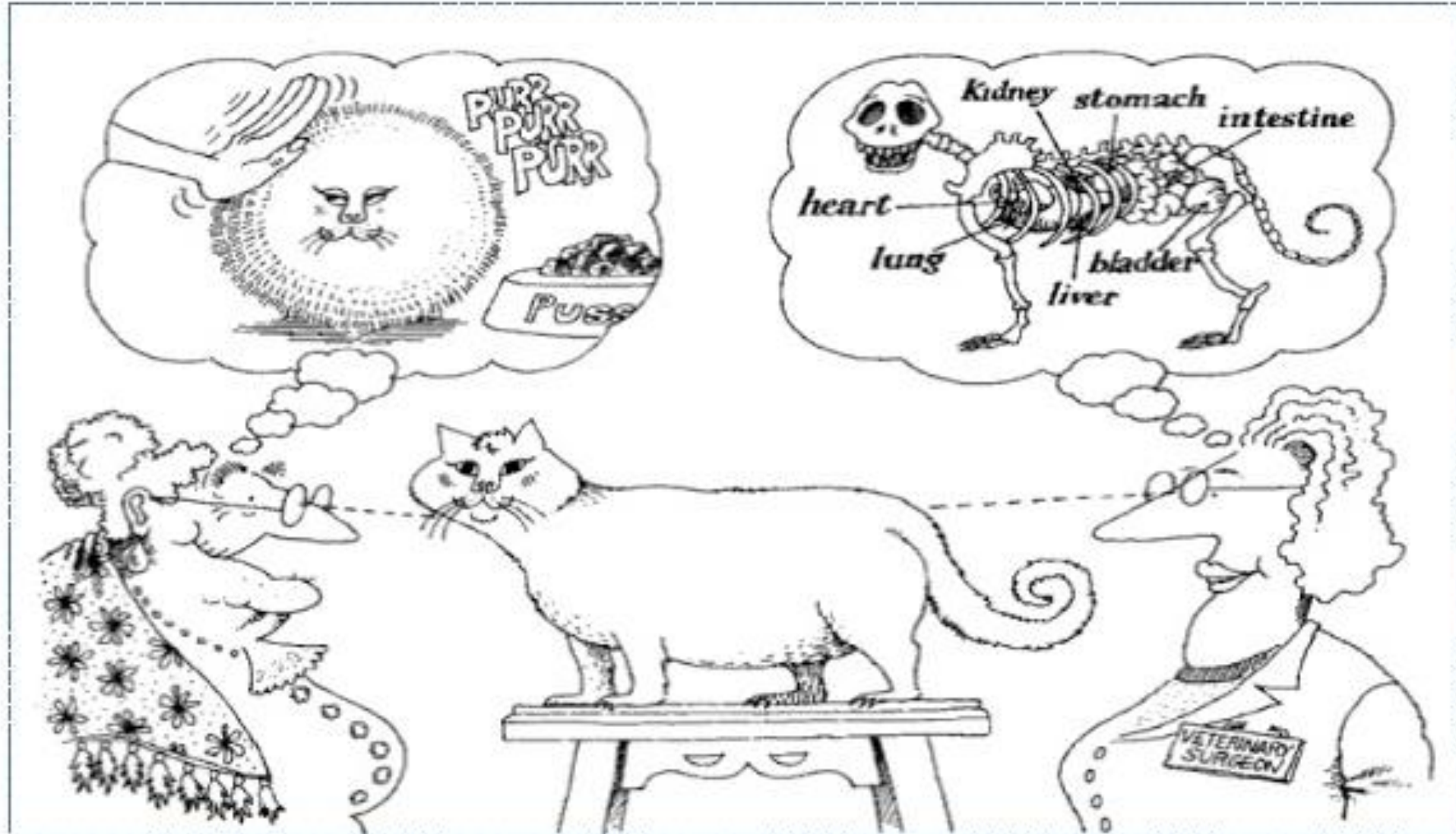
Computational thinking is about designing and evaluating potential solutions to problems – often through programming.

The concepts of computational thinking include:

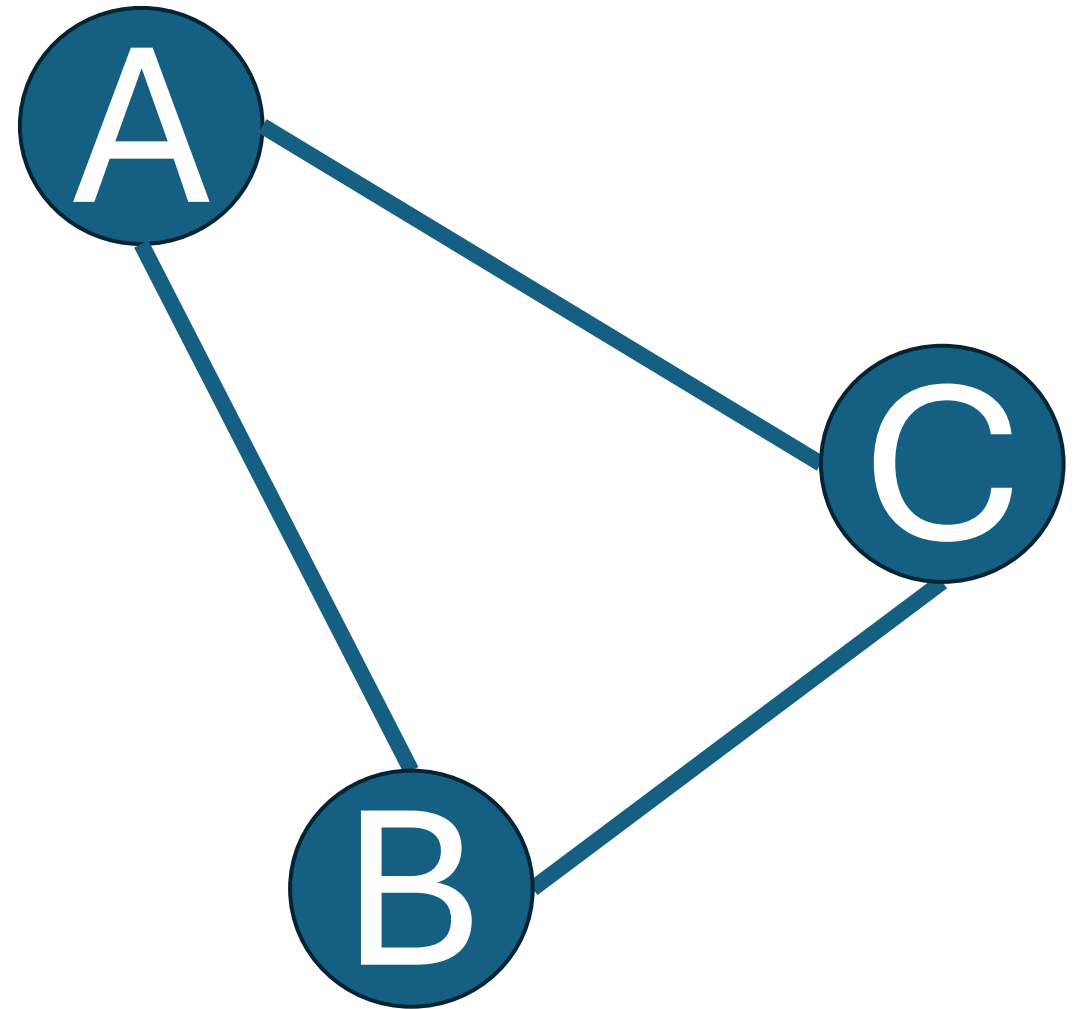
1. **abstraction** (reduction of complex tasks to essentials)
2. **decomposition** (breakdown of a problem into steps)
3. **pattern recognition** (identification of similar problems)
4. **algorithms** (series of steps to complete a task)

# Abstraction

(reduction of complex tasks to essentials)



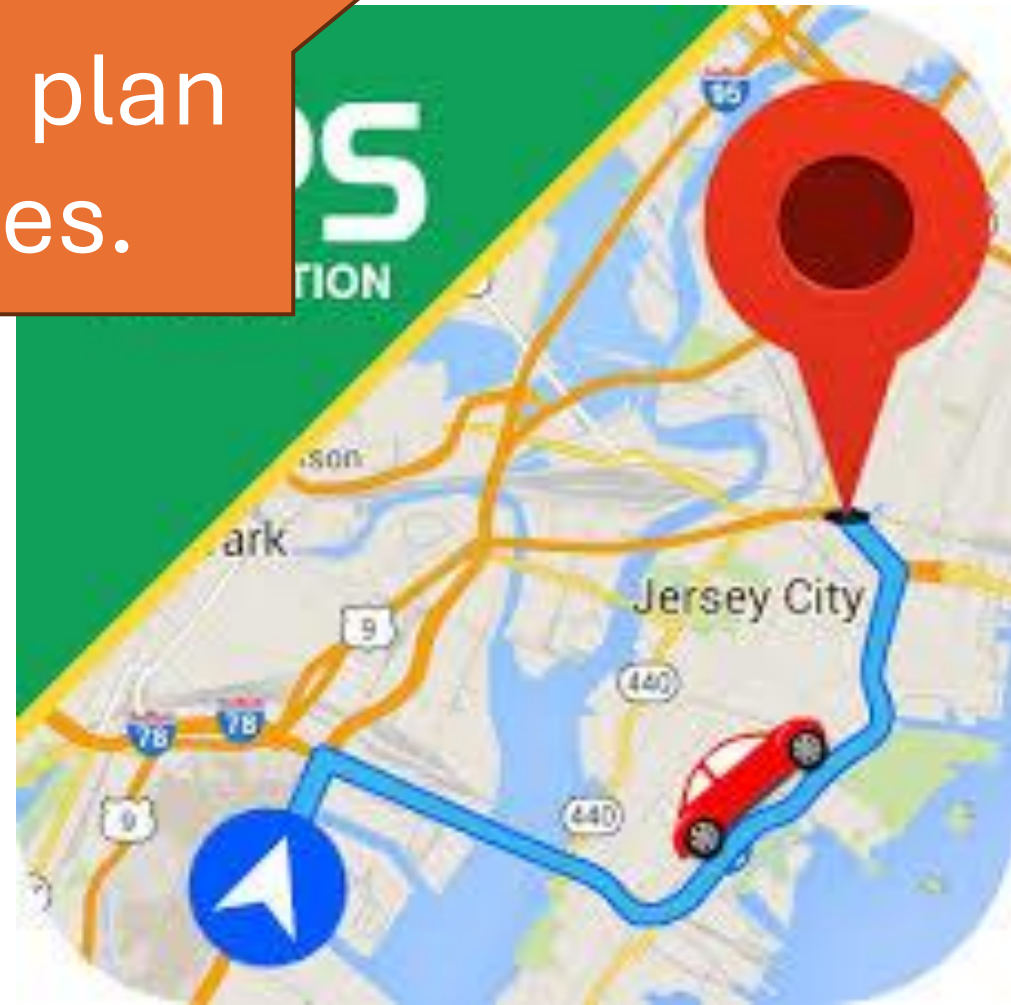
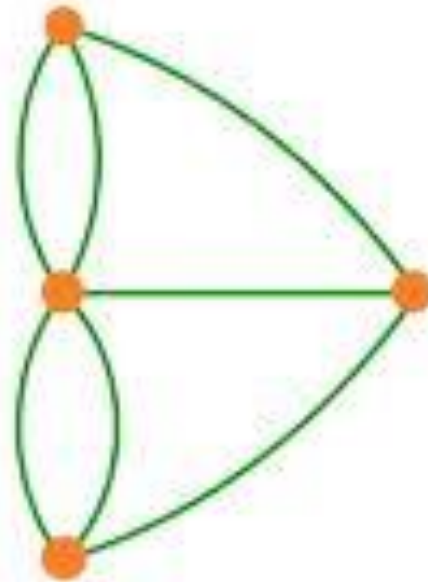
Graphs in  
Graph Theory  
look like this.



Graphs can be used to model roads and cities.



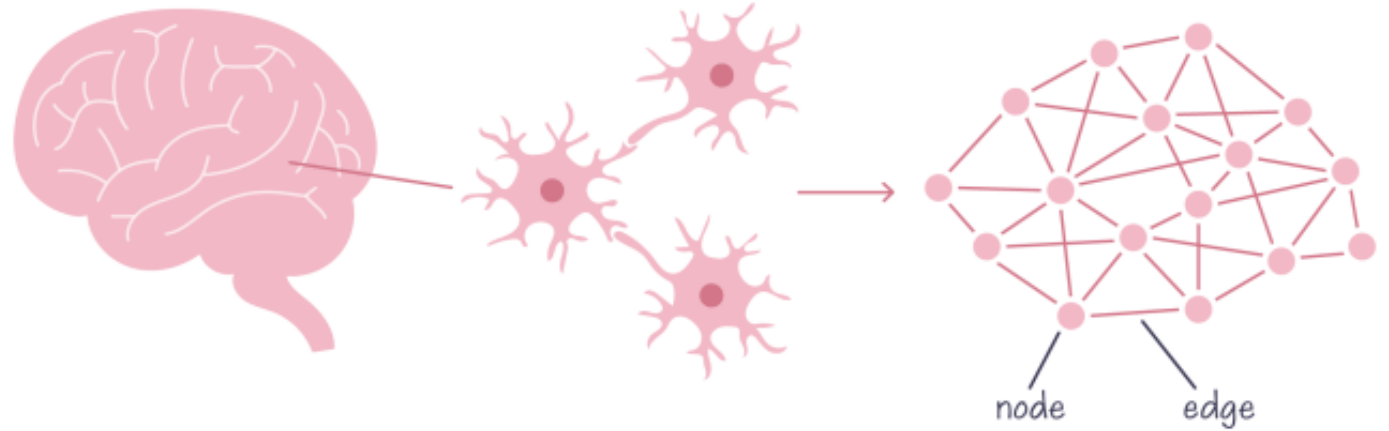
GPS uses this to plan routes.



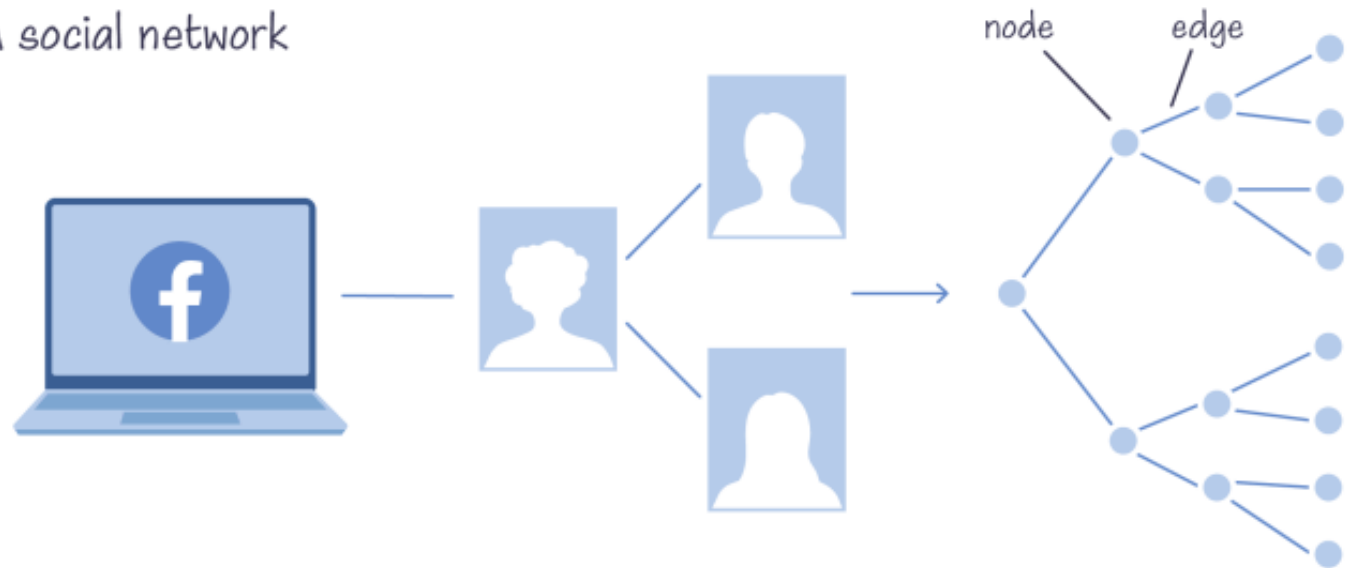
Graphs can be used to model neural networks.

Graphs can be used to model social networks.

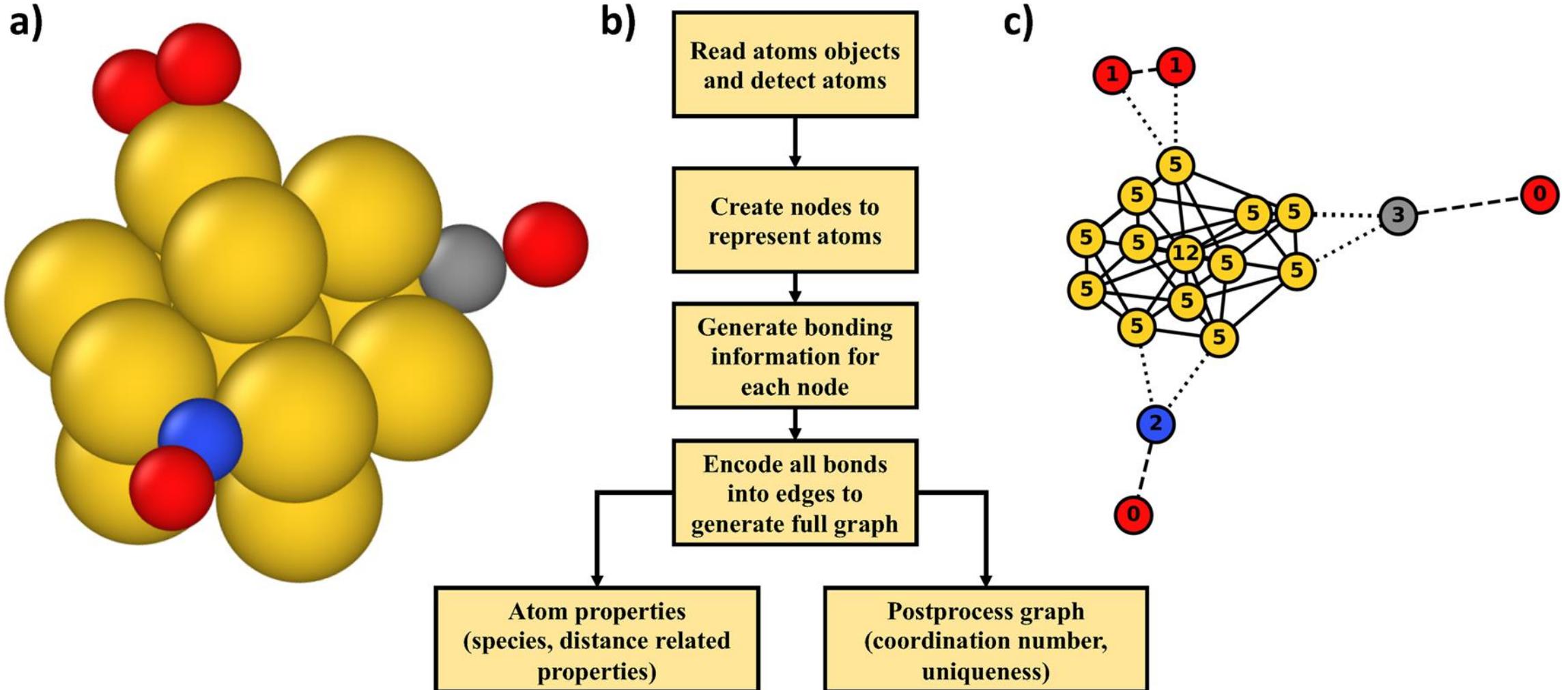
A neural network

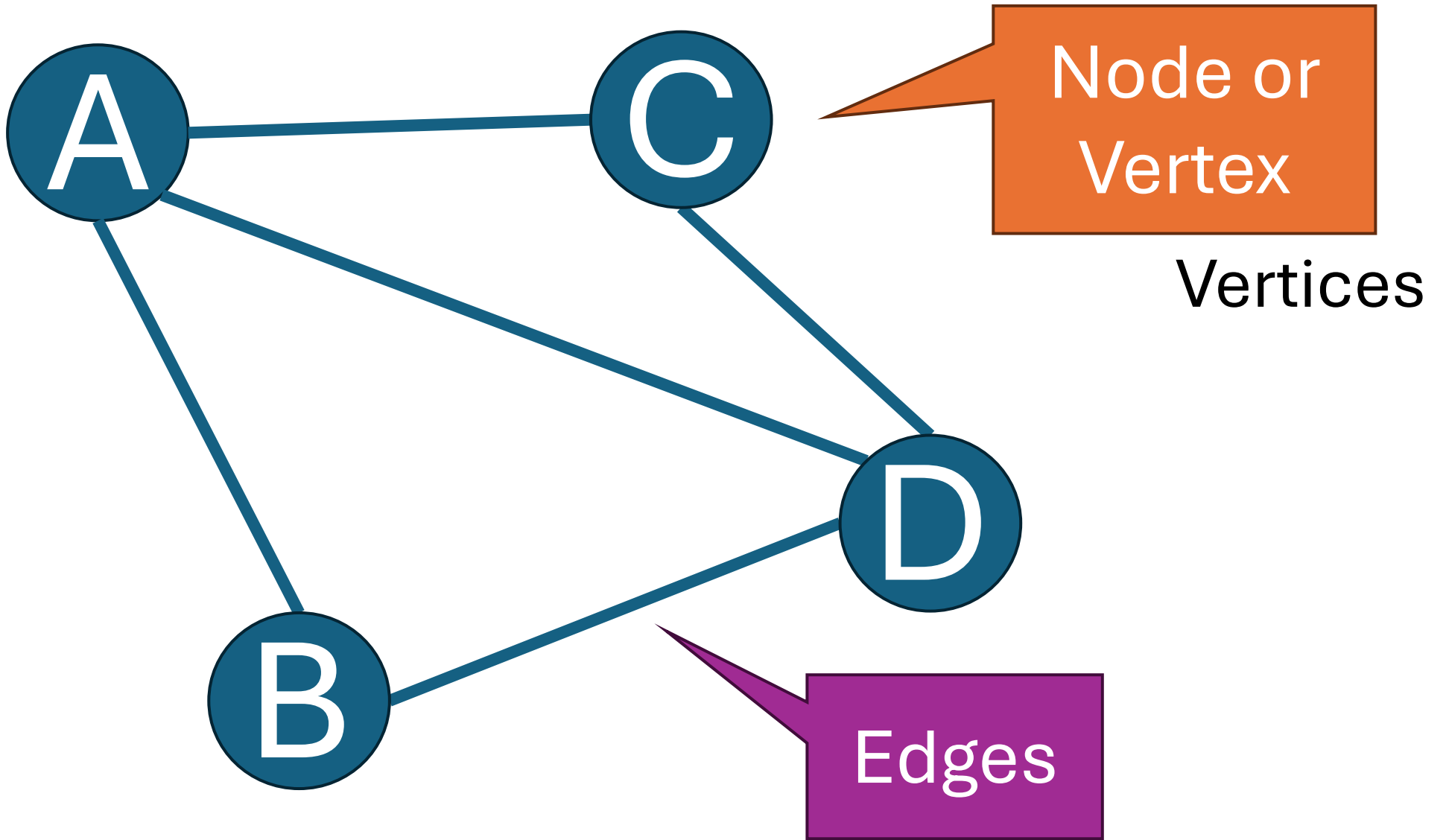


A social network

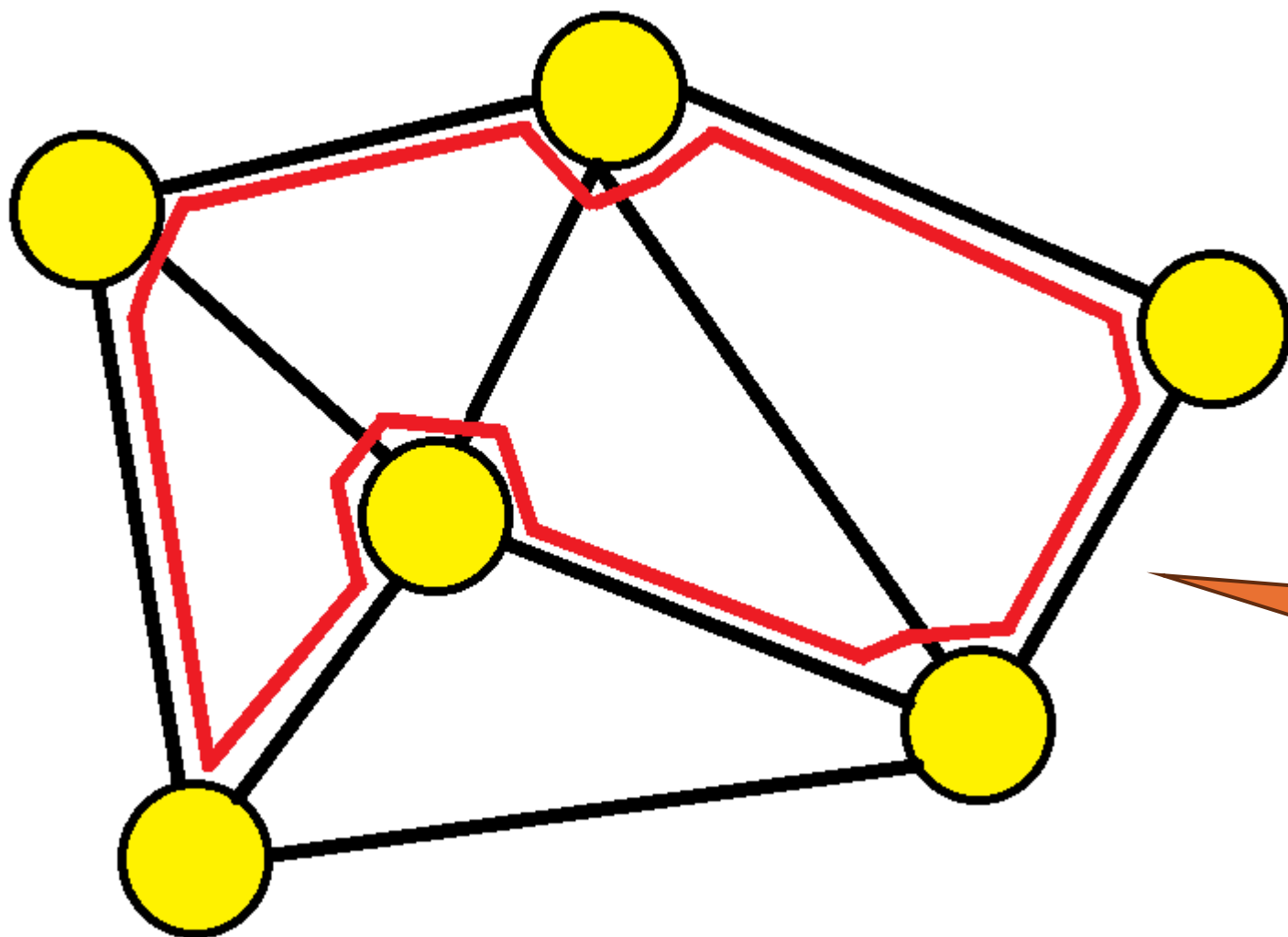


# Graphs can be used to model ATOMS in CHEMISTRY





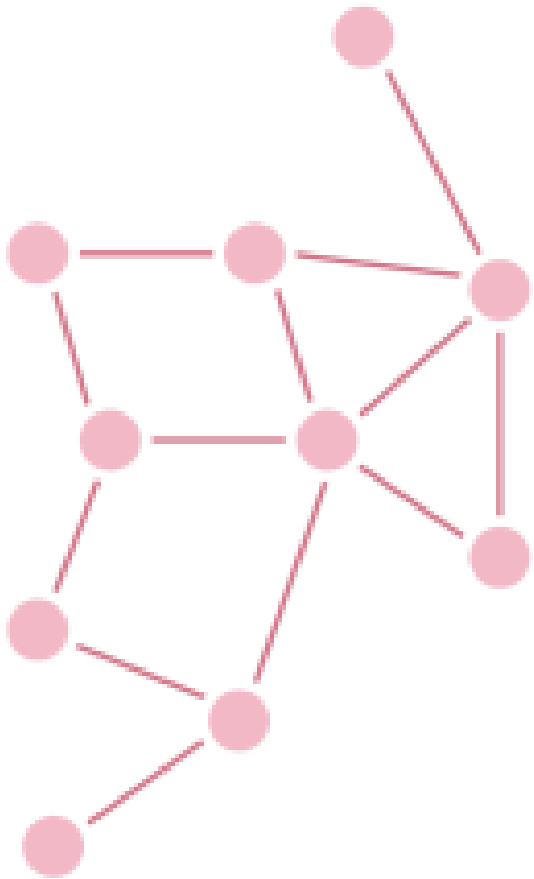




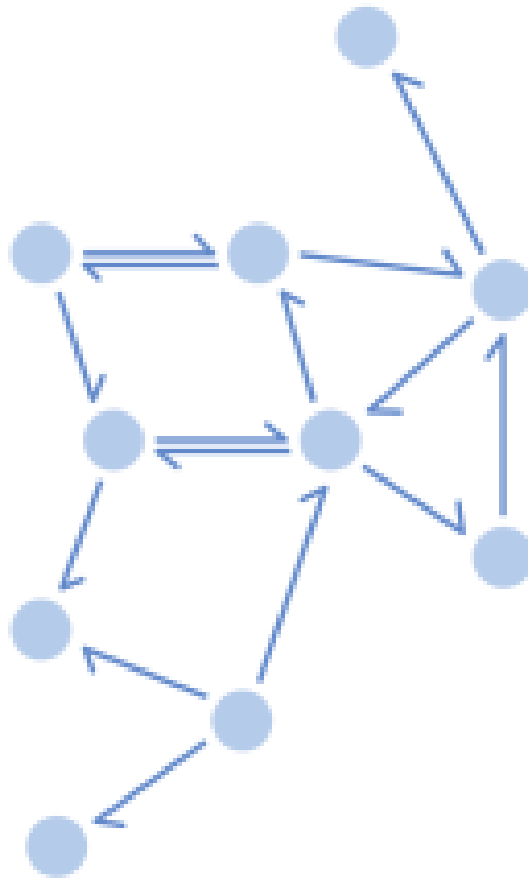
Path

Edges can have directions (arrows)  
and weights (numbers)

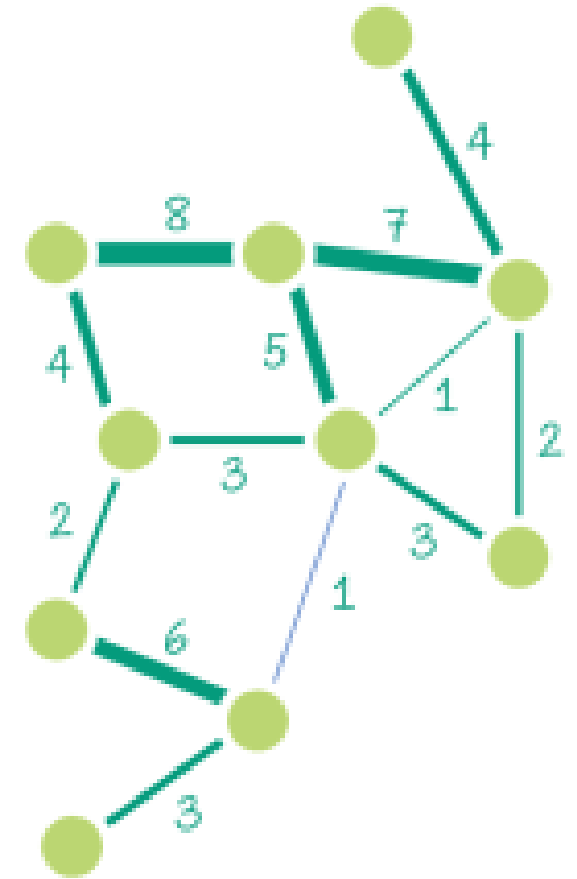
undirected

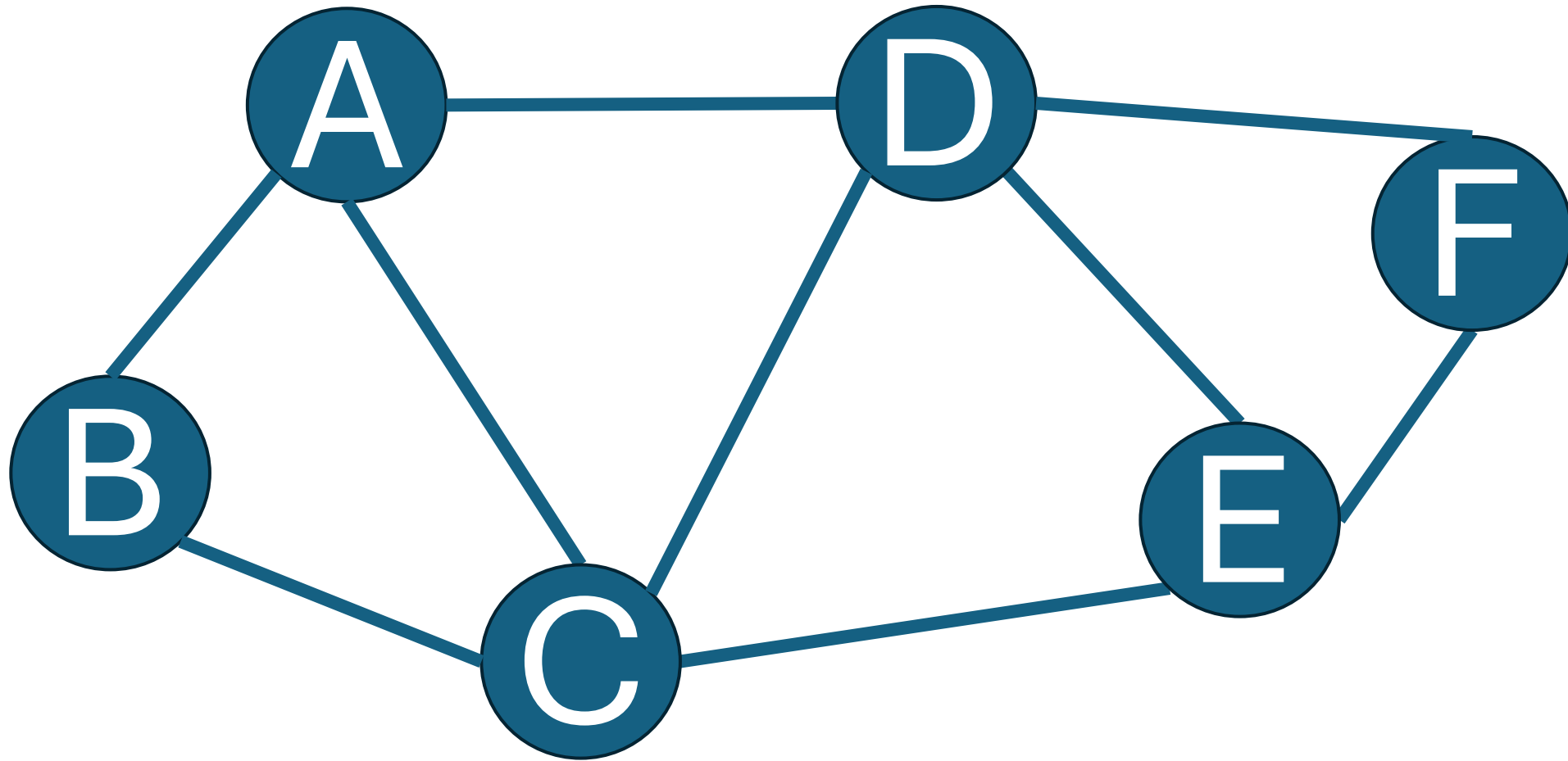


directed



weighted

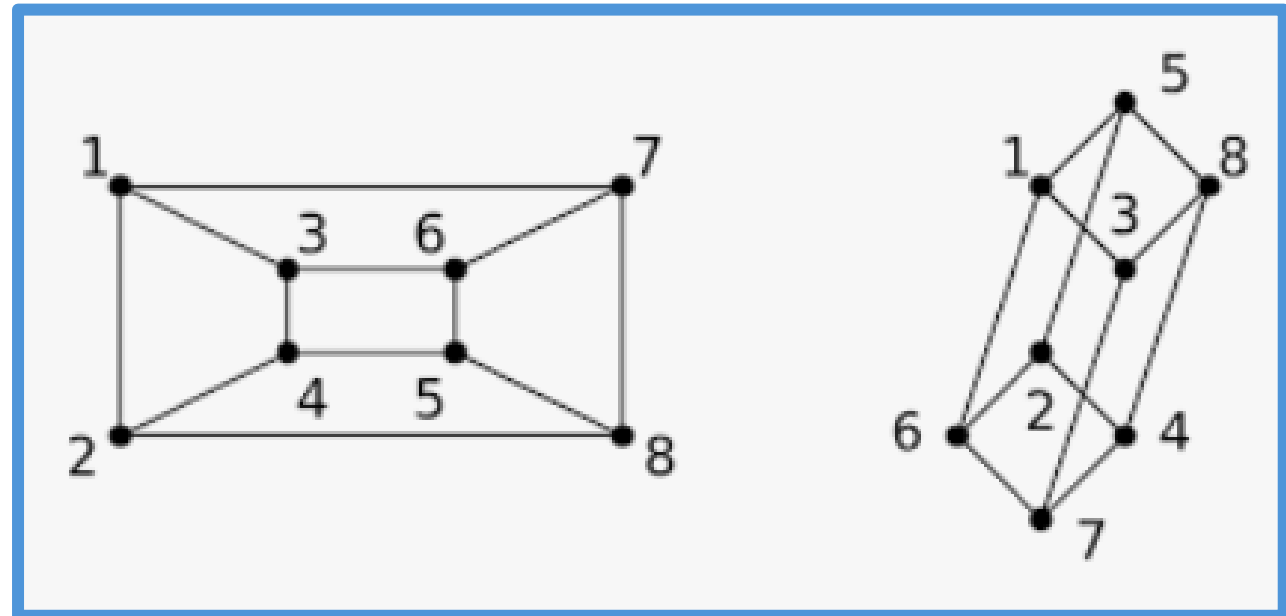
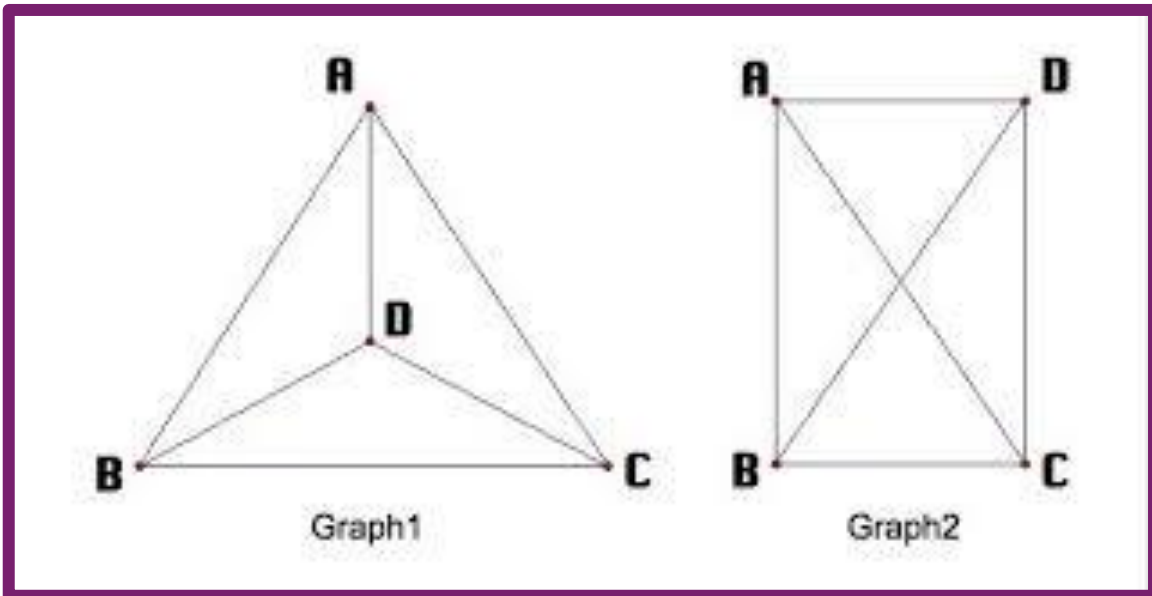
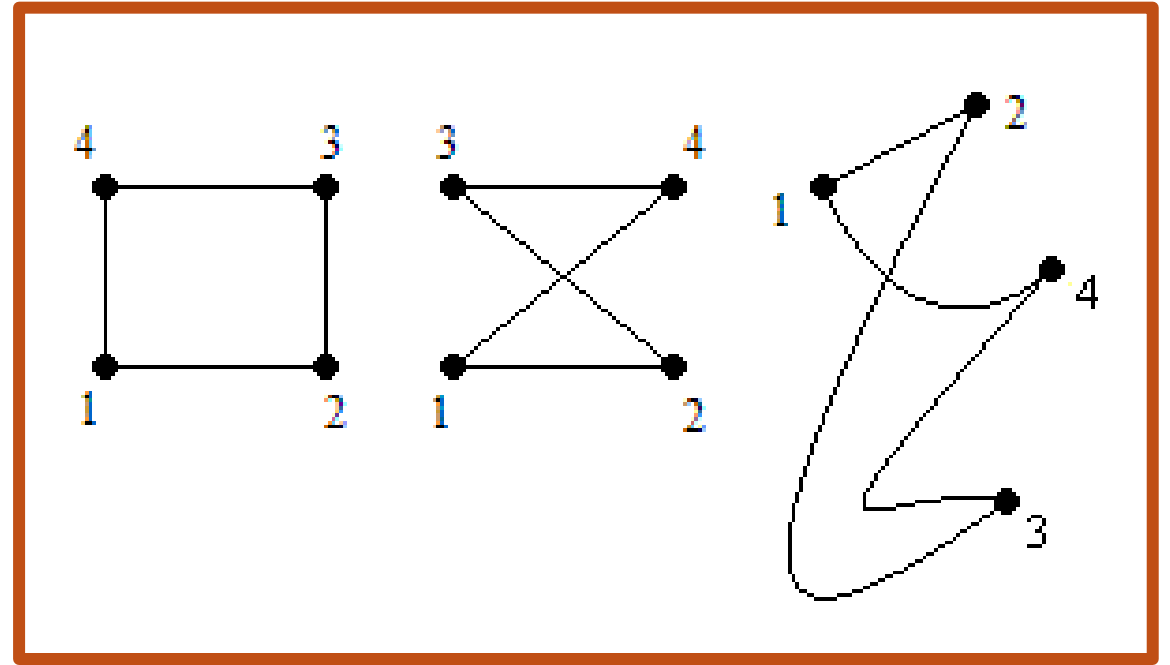




How many  
nodes?

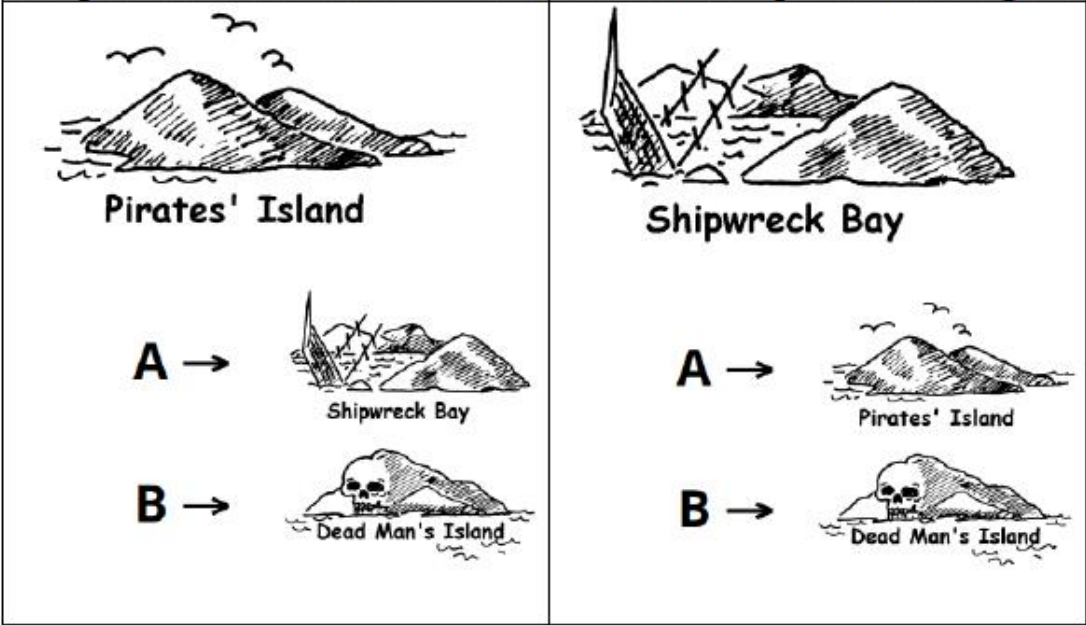
How many  
edges?

It is possible to draw an equivalent graph that looks very similar.



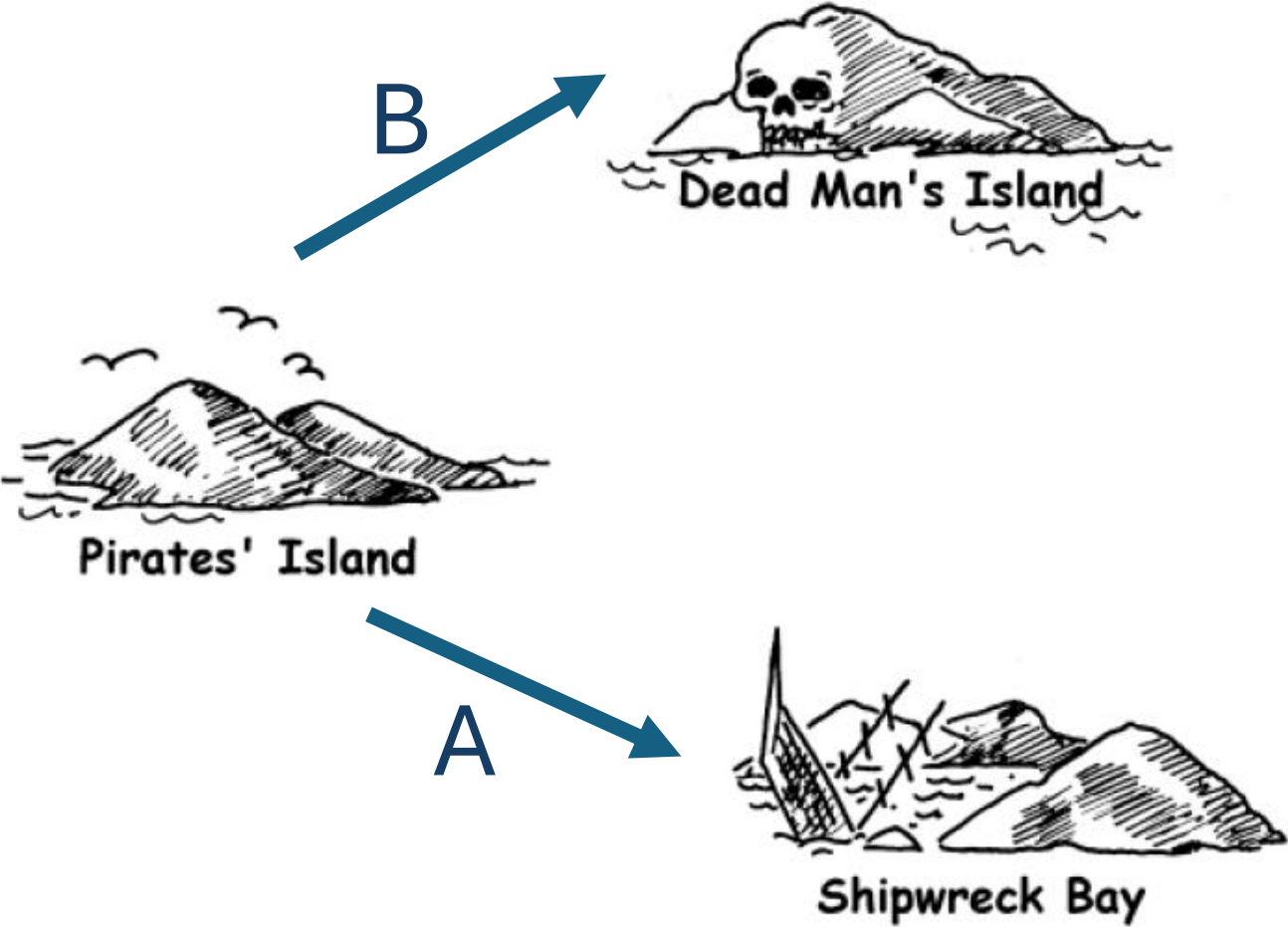
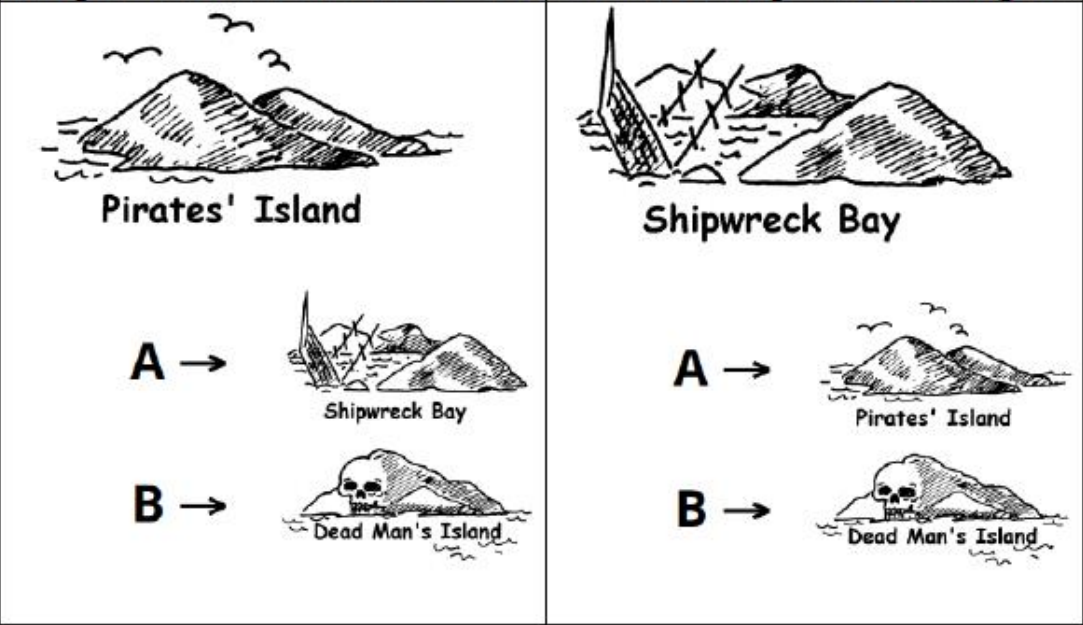
6. Create the network for this data. You will need to add the edges. The islands will act as nodes.

Graph information to add to the map on the right.



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