2. Graph theory

Graphs

Not a graph of a function, but a generic relationship structure

- A graph is something with vertices/nodes, and edges that connect them
- Mathematical definition (undirected): a graph $G = (V, E)$ is a 2-tuple of a set V of vertices and a set E of edges, such that $E = \{\{v_1, v_2\} : v_1, v_2 \in V\}$.
- Graphs are used to describe social networks, roads, processes, circuits - really, can be used to describe anything with relationships or connections
- One of the most powerful (and most well-studied) data structures
- Many characteristics graphs can have, e.g. planar, strongly connected, ...
- Many different subtypes of graphs: will cover trees, binary trees, and DAGs (directed acyclic graphs)