

10.1 Graphs ~~Graphs~~

A graph $G = (V, E)$ consists of

V a nonempty set of vertices or nodes

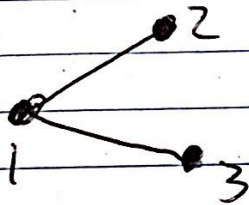
E a set of edges

each edge has two vertices associated to it called end points.

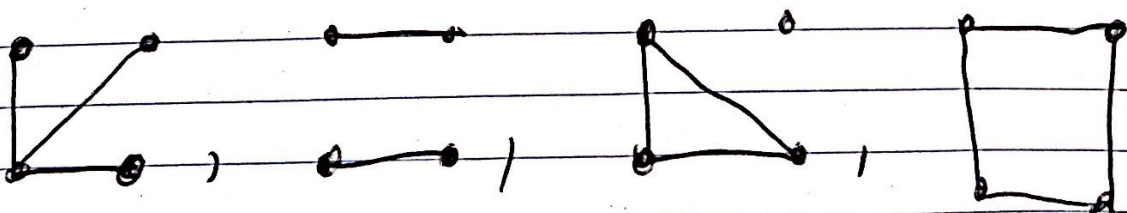
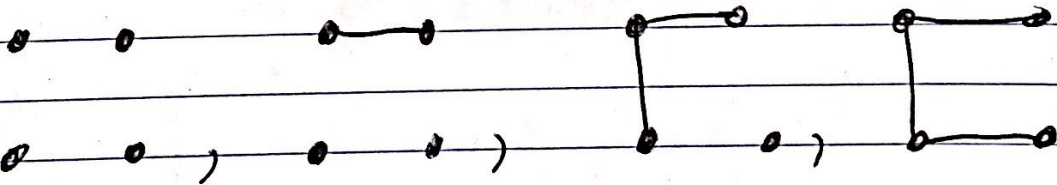
For use a graph's edges are undirected and is what the book calls a simple graph

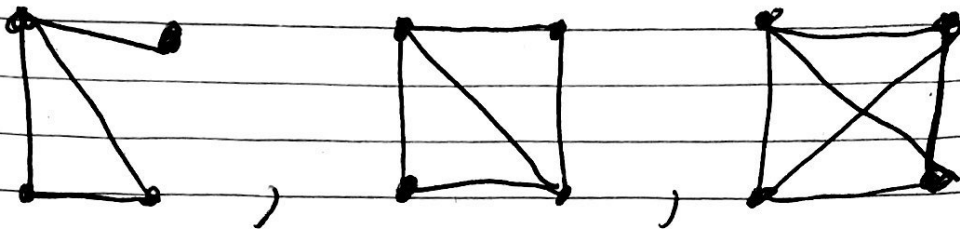
Example

$$G = (\{1, 2, 3\}, \{\{1, 2\}, \{1, 3\}\})$$



Try to draw all Graphs on 4 vertices



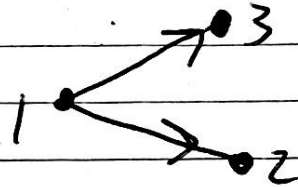


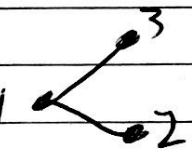
A directed graph (or digraph) (V, E) consists of a non-empty set of vertices V and directed edges (or arcs) E .

Each arc connects two vertices with a start vertex and an end vertex

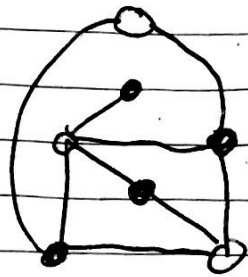
Example

$$D = (\{1, 2, 3\}, \{(1, 3), (1, 2)\})$$

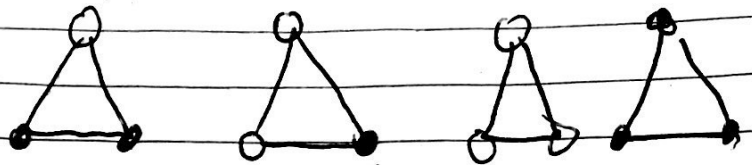


How many ways can  be turned into a directed graph?

A graph is bipartite if its vertices can be colored either black or white so that no two vertices of the same color are connected.



Bipartite



NOT bipartite

When is a graph bipartite? Try to find a criterion for determining if a graph is bipartite.

Can you find a way to produce graphs that are bipartite?