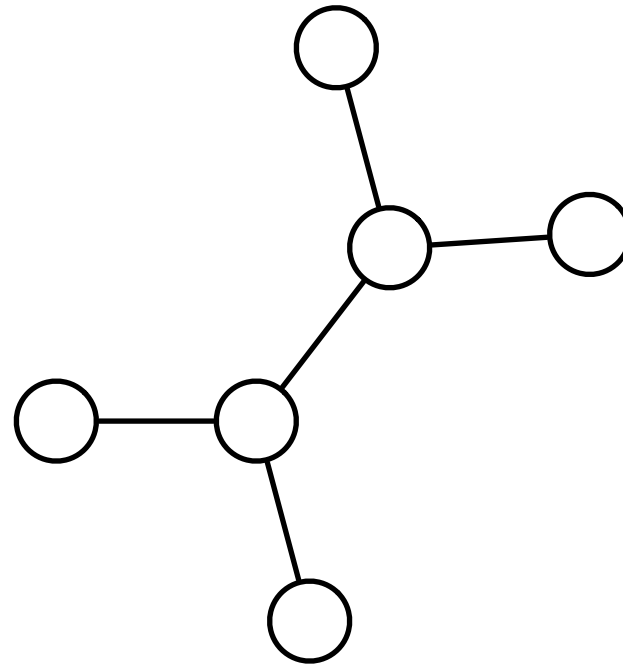# Distributed Algorithms 2020

2 Graph-theoretic foundations

Graphs in this course

- Defining:
  - models of distributed computing
  - what we want to solve
  - what are the assumptions

- Designing & analyzing algorithms

- Proving impossibility results

- Often: *graph ≈ network, node ≈ computer*

Quiz

- Graph where maximal independent sets are never minimum dominating sets?

Please do not confuse

- **Maximal**
  - not a subset of another solution
  - very easy to find: add greedily

- **Maximum**
  - largest possible solution
  - often hard to find

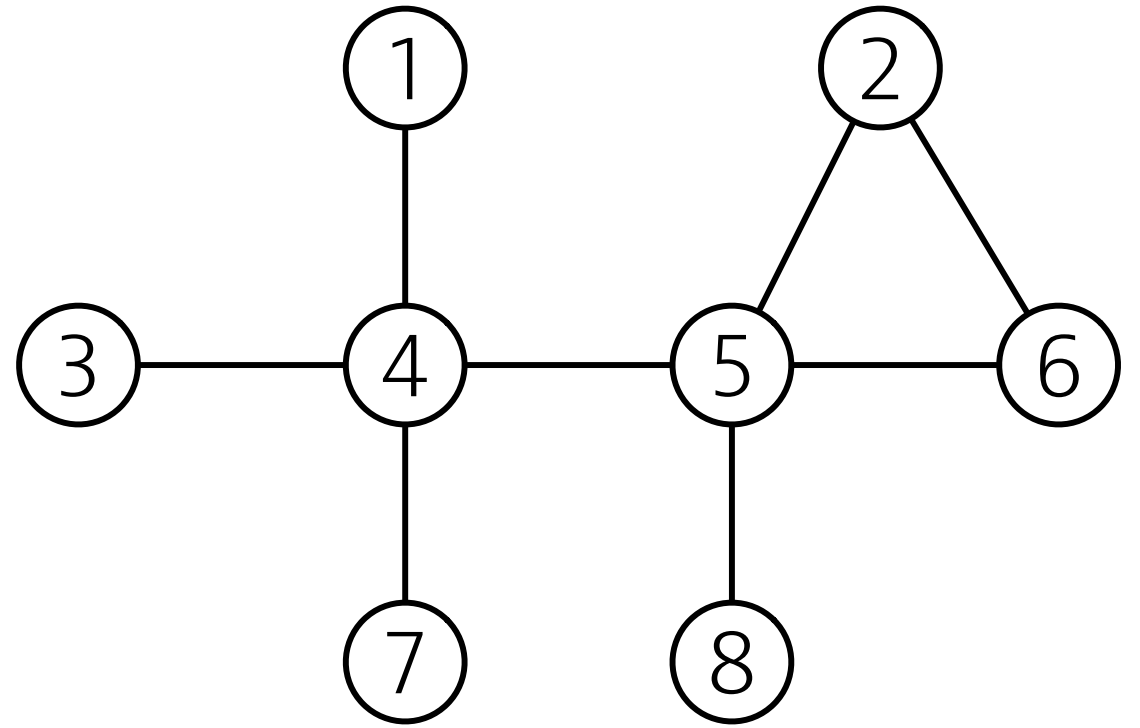# Please do not confuse

- **Minimal**
  - not a superset of another solution
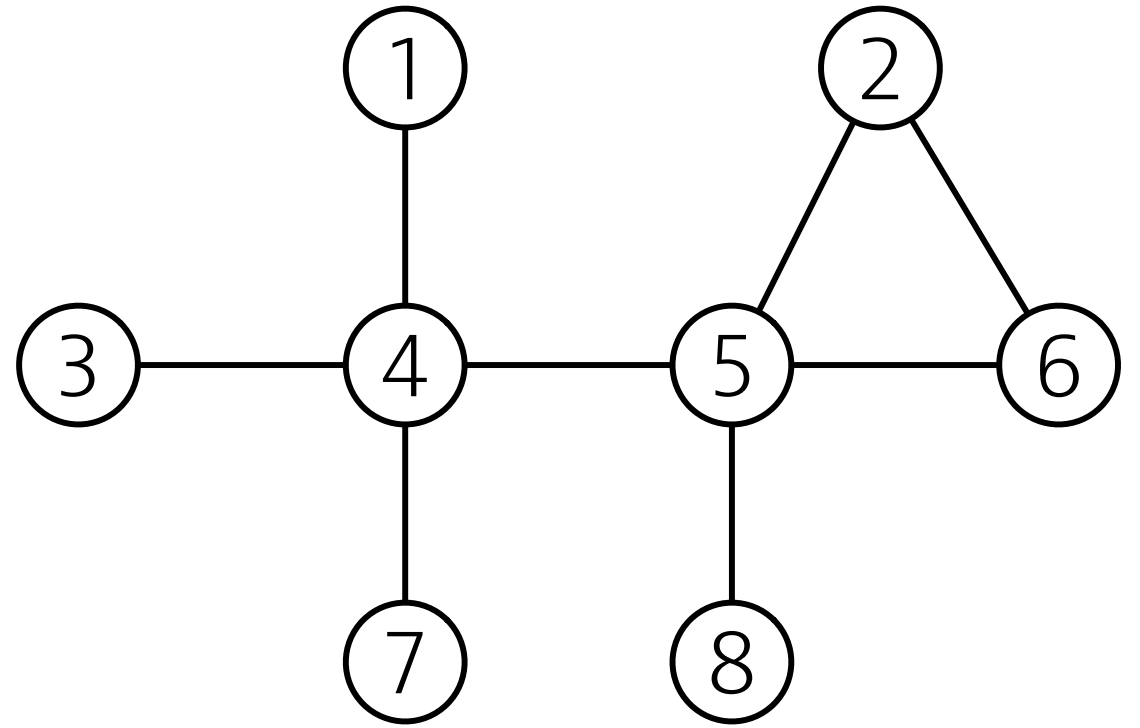 - very easy to find: remove greedily

- **Minimum**
  - smallest possible solution
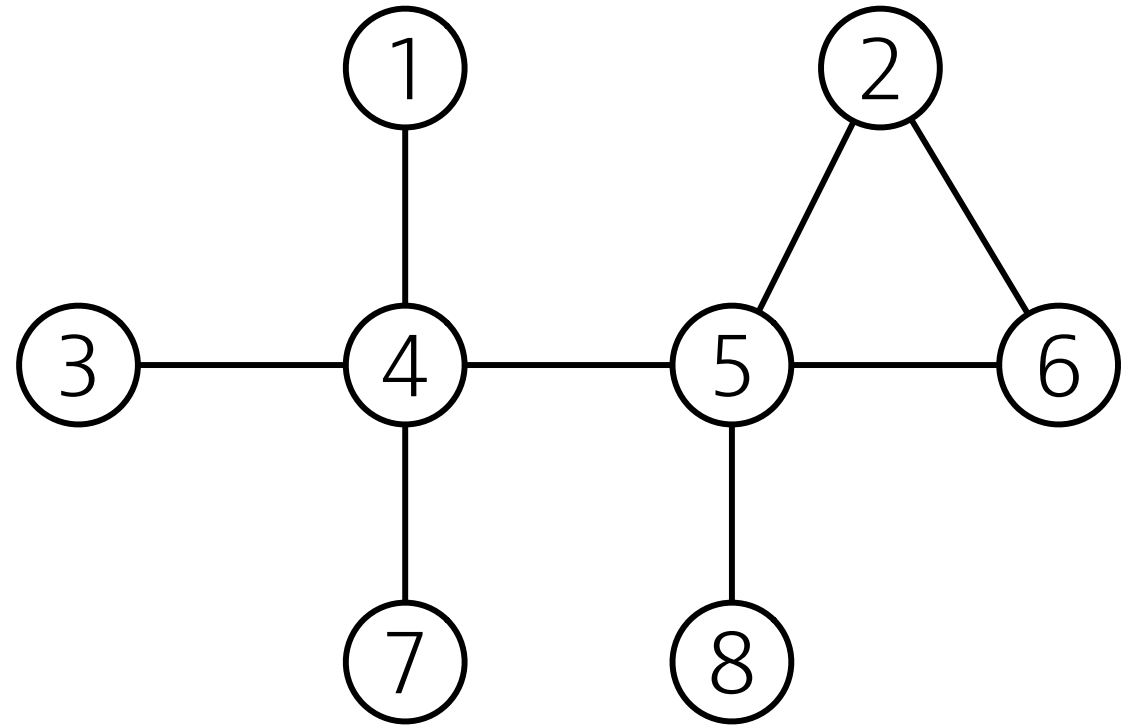 - often hard to find

Q & A

Please answer on Slack...
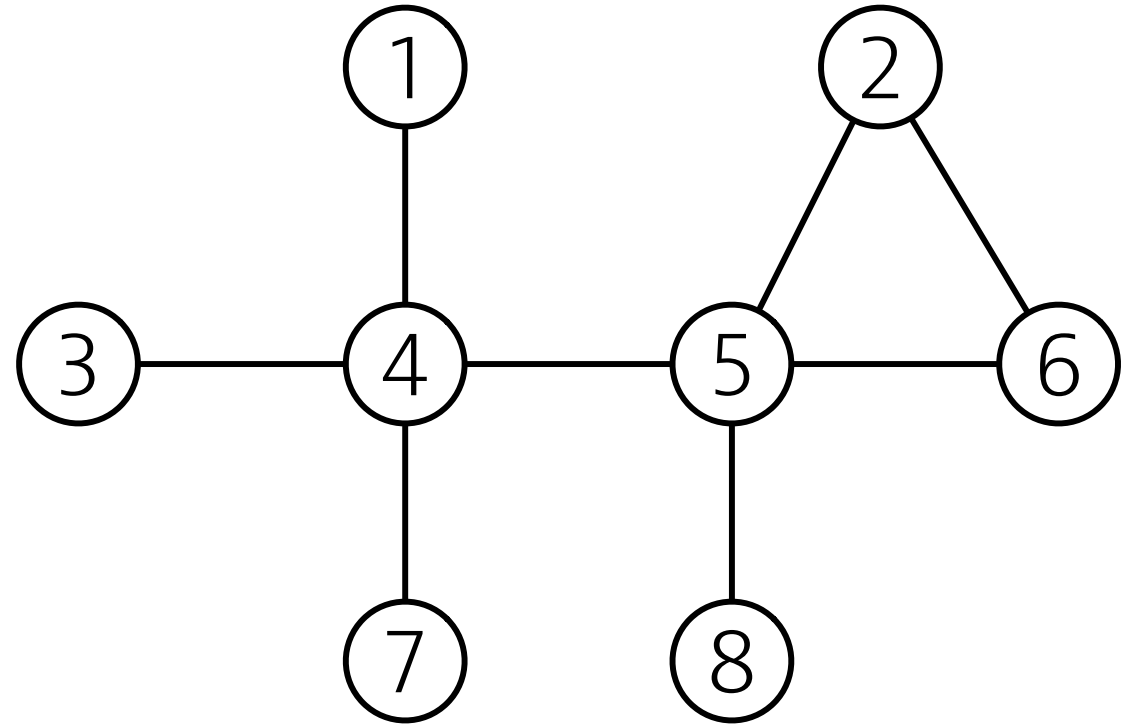
Minimum
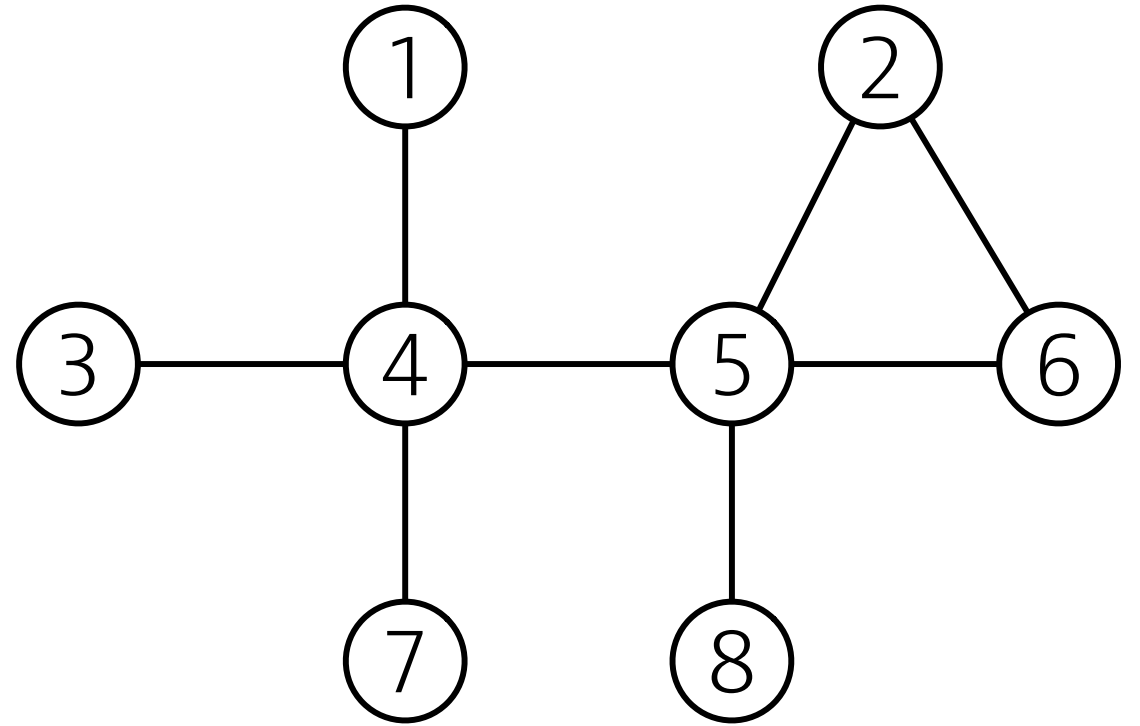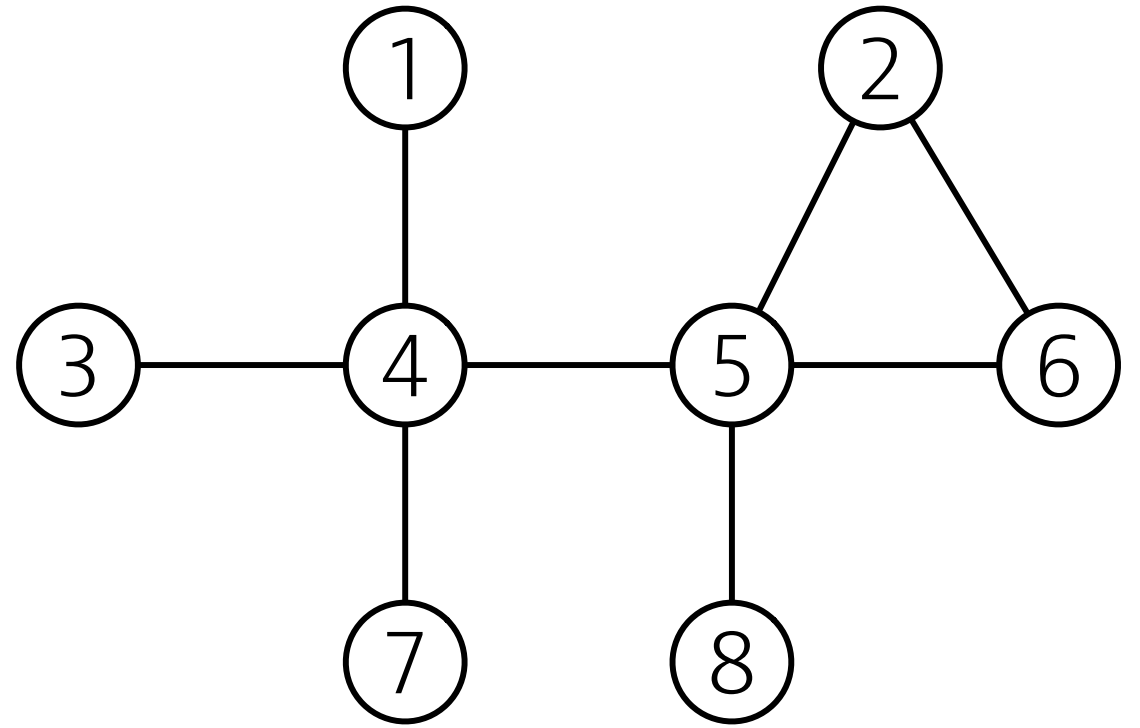vertex cover

Minimum
dominating set

Maximum
independent set

Smallest
set of nodes
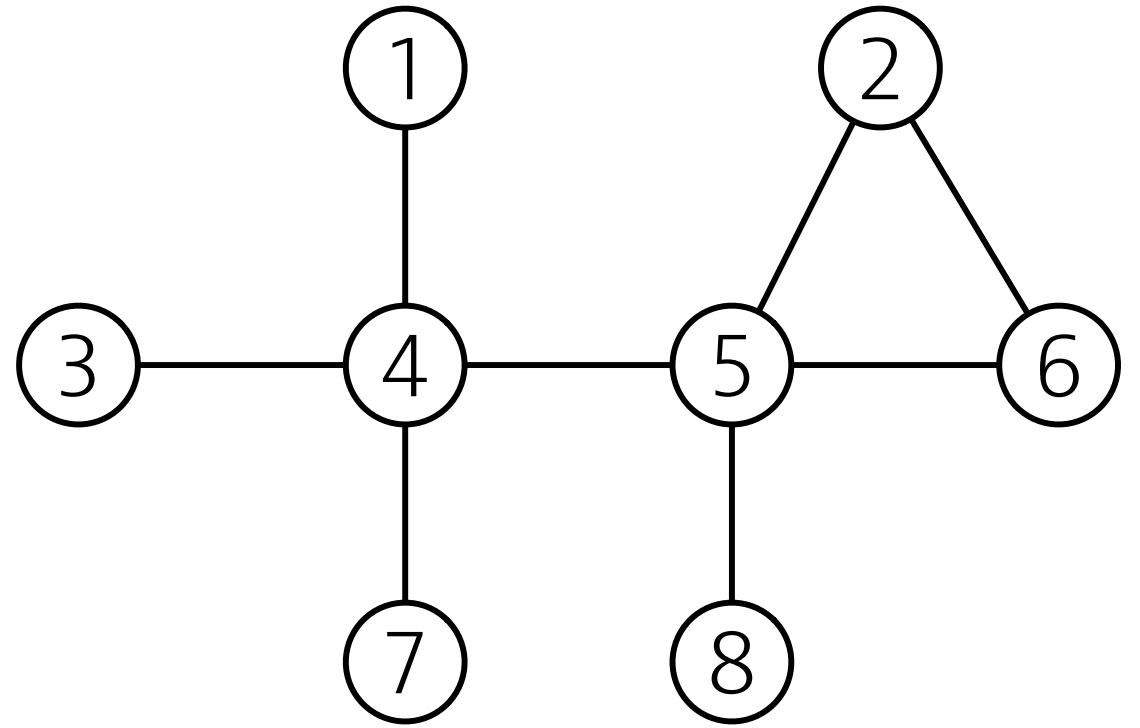that is both
an independent set
and a dominating set

Largest
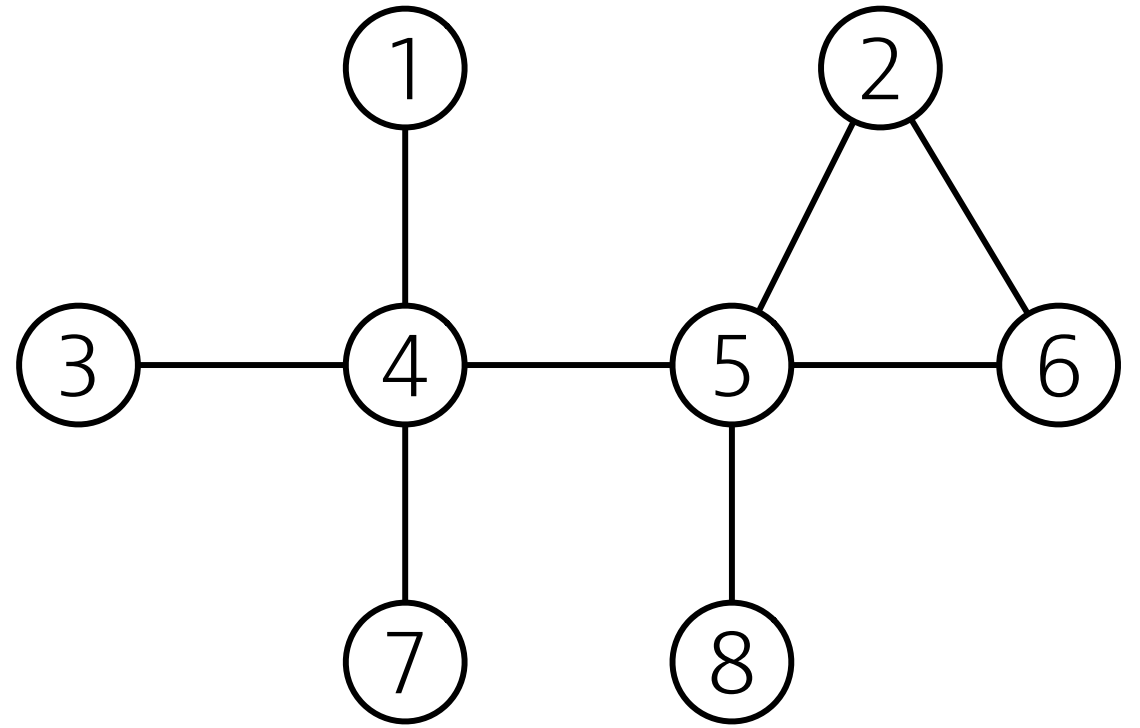set of nodes
that is both
an independent set
and a dominating set
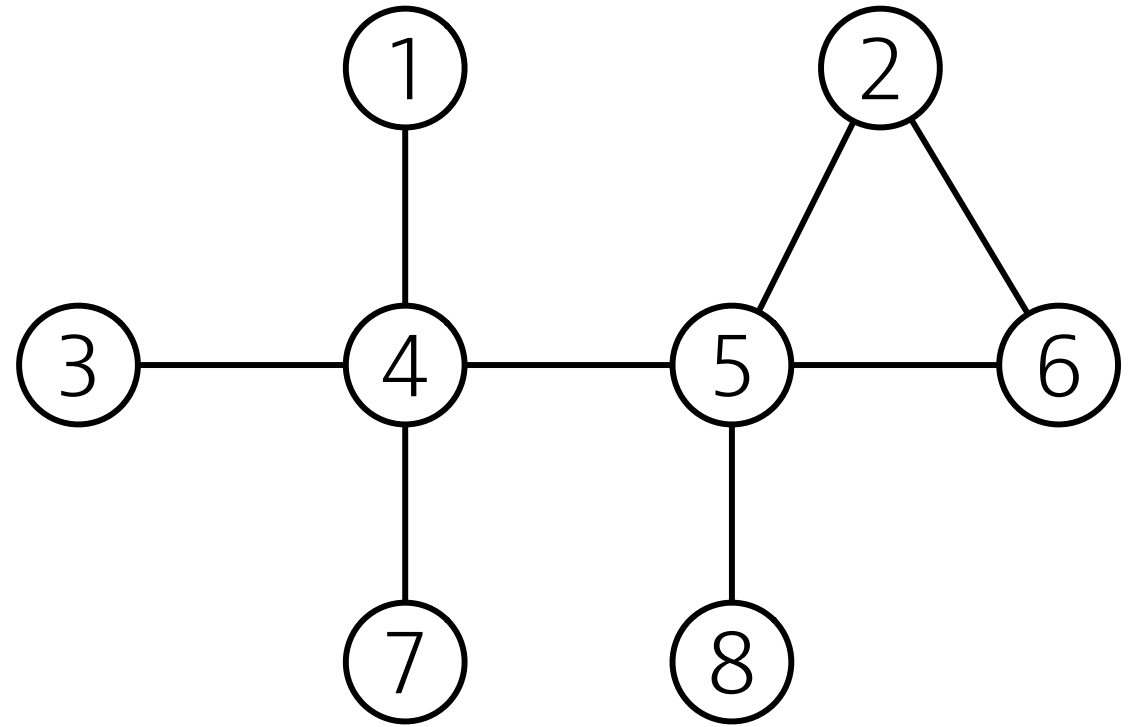
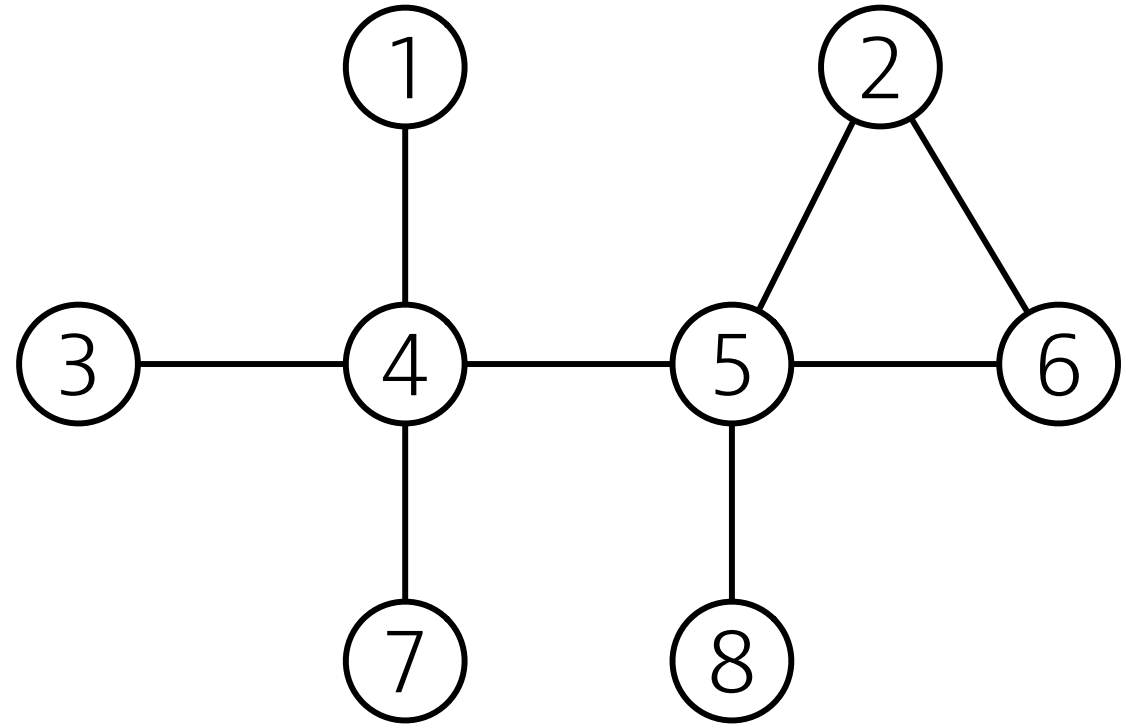Maximum matching
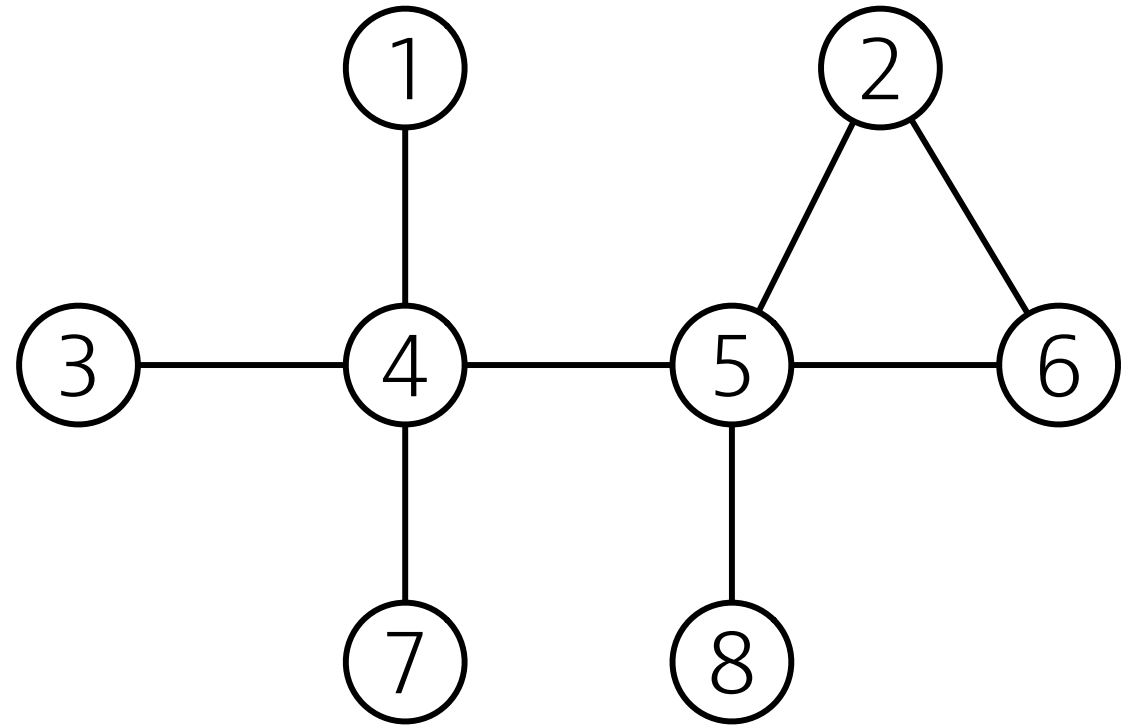
Minimum
edge cover

Minimum
edge dominating set

Smallest
set of edges
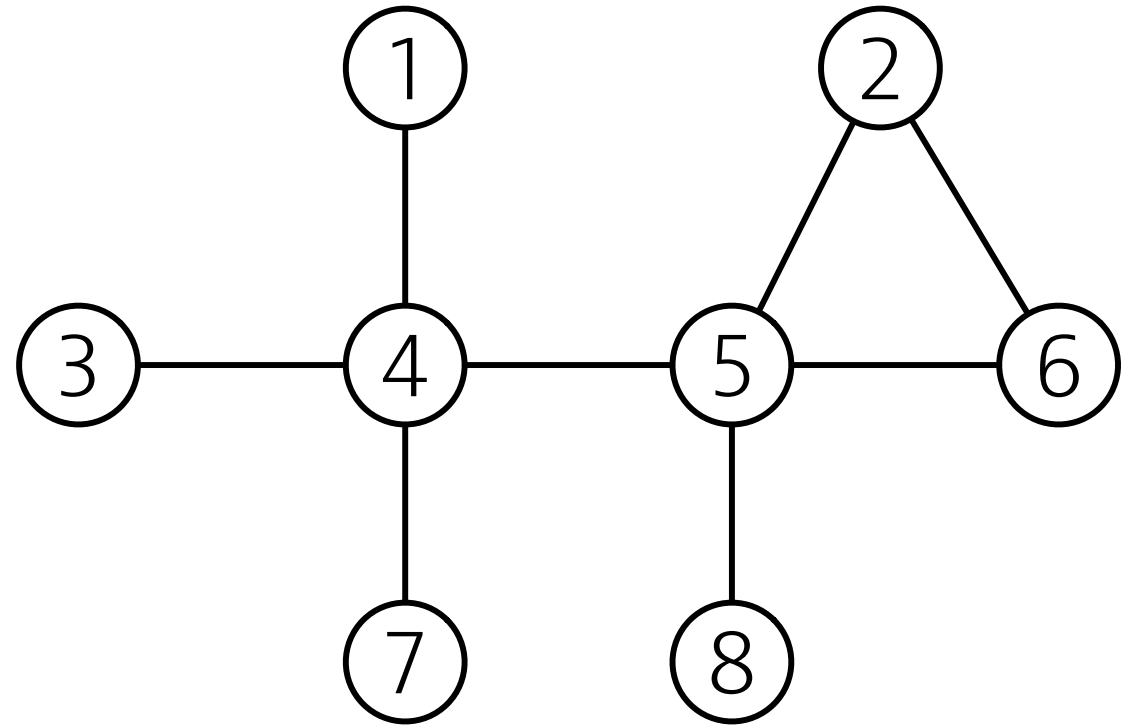that is both
a matching and
an edge dominating set

Largest
set of edges
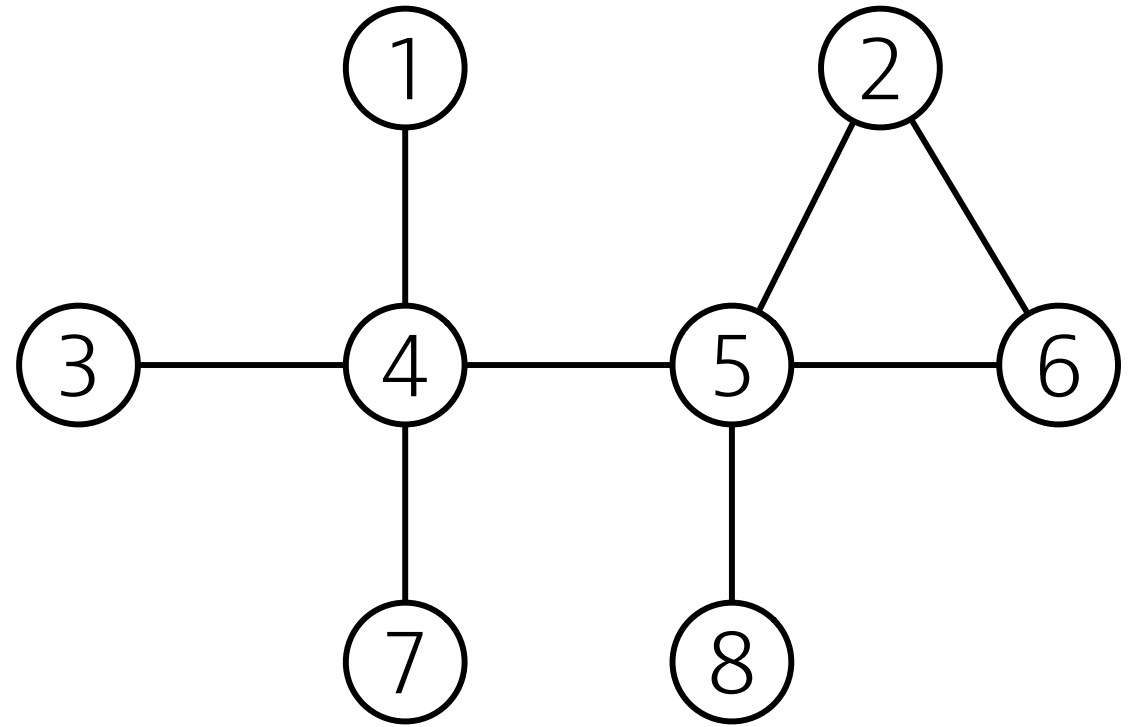that is both
a matching and
an edge dominating set

Minimum
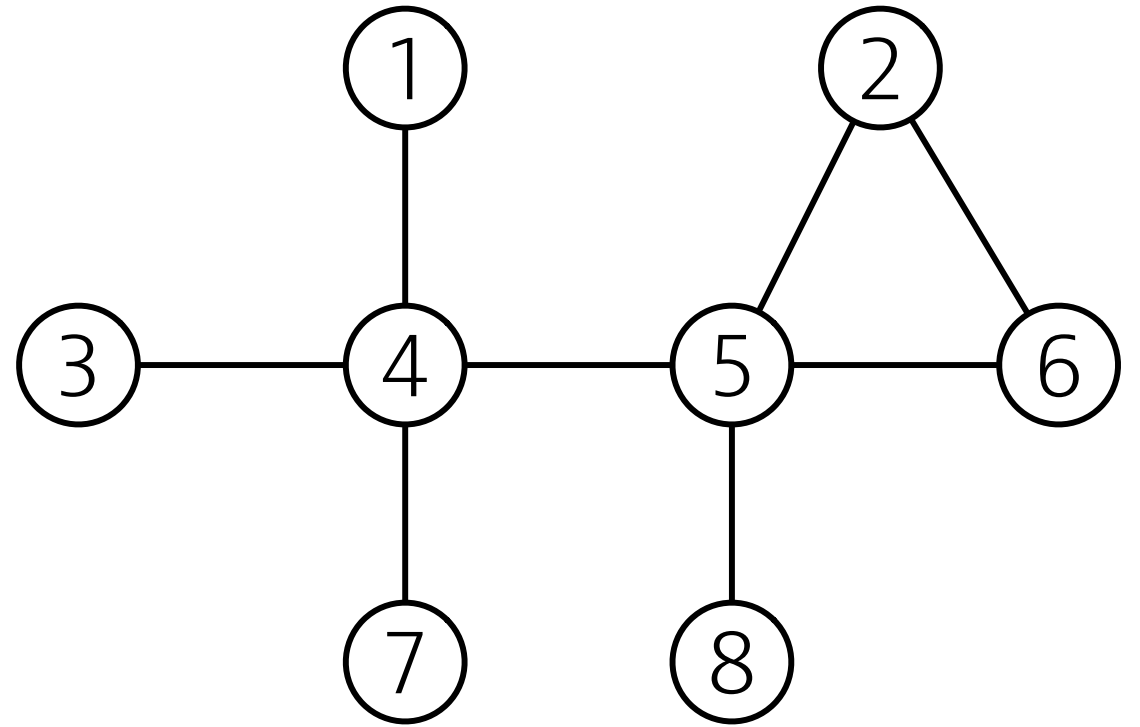edge dominating set
that is not a matching

Largest set of
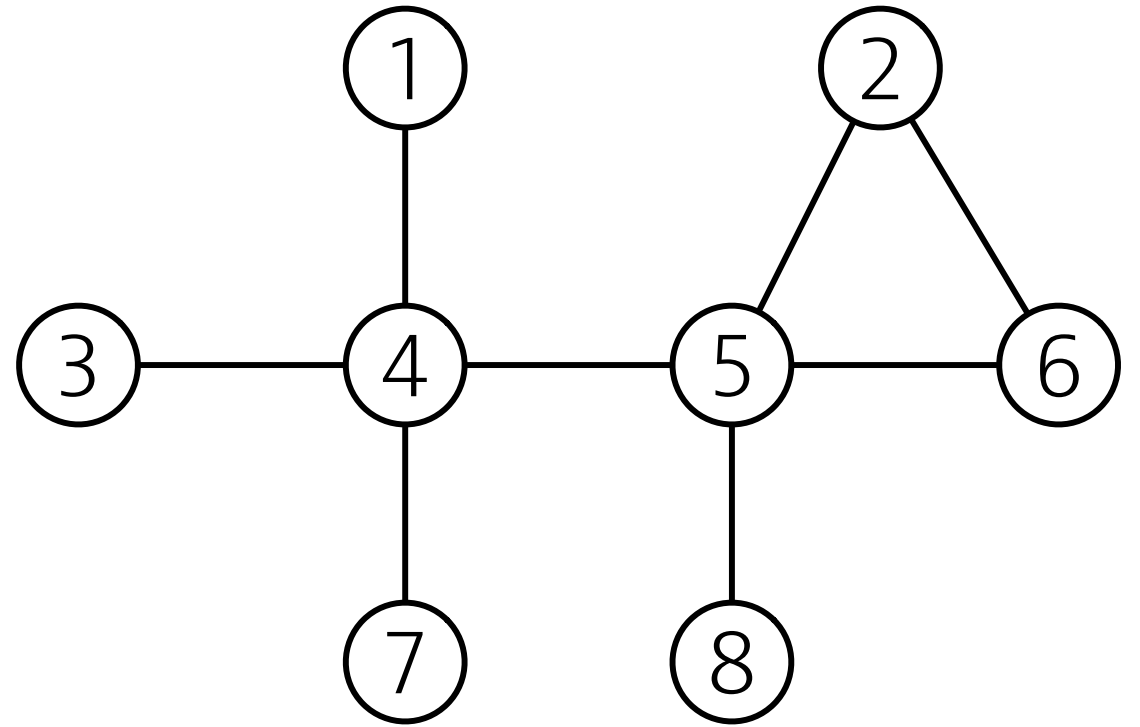nodes that induces
a bipartite subgraph

Largest
set of edges
that induces
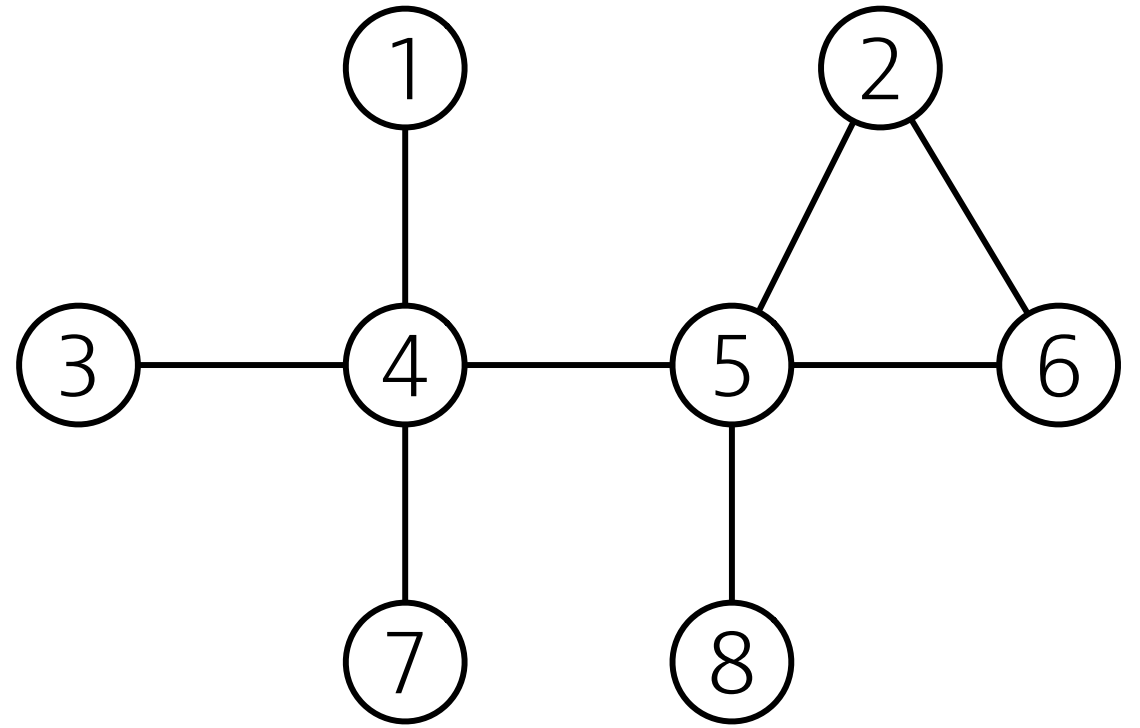a subgraph with
2 connected components

Largest
set of nodes
that induces
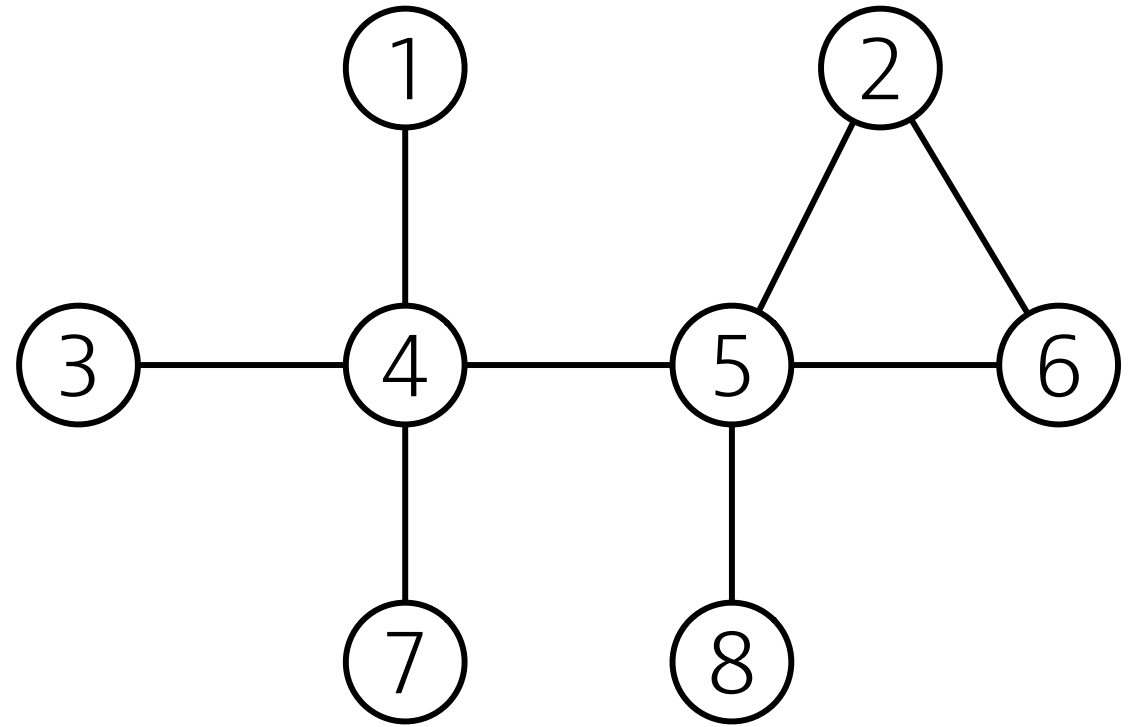a subgraph of
maximum degree 2

Largest
set of edges
that induces
a subgraph of
maximum degree 2

Set of nodes
that induces
a 2-regular subgraph

Nodes *u* and *v* such that the distance from *u* to *v* equals the diameter of the graph

Group work