

Distributed Algorithms 2025

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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 $\approx$ network, node $\approx$ 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

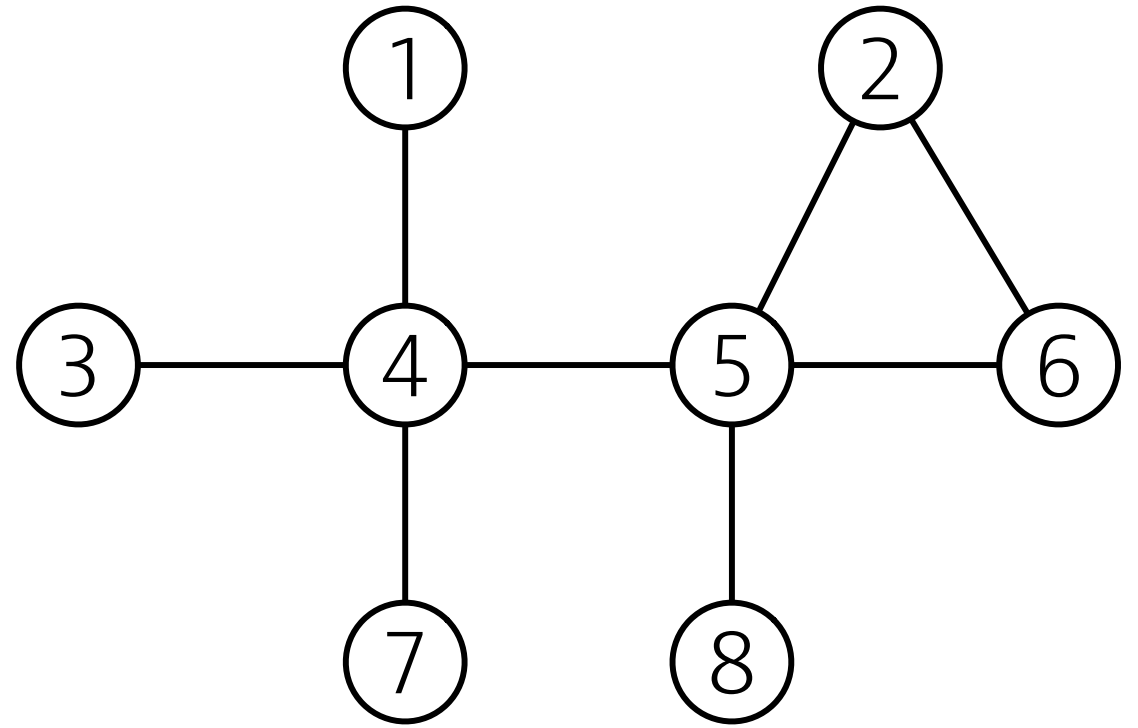
Please do not confuse

- **Minimal**

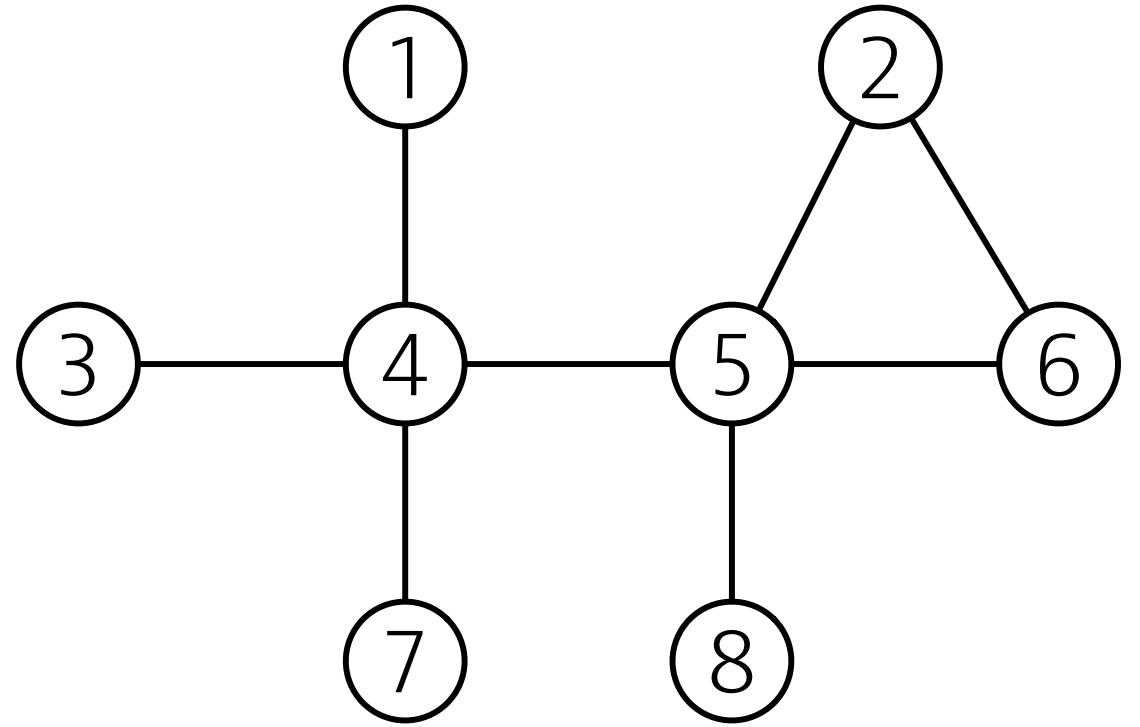
- not a superset of another solution
- very easy to find: remove greedily

- **Minimum**

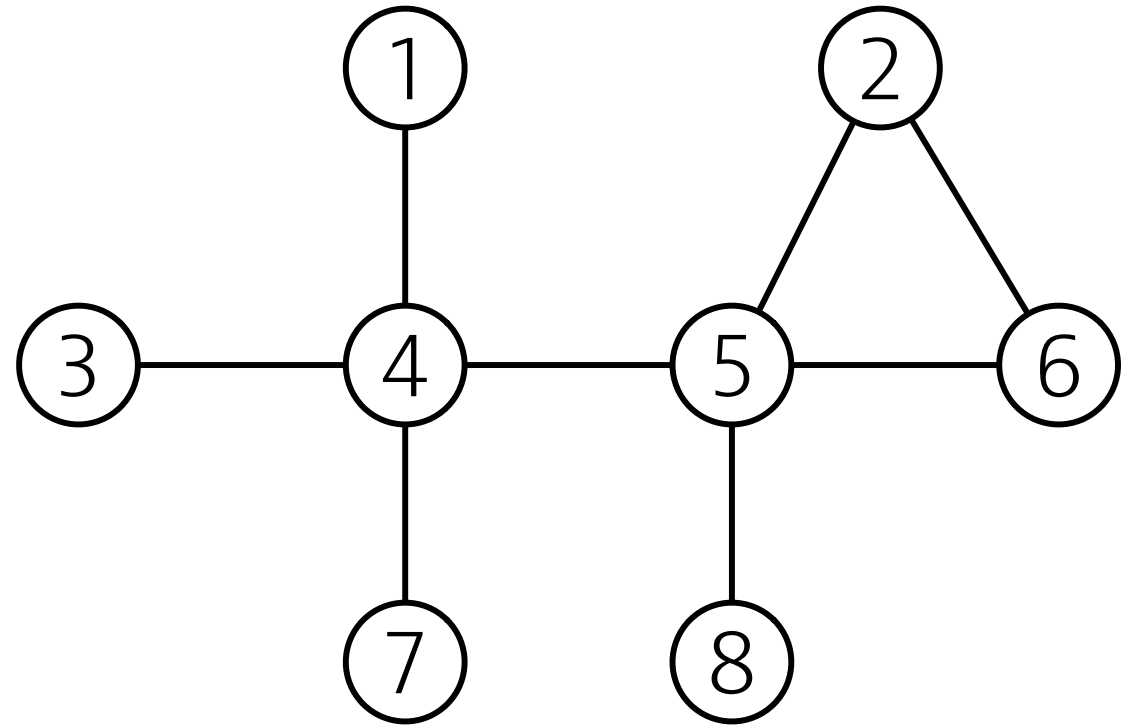
- smallest possible solution
- often hard to find



Minimum
vertex cover

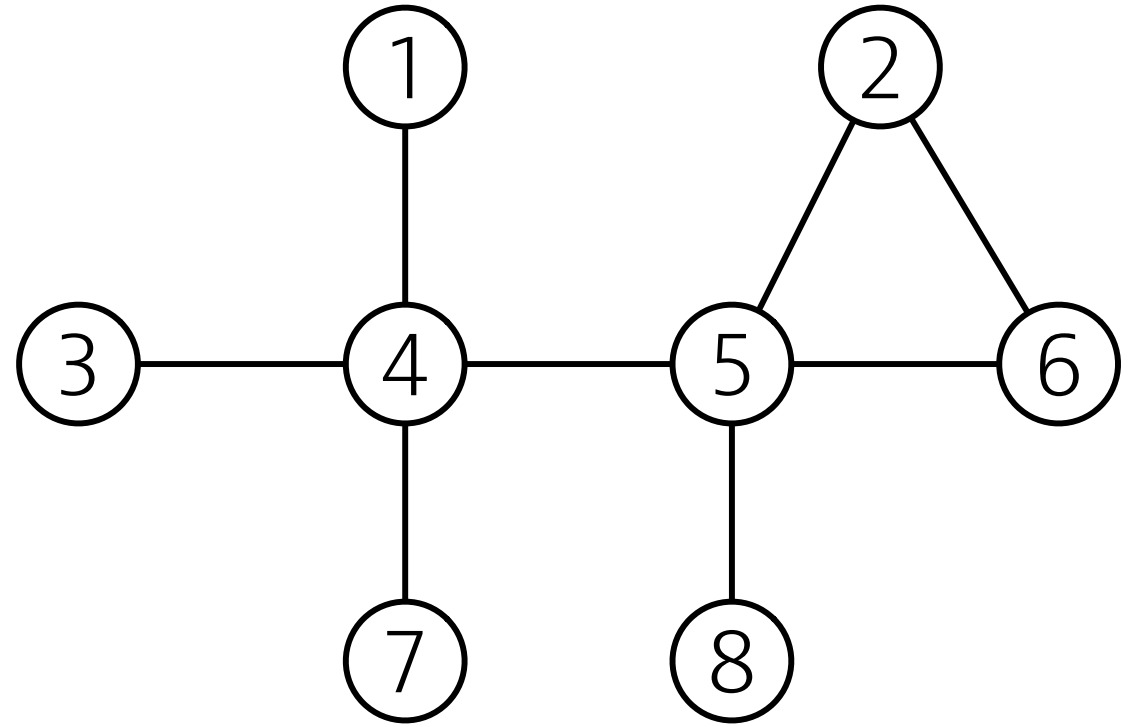


Minimum
dominating set

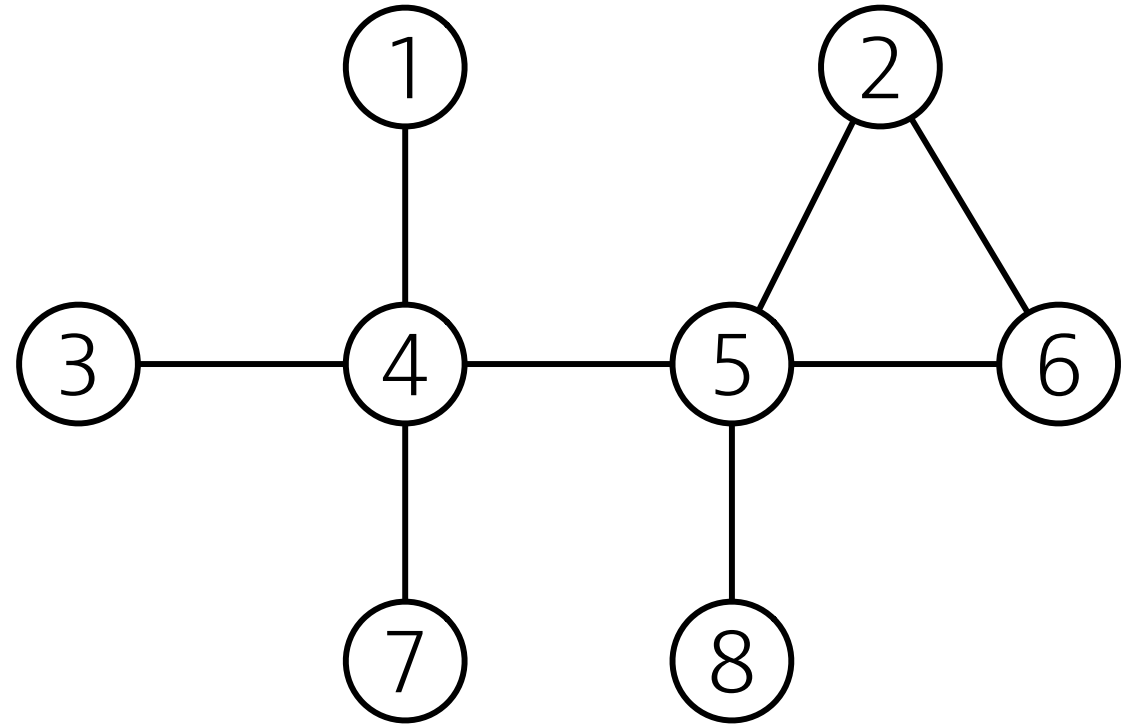


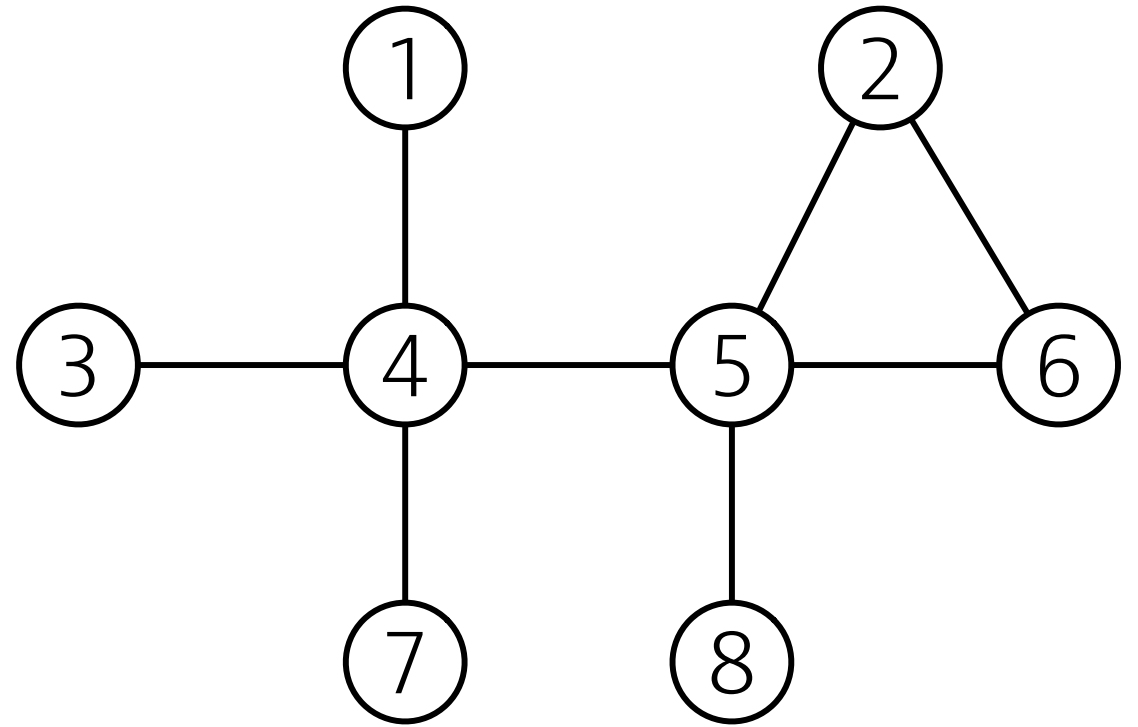
Maximum
independent set

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