

# Minimum Spanning Trees

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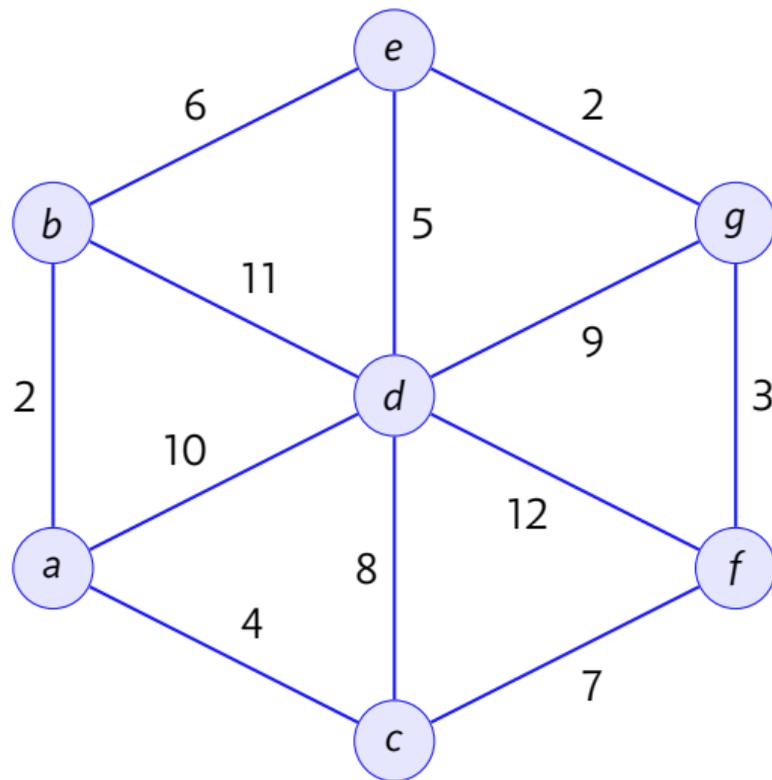
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# Objectives

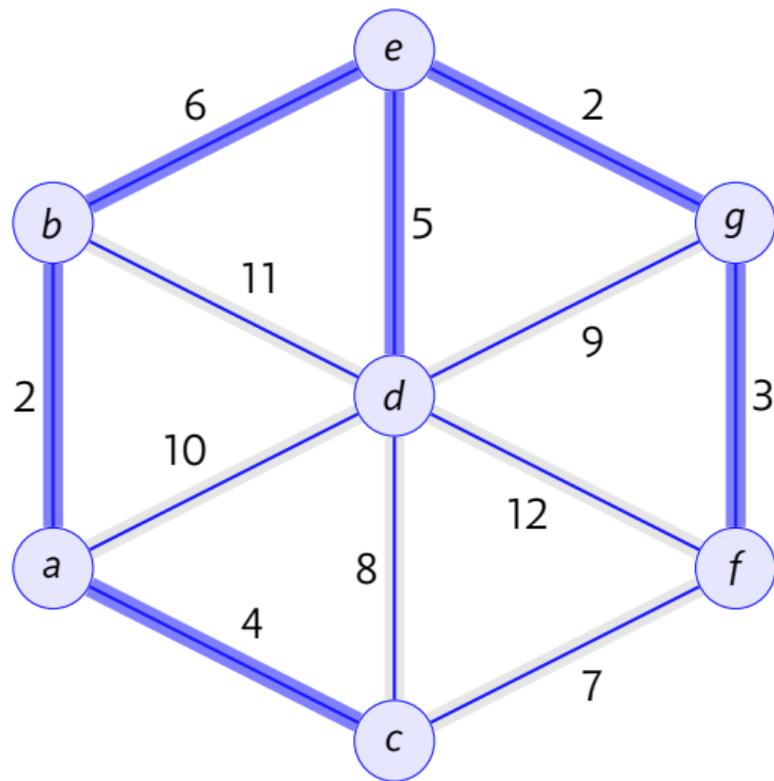
Your Objectives:

- ▶ Define minimum spanning tree and explain its properties
- ▶ List some problems that MSTs solve
- ▶ Explain some variations of the MST
- ▶ Specific algorithms presented in other video(s).

## A Minimum Spanning Tree



## A Minimum Spanning Tree



## Properties of MSTs

- ▶ All connected graphs have one.
- ▶ May have more than one.
- ▶  $|E| = |V| - 1$
- ▶ Other tree properties hold...

## Variations

- ▶ Maximum spanning tree
- ▶ “minimum” spanning subgraph
- ▶ Minimum spanning forest
- ▶ Second minimum spanning tree: Compute MST, then try again  $|E|$  times, removing a different edge from the MST each time.
- ▶ In contests: this algorithm is easy, so contest problems will try to disguise the fact that MST will solve it.