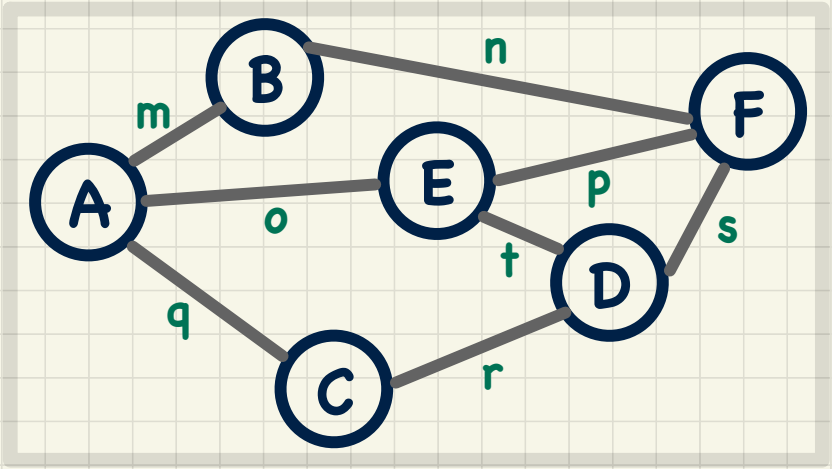
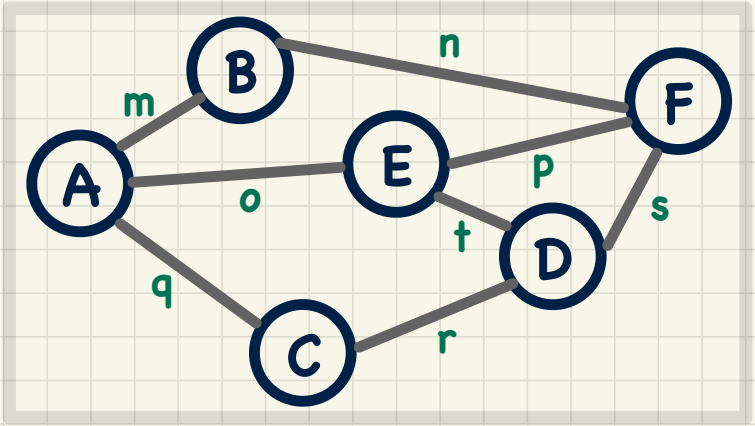
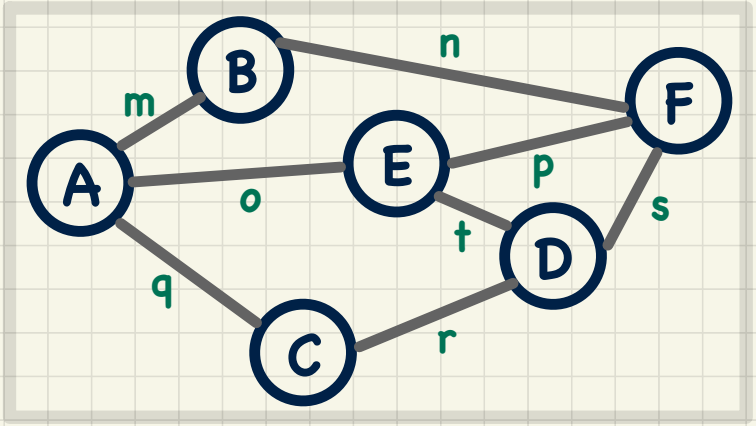
Graph: Paths and Cycles



- Path
- Cycle
- Simple Path
- Simple Cycle
- Reachable
- Reachable Paths

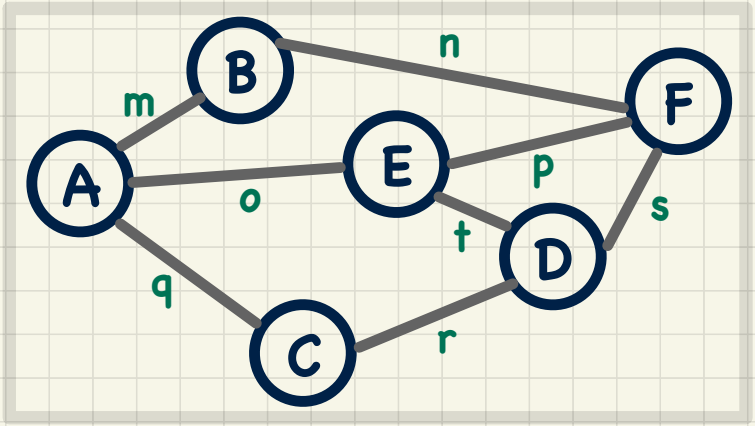
Graph: Subgraphs and Spanning Subgraphs



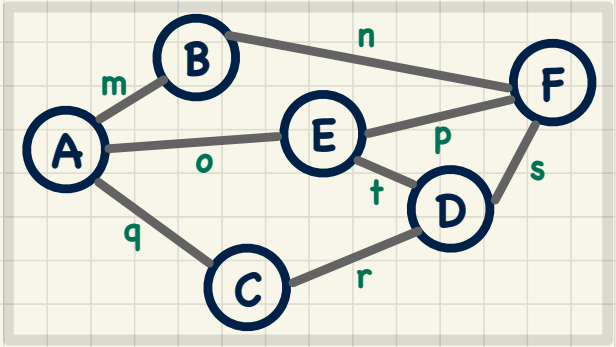


Graph: Subgraphs and Spanning Subgraphs

Formulate a condition of a graph $G' = (V', E')$ that is a subgraph, but **not** a spanning subgraph, of $G = (V, E)$.

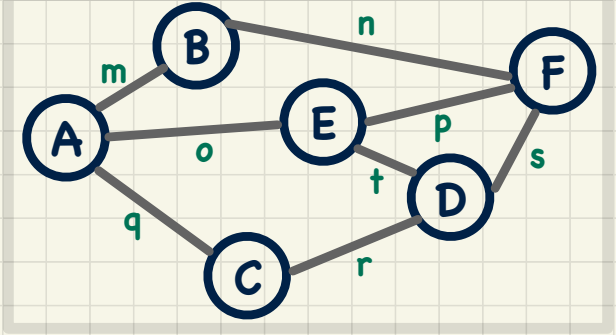


Graph: Connected Graph

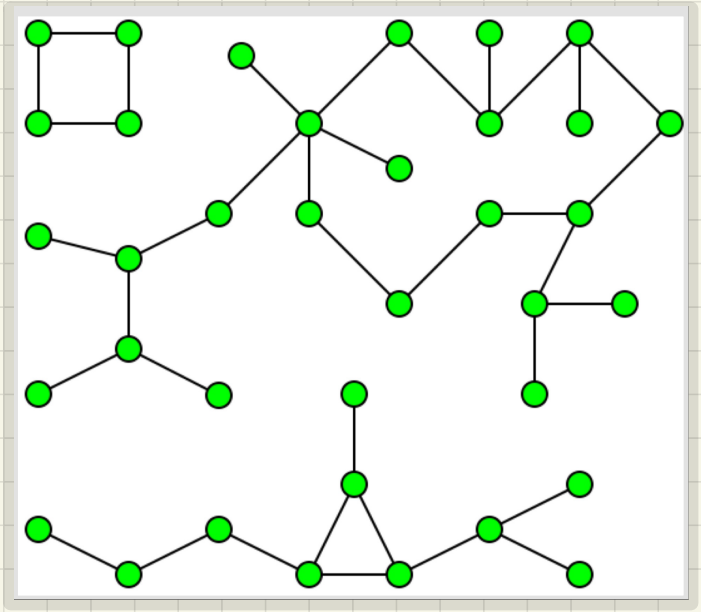


Is a spanning subgraph also connected subgraph?

Hint:

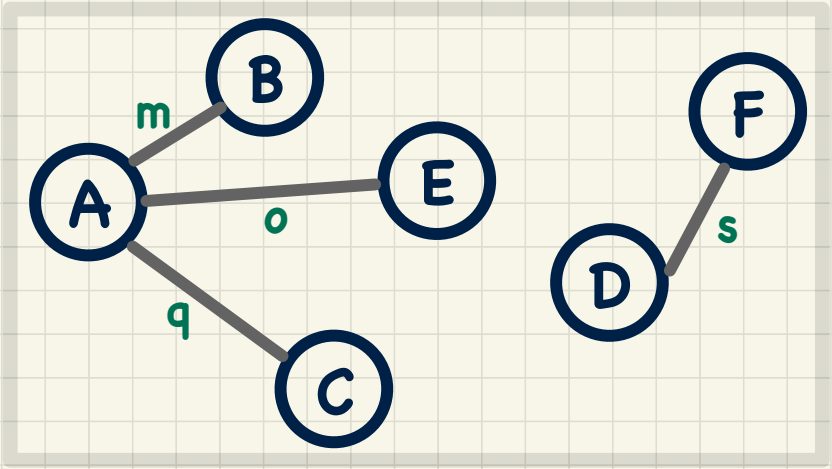


Graph: Connected Components

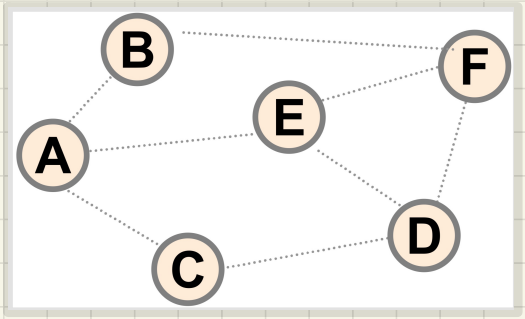


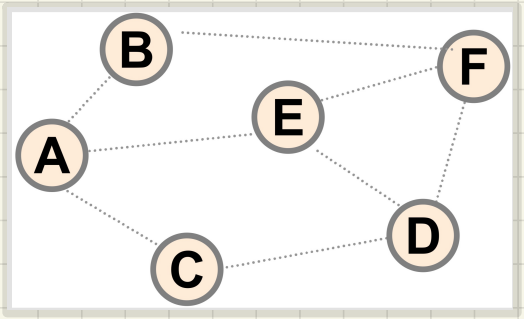
How many connected components does the graph have?

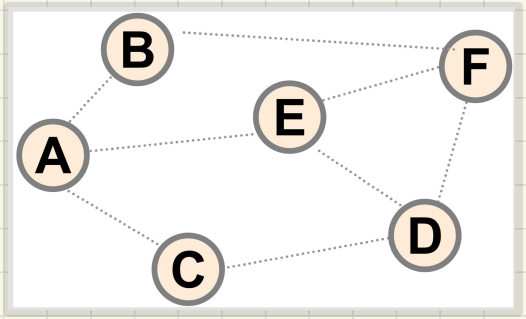
Graph: Forests and Trees

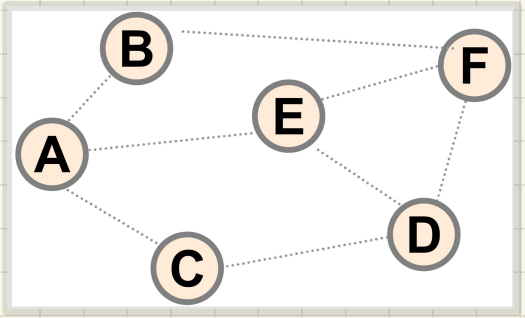


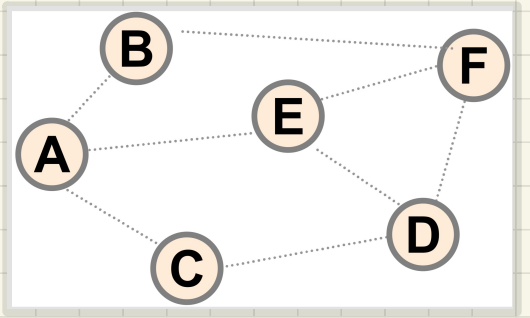
Graph: Spanning Trees





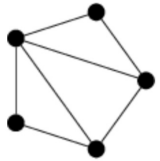




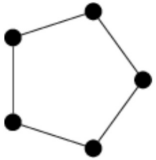


Graph: Exercises

Given a graph



Which one of the following is a ***spanning tree***?



(a)

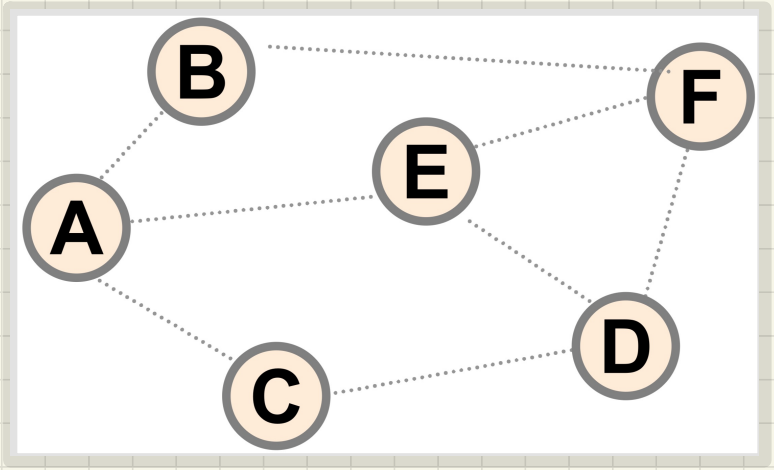
(b)

(c)

Properties: Structure vs. |V| and |E|

Given $G = (V, G)$ an **undirected** graph with $|V| = n$, $|E| = m$:

$$\begin{cases} m = n - 1 & \textbf{if G is a } \textit{spanning tree} \\ m \leq n - 1 & \textbf{if G is a } \textit{forest} \\ m \geq n - 1 & \textbf{if G is } \textit{connected} \\ m \geq n & \textbf{if G contains a } \textit{cycle} \end{cases}$$



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