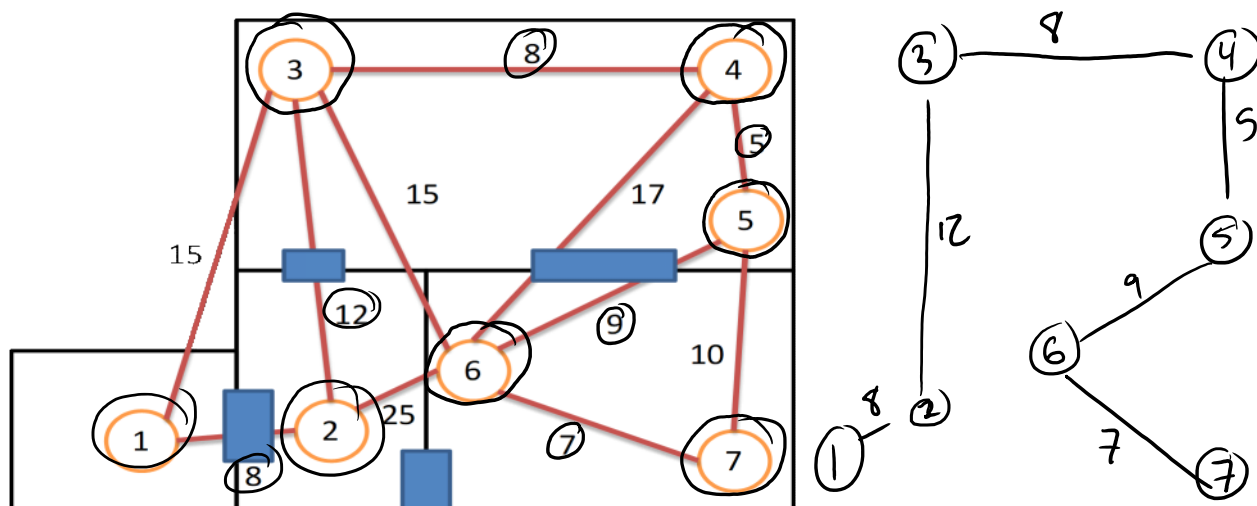


2018-02-25 Minimum Spanning Trees

Monday, February 25, 2019 3:01 PM

Minimum Spanning Trees

- Given a graph, we would like to reduce the graph such that all vertices are connected such that they are connected using the least possible edge weights.
- Differs from Dijkstra's Algorithm in that MSTs are concerned with the graph as a whole, not the graph from a given starting point.
 - An MST *might* have an inefficient connection between two vertices if that produces an overall shorter graph
- A graph may contain multiple MSTs
- Potential applications
 - Pseudo traveling salesman problem
 - Routing of network cable, power cable, water pipes, sewage, roads, etc.



Prim's MST Algorithm

1. Given an arbitrary starting vertex, push all outgoing edges into a min PQ
 2. While all vertices are not in our new graph:
 - a. Pop off least cost edge from PQ
 - b. If the associated vertex is not in our graph already:
 - i. Add vertex to our new graph (accept edge). Push on all outgoing edges into the PQ
- Unlike Dijkstra's algorithm, Prim's MST examines each edge in isolation.

Another Example

