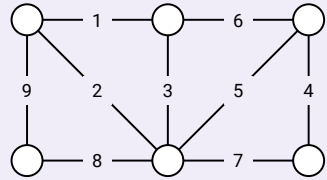


Q Kruskal's Algorithm

In which order does Kruskal's algorithm select edges in the MST?



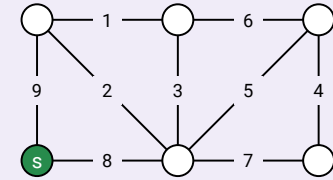
2

Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

Q1: In which order does Kruskal's algorithm select edges in the MST?

Q Prim's Algorithm

In which order does Prim's algorithm select edges in the MST? Start from vertex s.



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Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

Q1: In which order does Prim's algorithm select edges in the MST? Start from vertex s.

Q Adding a Constant

In a graph G with unique edge weights, do the edges of the (unique) MST change if we add 1000 to every edge weight?

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Q1: In a graph G with unique edge weights, do the edges of the (unique) MST change if we add 1000 to every edge weight?

Q Multiplying by a Constant

In a graph G with unique edge weights, do the edges of the (unique) MST change if we **multiply** 1000 to every edge weight?

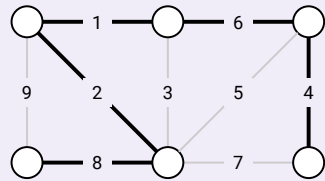
8

Q1: In a graph G with unique edge weights, do the edges of the (unique) MST change if we multiply 1000 to every edge weight?

Q Secret Edge

Suppose the bold edges form a MST. Will the MST change as a result of introducing one new edge with weight w ?

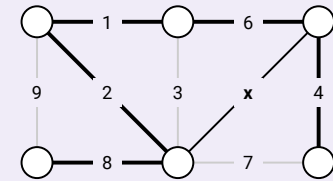
1. If $w < 1$, ...
2. If $1 < w < 5$, ...
3. If $5 < w < 9$, ...
4. If $9 < w$, ...



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Q Unknown Edge Weight

Suppose x is an unknown edge weight. Can the bold edges be a MST? If so, for what values of x ? If not, why not?



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Suppose the bold edges form a MST. Will the MST change as a result of introducing one new edge with weight w ?

Q1: If $w < 1$, ...

Q2: If $1 < w < 5$, ...

Q3: If $5 < w < 9$, ...

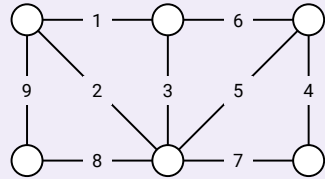
Q4: If $9 < w$, ...

Q1: Suppose x is an unknown edge weight. Can the bold edges be a MST? If so, for what values of x ? If not, why not?

Q Maximum Spanning Tree

Maximum spanning tree. Given an undirected graph G with positive edge weights, find a spanning tree that **maximizes** the sum of the edge weights.

Design an algorithm to find a maximum spanning tree in $O(E \log E)$ runtime.



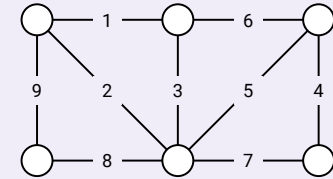
14

Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

Q Min-Product Spanning Tree

Min-product spanning tree. Given an undirected graph G with positive edge weights, find a spanning tree that **minimizes** the **product** of the edge weights.

Design an algorithm to find a min-product spanning tree in $O(E \log E)$ runtime.



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Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

Q1: Design an algorithm to find a maximum spanning tree in $O(E \log E)$ runtime.

Q1: Design an algorithm to find a min-product spanning tree in $O(E \log E)$ runtime.