Greedy Algorithm Ideas (let's narrow down)

Earliest end time

Latest end time

Earliest start time

Latest start time

Shortest interval

Fewest overlaps (with remaining intervals)

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Earliest End Time

Intuition: If u has the earliest end time, and u overlaps with v and w then v and w also overlap.

Why?

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Approximation Ratio

For a minimization problem (find the shortest/smallest/least/etc.)

If $OPT(\mathrm{I})$ is the value of the best solution for input I, and $ALG(I)$ is the value that your algorithm finds, then ALG is an α approximation algorithm if for every I,

$$\alpha \cdot OPT(I) \geq ALG(I)$$

i.e. you're always within an α factor of the real best.

Sometimes use big-$\mathcal{O}$ notation on the ratio.

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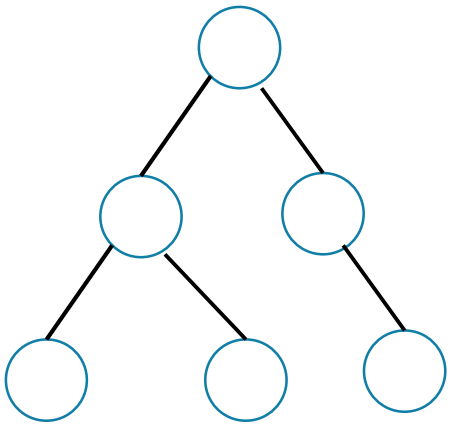
Vertex Cover

Vertex Cover

A set S of vertices is a vertex cover if for every edge (u, v): u is in S, or v is in S, (or both)

Find the minimum vertex cover in a graph.

We're picking a set of ***vertices*** so that the ***vertices*** cover every edge.



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