Independent Set

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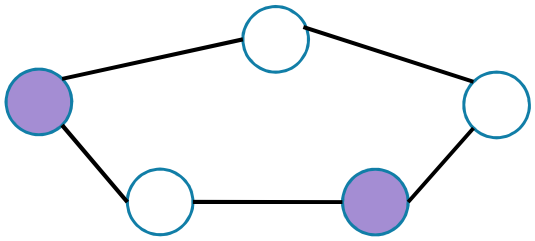
A set S of vertices is an independent set if for all u, v in S, (u, v) is not an edge.
(i.e. every edge has at most one endpoint in the set)

An independent set of size 2.



Write an LP for independent set

What do you want your variables to be?

How do you ensure that you don't have two adjacent vertices in the set?

Have a variable for each vertex x_u -- have it **indicate** whether you include u or not (i.e. make it a Boolean)

Constraints?

Vertex Cover LP

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Write an LP for finding the minimum weight vertex cover

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

What are your variables, then how do you constrain them?

Let $w(u)$ be the weight for a vertex u. You can treat $w(u)$ as a constant.

What do we do

Let's try an example first

Suppose your LP gave you this solution on this graph. How would you round it (i.e. convert to a valid vertex cover)?