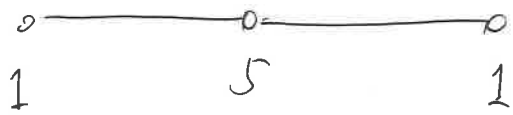
Pf (Prop): Take any max ind. set, if a leaf $v \notin S$, then parent$(v) \in S$.

But $S - \text{parent}(v) \sqcup \{v\}$ is again independent and has the same cardinality.

Counter example:

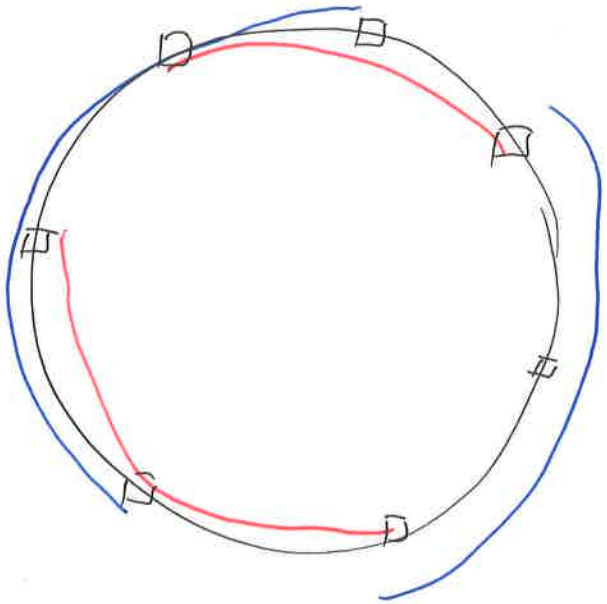


Dynamic Programming:

For a node v let's denote by

$OPT_{\underline{in}}(v)$: max weight of Ind. Set of the subtree rooted at v s.t. v is in the Ind. Set.

$OPT_{out}(v)$: " " " " " " not in the Ind. Set.

Case One: $OPT_{out}(v) = \sum_{u \in \text{children}(v)} \max\left(OPT_{in}(u), OPT_{out}(u)\right)$

Case Two: $OPT_{in}(v) = w(v) + \sum_{u \in \text{children}(v)} OPT_{out}(u)$.