# Lec 10/19

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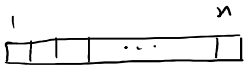
## Prim's Algorithm

nearest 


$$nearest[i] = \begin{cases} 0 & \text{if } i \in V' \text{ MST} \\ \text{node in } V' \text{ nearest to } i & \text{if } i \notin V' \text{ MST} \end{cases}$$

init: $nearest[1] = 0$ $nearest[i] = 1$ $\forall i \neq 1$.

find min cost in $(i, nearest[i])$, add that $i$ to MST.

↑ This takes $\Theta(n)$

Then update nearest takes $\Theta(n)$ as well.

So algorithm runs in $\Theta(n^2)$

Alternative: priority queue.

"light-safe edge" idea.

This one takes $\Theta(E \log^2 V)$

Prove Prim's Algorithm Works

Induction