\[ T(n) = T\left(\frac{2n}{10}\right) + T\left(\frac{7n}{10}\right) + n \]

\[ T\left(\frac{4n}{100}\right) + T\left(\frac{14n}{100}\right) = T\left(\frac{14n}{100}\right) + T\left(\frac{49n}{100}\right) + \frac{2n}{10} + \frac{7n}{10} \]

\[ n \quad \frac{9n}{10} \]
\[ + 81n \quad \frac{100}{10} \]
\[ 9 \quad \frac{n}{10} \]

---

**Thm:** Greedy is at most twice OPT.

**Pf.**

\[
\begin{align*}
&1 \text{ edges} \quad \text{Greedy} = 2k \\
&\vdots
\end{align*}
\]

By def it is a vertex cover. If not I would add endpoints of an unconnected edge.

**Goal:** OPT $\geq$ k?

OPT has to choose one of the endpoints of each of these $1e$ edges in order to cover them. So, OPT $\geq k$.

**Note:** By Greedy ALG, these $1e$ edges do not share endpoints.