Goals:
• Design a reduction
• Describe importance of reductions

Reminders/Questions:
Probability/Quicksort Review: [link]
• Last day with these groups!
• Prog. Ass. No assumption of unique x,y
• Why “if”
• Why work backwards?

Problem: Cell Tower Scheduling

- Cell towers need to broadcast in the shortest time (if two towers are 2 miles
  of each other, broadcast interference)

![Cell Tower Transmission (in mm) diagram]

1. Formal consists? (sets, with more packets get priority)
2. Describe conversion strategies:
   - Each tower is a vertex
   - Weight is # data packets
   - Edges b/t two transmission towers if distance < 2 miles
3. What is runtime of each conversion strategy?
   - (in terms of a, number of towers)


More General Reduction

P (want to solve)

\[ \begin{align*}
\text{Runtime: } & \text{ Runtime } F + \text{ Runtime } G + \text{ Runtime } g \\
\text{Usually uses: } & f, g \in \mathbb{Q}
\end{align*} \]

if Runtime \((f,g)\) is \(O(\text{poly}(n))\)

we write

\[ P \text{ is polynomial time reducible to } \mathbb{Q} \]

\[ P \leq \mathbb{Q} \Rightarrow \text{one is harder than the other.} \]

Goals:
• Describe importance of reductions
• Analyze how first choice affects Quicksort

Reminders/Questions:
• Probability/Quicksort Review: [link]
• GHC panel Tuesday at 7 pm on zoom (see email)
• Reductions compared to 301? Polynomial time, concrete examples, less formal (no languages)