CS 240: Data Structures and Data Management **Winter 2025**

Tutorial 05: Feb 14

1. **Recurrence Practice**
   Consider the recurrence

   $$T(n) = \Theta(1) + T(\sqrt{n})$$

   with base case $T(2) = \Theta(1)$. Show that $T(n) \in O(\log \log n)$.

2. **Interpolation**
   Suppose we have an array $\mathcal{A}$ of numbers such that $\mathcal{A}[i] = t\sqrt{i}$ for $0 \leq i \leq n-1$ and some positive number t. Show that, using interpolation search, searching for t in $\mathcal{A}$ takes $O(\log \log n)$ time.

3. **Creating Tries**
   Draw the binary trie, pruned trie and compressed trie containing the following keys 101, 1001, 1001000, 10011, 1110, 11111, 11100, 111110, 111101.