Running times of recursively defined algorithms

Algorithms that are described recursively typically have the following structure:

- Solve the problem if $n = n_0$; else
  - Preprocessing
  - Recursion to one or more smaller problems
  - Postprocessing

As a result, their running times can be described by recurrence relations of the form

$$t(n_0) = C \text{ (some positive constant)}$$
$$t(n) = f(n) + \sum_{i \in I} t(i) + g(n) \text{ if } n > n_0$$

For the second bullet,

- $f(n)$ is the preprocessing time
- I is a set of dataset sizes that we run the algorithm on recursively
- $g(n)$ is the time for postprocessing