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6.055J / 2.038J The Art of Approximation in Science and Engineering  
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# Part 1

# Divide and conquer

2. Assorted subproblems	7
3. Alike subproblems	19

Divide-and-conquer reasoning – breaking large problems into small ones – is useful in many contexts. Each example of it has unique features, but two broad reasoning categories stand out. In the first category, you break the large problem into unlike, or assorted subproblems. An example is estimating the number of piano tuners in New York or, since this problem was made famous by Fermi, in Chicago, where Fermi spent much of his career. You might break it into fragments such as the number of pianos, how often each one is tuned, and how long it takes to tune a piano.

In the second category, you break the large problem into similar or identical subproblems. An example is merge sort, which breaks a list to be sorted into two halves, each sorted using merge sort – an example of recursion.

The next two chapters contain extended examples in each category.