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Efficiency

So far, our attention has been focused on the distinction between functions that are Turing-computable (like addition and multiplication), and functions that are not (like the Halting Function and the Busy Beaver Function).

If the Church-Turing Thesis is true, this is the same as the distinction between functions that are computable and functions that are not.

As it turns out, however, that the question of whether a function is computable is not the only interesting question in computer science. Some of the most exciting research in computer science is to do with the question of how *efficiently* the values of a computable function can be computed.

In this section I'd like to give you a taste of what efficiency is all about, by telling you about the $P = NP$ problem.