Invited Speaker

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Problems, Problems, Problems

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Abstract

Here is a problem just about everyone has seen in a math class at some point: Given a function, find its range. For example, if we are given the function $f(x) = x^2$, defined for $x = 0, 1, 2, 3, 4, \ldots$, we know that its range is $0^2 = 0$, $1^2 = 1$, $2^2 = 4$, $3^2 = 9$, $4^2 = 16$, etc. Easy enough, it seems. Here is another problem just about everyone has faced: Your computer is showing you the dreaded spinning beach ball, and you forgot to save the document you have been working on do you try to wait it out, or reboot now and start over? That seems like a much harder task But surprisingly, these two problems the range problem, and the spinning beach ball problem are actually one and the same, in a certain precise sense. I will explain why this is the case, and mention other related problems, some more familiar than others. Some of the key insights here go back to Turing, and the advent of modern computing, which I will discuss along the way.