

Re: Zenkin's paper on Cantor (reply of Dr. Zenkin)

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In article <320e992a.0411190852.7ce02e6c@posting.google.com>,
>I have had such a discussion with an extremely intelligent and
>experienced mathematician. He told me that PCs are not Turing
>Machines, because they have "an infinite tape". I think he did not
>know anything about descriptive complexity. This infinite portion of
>the tape consists entirely of blank symbols, and therefore has
>descriptive complexity $O(1)$, which is easily realized by a physical
>system.

I think you mean "descriptive complexity" or "Kolmogorov complexity"; the term "descriptive complexity" nowadays is reserved for a different subject. But in any case, Kolmogorov complexity is irrelevant to the argument that PCs are not Turing machines. PCs do not have unbounded memory; they have a fixed finite memory, and hence can be modeled as finite-state automata. To build something that "is" a Turing machine in some defensible sense (as opposed to something that is *usefully modeled* or *approximated* by a Turing machine), one should at least build it so that it has no a priori memory bound, and continues eating up whatever resources are available in the universe as needed.

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The range of our projectiles---even ... the artillery---however great, will never exceed four of those miles of which as many thousand separate us from the center of the earth. ---Galileo, Dialogues Concerning Two New Sciences