Dear Reader,

I hope you all have started another great year.

Probably many of you are aware of a New York Times article in last December on Donald Knuth, "The Yoda of Silicon Valley," by Siobhan Roberts, who also wrote one on Lotfi Zadeh for the New Yorker in 2017 (which reminded me I had missed his obituary on our Bulletin). For people in TCS like myself, many stories in the article are well-known including a reward for finding mistakes in his books, his Tex project, etc., etc, but it was just great to have him in NYT, one of the most influential newspapers in the world. Obviously a lot of reader's comments were from those who know Knuth personally and I also posted the following one, which got the 16th most "Recommended" out of the 156 total comments.

"More than 10 years ago there was a technical meeting in the UK and I was with him just by chance on the bus commuting from the hotel to the conference site. We spent some 20 minutes together and our conversation came to his trip to Japan another 10 years before. It was for his winning a Kyoto Prize and he spent three weeks in Japan. He visited several places (including rural areas like Akita) and received warm hospitality everywhere. So far so good... What surprised me was his vivid memory; he correctly remembered more than 10 "Japanese" names of guys who met him (like local governors), of nice Rykan hotels he stayed, etc. I realized he was a genius."

I came across two articles on the Church-Turing Thesis coincidentally, one in this Bulletin by Yuri and the other in CACM (January, 2019) by Copeland and Shagrir (well-known philosophers due to Yuri). Both of them are concerned with new species of algorithms that may require rethinking of (the fate of) the Theory. I agree, but the CACM version includes one thing I am pretty skeptical: Namely the authors mention "relativistic computation," which exploits the Einstein's general theory of relativity, by which the Halting Problem becomes solvable (in say one hour!) This may have much more serious consequences than a settlement of the P vs. NP.

For instance, look at many important open questions in number theory. Many of them ask "whether there are infinite numbers n such that n has such and such properties." You will immediately come up with several famous examples including twin primes, harmonic divisor numbers, Fibonacci numbers, and many others. Notice that you can write a program, a pretty short one, to enumerate such numbers for each of them. If the Halting Problem is solvable in one hour, those problems are all resolved in hours!

AI has already and completely surpassed human Chess/Go/Shogi players. Who are next, mathematicians?

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