The 70,368,744,177,664 Names of God

Tariq Khan
Omaha, Nebraska, USA

The classic science fiction story from Arthur C. Clarke called *The Nine Billion Names of God* is assessed and updated. Modern day interpretations and extensions to the story are created using genetic and quantum computing qubit engineering to propose an analogous technical, if not metaphysically interesting, engineering target that will likely be achieved by the year 2040.

"It is really quite simple. We have been compiling a list which shall contain all the possible names of God. …Well, they believe that when they have listed all His names—and they reckon that there are about nine billion of them -- God's purpose will have been achieved."
-- Arthur C. Clarke, The Nine Billion Names of God

"So God created man in his own image, in the image of God created he him…"
-- Genesis 1:27

"Creating a state of 400 entangled quantum particles is routinely touted by physicists working on building a quantum computer (their target is 10,000 entangled particles). I predict a breakdown of the unitary evolution of the wave function at that point, and possibly the emergence of new phenomena."
-- Paul Davies, Universe from Bit

In 1953, the renowned author Arthur C. Clarke wrote his famous short story *The Nine Billion Names of God*. The six pages-in-length story is often listed as one of the greatest science fiction short stories of all time. In a tribute to Arthur C. Clarke's brilliance, an extension, updating, or "creative twist" is proposed for the fantastical engineering project Clarke describes in his fictional story.

Consider how in the Christian Bible how man was created "in the image of God." In the Biblical book of Genesis 9:6, it is stated that "Whoever sheds the blood of man, by man shall his blood be shed, for God made man in his own image." Thus, we could make a leap and suggest that the converse of Clarke's idea i.e., to list every possible name of man, could fulfill the same premise of the story to list every name of God.

One of the challenges that a technical reader of the short story might suggest is, exactly what qualifies or delineates a "name"? Clarke's beautiful short story notes:

"Call it ritual, if you like, but it's a fundamental part of our belief. All the many names of the Supreme Being - God, Jehovah, Allah, and so on - they are only man-made labels. There is a philosophical problem of some difficulty here, which I do not propose to discuss, but somewhere among all the possible combinations of letters, which can occur, are what one may call the real names of God. By systematic permutation of letters, we have been trying to list them all."
"I see. You've been starting at AAAAAAAAA. . . and working up to ZZZZZZZZZ. . . "
"Exactly - though we use a special alphabet of our own. Modifying the electromatic typewriters to deal with this is, of course, trivial. … "Luckily it will be a simple matter to adapt your automatic sequence computer for this work, since once it has been programmed properly it will permute each letter in turn and print the result. What would have taken us fifteen thousand years it will be able to do in a thousand days."

But there is a unique identifier, at least for the blueprint, for every human that has ever lived, their genome. As Dr Dennis O'Neil notes on this Palomar College website called the Biological Basis of Heredity:

Which chromosome from each of the 23 homologous pairs of both parents is inherited is a matter of chance. There are 8,324,608 possible combinations of 23 chromosome pairs. As a result, two gametes virtually never have exactly the same combination of chromosomes. Each chromosome contains dozens to thousands of different genes. **The total possible combination of alleles for those genes in humans is approximately 70,368,744,177,664.** This is trillions of times more combinations than the number of people who have ever lived. **This accounts for the fact that nearly everyone, except monozygotic twins, is genetically unique.**

By this approach, the list of every unique name of "man" would thus contain 70,368,744,177,664 unique entries.

But our technical reader again might argue, so what?, i.e., who determines what defines the completion of a "list" e.g., a scroll, a computer memory, an assortment of scratches carved in a cave? Here too we may make an extension to the story and suggest that it is not the act of having listed all 70 some trillion unique possible human genomes (names) that is magical, or in the story's case apocalyptic, but rather, comprehending, processing, recording, or storing, them all "simultaneously" that is our suggested ultimate or peak achievement. It is in this approach that we find an interesting analogy to the modern technological or engineering race to achieve quantum entangled computer bits (Qubits) towards the construction of a supremely fast and working Quantum Computer. The possible "magic" related to this type of engineering achievement is probably best described by Paul Davies in his 2014 work *Universe from Bit*:

> The conclusion is stark. If the cosmic information bound is set at 10^{122} bits, and if information is ontologically real, then the laws of physics have intrinsically finite accuracy. For the most part, that limitation of the laws will have negligible consequences, but in cases of exponentiation, like quantum entanglement, they make a big difference, a difference that could potentially be observed. Creating a state of 400 entangled quantum particles is routinely touted by physicists working on building a quantum computer (their target is 10,000 entangled particles). **I predict a breakdown of the unitary evolution of the wave function at that point, and possibly the emergence of new phenomena**. To quote Wittgenstein (1921): "Whereof one cannot speak, thereof one must remain silent." **We cannot - should not - pronounce on , or predict, the state or dynamical evolution, of a generic quantum system with more than about 400 entangled particles, because there are not enough words in the entire universe to describe that state!**

So now with our extended or updated interpretation of *The Nine Billion Names of God* to be *The 70.4 Trillion Names of God* (unique genomes of humans) simultaneously entangled in quantum bits of a quantum computer, we have now not only a more precise target for the story but, also, an actual target that should very well be achieved in the not too distant future. While Paul Davies' noted target of 2^{400} entangled qubits (400 bits equating to 2.58225 x 10^{120} in decimal, 70,368,744,177,664 in decimal would require 2^{46} bits i.e., 46 Entangled Qubits. Given the current rate of technological and engineering progress in various global corporate, government research, and university laboratories (Figure 1), this achievement could be accomplished sometime close to the year 2040 (Figure 2). 2040 as a year when some scientists predict a super-intelligence Singularity may appear while some predict the end of civilization. When the 2^{46} qubit entanglement is achieved, the author does not suspect that the world will end or that "overhead the stars will go out," however, there is a joy in updating classic stories into modern and perhaps still mysterious and magical engineering goals.

A special "thank you" to the late Arthur C. Clarke for all of his wonderful and inspirational books, films, and contributions both scientific and human.

Figures

Figure 1.

Google web search of "record entangled qubits" showing Quantum Computer entangled Qubit engineering progress between 2017, 2018, and 2019 of 10 to 18 to 20.
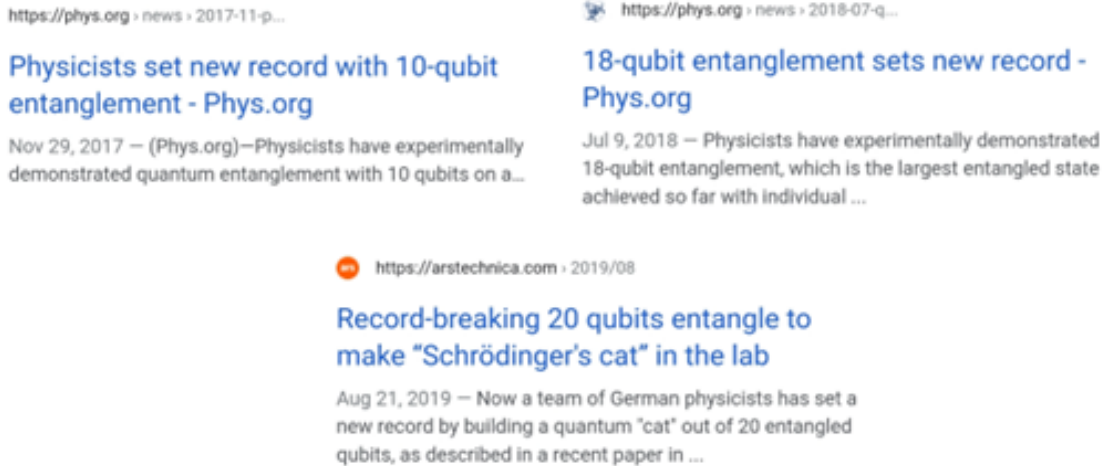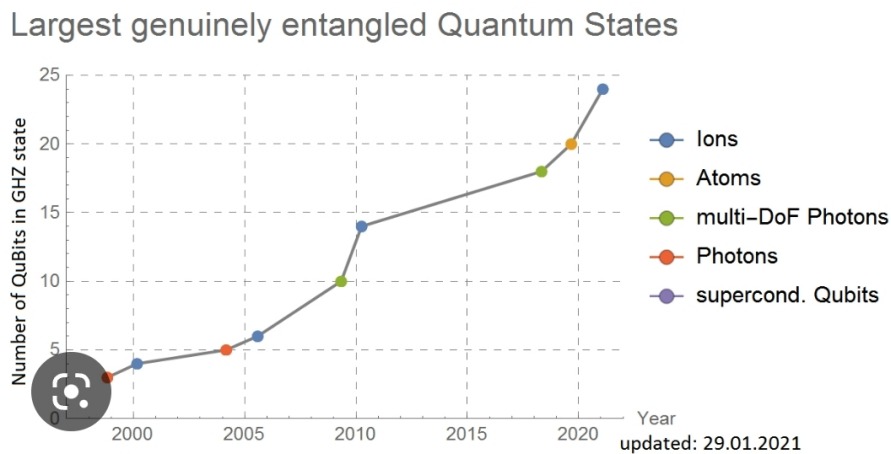

Figure 2.

Graph showing growth in the engineered count of entangled Qubit states by year showing an extrapolated attainment of 46 entangled qubits around the year 2040 at which point the 70,368,744,177,664 unique genomic names of every possible human could be simultaneously stored or recorded simultaneously. An engineering achievement analogous too Arthur C. Clarke's Tibetan monks listing of The Nine Billion Names of God.

Source: https://mariokrenn.wordpress.com/2021/01/29/reference-list-for-records-in-large-entanglement-generation-number-of-qubits-in-ghz-states/

References

1) Clarke, A. C. (1967). *The nine billion names of God: the best short stories of Arthur C. Clarke*. [1st ed.] New York, Harcourt, Brace & World.

2) O'Neil, D. (2014). *Biological Basis of Heredity.* Behavioral Sciences Department, Palomar College, San Marcos, California Retrieved from: https://www2.palomar.edu/anthro/biobasis/bio_3.htm on October 17, 2022.

3) Davies, P. (2014). Universe from bit. In P. Davies & N. Gregersen (Eds.), *Information and the Nature of Reality: From Physics to Metaphysics* (Canto Classics, pp. 83-117). Cambridge: Cambridge University Press. doi:10.1017/CBO9781107589056.006