Doubling Rice Grains

Once upon a time, the emperor of China was so delighted by the game of chess that he offered the game's inventor anything he wanted in the kingdom. The inventor replied that he wanted only rice.

"I would like one grain of rice on the first square of the chessboard, two grains of rice on the second square, four grains of rice on the third square, eight grains of rice on the fourth square" and so on. Thinking this would amount to little, the emperor readily agreed.

While the amounts of rice are minuscule in the beginning, they become substantial - about four billion grains - by halfway through the chessboard.

Fulfilling the inventor's request is impossible. If you double the grains of rice with each square, the final square alone would require \(2^{64-1} = 2^{63} \approx 9 \text{ billion billion grains of rice}\). This is enough rice to cover the entire world (excluding the oceans) in rice grains.