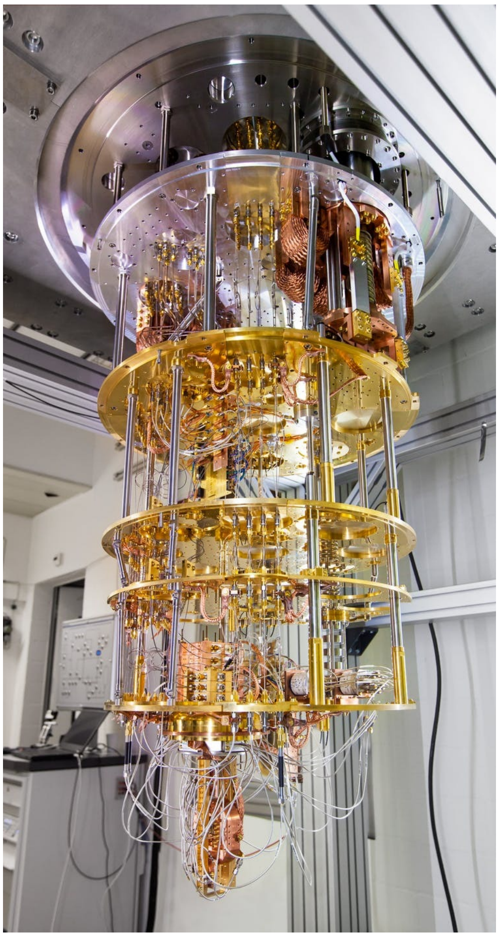
Problem 6. «A promise»

Young cryptographers, Alice, Bob and Carol, are interested in quantum computings and really want to buy a quantum computer. A millionaire gave them a certain amount of money (say, X_A for Alice, X_B for Bob, and X_C for Carol). He also made them promise that they would not tell anyone, including each other, how much money everyone of them had received.

- Could you help the cryptographers to invent an algorithm how to find out (without breaking the promise) whether the total amount of money they have, $X_A + X_B + X_C$, is enough to buy a quantum computer?
- What weaknesses does your algorithm have (if someone breaks the promise)? Does it always protect the secret of the honest participants from the dishonest ones?



IBM's 50 qubit quantum computing system