DISCUSSION FOR ELEVENTH TUTORIAL

DATE: TO BE PRESENTED MARCH 19 AND MARCH 26, DUE APRIL 2 AND APRIL 9

Ten people are sitting around a table and they each pick a random integer (possibly negative). Each person tells the person to the left and to the right their secret number and then everyone announces the sum of the two numbers that they received. When those numbers are announced, the first person reveals his sum as 2, the next 4, the third 6, all the way up to 20. What was the secret number of the sixth person (the person who announced the number 12)?

Ideally, what we want here is not just to know the number of the sixth person, but the secret number of anyone at the table assuming that there were n people at the table and it was announced all around that the sums were $a_1, a_2, \ldots, a_n$. We are looking for a good way of finding that number so that we don't have to solve a linear system of 10 equations and 10 unknowns (one way of solving it). What can you do to solve this question faster?