

Q8. Is the answer in the previous question desirable? Provide your reasoning. If your answer is undesirable, please provide a solution (1) to improve the efficiency and (2) allow the addition of one more sender.

**The answer in the previous question is undesirable**

(1) The Inner Product Between the CDMA Codes Needs to Be Zero

To make a more efficient system, we could change sender 2's codeword to **(1, -1, 1, 1, 1, -1, 1, 1)** so that sender 1 and 2's codeword have an inner product of zero.

(2) The third sender could use the code **(1, 1, -1, 1, 1, 1, -1, 1)** because it is orthogonal to the two other codes.

To get the third code, we could solve the system of equations we obtained by setting the inner product of the third code with the first and second codes to zero.

<https://youtu.be/KXbJS62blZg>