Tutorial : Error Correction

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Error Correction

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When transmitting the major information over a noisy communication link, the department has chosen to use the following 7-bit encodings in the hopes that they'll be able to correct multiple-bit errors during transmission. Using this code, how many bit errors in a message about a single major will the receiver be able to correct?

6-1 : 0101010
6-2 : 1001100
6-3 : 0110001
6-7 : 1010010

1 ✔ Answer: 1

Explanation

To answer this problem, one first needs to calculate the minimum hamming distance across all pairs of encodings. To compute the hamming distance, compare the number of bit positions that are different between each pair of encodings.

6-1 to 6-2: Bits 6, 5, 2, and 1 differ → hamming distance = 4
6-2 to 6-3: Bits 6, 5, 4, 3, 2, and 0 differ → hamming distance = 6
6-3 to 6-7: hamming distance = 4
6-1 to 6-3: hamming distance = 4
6-1 to 6-7: hamming distance = 4
6-2 to 6-7: hamming distance = 4

The minimum hamming distance between each pair of encodings is D = 4. Therefore, the number of bit errors that can be corrected is $\lfloor((D-1)/2)\rfloor$ = 1.

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Answers are displayed within the problem

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? More explanation of the formula — 4
I need to know that how the formula from the last question is formed.

Actual workings — 2
hi all, i had difficulty with this question and after reviewing the answer i found that all my workings were correct apart from the final...

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