# Quiz 3: do it yourself; use the course notes - Res...

## Attempt 1 of 2

Written May 24, 2024 8:55 PM - May 24, 2024 9:30 PM

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|---|---|
| Attempt Score | 9.75 / 11 - 88.64 % |
| Overall Grade (Highest Attempt) | 9.75 / 11 - 88.64 % |

### Question 1 — 2 / 2 points

Create a code with five codewords that has a Hamming Distance of 4 bits. Show / explain how you know the Hamming Distance is 4 bits.

My Code:
Codeword 1 = 00000000
Codeword 2 = 11111111
Codeword 3 = 00001111
Codeword 4 = 11110000
Codeword 5 = 00111100

The Hamming Distance of a code is the minimum number of bits between the closest two codewords. An example of the closest two codewords in this code are codewords 2 & 3 which have a hamming distance of 4 bits as there is a difference of 4 bits between the two words.

**The correct answer is not displayed for Written Response type questions.**

### Question 2 — 1 / 2 points

Create the Hamming codeword (using even parity) for the dataword 1010101. Show your work and clearly identify the parity bits. If you want, hand-write it and upload an image.

```
_ _ 1 _ 0 1 0 _ 1 0 1
P P 2 P 4 4 4 P 8 8 8
1 2 1 4 1 2 2 8 1 2 2
            1       1
```

Hamming codeword = 11110100101

**The correct answer is not displayed for Written Response type questions.**

## Question 3 — 2 / 2 points

Does the Hamming codeword 0000011 (made using odd parity) have errors in it? Where? What was the original dataword supposed to be? Show all your work

```
0 0 0 0 0 1 1
- - - - - - -
P P 2 P 4 4 4
1 2 1 4 1 2 2
            1
```

Yes, it has errors. Error is at 2 + 4 = 6th bit.

The original dataword was supposed to be 0001

**The correct answer is not displayed for Written Response type questions.**

## Question 4 — 2 / 2 points

If a code has a Hamming distance of 11 bits, how many errors can it detect? Why can it not detect more than that?

It can detect a maximum 10 bits. It cannot detect more than that many bits as it will the exact opposite of the originally sent code which cannot be detected as an error.

**The correct answer is not displayed for Written Response type questions.**

## Question 5 — 2 / 2 points

If a code has a Hamming distance of 26 bits, how many errors can it correct? Why can it not correct more than

Error correcting ability is $< H/2$. Thus, it can correct maximum of 12 bit errors. It cannot correct more than that many bits as more than 50% error bits will be ambiguous and considered as the opposite codeword.

**The correct answer is not displayed for Written Response type questions.**

## Question 6 — 0.75 / 1 point

Which bits are checked by parity bit 4, in a 12-bit-long codeword?

bits 5,6,7,12

**The correct answer is not displayed for Written Response type questions.**

▼ Hide question 6 feedback

Bits: 4, 5, 6, 7, and 12 are checked by parity bit 4
The Hamming algorithm works only because parity bits check themselves

Done