



MITx 6.004.1x

Computation Structures 1: Digital Circuits

Help

selfpoised ▾

Course

Progress

Dates

Course Notes

Discussion

🏠 [Course](#) / [1. Basics of Information](#) / [Lecture Videos \(38:24\)](#)



◀ Previous

18 of 20 ▾

Next ▶

LE1.7

🔖 Bookmark this page

🧮 Calculator

LE1.7.1: Parity

4/4 points (ungraded)
To protect stored or transmitted information one can add check bits to the data to facilitate error detection and correction. One scheme for detecting single-bit errors is to add a parity bit:

b0 b1 b2 ... bN-1 p

When using even parity, p is chosen so that the number of "1" bits in the protected field (including the p bit itself) is even; when using odd parity, p is chosen so that the number of "1" bits is odd. In the remainder of this problem assume that even parity is used.

To check parity-protected information to see if an error has occurred, simply compute the parity of information (including the parity bit) and see if the result is correct. For example, if even parity was used to compute the parity bit, you would check if the number of "1" bits was even.

If an error changes one of the bits in the parity-protected information (including the parity bit itself), the parity will be wrong, i.e., the number of "1" bits will be odd instead of even. Which of the following parity-protected bit strings has a detectable error assuming even parity?

11101101111011011

☒ Has detectable error

☐ Appears okay



11011110101011110

☐ Has detectable error

☒ Appears okay



10111110111011110

☒ Has detectable error

☐ Appears okay



00000000000000000

☐ Has detectable error


☒ Appears okay



Submit

LE1.7.2: Error Detection

5/5 points (ungraded)
After finishing CS 6.004.1x, you're hired at a casino where you are asked to evaluate the following proposals for speeding up

 Calculator

After finishing 6.004.1x, you're hired at a casino where you are asked to evaluate the following proposals for encoding the suit of a card (one of "heart", "diamond", "club", or "spade") to determine the number of bit errors that could be detected when using that encoding.

Proposal 1: assign a unique 2-bit code to each choice:

heart: 00 diamond: 01 club: 10 spade: 11

Number of bit errors that can be detected?:

0

✓

Proposal 2: add some more bits to Proposal 1

heart: 000 diamond: 001 club: 010 spade: 011

Number of bit errors that can be detected?:

0

✓

Proposal 3: add odd parity to Proposal 1

heart: 001 diamond: 010 club: 100 spade: 111

Number of bit errors that can be detected?:

1

✓

Proposal 4: add even parity to Proposal 3!

heart: 0011 diamond: 0101 club: 1001 spade: 1111

Number of bit errors that can be detected?:

1

✓

Proposal 5: send the Proposal 1 codes in triplicate

heart: 00 00 00 diamond: 01 01 01 club: 10 10 10 spade: 11 11 11

Number of bit errors that can be detected?:

2

✓

Submit

Discussion

Hide Discussion

Topic: 1. Basics of Information / LE1.7

Add a Post

Show all posts	by recent activity
✓ How should I calculate min Hamming Distance in Proposal 5	5
🗨 Error detetion[staff] Proposal 2, In my opinion, 3 bits error does not produce anthoer valid code word, so 3 bits error can be detected. need help. thanks.	4

< Previous

Next >

edX

- About
- Affiliates
- edX for Business
- Open edX
- Careers
- News

Legal

- Terms of Service & Honor Code
- Privacy Policy
- Accessibility Policy
- Trademark Policy
- Sitemap

Connect

- Blog
- Contact Us
- Help Center
- Media Kit
- Donate



© 2021 edX Inc. All rights reserved.
深圳市恒宇博科技有限公司 [粤ICP备17044299号-2](#)