



COMPUTER SYSTEMS FUNDAMENTALS (4COSC004W)

Lecture: Week 4. Part 1 of 3



Contact details

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In this video we will cover:

- Data storage units:
 - *Terminology*
 - *Appreciation of magnitudes of data*

DATA STORAGE

UNITS OF DATA STORAGE

By the end of this unit you will:

- Be able to distinguish between various units of data storage
- Be able to convert between the units correctly

Bit

- Binary Digit
- Either a 1 or a 0
- Smallest unit of data

Nibble

- 4 Bits
- Useful for converting Binary to Hex and back

Byte

- 8 Bits
- 2 Nibbles
- Smallest unit of data addressable by CPU
- CPU transfers data in units of 1 Byte
- Smallest number in 1 Byte $00000000_2 = 0_{10}$
- Largest number in 1 Byte $11111111_2 = 255_{10}$
- 256 different values
- 1 ASCII Character (next video)

Kilobyte

1024 Bytes (2^{10})

- This is **NOT** 1000 bytes !!!!
- 1KB = 1 Kilobyte
 - *A book with 2 pages, with an average of 600 words per page, and on average 6 characters per word:*
 - How much storage space would be required using ASCII?
 - $$\frac{2 \times 600 \times 6}{1024} = 7.03125 \text{ KB}$$

Megabyte

2^{20} bytes

- This is **NOT** 1 million Bytes
- 1 Megabyte = 1MB = 2^{20} Bytes = 1,048,576 Bytes
- 1MB = 1024 Kilobytes

Gigabyte

2^{30} bytes

- 1 Gigabyte = 1GB = 2^{30} Bytes = 1,073,741,824 Bytes
- 1GB = 1024 MB

Terabyte

2^{40} bytes

- 1 Terabyte = 1TB = 2^{40} Bytes = 1,099,511,627,776 Bytes
- 1TB = 1024 GB

Data storage units:

Name	Size
Byte (B)	2^0 Bytes
Kilobyte (KB)	$2^{10} \text{ Bytes} = 1024 \text{ B}$
Megabyte (MB)	$2^{20} \text{ Bytes} = 1024 \text{ KB}$
Gigabyte (GB)	$2^{30} \text{ Bytes} = 1024 \text{ MB}$
Terabyte (TB)	$2^{40} \text{ Bytes} = 1024 \text{ GB}$
Petabyte (PB)	$2^{50} \text{ Bytes} = 1024 \text{ TB}$
Exabyte (EB)	$2^{60} \text{ Bytes} = 1024 \text{ PB}$
Zettabyte (ZB)	$2^{70} \text{ Bytes} = 1024 \text{ EB}$
Yottabyte (YB)	$2^{80} \text{ Bytes} = 1024 \text{ ZB}$

In this video we covered:

- Data storage
 - *Unit sizes*
 - *Bit, Nibble, Byte, KB, MB, GB,*

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