COMPUTER SYSTEMS FUNDAMENTALS
(4COSC004W)

Data Storage Part 1 of 3

In this lecture 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

- **B**inary Digi**t**
- 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?
      - $\frac{2 \times 600 \times 6}{1024} = 7.03125\ KB$

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

In this lecture we covered:

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

Thank you