

	Internal HD	SATA HD	External SS	USB	Removable CD	BWD	Rewind
at capacity	3TB = £85	12GB	128GB	128GB	56B	350GB	1250GB
speed	6TB	9TB	2TB	256GB	64MB	475GB	25GB
reliability	X	V	X	V	V	V	V
Extremely Reliable	Good when not in use - vulnerable to heat & dust	Very durable - SAs More HDDs	Extremely Reliable	Very Reliable	Good for medium term		

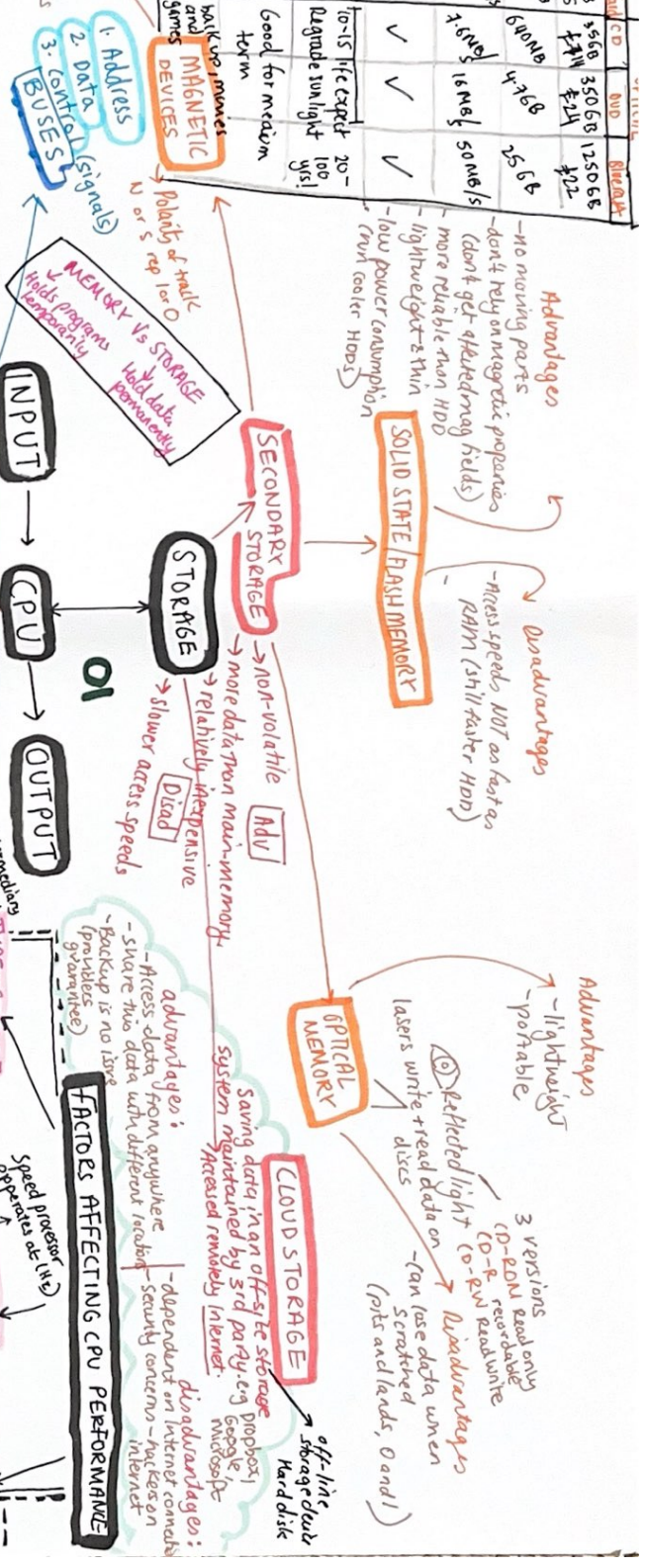
EMBEDDED SYSTEMS

- = devices use CPU / microprocessors to control their functions
- control = usually on a single microprocessor stored within device
- DON'T NEED AN OS - tasks are simple + repetitive
- ADV - make devices easier to use ↑ reliability and usability features

FETCH - DECODE - EXECUTE

1. Address of next instruction copied
 $PC \rightarrow MDR$
2. PC increments (to next instruction)
3. Simultaneously, instruction held is copied
 $MDR \rightarrow MDR$ at that location
4. contents copied from $MDR \rightarrow CIR$
5. CIR decodes instruction in CIR to see what needs to be done next
6. Instruction is executed by CU
e.g. fetching data from memory
adding data in accumulator
jumping to another program

Assumes single processor and single memory



OTHER MEMORY

ROM - Non-Volatile
cannot read-write once made
retains data no power

The computer has a piece of software called
Boots (Bios)

VIRTUAL MEM

- (on figuring secondary)
It is used to store running program
executed in the RAM.

MAR

where address location is fetched & store

loses ALL of its
as soon as there

everything since you lost saved power.
SAVED: HDD | SSD | UNWRITTEN: RAM (volatile) →

Internet - network of networks

[can find connects devices + networks]

WWW - collection of websites that are hosted on web servers + accessed through HTTP

URL - addresses to access web servers

cloud hosting - rig hosting websites on

"cloud" - hosted centrally on a network server (SaaS)

Ad - copy 1 char DIS-clone/letter
- no need for HW need internet
- no need for 175k in

NETWORK ATTACKS

PASSIVE (hard to detect, no interrupt, sniffing data)

ACTIVE (with malware - SW installed)

INSIDER, BRUTE FORCE (knows data)

DENIAL OF SERVICE

malware: social engineering, spyware, trojan, etc.
- detects, rootkit, is phishing
- module - hackers
- gets data
- spyware

indirect validation

Encryption - protect data when hacked

Plain text - OG message
cipher text - encrypted message
Encryption - plaintext → ciphertext
Key - sequence of num to encrypt or decrypt
Encryption algorithm - method for encrypting

Single Key used (letters, num, special)

Caesar Shift - e.g. Caesar Shift

Asymmetric encryption

Public Key and Private Key

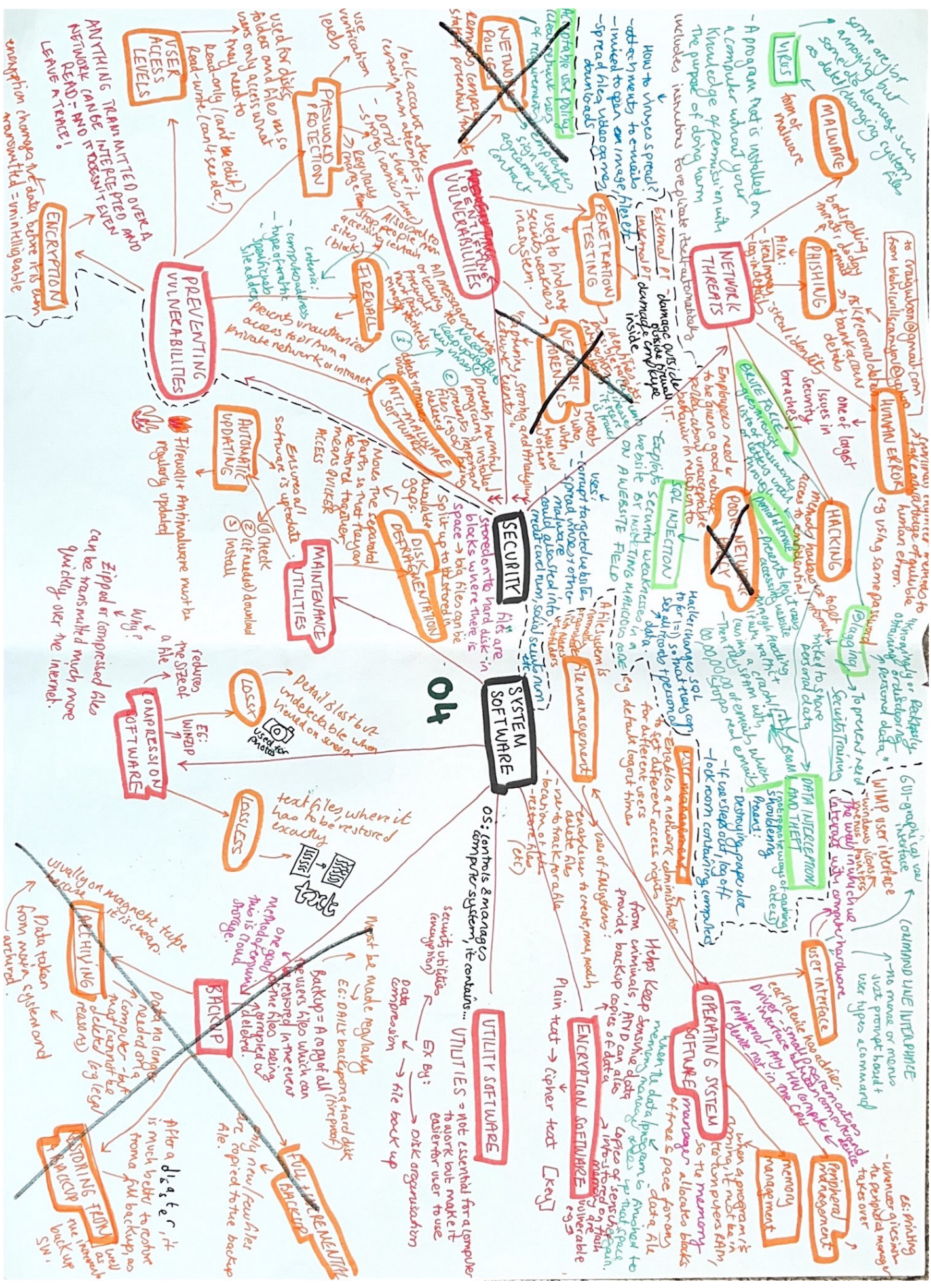
used 1st
only sent to trust individual

→ @ www.rspk

1. type domain name
2. DNS translates this to IP address

Advantages to Domain Names:

1. Humans don't have to remember IP addresses
2. If IP changes, we can still use same domain name
3. Everyone has access to local DNS



Secondary Storage:

- Primary storage - Accessible by CPU
- Secondary storage - Not directly "seen" by all applications stored when not in use

- HDD - moving track where data is, noisy, slow magnetically
- SSD - no moving parts, faster HDD, silent, don't need magnetizing
- Other types of flash (USB, SD, etc.)
- Optical storage - bc internet speeds, modern clouds don't have optical drives

- Magnetic Tape and $\downarrow$ (cost)
 - Tape is read/written sequentially

Optical disk	memory card	magnetic tape	HDD	SSD
average file speed				
Magnetic optical HDD	Minward	SSD		
Optical	RAM	SSD	HDD	Magnetic type
air capacity				

Systems Software

① Communicates internal + external hardware

② Driver as a translator for signals between OS and hardware

③ When computer booted up, the OS will check the correct device drivers for the hardware it detects

④ If new hardware driver is installed, it can be tested

⑤ Application for application: multitasking

⑥ File management

⑦ Disk management

⑧ Security

⑨ OS helps CPU with space

⑩ OS divides CPU time between apps in most efficient way

⑪ OS divides CPU time between apps in most efficient way

⑫ OS divides CPU time between apps in most efficient way

⑬ OS divides CPU time between apps in most efficient way

⑭ OS divides CPU time between apps in most efficient way

⑮ OS divides CPU time between apps in most efficient way

⑯ OS divides CPU time between apps in most efficient way

⑰ OS divides CPU time between apps in most efficient way

⑱ OS divides CPU time between apps in most efficient way

⑲ OS divides CPU time between apps in most efficient way

⑳ OS divides CPU time between apps in most efficient way

㉑ OS divides CPU time between apps in most efficient way

㉒ OS divides CPU time between apps in most efficient way

㉓ OS divides CPU time between apps in most efficient way

㉔ OS divides CPU time between apps in most efficient way

㉕ OS divides CPU time between apps in most efficient way

㉖ OS divides CPU time between apps in most efficient way

㉗ OS divides CPU time between apps in most efficient way

㉘ OS divides CPU time between apps in most efficient way

㉙ OS divides CPU time between apps in most efficient way

㉚ OS divides CPU time between apps in most efficient way

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㉜ OS divides CPU time between apps in most efficient way

㉝ OS divides CPU time between apps in most efficient way

㉞ OS divides CPU time between apps in most efficient way

㉟ OS divides CPU time between apps in most efficient way

㊱ OS divides CPU time between apps in most efficient way

㊲ OS divides CPU time between apps in most efficient way

㊳ OS divides CPU time between apps in most efficient way

㊴ OS divides CPU time between apps in most efficient way

㊵ OS divides CPU time between apps in most efficient way

CONVERT DECIMAL TO HEX

Convert decimal 106 to hex

106 ÷ 16 = 6 + 10

10 = A

16 = 10

106 = 6A

16	1
6	A

CHARACTER SET: A collection of characters used to represent data in a computer system

ASCII - 7 bit 2 = 128 char

Unicode - 16 bit 2 = 65,536

UTF-8 - 8 bit 2 = 256

UTF-16 - 16 bit 2 = 65,536

UTF-32 - 32 bit 2 = 4,294,967,296

CONVERT BINARY TO HEX

Convert 1011 1001 to hex

1011 (B) 1001 (9)

1011 1001 = B9

1011	1001
B	9

CONVERT HEX TO BINARY

Convert B9 to binary

B = 1011 9 = 1001

B9 = 1011 1001

1011	1001
B	9

CONVERT HEX TO BINARY

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Convert B9 to binary

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B9 = 1011 1001

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B	9

256	16	1
8	7	

CONVERT HEX TO DECIMAL

Convert B9 to decimal

B = 11 9 = 9

B9 = 11 * 16 + 9 = 185

CONVERT DECIMAL TO HEX

Convert 185 to hex

185 ÷ 16 = 11 + 9

11 = B 9 = 9

185 = B9

11	9
B	9

CONVERT DECIMAL TO HEX

Convert 185 to hex

185 ÷ 16 = 11 + 9

11 = B 9 = 9

185 = B9

11	9
B	9

CONVERT DECIMAL TO HEX

Convert 185 to hex

185 ÷ 16 = 11 + 9

11 = B 9 = 9

185 = B9

11	9
B	9

CONVERT DECIMAL TO HEX

Convert 185 to hex

185 ÷ 16 = 11 + 9

11 = B 9 = 9

185 = B9

11	9
B	9

1011	1001
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