RAM vs Cache Memory

RAM	Cache Memory
Fast read and write access	Faster read and write access
Volatile	Volatire
Used to store data and currently running programs	Used to store frequently used data
Necessary as most data is stored on slower storage media	Resides close to CPU

Defragmentation of SSDs

SSD uses direct access, so there woudl be no improvement in read times

May perform "trim" command which imrpoves speed of write operations

SSD uses NAND based flash memory. Defragmentation may shorten its lifespan.

FTP vs UDP

FTP	UDP
Breaks data into packets	Breaks data into packets
Can re-send dropped or damaged packets	Does not re-send dropped or damaged packets
Packets can be re-assembled if they arrive out of order	
FTP not useful for streaming media, as receiving new packets is more important than receiving old ones	UDP useful for streaming media, as receiving new packets is more useful than receiving old ones

Floating Point vs Integer

Integer	Floating Point
Numbers are stored accurately	Non-integers can be stored
Requires less complex processing	Greater range of numbers can be stored
Allows for exact representation of 0	
Takes up less storage space	

Von Neumann Architecture

Clock
| Manages Fetch/Decode/Execute cycle

ALU
| Processes data involving arithmetic and logical operations

Registers
| A small/fast/temporary storage addressed by mechanisms other than main memory

Buses
| Connects all internal components of a computer

Cache Memory
| Fast, easily accessed memory close to the CPU.

Star Network

If one cable breaks, network will still operate.

Faults are easy to detect.

Data has to pass through hub, so it is very secure.

Easy to add new stations.

Handshaking

Exchange of signals between devices to establish readiness to communicate

Example: Establishing a printer's readiness to print

Packet Switching

Data split into packets

Each packet can be transmitted on different routes

Packets may arrive out of order

More secure than circuit switching

Makes more efficient use of data lines

Contains **source address**, **order number of packet** and **parity bit**.

Storage Devices

External HDD
| Fast data transfer
| Cost-effective cost per unit of storage
| Portable and can be stored securely

Third party storage provider
| Fast transfer(depending on network speed)
| Could be more expensive than HDD due to company fees
| Data is stored securely

Flash memory drive
| Very fast access
| Cost effective cost per unit of storage
| Very portable

Magnetic tape
| Can have very slow access speed
| Allows for very large amounts of storage

Network Protocols

HTTP
| Transferring multimedia web pages over the Internet

DHCP
| Assigning dynamic IP addresses to devices on a network.

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Published 29th January, 2017.
Last updated 29th January, 2017.
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Data Transmission

Simplex	In one direction only
Half-Duplex	In both directions, but not simultaneously
Duplex	In both directions simultaneously

Overflow Areas

Physical location of a piece of data is calculated using a **hashing algorithm**
Calculation is carried out on the **primary key**
Data collision occurs when two items are hashed to the same location
In this case, the data is sent to the overflow area.
When there are many hash collisions, access to the overflow area may be slow
A new hashing algorithm is required and a larger file may be needed.