

Friday, 27 April 2018

Secondary Storage



Second

When we want to store (save) data, the data must be stored in a way that we can use a type of storage device.

Name as many storage devices as you can think of in your notebook.



have a need to store data when the computer is turned off. This is not suitable. So we need a type of storage device that can store data permanently.

think of in your notebook.

Secondary Storage

Defined

Devices that store information but which do not lose the data when they are switched off; usually not on the main circuit board (Motherboard)

There are many types of secondary storage as we just discovered. These are separated in to three categories:

- *Magnetic*
- *Optical*
- *Solid State*

Magnetic Storage

Defined



- *Magnetic storage includes, hard disk drives, magnetic tapes and floppy disks.*
- *Hard disk drives consist of stacks of non-removable disks coated with magnetic materials. The disk spin and the read-write heads move across the disks. Electro-magnets in the read-write heads read and write the data.*
- *Hard disks are suitable for large data storage & backing up that does not need to be transported.*

10 Minute task – Identify advantages and disadvantages of magnetic storage

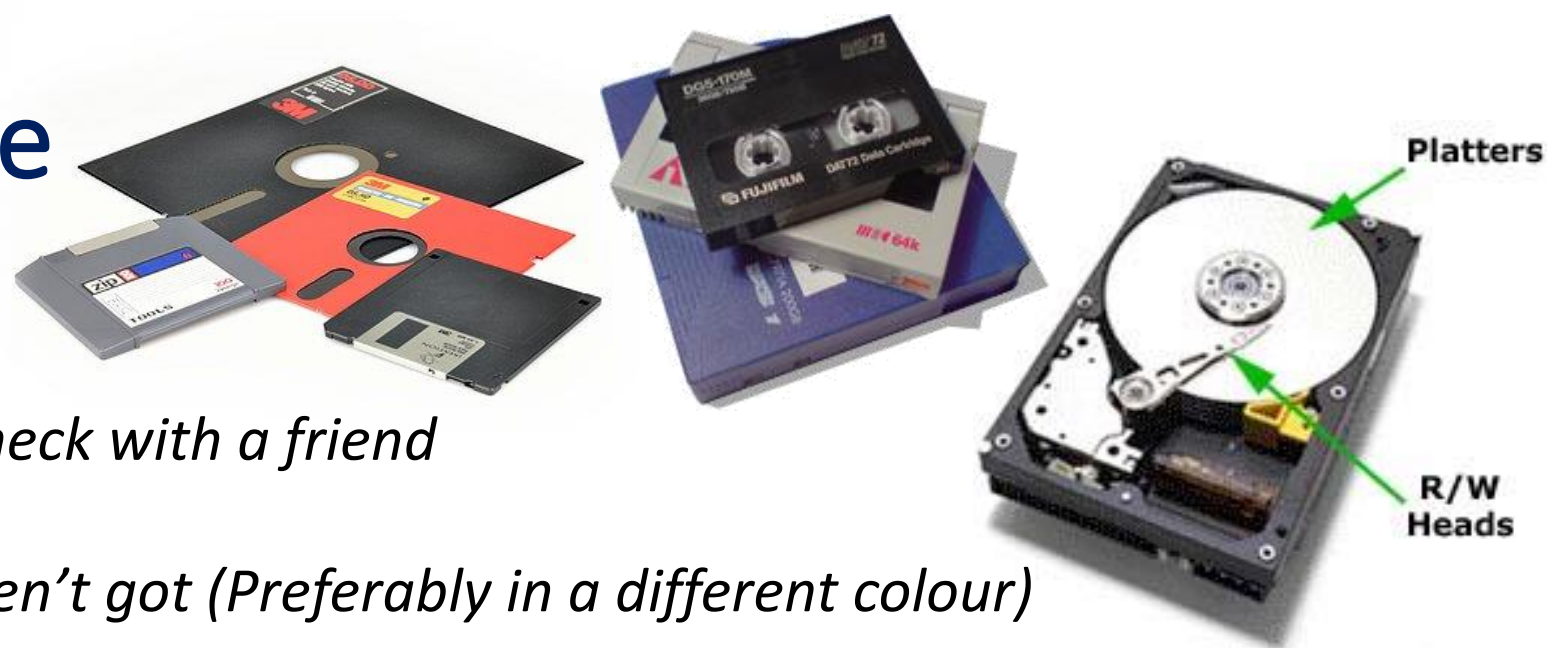
Advantages	Disadvantages

Magnetic Storage

Pair share

If you think you've finished check with a friend

Add extra notes that you haven't got (Preferably in a different colour)



Advantages	Disadvantages
<ul style="list-style-type: none">• Very fast access, speed• Random access: data can be read instantly from any part of the disk• Store large amounts of data: hard disk drives that store terabytes of data are common in most home computers.• Low cost.	<ul style="list-style-type: none">• Not very portable• Susceptible to physical knocks that may cause the read-write head to hit the discs and corrupt data.• Worn tape can become stretched and so unusable or unreadable.

Optical

Defined

- Optical
- The are data.
- The 3 n
 - Com
 - Digi
 - Blu-



ing up

10 Minute task – Identify advantages and disadvantages of optical storage

Advantages	Disadvantages

Optical Storage

Pair share

If you think you've finished check with a friend

Add extra notes that you haven't got (Preferably in a different colour)



Advantages	Disadvantages
<ul style="list-style-type: none">• Cheap.• Easy to transport• Light weight	<ul style="list-style-type: none">• Do not store as much a hard disks• Slow access speeds• Stored data degrades over time• Data cannot be written over unless specifically a CD RW<ul style="list-style-type: none">• All purchased discs will be closed (Not rewritable)

Solid state Storage

Defined



- Data can be stored electronically using **flash memory**
- Flash memory was developed from a type of ROM called 'electrically erasable programmable read-only memory (EEPROM) introduced in 1984
- EEPROM's had to be completely erased before they could be written to, but flash memory can be written to and read in small blocks
- Flash memory is used in: SD (secure digital) cards (4-32GB), Micro SD cards (4-32GB), SDXC (extended capacity) cards (2TB) & USB flash drives (256GB – 1TB)
- Flash memory is extremely portable and so increasingly used within devices: tablets, laptops, cameras, phones & some computers.

10 Minute task – Identify advantages and disadvantages of optical storage

Advantages	Disadvantages

Solid State Storage

Pair share



If you think you've finished check with a friend

Add extra notes that you haven't got (Preferably in a different colour)

Advantages	Disadvantages
<p>Very fast access speeds; far faster than discs.</p> <p>Small, light and easily portable.</p> <p>Quiet.</p> <p>Flash memory is solid state – meaning no moving parts and so if dropped or damaged there is less chance of data loss</p>	<ul style="list-style-type: none">• More expensive than alternatives• Currently the capacity is less than that of a magnetic hard disk drive• There are a limited number of erase / write cycles, up to 100,000 for high quality SSDs and so it cannot be used indefinitely (forever)

Cloud Storage



Defi

- Clo
- Use
- You
- You
- 10



disk
s on the

Advantages	Disadvantages

Cloud Storage

Pair share



If you think you've finished check with a friend

Add extra notes that you haven't got (Preferably in a different colour)

Advantages	Disadvantages
<ul style="list-style-type: none">• Data will be secure of there is a fire or other problems at the site.• The data can be accessed from anywhere in the world with an internet connection.• No need to buy expensive storage.• Many users can access the data and collaborate with each other from anywhere in the world.• Increasing online storage is provided at no extra cost to subscriptions of software (Microsoft 360).	<ul style="list-style-type: none">• Needs an internet connection• Download / upload speeds can be affected by the internet connection.• The hosting company could be a target of hackers.• You have less control if the data is held by a company.• Storing some data online may breach the Data Protection Act as it should be kept secure and confidential.• Storage can be expensive in the long term.

Exam Question Practise

Stick this
into your
book!

Shaun will be using a helmet-mounted action camera to record videos whilst skiing. The camera records video on a flash memory card.

- i) Give two reasons why flash memory is a suitable storage type for an action camera. **[2]**

1.
2.

- ii) Explain why a magnetic hard disk would be an unsuitable storage type for an action camera. **[2]**

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Exam Question Practise

Jason has bought a new laptop. The laptop contains 3 GB RAM and 128GB secondary storage.

A) Explain why secondary storage is needed in addition to RAM.

[3]

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Jason wants to back up the data on his laptop twice a week.

b) Give two advantages and two disadvantages of storing his backup data on optical discs.

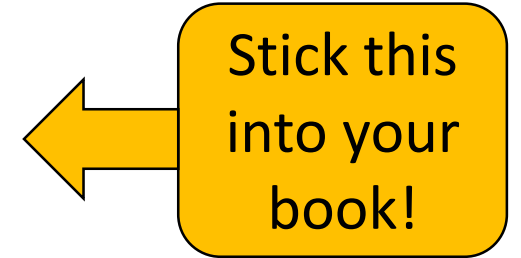
[4]

Advantages – 1.....

2.....

Disadvantages – 1.....

2.....



Stick this
into your
book!

Lesson: Part 2

Storage Capacities

Storage Capacity

Write the heading!



So now we understand all of the different device we can store data on to, but we really need to understand the difference in the amounts they can hold

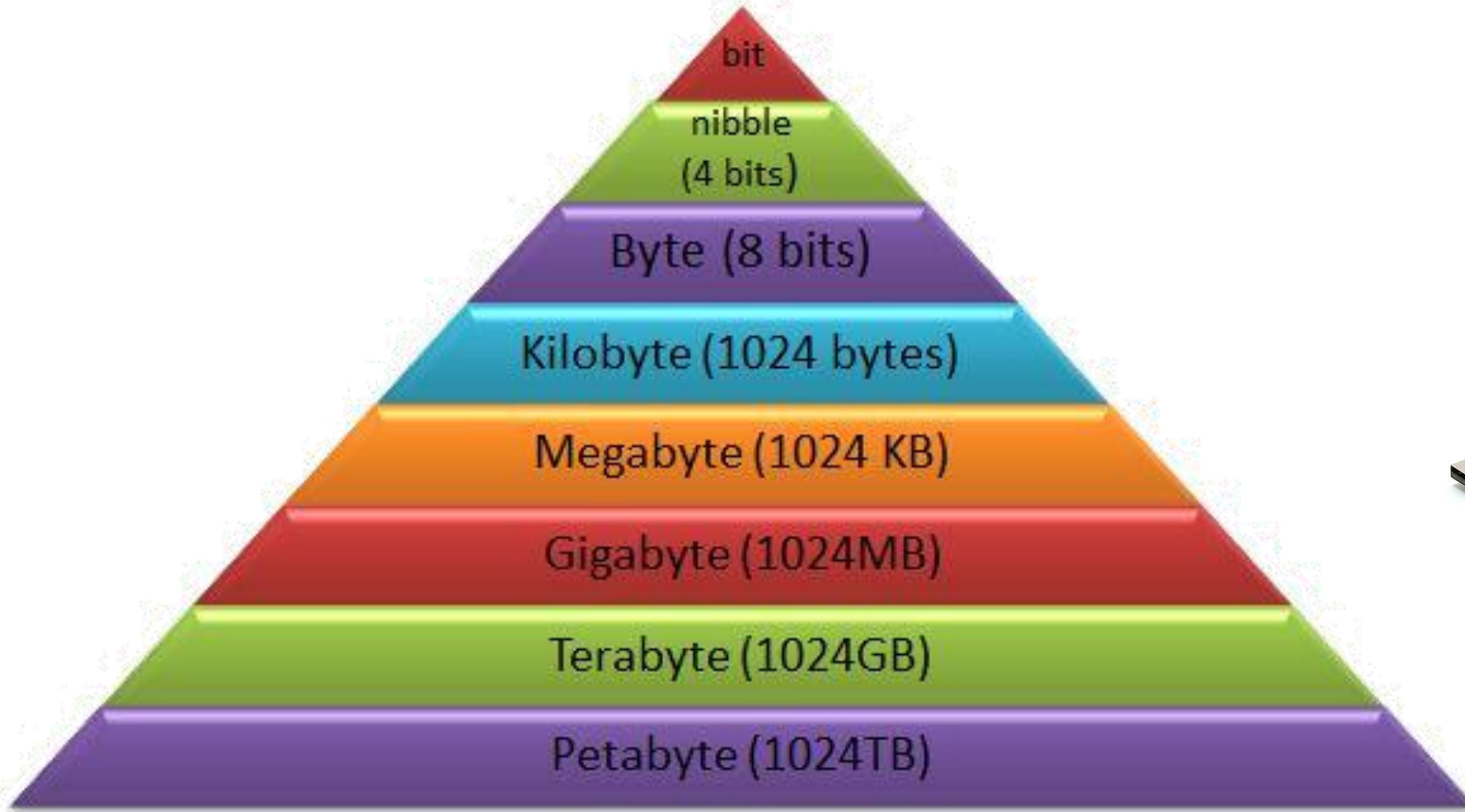
Sort the storage units into order of smallest (top) to largest (bottom).

- Petabyte
- Kilobyte
- Gigabyte
- Bit
- Terabyte
- Nibble
- Byte
- Megabyte

You may want to discuss your thoughts



Storage Capacity



Conversions

Write your answers in your books

How many bytes are there in the following:

- a) 1kb $1 * 1024 = 1024$ bytes
- b) 3mb $3 * 1024 * 1024 = 3\,145\,728$ bytes
- c) 5gb $5 * 1024 * 1024 * 1024 = 5\,368\,709\,120$ bytes
- d) How many bits are in one nibble 4 bits

A little help

- 1 bit = 0 or 1
- 1 nibble = 4 bits
- 1 byte = 8 bits
- 1 kilobyte (Kb) = 1024 bytes
- 1 megabyte (Mb) = 220 bytes
- 1 gigabyte (Gb) = 230 bytes
- 1 terabyte (Tb) = 240 bytes

Application activity



Complete the data unit conversion worksheets.

You may use your notes and a calculator if it helps, support reading is available with working examples

ALL

Organise data units into a sequential structure (Activity 1 Worksheet)

MOST

Complete initial conversions from one data unit to another. (Activity 1 Worksheet)

SOME

Complete further data conversions with practical situations (Activity 2 Worksheet)

Challenge
Complete the exam question
See your teacher

June 2013

2 Bob's computer has 512 kilobytes of ROM and 8 gigabytes of RAM.

(a) State how many bytes are in a kilobyte and a gigabyte.

a kilobyte
.....
a gigabyte
..... [2]

(b) (i) Describe the purpose of the ROM in Bob's computer.

.....
.....
.....

(ii) Describe the purpose of the RAM in Bob's computer.

.....
.....
.....
..... [4]

(c) State **one** difference between ROM and RAM, other than the size and the purpose.

.....
..... [1]

June 2013

Exam Question

2	(a)		<ul style="list-style-type: none"> 1 kilobyte = 1024 bytes/~1000bytes 1 gigabyte = 1024 x 1024 x 1024 bytes/~1000000000 bytes. 	2	1024 x 1024 x 1024 = 1073741824.
	(b)	(i) ROM <ul style="list-style-type: none"> Stores the boot program/bootstrap loader/BIOS Used to start the computer/Loads the operating system. (ii) RAM <ul style="list-style-type: none"> Stores the parts of the OS/programs <u>that are running</u>... Stores the data <u>currently in use</u> ... for access by the CPU (2 for each)		4	
	(c)		eg <ul style="list-style-type: none"> ROM is non-volatile and RAM is volatile RAM is easily expandable, ROM size is (usually) fixed for a given computer Contents of RAM change frequently, contents of ROM never (hardly ever) change. 	1	