KS3 Computer Science

Computer Hardware: Memory and Storage

Name: Class: Teacher:

Introduction

The storage of data and instructions is important because the CPU needs to be able to access the data or instructions quickly and easily and the a user needs to be able to store their work for future use. The computer two type of storage for this data:

- Primary memory
- Secondary storage

Primary memory is memory that is used to store data that is being used, is about to be used or has been used by the CPU (Central Processing Unit).

Secondary storage is used to store longer-term data such as work stored by the user or software that the user needs.

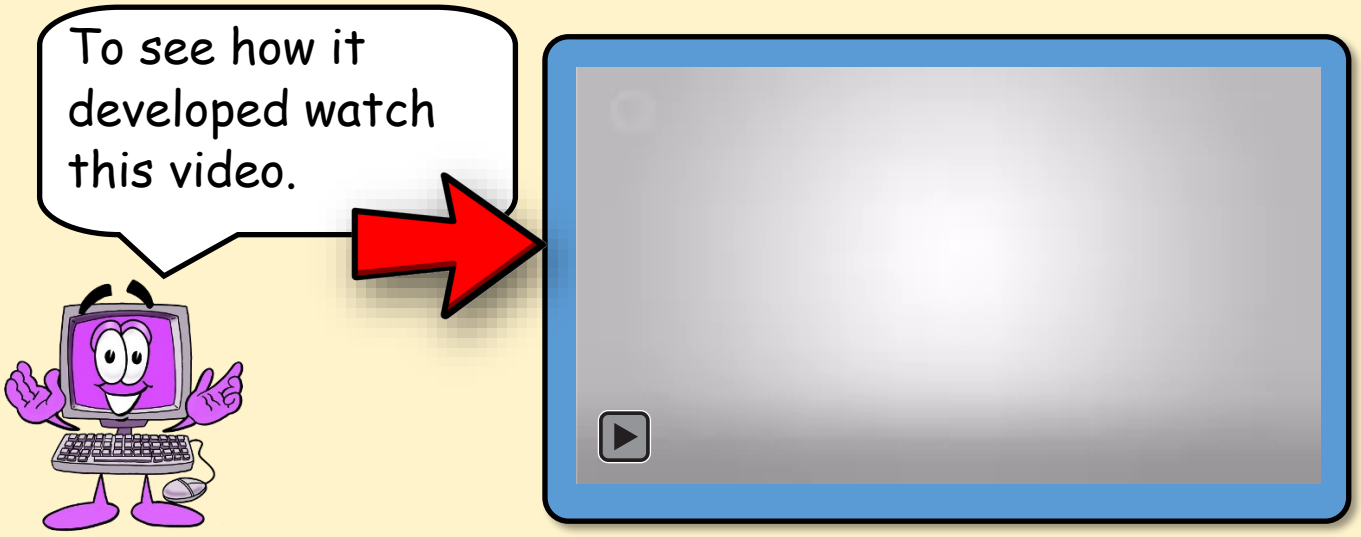
Types of Memory

There are two type of memory that your computer uses:

- Volatile memory
- Non-volatile memory.

Volatile memory is memory that is deleted when the power to the computer system is turned on. In other words it needs power to hold what is stored on it.

Non-volatile memory does not need power to retain what is stored on it. This is used to store files that that you need to use the next time the computer is turned on.



Primary Memory Hardware

Read Only Memory (ROM)

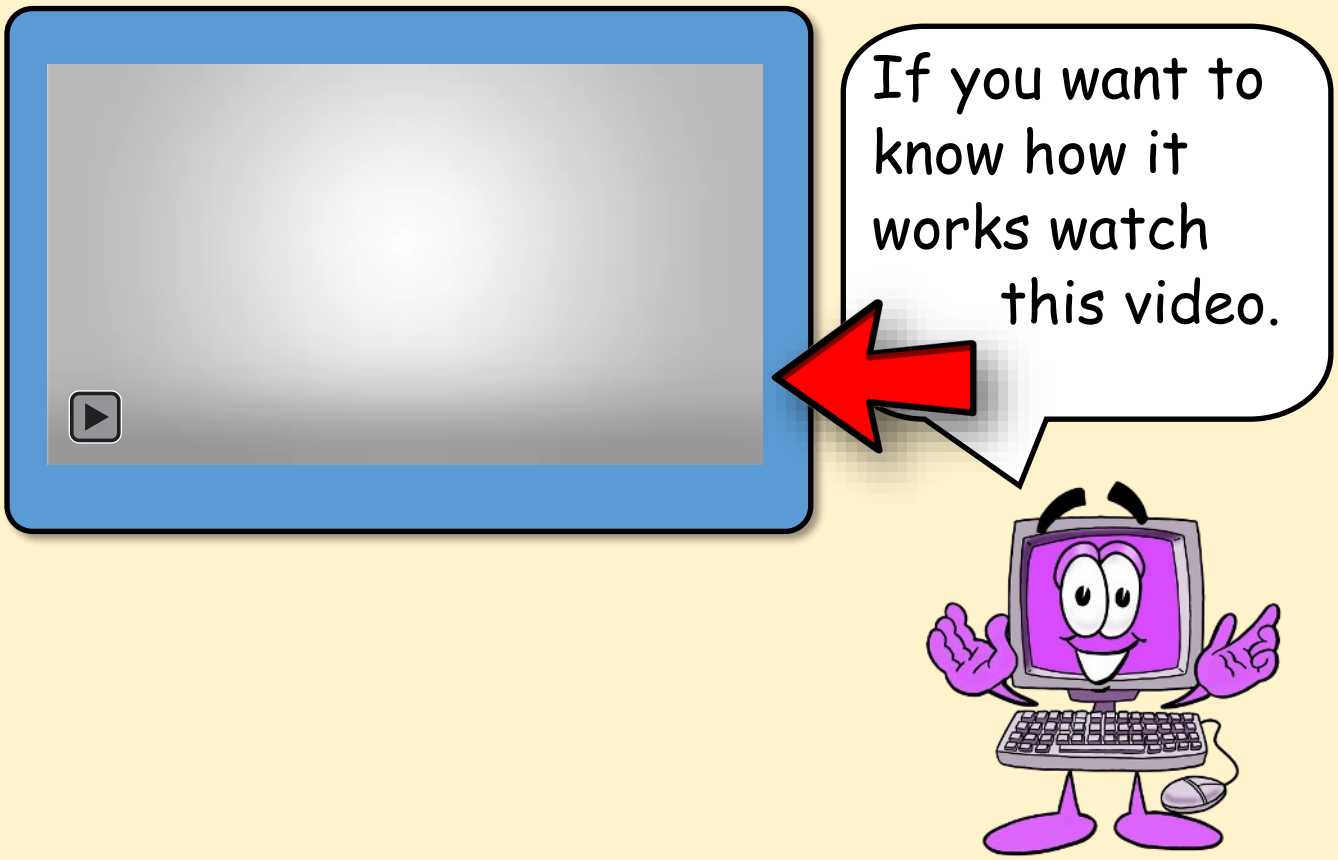
The ***ROM*** is used to store data or instructions that do not need to be changed. An example of this is the ***BIOS (Basic In Out System)*** which is a set of instructions that the CPU uses when the computer is first switched on.

The data that is stored on the ***ROM*** is required every time the computer is turned on and therefore this memory is ***non-volatile***. In other words it can store the data when the power is turned off.

Random Access Memory (RAM)

The **RAM** makes up the bulk of the memory that is used in computer systems. ***RAM*** does store data when the power is turned off so it is ***volatile data***. Usually the data in the ***RAM*** can be accessed quicker than the ***ROM*** wherever it happens to be stored.

RAM is used to store the data and instructions that the CPU is currently using and data and software applications that the user is currently using.



Activity 1: Primary Memory and Secondary Storage

Question 1

What is **primary memory**?

Question 2

What is **secondary storage**?

Question 3

What is meant by **volatile memory**?

Question 4

What is meant by **non-volatile memory**?

Question 5

What does **ROM** stand for?

Question 6

What is **ROM** used for?

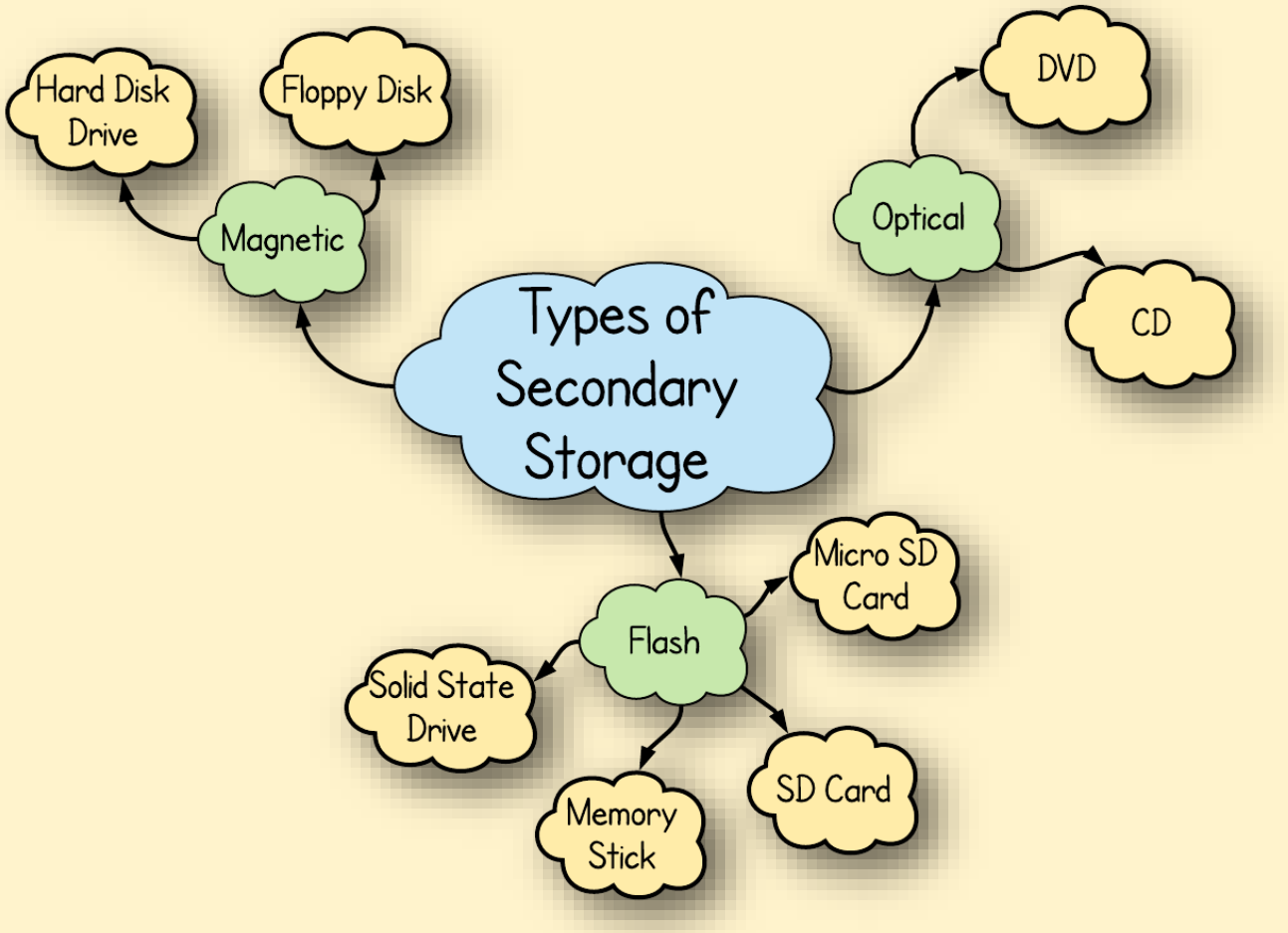
Question 7

What does **RAM** stand for?

Question 8

What is **RAM** used for?

Secondary Storage Types



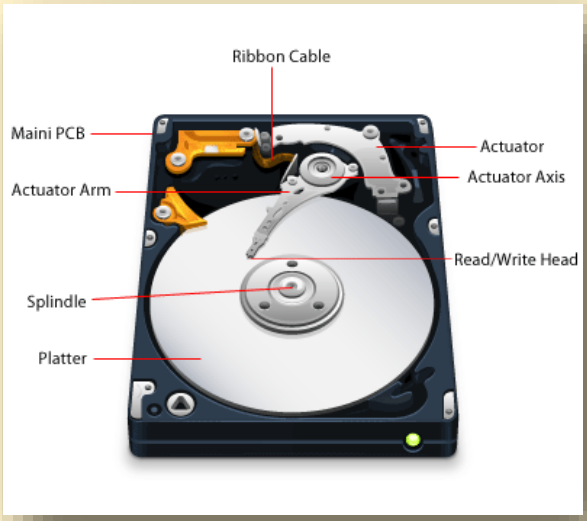
Magnetic Storage Devices

Device: Hard Disk Drive (HDD)

Use: Stores data when the computer is switched off so that it can be used later by the computer system or the user.

Advantages:

- Very large storage capacity
- Relatively cheap for large capacities compared to flash memory storage devices.



Disadvantages:

- Easily damaged by knocks, heat and magnetic fields.
- Not as suitable for removeable devices compared to flash memory as hard disk should not be moved when in use.

Device: Floppy Disk

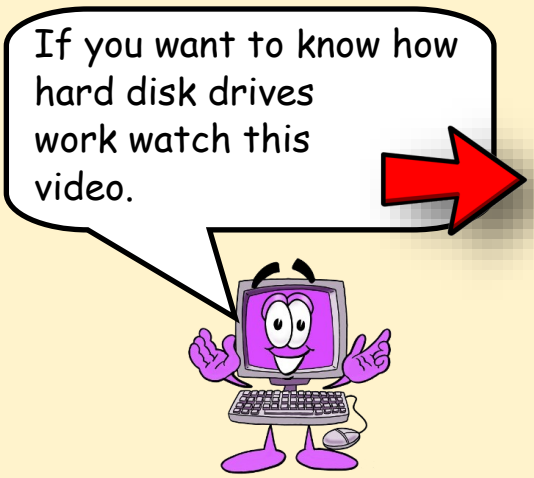
Use: Older form of storage used to transport data from one computer to another. Not commonly used today as technology has moved on.

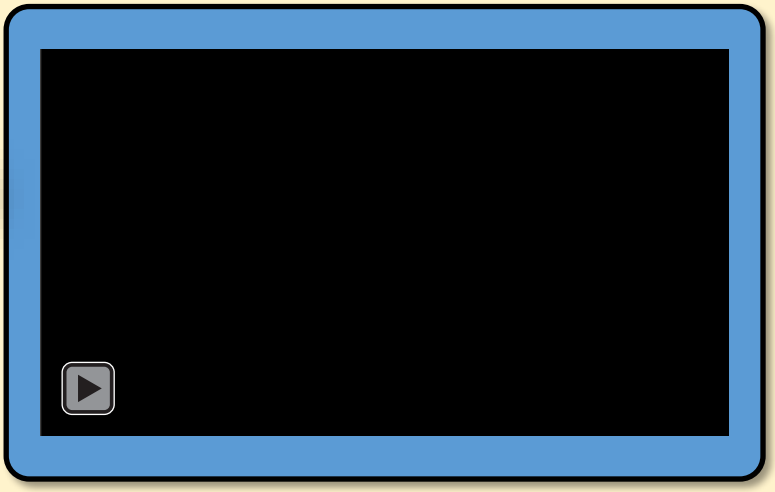
Advantages:

- Easily transported
- Older computers can use them
- Not as easily damaged as hard disks

Disadvantages

- Not commonly used in newer computers
- Very small storage capacity
- Easily lost or stolen
- Can be damaged by magnetic fields or mishandling.





Optical Storage Devices

Device: CD (Compact Disk)

Use: This was originally used for storing music. Later CD drives for computers were able to read and write data to the disks. CDs can store about 700 mb of data which is about 80 minutes of music. Computer games are often sold on CD-ROM as these cannot be erased.

Advantages:

- Write once (CD-R) are cheap to buy.
- CD-RWs can be written on more than once.
- All modern computers can use them.

Disadvantages:

- CD-ROM cannot be written to after manufacture.
- Small capacity compared to DVD, Blu-ray, flash-memory
- Easily damaged, e.g. scratches

Device: DVD (Digital Versatile Disk)

Use: This mainly used for storing videos and movies. It has a larger capacity than a CD depending on the type of DVD used but single sided DVDs can store 4.7 gb and double sided 9 gb. DVD-ROM is used to store computer software for sale.

Advantages:

- Write once are cheap to buy
- All modern computers can use them
- Large storage capacity

Disadvantages:

- Rewritable DVD-RWs are expensive
- Double-layer DVDs are expensive
- Some devices cannot use the plus and minus type of DVD
- Cannot be used on CD drives of older computers
- Easily damaged, e.g. scratches.

Device: Blue-ray

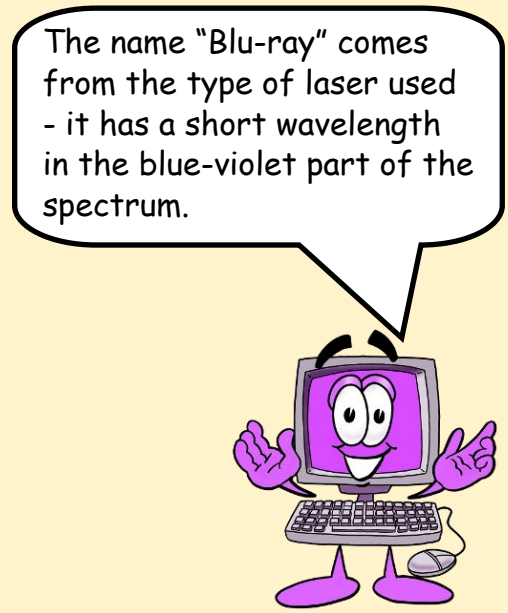
Use: They are used to store very large amounts of data and is typically used for high-definition audio and video.

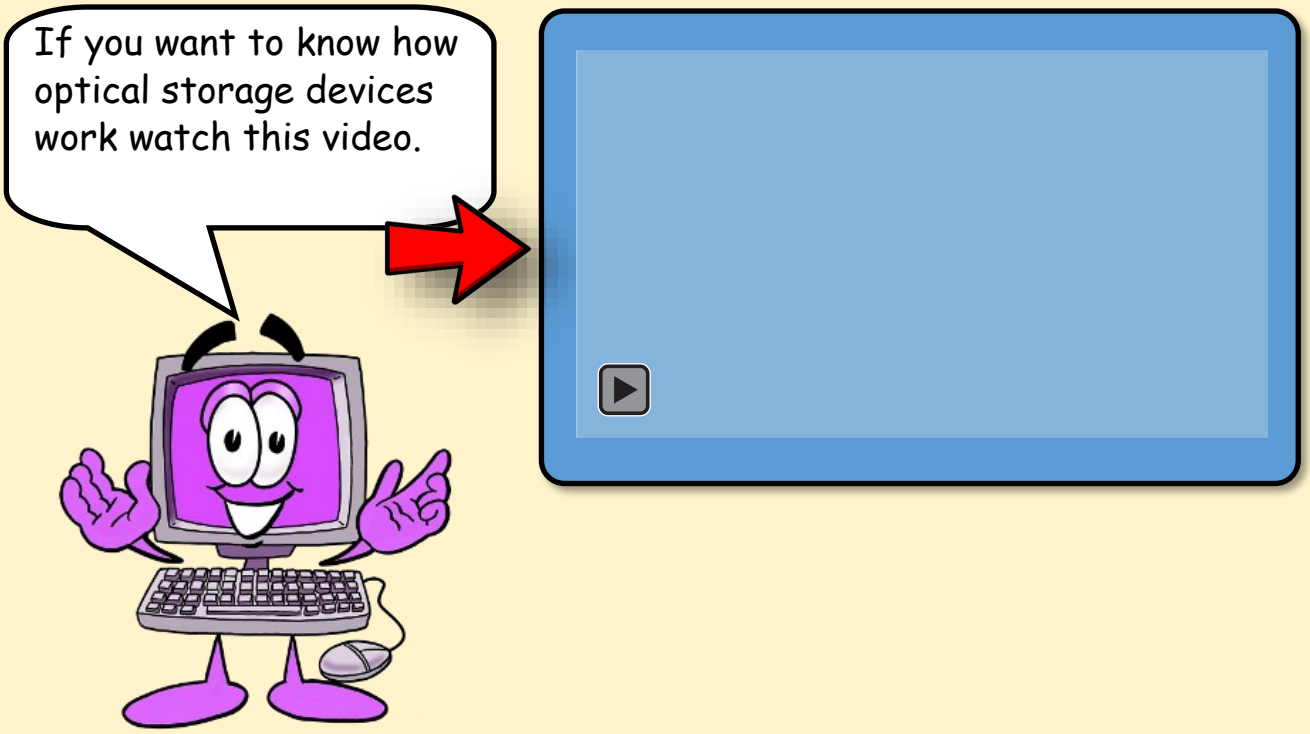
Advantages:

- Very large storage capacity

Disadvantages:

- Devices and media are expensive.
- Not useable by CD or DVD drives.
- Easily damaged, e.g. scratches





Flash Memory Storage Devices

Device: USB Memory Sticks, SD Cards, Mirco SD Cards, Solid State Drives (SDD)

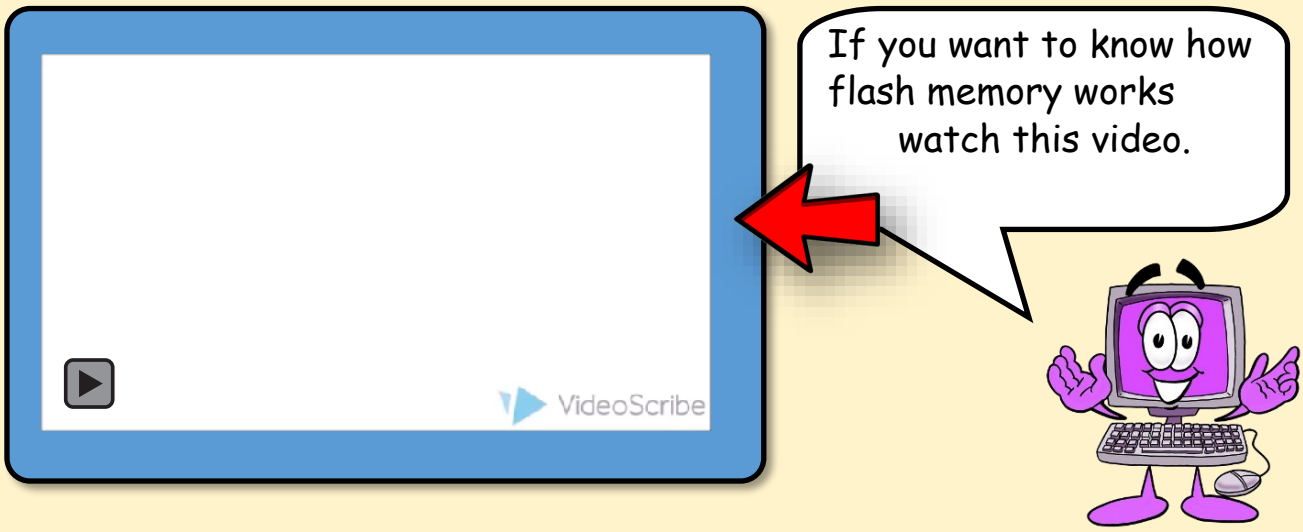
Use: These devices are used to store and transport data between computers. They are used to store working files, music and videos. Solid State Drives can (SSD) also be found in laptops and desktops as a replacement for Hard Disk Drives (HDD).

Advantages:

- All modern computers can use flash memory via USB
- Large storage capacity
- Not easily damaged.

Disadvantages:

- Very expensive for large capacity devices compared to hard disk drives.
- They can only be used reliably about 10,000 times approximately.
- Easily lost or stolen when used as removable media.



Activity 2: Secondary Storage

Question 1

What are the three types of secondary storage?

Type 1:

Type 2:

Type 3:

Question 2

Fill in the table below:

Storage Device Image	Name	Primary Memory Or Secondary Storage	Magnetic, Optical Or Flash
			
			
			
			
			
			

Question 3

What is virtual memory?

HOUSE POINT ACTIVITY

How does a computer store data on a **Hard Disk Drive (HDD)**?