



# ICT IGCSE THEORY CAMBRIDGE

## 1.1 Hardware and Software

# Types and components of computer systems

- Overview: Hardware and Software
- Define hardware as consisting of physical components of a computer system
- Identify internal hardware devices (e.g. processor, motherboards, random access memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives).
- Identify external hardware devices and peripherals (such as monitors, keyboards, mice, keyboards, printers as input and output devices and external storage devices in general)
- Define software as programs for controlling the operation of a computer or processing of electronic data
- Identify the two types of software – applications software and system software
- Define applications software (e.g. word processing, spreadsheet, database management systems, control software, measuring software, applets and apps, photo-editing software, video-editing software, graphics manipulation software)
- Define system software (e.g. compilers, linkers, device drivers, operating systems and utilities)

Define hardware as consisting of physical components of a computer system

## What is Hardware?



- Hardware are the **physical components** which make up the computer system.
- Each item of hardware have their specific roles in a computer system.
- Hardware components can either be internal or external.

## Internal hardware devices

### Central Processing Unit (CPU)

The **CPU** is the 'brain' of the computer. It is the device that carries out calculations to complete software instructions.



### Motherboard

The **motherboard** is circuit board which is connects to main components of the computer system.



### Memory

Any data or instructions that are to be processed by the CPU must be placed into main memory.



### Graphic Video Cards

A graphics card is a device that attaches to the motherboard to enable the computer to process and display graphics.



### Power Supply

The power supply is connected to main power sources to give power to the computer system. The power supply connects to all the main components of the computer system including the motherboard, hard drive, optical drives



# Internal hardware devices

## Network Card

A **network card** provides the computer with a network (internet connection) either through wireless signals or a physical cable connection.



## Optical Disk Drive

The **optical disk drive (CD/DVD/Blu-Ray)** allows for optical disks to run on the computer. Also some optical disk drives are able to write “burn” data onto discs.



## Internal Hard Disk

A **hard disk** drive is a hardware device that's used to store information like software and files. The capacity of hard drive ranges from GB to Tera Bytes.



## Sound Card

A sound card is a device that attaches to the motherboard to enable the computer to input, process, and deliver sound



# External hardware devices

## Input Hardware Devices – Input data into a Computer

Examples :

- Mouse
- Keyboard
- Microphone



## Output Hardware Devices – Outputs data from a computer

Examples :

- Monitor
- Speakers
- Printers



## External Storage Devices – Provides external storage or backup solutions

Examples :

- External Hard drive
- Pen drive



# Computer Software

## What is Software?

Software is a **collection of instructions** that can be 'run' on a computer. These instructions tell the computer what to do.

Software is **not a physical thing** (but it can of course be stored on a physical medium such as a CD-ROM), it is just a bunch of codes.

For a computer system to be **useful** it has to consist of **both hardware and software**.



# Applications Software and System Software

## Application Software

Examples:

- Word Processor
- Spreadsheet
- Databases

**Application software are designed to allow users to complete specific tasks. This may be to:**

- Write a letter/Present information
- Browse the internet
- Manipulate data in a spreadsheet or database
- Manipulate graphics, sound or video.



## System Software

Examples :

- Operating Systems
- Device Drivers
- Utilities (antivirus)

**System software are normally involved in the running of the computer:**

- Operating systems to provide a user interface
- Device drivers which allow hardware components to work.
- Utility software which maintain the computer performance.



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# Application Software Examples

## Word Processing

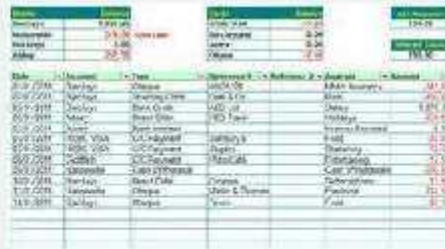
Used to prepare reports, school essays etc.



- Create New or edit existing text documents.
- Formatting tools
- Create font styles
- Importing tables/images
- Spell Check
- Copy/Paste
- Find/Replace
- Page layout

## Spreadsheet

Use to create to organise and manipulate numeric data.

A screenshot of a spreadsheet application window. It displays a table with multiple columns and rows of data. The columns are labeled with names and various numerical values. The interface includes a menu bar and a toolbar.

- Use of various formulas to carry out set tasks:
  - Sum, Max, Min, Average
  - Count, CountA
  - CountIf & SumIf
  - Lookups
  - IF and Nested Ifs
- Apply various formatting to cells/
- Create graphs (Ba/Pie charts)




## Database

Database is used to insert and organise data using fields and records.



- Create a table so that records can be inserted.
- Run queries using search criteria to find specific data.
- Create reports including labels from the search criteria.

# Application Software Examples

| Photo Editing  | Graphics Manipulation  | Video Editing   |
|--|--|---|
| <p>Used to edit digital images to either touch up or to apply various formatting techniques.</p>    | <p>Used to create and edit bitmap and vector graphics.</p>   | <p>Used to edit and format video using various tools and techniques.</p>   |
| <ul style="list-style-type: none"><li>• Contrast/Brightness</li><li>• Use of layers</li><li>• Filter tools</li><li>• Lighting effects</li><li>• Liquify (change features of a face)</li><li>• Brush tools</li><li>• Clone/Stamp tool</li></ul> | <ul style="list-style-type: none"><li>• Pixels in bitmap images can be changed to produce a different image.</li><li>• Vector images use:<ul style="list-style-type: none"><li>• Lines</li><li>• Curves</li><li>• Text</li></ul></li></ul> | <ul style="list-style-type: none"><li>• Split and Trim videos</li><li>• Create split screens</li><li>• Rearranging order of clips.</li><li>• Transitions between clips (Fade)</li><li>• Inserting Audio</li><li>• Applying filters and using video enhancement techniques</li></ul> |

# Application Software Examples

## Apps (Phone Applications)

Apps are the software which runs on mobile phones. They usually come with the phone or can be downloaded and updated.



- Games (Angry Birds)
- Video/Music Streaming (YouTube)
- Social Media (Facebook, Twitter, Instagram)
- Communication (Whats App, Viber)
- Camera (Editing images)
- GPS (Satellite navigation)
- Health/ Fitness

## Measuring and Control Software

Measuring and control software which are responsible for changing physical conditions in an environment.



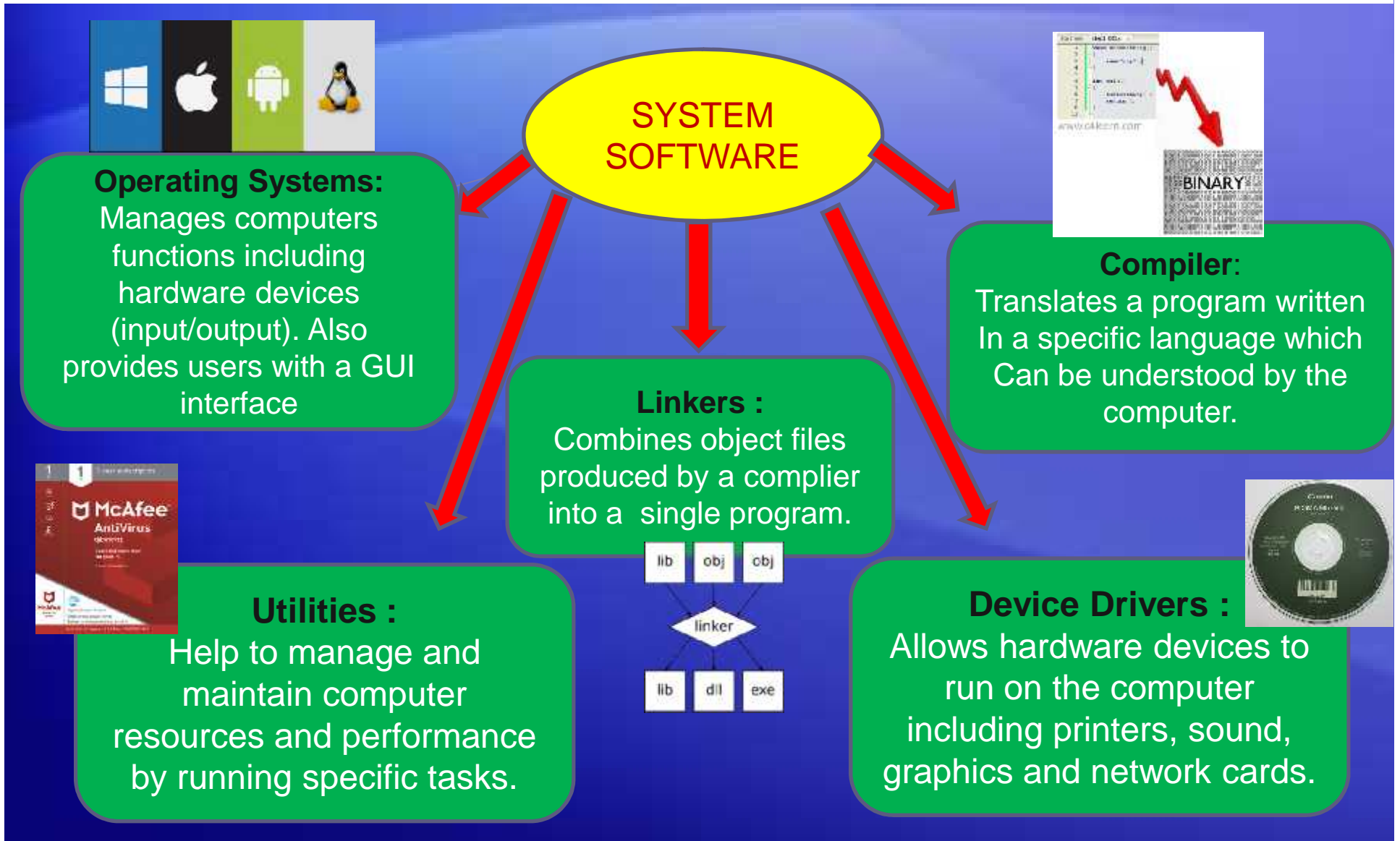
### Measuring

- Sensors take readings which are processed by the computer or microprocessor.

### Control Software

- By comparing sensor readings to a pre-set level the control software will decide on an output (For example to increase or decrease the heat in a green house.

# System Software Examples



Reuse text and other document parts:  
Introducing building blocks

## Exam Question



Describe the difference between Hardware and Software?

**Key Words:** physical components, instructions

Hardware are the **physical components** which make up the computer system. Software is a collection of **instructions** that can be 'run' on a computer. These instructions tell the computer what to do.

Describe the difference between Application and System Software?

**Key Words:** specific tasks (Word Processor), manage and maintain (Operating System)

Application software are designed to allow users to complete **specific tasks**. For example a **Word Processor** is used to write a letter. System software is used to **manage and maintain** the computer system. An **operating system** such as Windows 10 is used to manage the functions of the computer system.