

IST Data Handling Notes

Data and Information

- Data is **raw facts** without any clear meaning.
 - o Information is data displayed or altered to make it **useful or meaningful**.
- Done by organising, editing, analysing and displaying
 - o Data is **organised** by type, such as temperature, wind speed, in weather forecasting
 - o Then, data is **edited** to remove duplicates or unwanted data
 - o Data is **analysed** to find trends or patterns
 - o Data is displayed through books, television or any media

Data Forms

- **Analogue** data has an infinite number of possible values.
- **Digital** data is limited, and computers can only handle whole numbers.
- Analogue to Digital through **digitalising** or **data sampling**
 - o Changing a measurement into a single digital data value
- Digital to Analogue, such as digital sound into analogue current

Data Coding

- All data and software are stored using **0's and 1's**, in binary, called **bits**
 - o Group of 8 bits is a **byte**, storing a value from 0 to 255
 - o Stores keyboard letters as ASCII coded numbers

Data Sources and Types

- **Primary**, or **original data**, is created yourself and can be pictures, observations or lists.
- **Secondary**, or **second hand data**, is created by others, and can be previous survey results.
- Data, in the form of numbers, can be used to represent different things
 - o Text – word processors
 - o Numbers – spreadsheet management software
 - o Video and animation – video-editing, multimedia, graphics software
 - o Audio – multimedia and audio software
 - o Graphics – paint and drawing software

Data Transmission and Compression

- Two ways of **sending binary data** between computers include:
 - o **Serial data transmission** – all bits are sent along a **single wire** one at a time, and a separate wire used to send back.
 - o **Parallel data transmission** – eight bits are sent at the same time through **eight wires**, meaning faster but more wires (another eight for data coming back).
- Data can be **compressed** in two ways:
 - o **Lossless compression** – throws away duplicated data values and does not lose data
 - o **Lossy compression** – data is permanently lost, and quality will be reduced

Data Storage and Function

- Storage provides a **place for the data and software**. There are two main types of storage.
- **Primary storage** is normally built into the computer, and is quickly accessible.
 - o Random Access Memory is temporary storage, used to store data being used right now.
 - o Read Only Memory is a more permanent storage, used to store data to start the computer.
- **Secondary storage** are devices connected to the motherboard.
 - o **Magnetic storage** – hard disk, floppy disk and tapes, using north and south as data bits
 - o **Optical storage** – CDs and DVDs, using lasers to read bumps on disk surface
 - o **Flash storage** – RAM/ROM drives and cards, though not as fast as RAM/ROM
- Secondary storage is described by how data is accessed.
 - o **Direct access** (also random access) allow computer to go directly to a location
 - o **Sequential access** force computer to locate an item by searching everything
 - Used in magnetic tape storage only
- Data is measured through **bytes**

Measurement	Relative Size	Typical Example
Byte (B)	8 bits	One keyboard character
Kilobyte (KB)	1024 bytes	One page of text
Megabyte (MB)	1024 kilobytes	Full screen colour image
Gigabyte (GB)	1024 megabytes	90 minutes of high quality music
Terabyte (TB)	1024 gigabytes	No example

- Data is stored using different types of data files, using **file extensions**, such as .txt or .jpg.

Data Security

- Backups are done in two ways:
 - o **Manual backups** are done by the user and copied to CD disks or Flash drives, or backup software
 - o **System backups** are used by businesses to protect files, done automatically, taking a few hours