Information Technology, the Internet, and You

CHAPTER 1

Computing Essentials 2017

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Learning Objectives

- Explain the parts of an **information system**: *people*, *procedures*, *software*, *hardware*, *data*, and the *Internet*.

- Distinguish between **system software** and **application software**.

- Differentiate between the two kinds of **system software** programs.

- Define and compare **general-purpose**, **specialized**, and **mobile applications**.

Learning Objectives

- Identify the **four types of computers** and the types of personal computers.

- Describe the different types of **computer hardware**, including the *system unit*, *input*, *output*, *storage*, and *communication devices*.

- Define **data** and describe *document*, *worksheet*, *database*, and *presentation files*.

- Explain computer **connectivity**, the **wireless revolution**, the **Internet**, and **cloud computing**.

Parts of an Information System

A personal computer is not just the *screen* or *keyboard* but it is more than that by being a part of an **information system**.

An **information system** has several parts:

- **People**
- **Procedures**
- **Software**
- **Hardware**
- **Data**
- **Internet**

People

- Most important part of any information system.
- Computers make **people**, *end users* like us, more **productive**.
- Our lives are touched every day by **computers** and **information systems**.
- Many times the contact is **direct**, such as when we **create documents** using a word processing program (*MS-Word*) or when we **connect to the *Internet***.
- Computer is used in various fields like:
  - Entertainment
  - Business
  - Medicine
  - Education

Procedures

- The **rules** or **guidelines** for **people** to follow when using *software*, *hardware* and *data* are procedures.
- **Software** and **hardware** manufacturers provide *manuals* with their products.

Software

- **Software** is another name for **programs**. In most cases, the words *software* and *programs* are *interchangeable.*

- **Programs** are the *instructions* that tell the computer how to *process data* into the form you want.

Program to **Add** two numbers (*step-by-step instructions*)

1. Input **Number 1**
2. Input **Number 2**
3. Add **Number 1** and **Number 2** and put the result in **SUM**

    (**SUM = Number 1 + Number 2**)
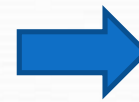1. Output **SUM**

Software

- There are two major kinds of software:

  system software and **application software**.

- Think of **application software** as the kind **you** (*the people*) use.

  - MS-Word, MS-Excel, Google Chrome, Real Player, Paint

- Think of **system software** as the kind the **computer** uses.

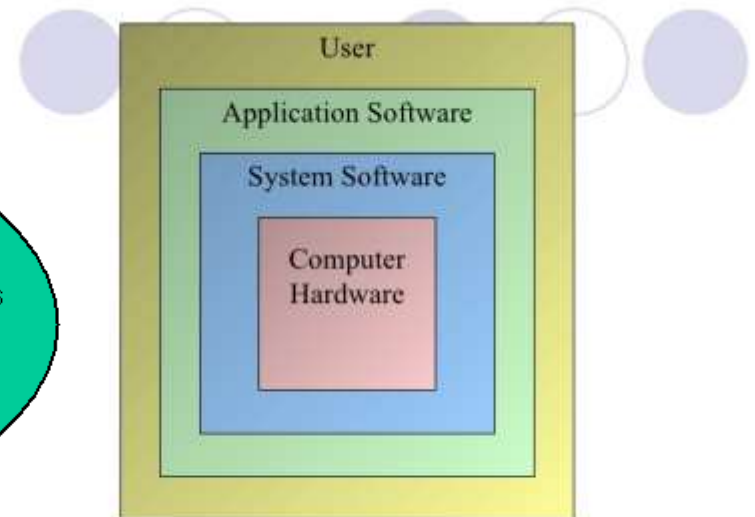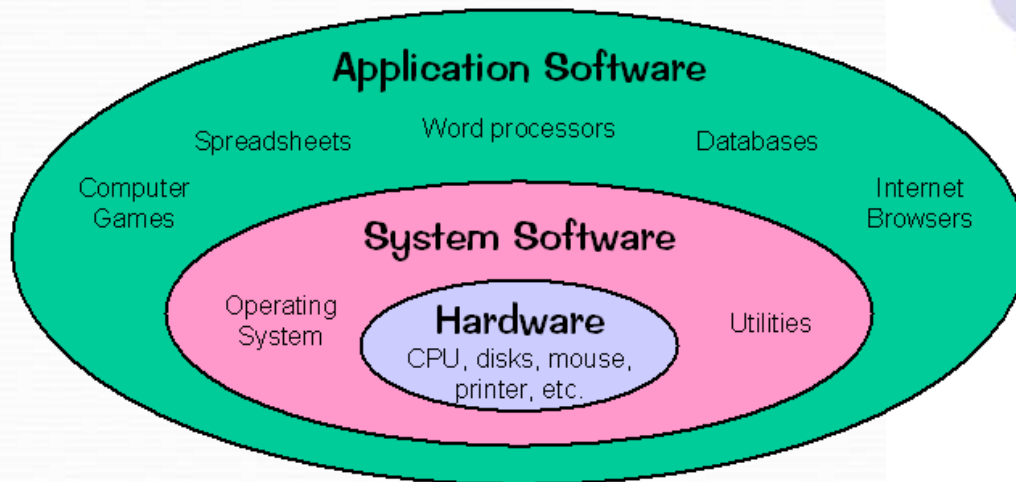 - Windows vista/8/10, Mac OS, Android

Application Software

System Software

System Software

- **System software** is **background** software that helps the **computer manage its own internal resources**.

- **System software** enables the **application software** to **interact** with the **computer hardware.**

- The **user** interacts primarily with **application software**.

Relationship between User, Application Software, System Software and Computer Hardware

System Software

- **System software** is **not a single program**. Rather, it is a **collection of programs**, including the following:

  - **Operating systems** are programs that **coordinate** computer resources, provide an **interface** between users and the computer, and **run** applications. (*Windows 10, Mac OS*)

  - **Utilities** perform **specific tasks** related to managing computer resources. (*Antivirus program*)

Operating Systems

Windows 10

Mac OS X

Application Software

- **Application software** might be described as **end user software**.

- Three types of application software are:

  - **General-purpose applications** are **widely used in nearly all career areas**. (*Browsers, Word processors, Spreadsheets, Presentation graphics, Database management systems*)

  - **Specialized applications** include thousands of other programs that are more **narrowly focused on specific disciplines and occupations**. (*Graphics, web authoring programs*).

  - **Mobile apps**, also known as mobile applications or simply **apps**, are **small programs primarily designed for mobile devices** such as **smart phones** and for **tablet** computers. There are over half a million apps.

General-purpose Application Software

Teach-ICT.com

Special-purpose Application Software

WEBPAGE AUTHORING SOFTWARE:

Mobile Apps

Types of Computers

- There are four types of computers:
  - **Supercomputers**
  - **Mainframe computers**
  - **Midrange computers**
  - **Micro computers (*Personal computers or PC*)**

Types of Computers

- **Supercomputers** are the **most powerful** type of computer – **very fast** and **huge storage**.
  - These machines are special, high-capacity computers used by **very large organizations**.
  - Supercomputers are typically used to **process massive amounts of data**. (*Weather prediction*)

Types of Computers

- **Mainframe computers** occupy specially wired, air-conditioned rooms.

  - Although not nearly as powerful as supercomputers, mainframe computers are capable of **great processing speeds** and **data storage**. (*Insurance companies, Airline reservation*)

Mainframe Computer

Types of Computers

- **Midrange computers**, also referred to as **servers**, are computers with processing capabilities less powerful than a **mainframe computer** yet more powerful than a **personal computer**.
  - Used by **medium-size companies**. (*retrieving data from a database or supplying access to application software*)
- **Micro computers**, also known as **PCs**, are the **least powerful**, yet the **most widely used** and fastest-growing type of computer.
  - There are five types of micro computers: *desktops, laptops, tablets, smart phones, and wearables*.

Micro computers

- **Desktop computers** are *small enough* to fit on **top** of or alongside a **desk** yet are *too big* to carry around.

- **Laptop computers**, also known as **notebook computers**, are *portable* and *lightweight* and fit into most briefcases.

Micro computers

- **Tablets** are *smaller*, *lighter*, and generally *less powerful* than laptops. Like a **laptop**, tablets have a **flat screen** but typically do not have a standard keyboard. Instead, tablets typically use a *virtual keyboard* that appears on the screen and is touch-sensitive.

- **Smartphones** are the most widely used **handheld** computers.

- Other mobile computers include **wearable** devices like *Apple's watch*.

Personal Computer Hardware

- The physical equipment falls into four basic categories: **system unit**, **input/output**, **secondary storage**, and **communication**.

- **System unit**: The system unit is a **container** that houses most of the *electronic components* that make up a computer system.

System Unit

- Two important components of the system unit are **microprocessors** and **memory**.
  - The **microprocessor** *controls* and *manipulates* **data** to produce **information**.
  - **Memory** is a *storage* or *holding area* for *data*, *instructions*, and *information*.
    - One type, *random-access memory* (**RAM**), holds the program and data that is *currently being processed*.
    - This type of memory is sometimes referred to as *volatile* or *temporary storage* because its contents will typically be **lost** if the electric power to the computer is switched off.
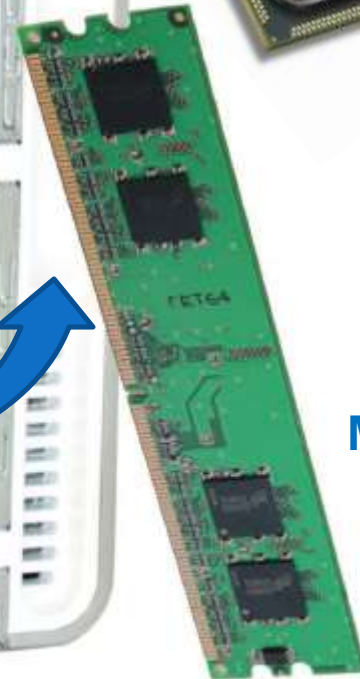
System Unit

Microprocessor

Memory (RAM)

Storage

Primary vs Secondary Storage Devices

RAM — Primary Storage

Secondary Storage

Secondary Storage

- Unlike **memory**, **secondary storage holds** data and programs even after electric power to the computer system has been turned off, hence it is **non-volatile**.

- The most important kinds of secondary storage are *hard disks*, *solid-state storage*, *and optical discs*.

STORAGE

Secondary Storage

Flash · Floppy Disk · Zip Disk · CD + RW

CD + R · DVD + RW · DVD + R · Storage Tape

Smart Media · Removable Hard – Drive · Micro Drive · Memory Stick

Secondary Storage Devices

Smart Cards · Online Storage Site · PC Card

Hard Disk

- **Hard disks** are typically used to store **programs** and very **large data files**.
- Using **rigid metallic platters** and read/write heads that move across the platters, **data** and **information** are stored using *magnetic charges* on the disk's surface.

Solid-state Storage

- **Solid-state storage** does not have any moving parts, is more *reliable*, and requires *less power*. It saves **data** and **information** *electronically* similar to **RAM** except that it is **not volatile**.

Solid State Hard Disc	Memory Stick	Flash Memory	Micro Flash Memory
(Direct Access)	(Direct Access)	(Direct Access)	(Direct Access)

Optical Disc

- **Optical discs** use *laser technology* to store data and programs. Three types of optical discs are compact discs (**CDs**), digital versatile (or video) discs (**DVDs**), and Blu-ray discs (**BD**).

Optical storage devices

Compact Disc (CD)
Capacity: 700 MB
Available from 1982

DVD
Capacity: 4.7 GB
Available from 1995

Blu-ray Disc
Capacity: 25 GB
Available from 2006

Input Devices

- **Input devices** *translate* data and programs that **humans** can understand into a form that the **computer** can process.
 - Common input devices are the **keyboard** and the **mouse**.

Input Devices

joystick

mouse

mic

camera

touch tablet

hand-held scanner

keyboard

flatbed scanner

ComputersProfessor.com

Output Devices

- **Output devices** *translate* the processed information from the **computer** into a form that **humans** can understand.
  - Common output device is the **display**, also known as a **monitor**.

Communication

- Using **communication devices**, a personal computer routinely *communicates* with other computer systems located as near as the next office or as far away as halfway around the world, using the *Internet*.
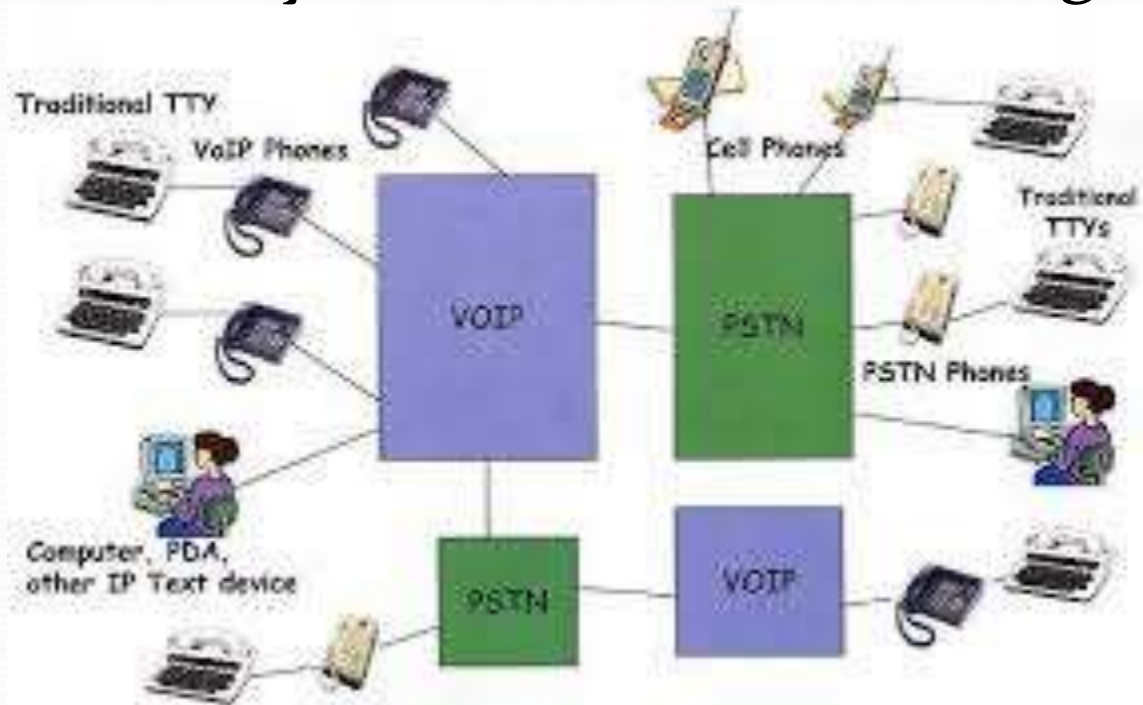
Communication

- A **modem** is a widely used communication device that modifies *audio*, *video*, and other types of *data* into a form that can be transmitted across the *Internet*.
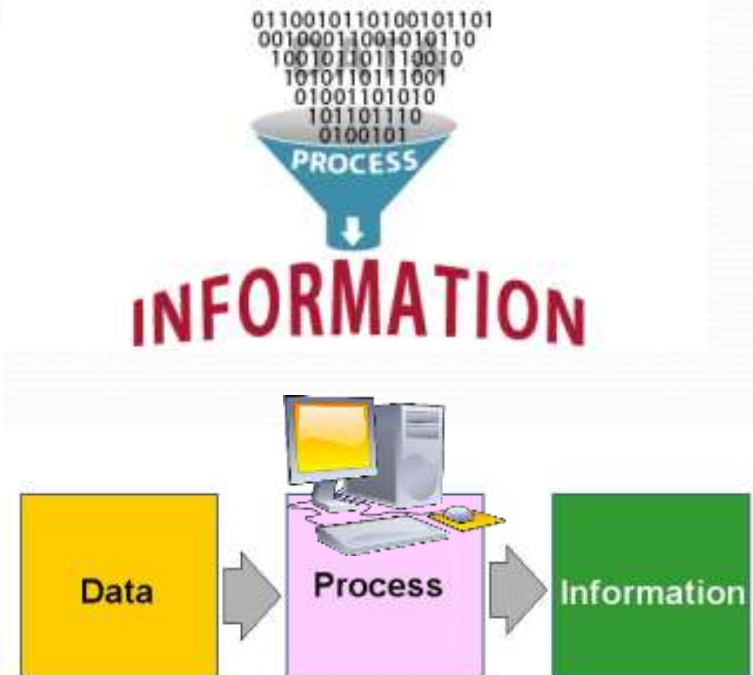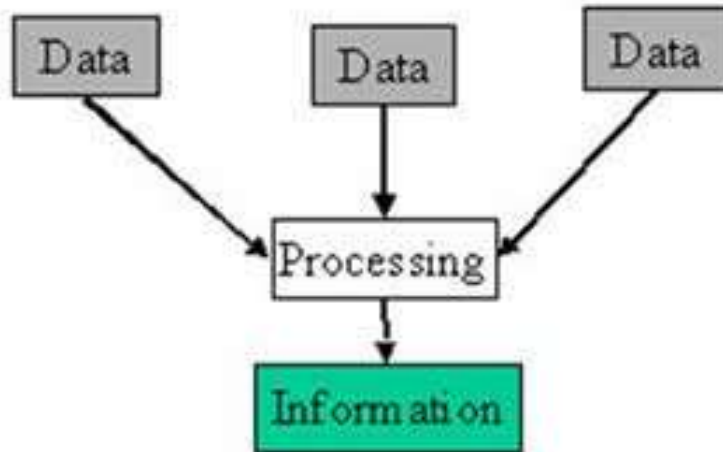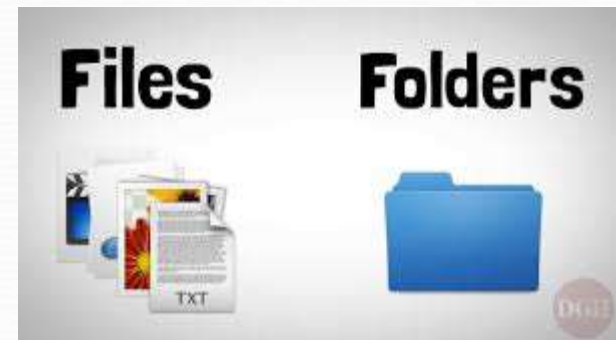
Data

- **Data** is raw, unprocessed facts, including *text*, *numbers*, *images*, and *sounds*.
- The **data** after processing becomes **information**.

Information is created from data

Files

- When stored electronically in **files**, **data** can be used directly as *input* for the computer.
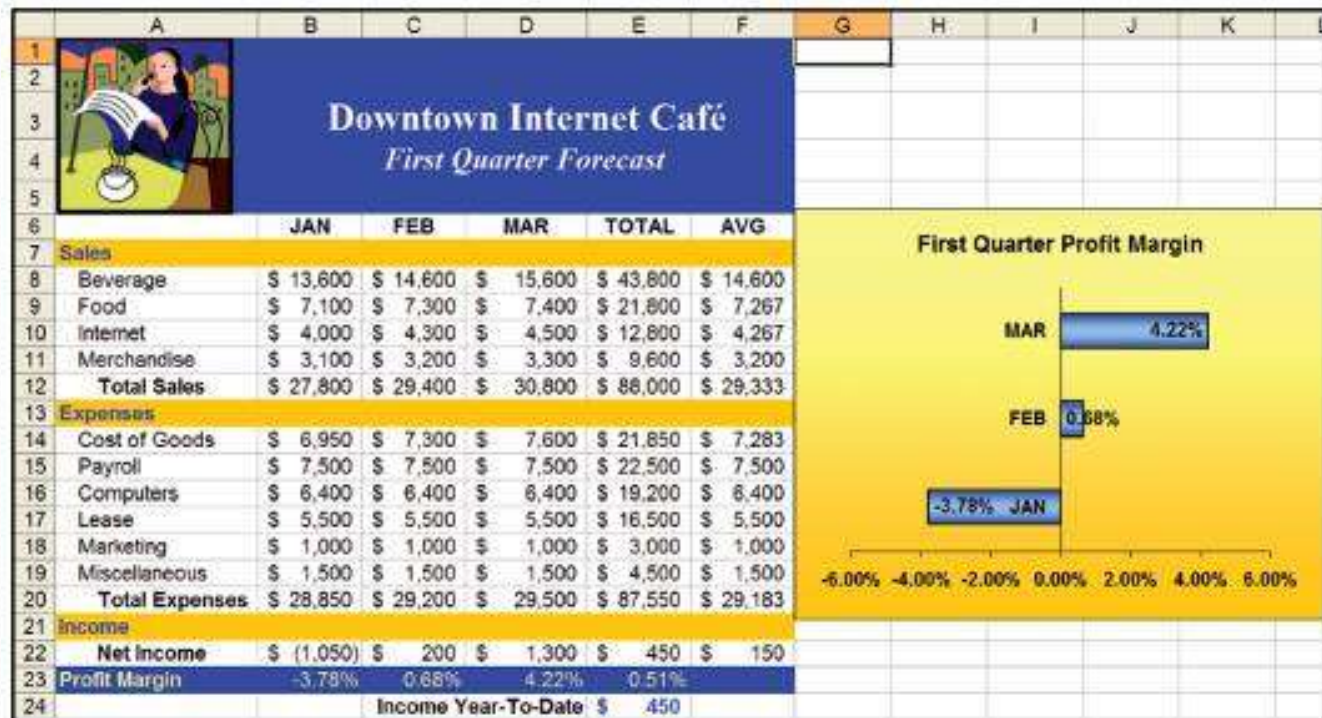
File Types

- Four common types of files are:
  - **Document files**, created by **word processors** to save **documents** such as *memos*, *term papers*, and *letters*.

Adventure Travel Tours
New Adventures

Attention adventure travelers! Attend an Adventure Travel presentation to learn about some of the earth's greatest unspoiled habitats and find out how you can experience the adventure of a lifetime. This year we are introducing four new

File Types

- **Worksheet files**, created by **electronic spreadsheets** to **analyze** things like *budgets* and to **predict** *sales*.

File Types

- **Database files**, typically created by **database management programs** to contain highly *structured* and *organized* **data**. For example, an employee database file might contain all the *workers' names*, *Social Security numbers*, *job titles*, and other related pieces of information.

File Types

- **Presentation files**, created by **presentation graphics programs** to save presentation materials. For example, a file might contain *audience handouts*, *speaker notes*, and *electronic slides*.
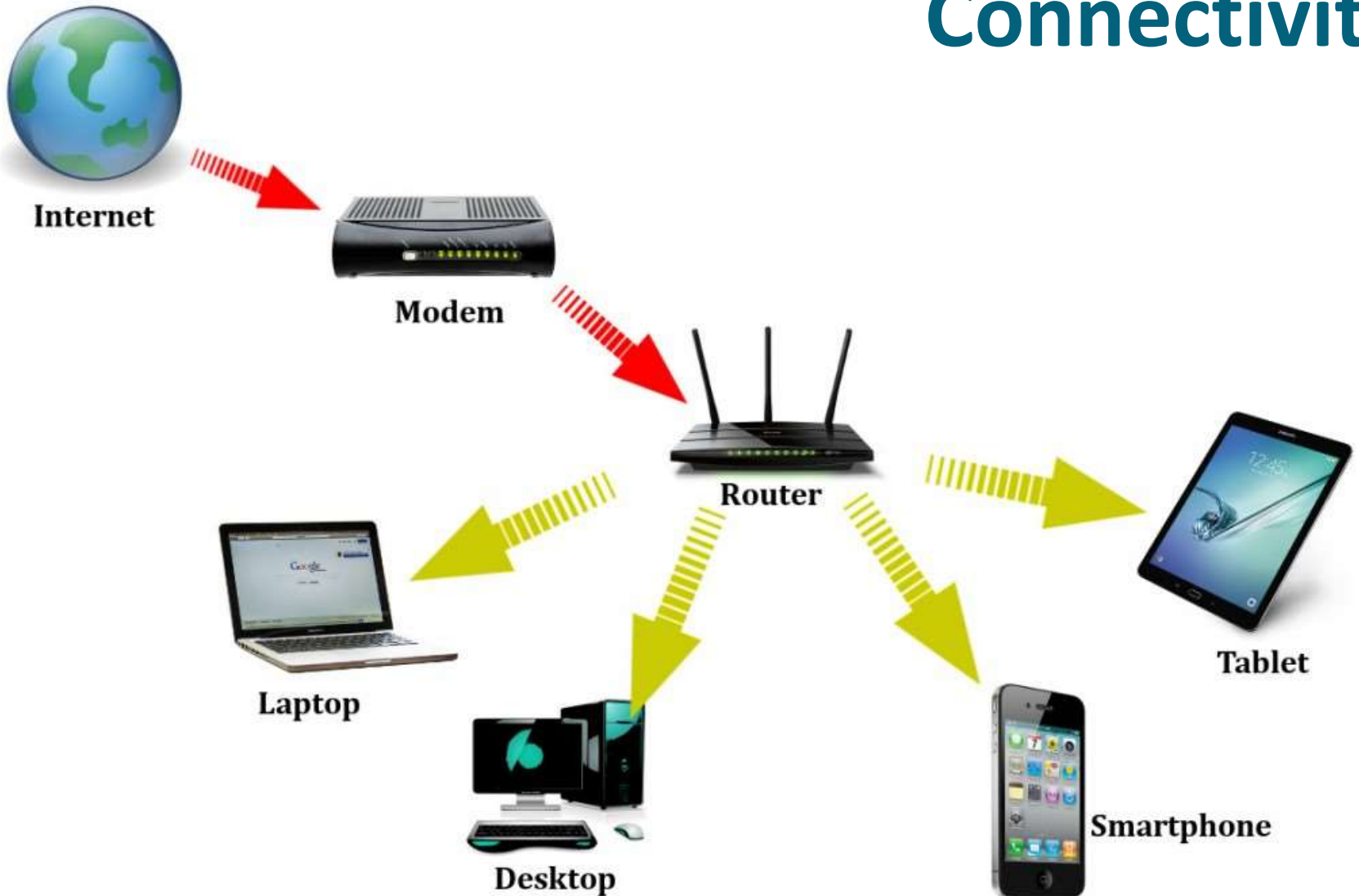
Connectivity

- **Connectivity** is the capability of your personal computer to **share information** with other computers.

- A **network** is a **communications system connecting two or more** computers.

- The largest network in the world is the **Internet**. It is like a giant highway that connects you to millions of other people and organizations locate throughout the world.

- The **web** provides a **multimedia interface** to the numerous **resources** available on the Internet.

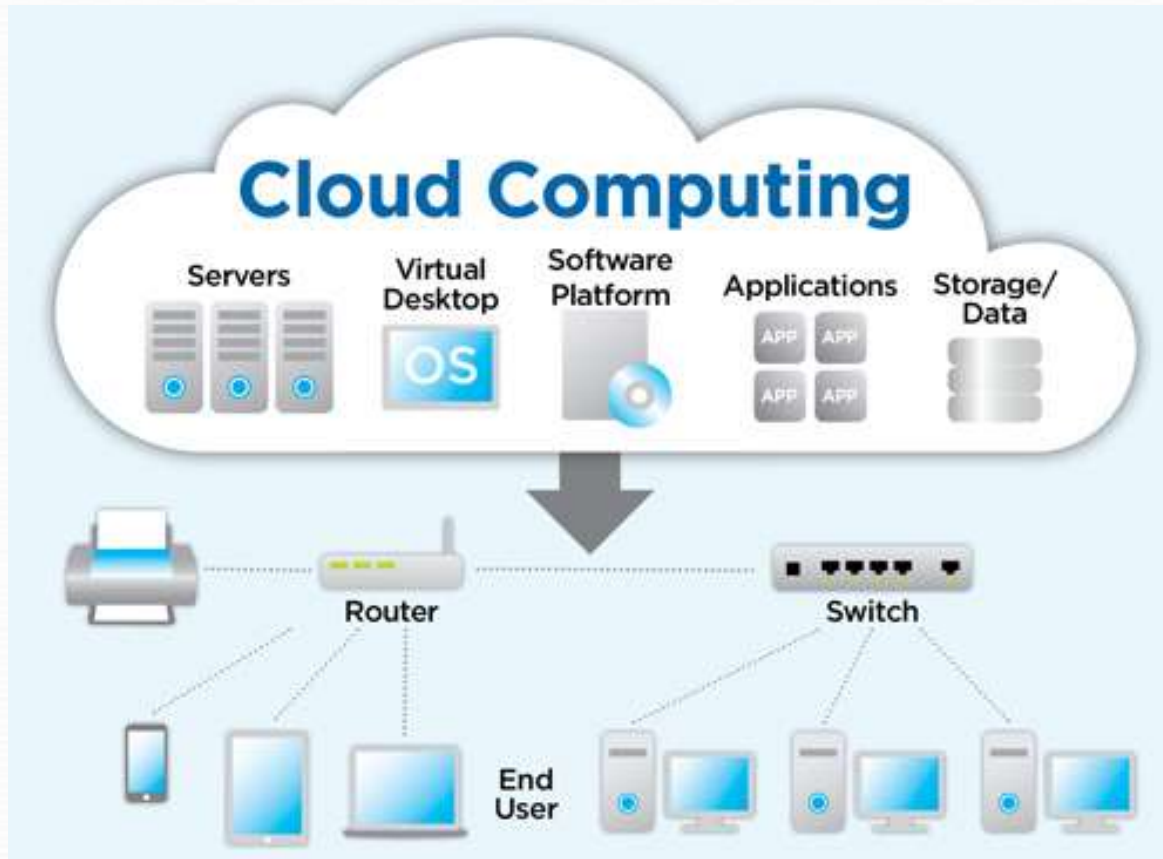# Connectivity

Internet

Modem

Router

Laptop

Desktop

Tablet

Smartphone

Connectivity

- **Cloud computing** uses the **Internet** and the **web** to *shift* many *computer activities* from a **user**'s computer to computers on the **Internet**.

Connectivity

- **Wireless communication** has changed the way we communicate with one another by the widespread use of **wireless communication devices** like *tablets*, *smart phones*, and *wearable devices*.

Wireless Communication

Wireless communications
Mobile phone
Wireless laptop
Wired desktop
Internet
Router/wireless access point
Wired laptop
Wireless desktop
Wireless printer

Connectivity

- The **Internet of Things** (**IoT**) is the continuing development of the Internet that allows everyday objects **embedded** with **electronic devices** to *send* and *receive data* over the **Internet**.

Review

- Parts of an Information System
- Types of Software – System & Application
- Types of Computers
- Micro computer hardware - System unit, Input / Output devices, Memory, Storage
- Data and types of files
- Connectivity