Computer Peripherals and Interfacing

CSE 315
Peripherals & Interfacing
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Discussion Materials:

- Storage Devices
  - Hard Disk Drive
  - Flash Memory (PD & MC)
- I/O Devices
  - Displays (LCD, LED)
  - Printers (DMP, IJP & LP)
  - Scanners
  - Pointing Devices

Peripheral

- Devices that are ***external*** to the main processing function of the computer
  - Other than the CPU, memory, power supply
- Classified as ***input***, ***output***, and ***storage***
- Connected via
  - Ports &
  - Interface to systems bus like
    - Small Computer System Interface (SCSI), Integrated Drive Electronics (IDE), Personal Computer Memory Card International Association (PCMCIA)

Examples:

Interfacing

- An interface is the point of interaction with software, or computer hardware, or with peripheral devices

There are two types of interfaces:

- 1. Hardware Interfaces.
- 2. Software Interfaces.

Interfacing Contd.

- HARDWARE INTERFACES: Hardware interfaces exist in computing systems between many of the components such as the various buses, storage devices, other I/O devices, etc.

- SOFTWARE INTERFACES: A software interface may refer to a range of different types of interface at different levels.

Interfacing Contd.

Different levels of software interfacing.

- An operating system may interface with pieces of hardware.
- Applications or programs running on the operating system may need to interact via streams
- In object oriented programs, objects within an application may need to interact via methods.

Ports

- A port serves as an interface between the computer and other computers or peripheral devices

Primarily there are two types of ports:

1. Physical Ports
2. Virtual Ports

Physical Ports:

- Physical ports are used for connecting a computer trough a cable and a socket to a peripheral device.

Physical computer ports list includes:

a. Serial ports (DB9 socket)

b. USB ports (USB 2.0 or 3.0 socket / connector)

c. Parallel ports (DB25 socket / connector

Virtual Ports

- Virtual ports are data gates that allow software application (network) to use hardware resources without any interference.

This computer ports (network ports) are defined by IANA (Internet Assigned Numbers Authority).

Used by TCP (Transmission Control Protocol), UDP (User Datagram Protocol), DCCP (Datagram Congestion Control Protocol) and SCTP (Stream Control Transmission Protocol)

Storage Devices: Terminology

- Medium
  - The technology or product type that holds the data
- Access Time
  - The time to locate data and read it
  - Calculated as an average in seconds e.g. - s, ms, µs, ns, etc
- Transfer Rate
  - Amount of data moves per second
  - Calculated in bytes/second e.g. – KBPS, MBPS etc

Storage Devices: Primary

- Primary memory
  - Named as cache or conventional memory
  - Has an immediate access by the CPU
- Expanded storage
  - RAM – Random Access Memory
  - A buffer between cache memory and secondary memory

Storage Devices: Secondary

- Secondary storage
  - Permanent memory
  - Non volatile memory
  - Data and programs must be copied to primary memory for CPU access
  - Electro-Mechanical devices
  - Direct access storage devices (DASDs)
  - Online storage
  - Offline storage – loaded when needed

Storage Devices: Hierarchy

	Devices	Access Time	Transfer rate
Primary storage	CPU registers	-	-
	Cache memory	15-30 ns	-
	Conventional memory	50-100 ns	-
	Expanded memory	75-500 ns	-
Secondary storage	Hard disk	10-50 ms	600-6000 Kbytes/s
	Floppy disk	95 ms	100-200 Kbytes/s
	CD-ROM	100-600 ms	150-1000 Kbytes/s
	Tape	0.5+ s	200-3000 Kbytes/s

Storage Devices: Technology

- Primary storage
  - Semiconductor technology.
  - Volatile i.e. contents are depended on power
- Secondary storage
  - Magnetic technology e.g. Hard Disk Drives
  - Non-volatile i.e. contents are not depended on power

Storage Devices: Intervention

- Online storage
  - Storage that is accessible to programs without human intervention
  - ***Primary*** & ***Secondary*** storages are ***online***
  - Example- RAM, HDD etc
- Offline storage
  - Storage that is not accessible to programs without human intervention
  - Sometimes called ***archival storage***
  - Example- CD, DVD, External HDD etc

Assignment for next class:

- Serial port, Parallel port, USB 10
- Relation between peripheral and interfacing 10

Due date: Next lecture day