Essentials of ICT
ICT1113

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Lecture 04_Part I
Input Devices

- Provide data and commands to the computer system
  - **Keyboard**
  - **Pointing devices**
    - *Based on motion of an object*
      - Mouse, Trackball, Joystick
    - *Based on touching a surface*
      - Touchpad , Touch screen
  - **Optical devices**
    - Barcode readers, Scanners and OCR devices
  - **Audio visual devices**
    - Microphones, Webcam, Digital cameras

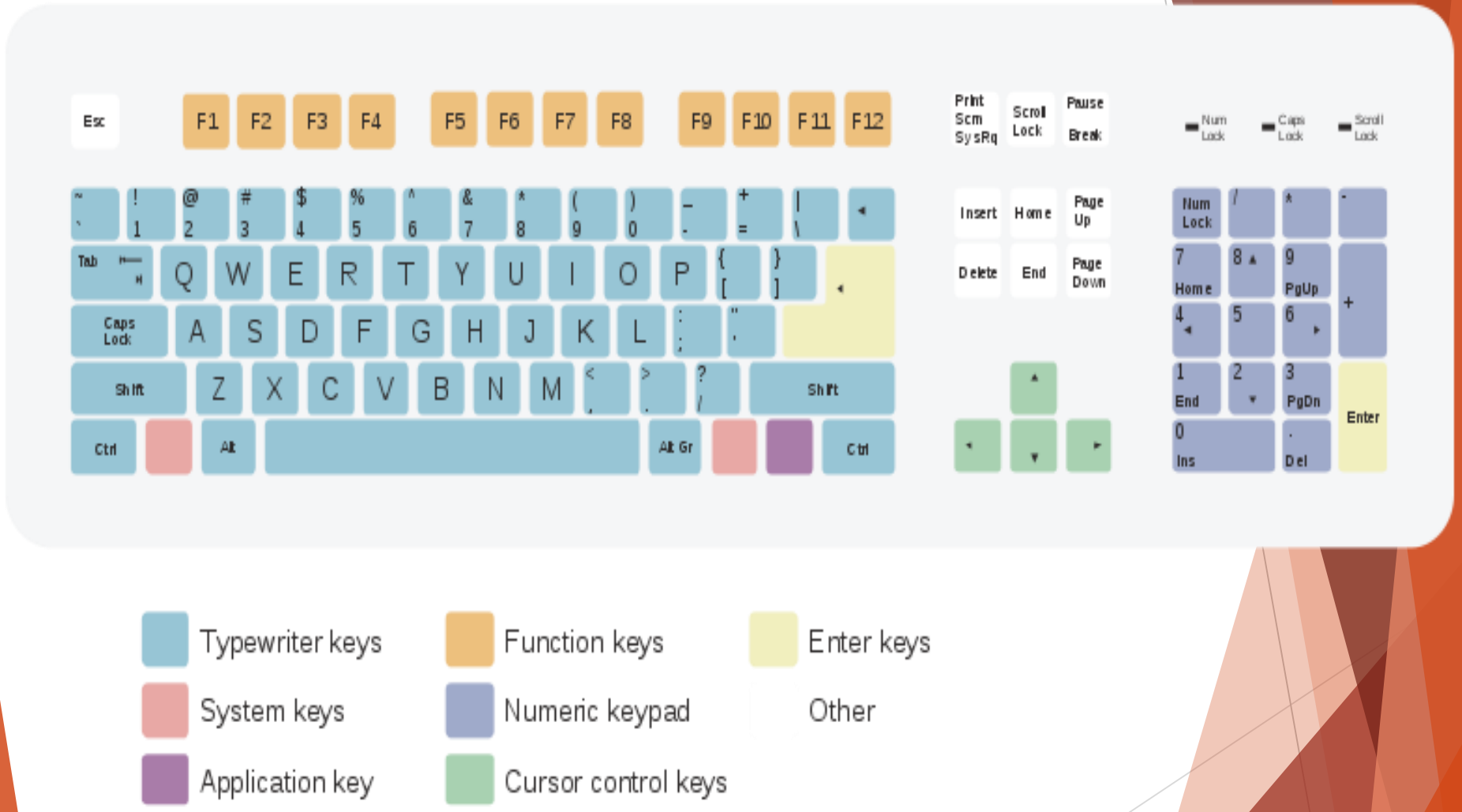
Keyboard

- **Primary input device of the computer System**
  - a layout of buttons
  - keys act as mechanical levers / electronic switches
- **Each button / key**
  - input a linguistic character to a computer or
  - call upon a particular function of the computer
- **Comes in different sizes , technologies, shapes and layouts**
  - Standard, Laptop-size, Thumb-sized
  - Chorded, Software, Foldable, Projection, Optical

Key Types

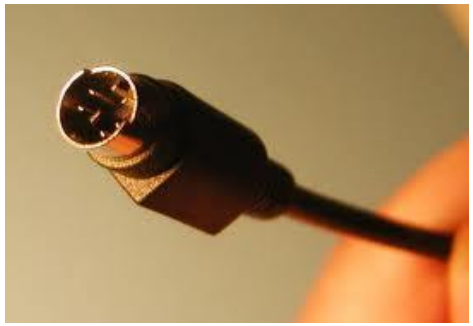
- ***Alphanumeric keys***
  - Alphabetical, numeric, and punctuation keys
  - simply enter what ever symbol that is displayed on the particular key
- ***Modifier keys***
  - modify the normal action of another key
  - most widely-used modifier keys : **Control key, Shift key , Alt key**
- ***Numeric keypad***
  - helps to enter numeric data faster than using the alphanumeric keys
- ***Function keys***
  - allocated certain functions by different application, labeled **F1 to F12**

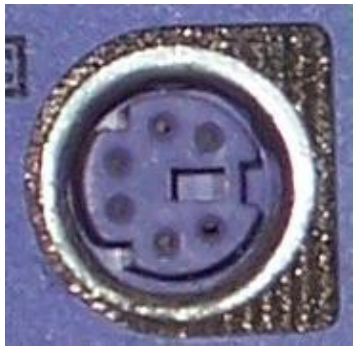
    ex: most applications allocate the function of showing the “application help” to the F1 key
- ***Cursor-Movement keys***
  - quad directional arrow keys, Home, End, Page-up, Page-down
- ***Special-purpose keys***
  - allow you to carryout special functions
  - **Insert** (also known as the overwrite), **Delete,** Print screen, Scroll Lock, Pause and Esc



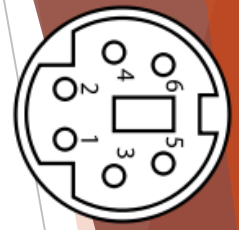
QWERTY keyboard layout evolved from the standard typewriter keyboard, with extra keys for computing

- **Connects with computer system**
  - **through wire (DIN-5 connector, PS/2 , USB)**
  - **wireless (Bluetooth ,IR)**





Pin out

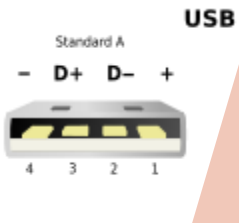


Pin out

6-pin Mini-DIN connector , PS/2 PS/2 keyboard connection port

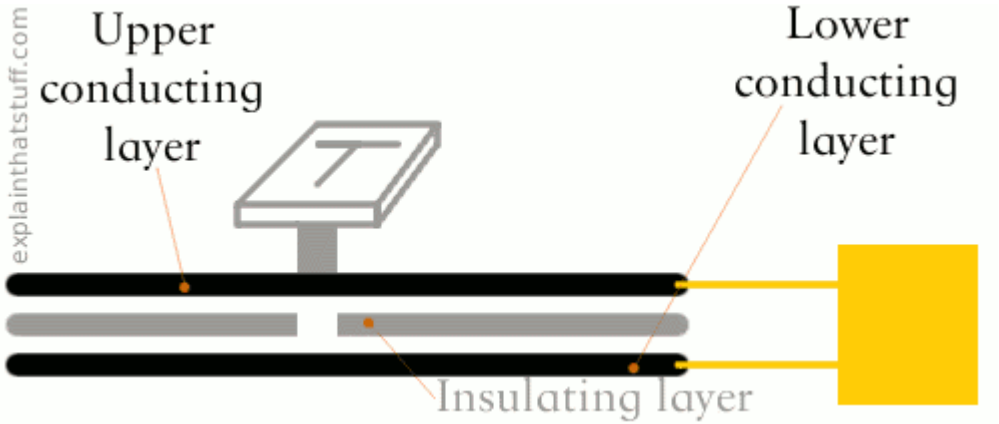
USB plug

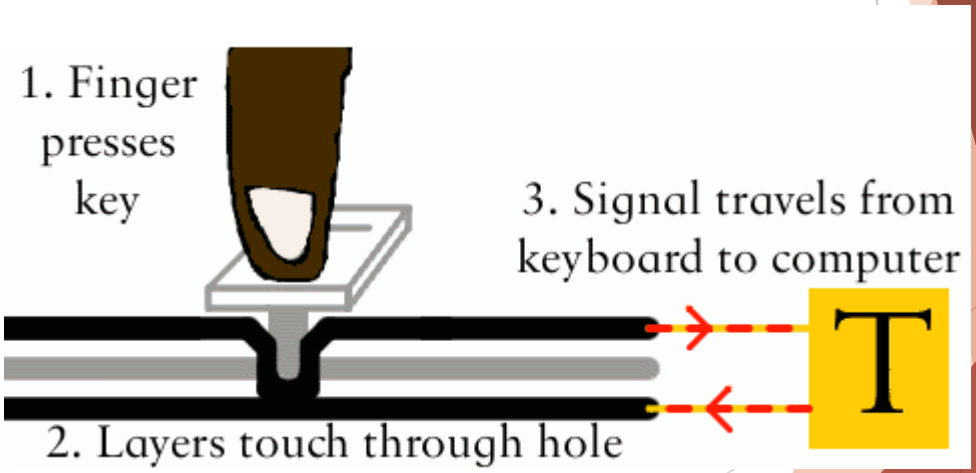
DIN connector , Standard AT connector



Pin out

Inside of the Keyboard





Keyboard Technology

- When a key is pressed,
  - **keyboard controller** writes the pressed **key's scan code** to the **keyboard buffer** (reserved area in the main memory which holds data until it is processed)
  - keyboard controller sends an **interrupt**
  - keyboard interrupt handler is started (piece of system software)
  - When responding to the interrupt the system software can read the scan code in the keyboard buffer
  - next the scan code is passed to the CPU and the appropriate part of the program which is related to that particular key is executed

Has theoretical potential to replace keyboards…

- Speech recognition converts speech into machine-readable text (that is, a string of character codes)
- Already implemented in various software products: it is starting to replace the keyboard
  - transcription of medical or legal dictation
  - journalism
  - writing essays or novels
- Therefore, it has theoretical potential to replace keyboards entirely

Pointing Devices

- Allow a user to input spatial data to a computer
- Any location on the computer screen can be addressed by using X-Y coordinates
- Movements of the pointing device are echoed on the screen by movements of the pointer (or cursor) and other visual changes

- Mouse, Trackball, Joystick, Pointing stick, Graphics tablet, Stylus, Touchpad, Touchscreen

Mouse

- A computer mouse with the most common features:

  Ball/roller or optical sensors…indicate the mouse motion

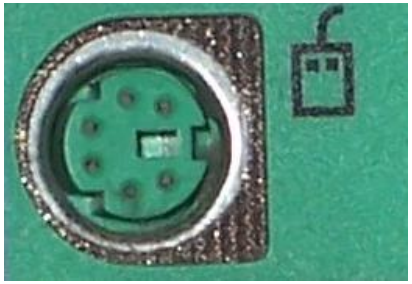
  Two buttons and/or scroll wheel….make selections and scroll

  Housing Interface…connects to computer system

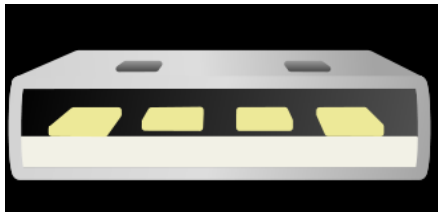
- Functions by detecting two-dimensional motion relative to its supporting surface
- Variants – motion sensing mechanism
  - Ball /Roller
  - Optical sensor
- Mechanical, Optical and Laser mouse

Connectivity

- Mouse should be connected to the computer system
  - through wire (PS/2 , USB)
  - wireless (Bluetooth ,IR)



The color-coded PS/2 connection port



Universal Serial Bus (USB)

Bluetooth

Up to 60 metres

Touchpad / Trackpad

- Surface translate the motion and position of a user's fingers to a relative position on screen

- Common feature of laptop computers
- Operated by using finger
  - move your finger on the surface, the mouse cursor will move in that same direction
  - has two buttons ,enables you to click like a standard mouse
- Technology
  - Capacitance-based touchpads , most common

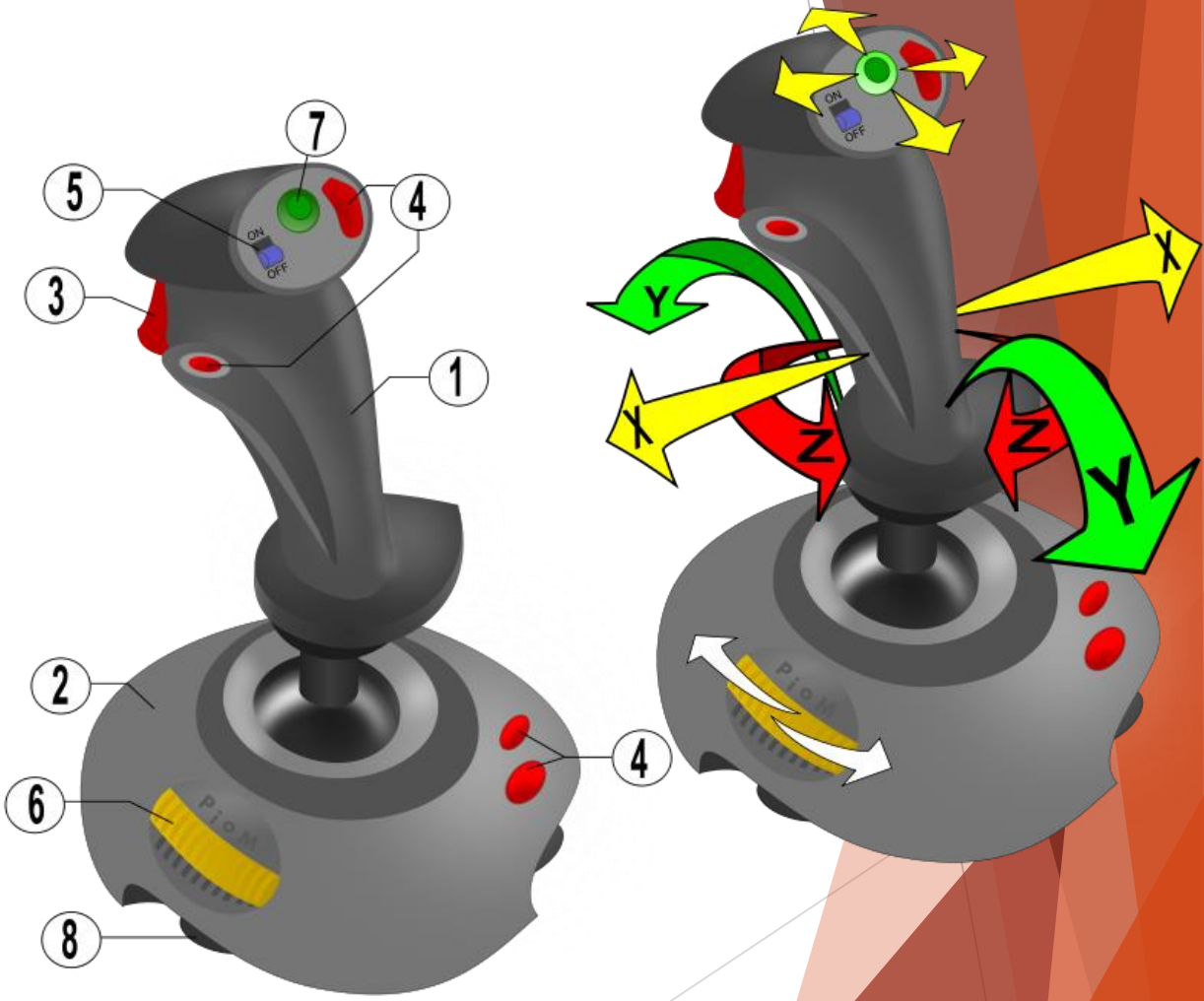
Joystick

- Consists a stick that pivots on a base
- One or more push-buttons
- Reports the angle or direction of stick and controls the movement of a pointer
- General configuration
  - moving the stick left or right : signals movement along the X axis
  - moving it forward (up) or back (down): signals movement along the Y axis
- Most are two-dimensional, but one and three-dimensional joysticks do exist
  - twisting the stick left (counter-clockwise) or right (clockwise) signals movement along the Z axis

Video game joystick elements:

Elements

1. Stick
2. Base
3. Trigger
4. Extra buttons
5. Autofire switch
6. Throttle
7. Hat Switch (POV Hat)
8. Suction Cup



- Often used to
  - control video games
  - control flight as a center stick or side-stick (aircraft, military fast jets)
  - input for smaller electronic equipment such as mobile phones : finger-operated joysticks
- Connects to computer system
  - through the game port (a 15-pin connector), USB interface

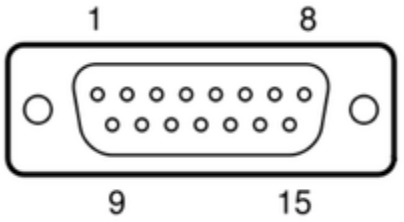
Video game console

Mobile phone keypad joystick

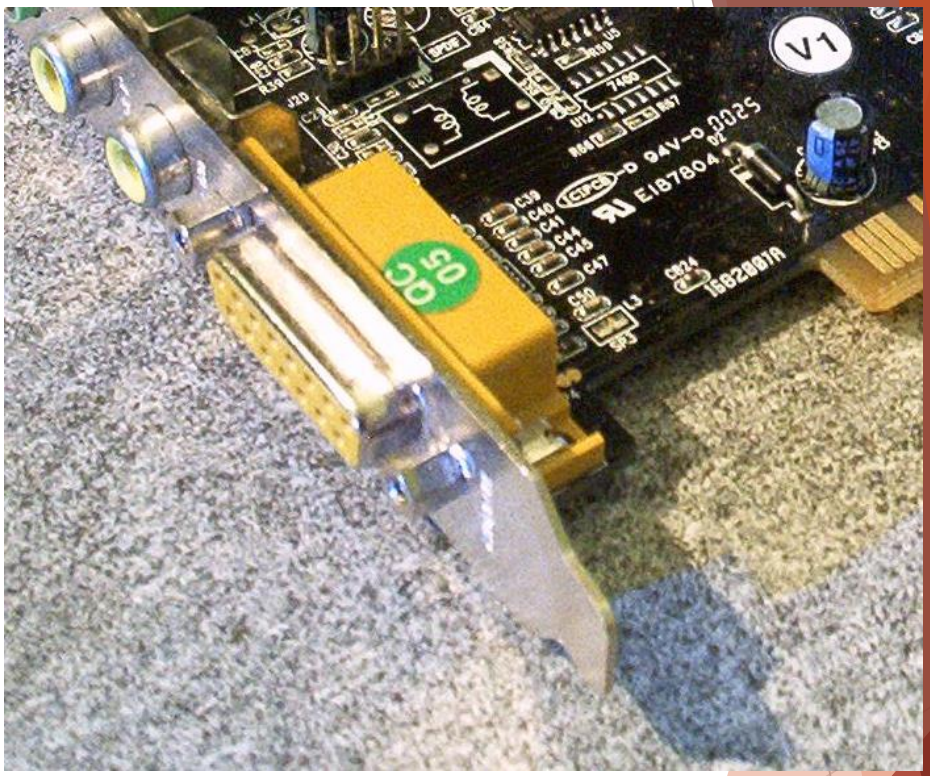
Centre stick

The Flighterstick

Connection



DA-15
male

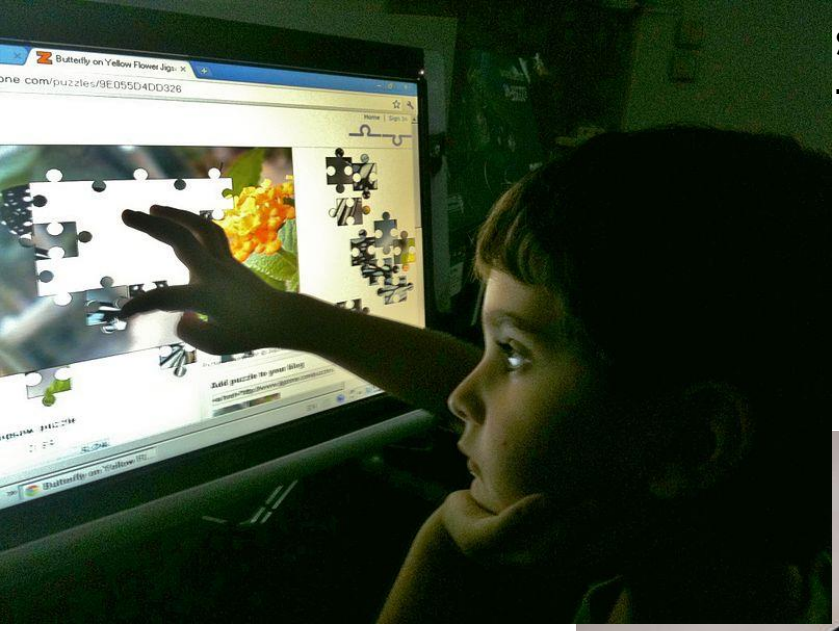


A DA-15 connector on a Soundcard

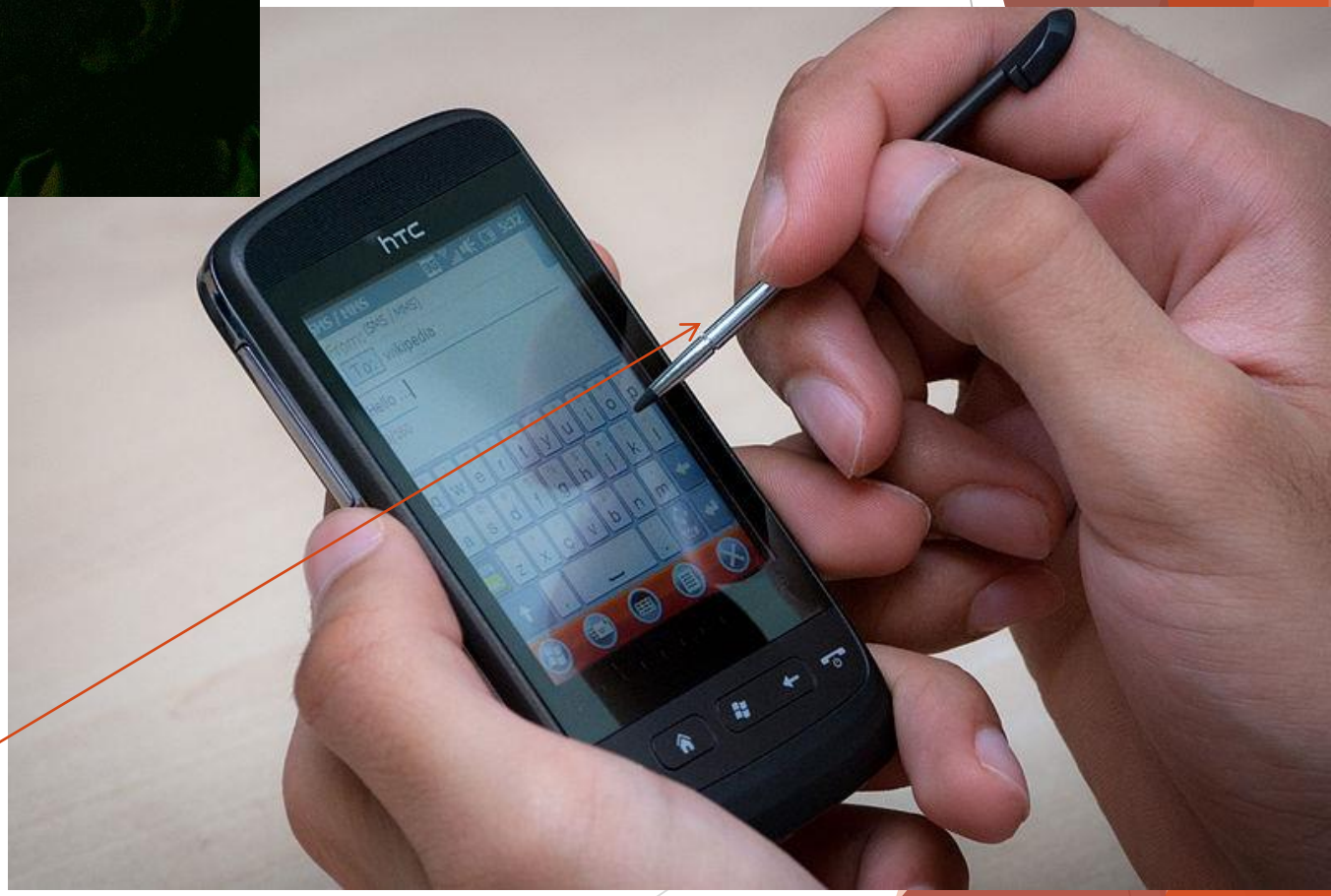
Joystick input port

Touchscreen

- Electronic visual display that the user can control through simple or multi-touch gestures by touching the screen with one or more fingers
- User reacts to what is displayed and to control how it is displayed
- Some touchscreens can also detect objects such as a stylus
- Commonly used in locations where using a mouse or keyboard is not feasible
  - automated teller machines, fast food outlet



solving a computerized puzzle using a touchscreen



pen-shaped instrument

A smartphone being operated with a stylus

- Common in devices such as
  - game consoles
  - tablet computers
  - Smart phones

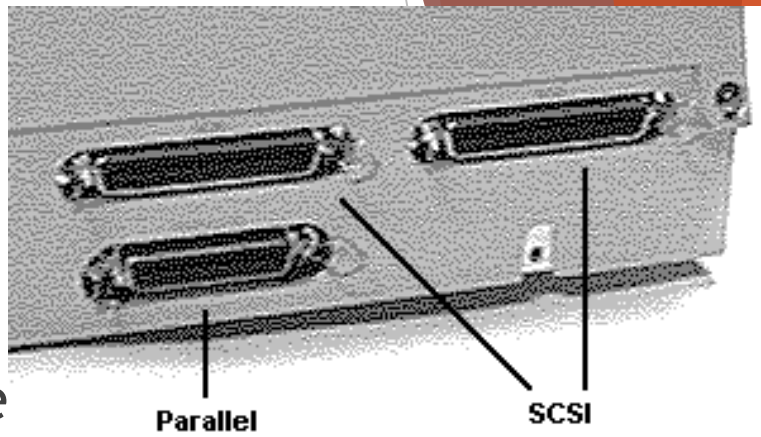
Scanners

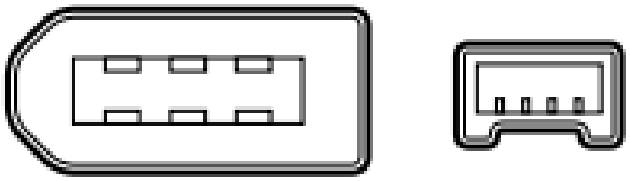
- Optical input device
- Capture images, printed text, handwriting, or an object, and converts it to a digital image

- Available as
  - Flatbed /desktop scanner or
  - Hand-held scanners

Flatbed-Scanner

- For the **scanned image** to be useful, it must be **transferred to your computer**
- Connect to the computer system
  - Parallel port
  - SCSI
  - USB
  - FireWire ..with higher-end scanne





The 6-circuit and 4-circuit alpha FireWire 400 connectors

4-circuit (left) and 6-circuit (right) FireWire 400 alpha connectors

Barcode Readers

- Read printed barcodes , capture data and input into the computer system
- Technology
  - light source emits strips of LASER light
  - reflected image is picked up by the light sensors
  - image is processed and the barcode is identified
  - passed on to the computer system as an alphanumeric value
- Connected to the computer system through
  - USB connectors ,PS/2 connector , Wireless networking

barcode symbol

A handheld barcode scanner

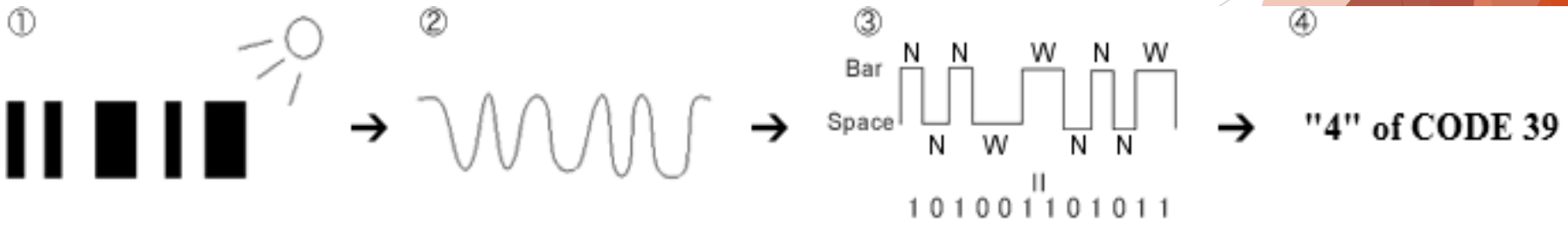
1.Shine a light at a bar code

2.Sensor receives reflections to obtain analog waveforms

3. analog signal is converted into a digital signal

4. from the obtained digital signal code system is determined

Principles of bar code reading



Audio Visual Devices

- Devices that can capture and transfer sound, still images or video

  - Audio : sound or audible noise
  - Visual : still or moving images

Microphones

- Input sound into the computer system
- Microphone aids in
  - recording voice
  - communicating though voice
  - providing voice commands
- speech recognition, Voice over Internet Protocol (VoIP)…

Webcam

- Feeds its images **in real time** to a computer system
- Permits computers to act as
  - video phones or video conference stations
- Uses : Video calling and conferencing, Video security
- Include a lens, an image sensor, and some support electronics
- connected to the computer system via USB, Ethernet or Wi-Fi

Digital Cameras

- Takes video or still photographs, or both, digitally by recording images via an electronic image sensor
- Image file is compressed and stored on the memory card

Questions ???