

## Chapter Five

# Input

**Discovering  
Computers 2012**

**Your Interactive Guide  
to the Digital World**



# Objectives Overview

Define input and differentiate among a program, command, and user response

Identify the keys and buttons commonly found on desktop computer keyboards, and describe how keyboards for mobile computers and devices differ from desktop computer keyboards

Describe different mouse types and explain how to use a mouse

Describe various types of touch screens and explain how a touch-sensitive pad works

Describe various types of pen input, and identify other types of input for smart phones

Summarize the purpose of various game controllers

# Objectives Overview

Explain how resolution affects the quality of a picture captured on a digital camera

Describe the uses of voice recognition, Web cams, and video conferencing

Discuss how various scanners and reading devices work

Summarize the various biometric devices

Discuss how POS terminals, automated teller machines, and DVD kiosks work

Identify alternative input devices for physically challenged users

# What Is Input?

- **Input** is any data and instructions entered into the memory of a computer



# What Is Input?

- Instructions can be entered into the computer in the form of programs, commands, and user responses

A program is a series of related instructions that tells a computer what tasks to perform and how to perform them

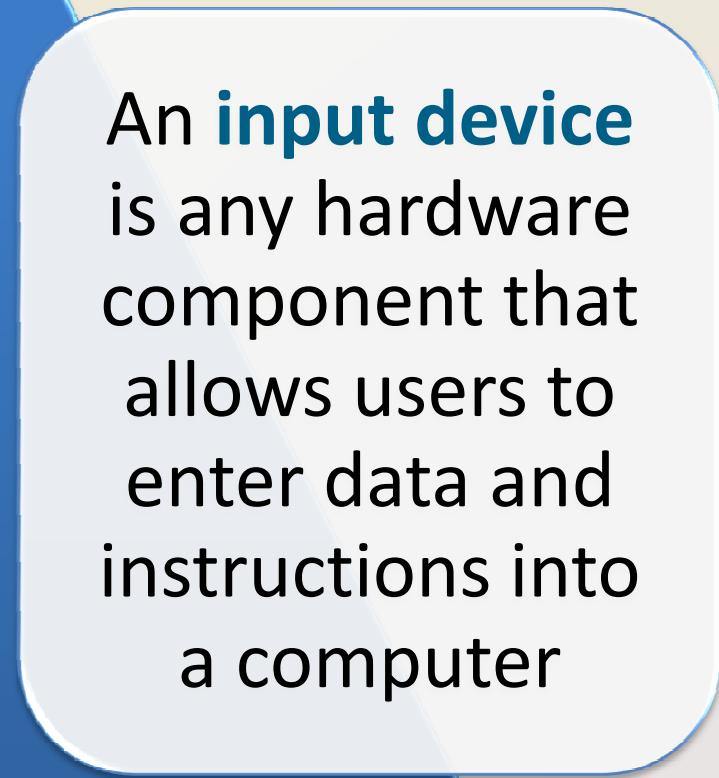
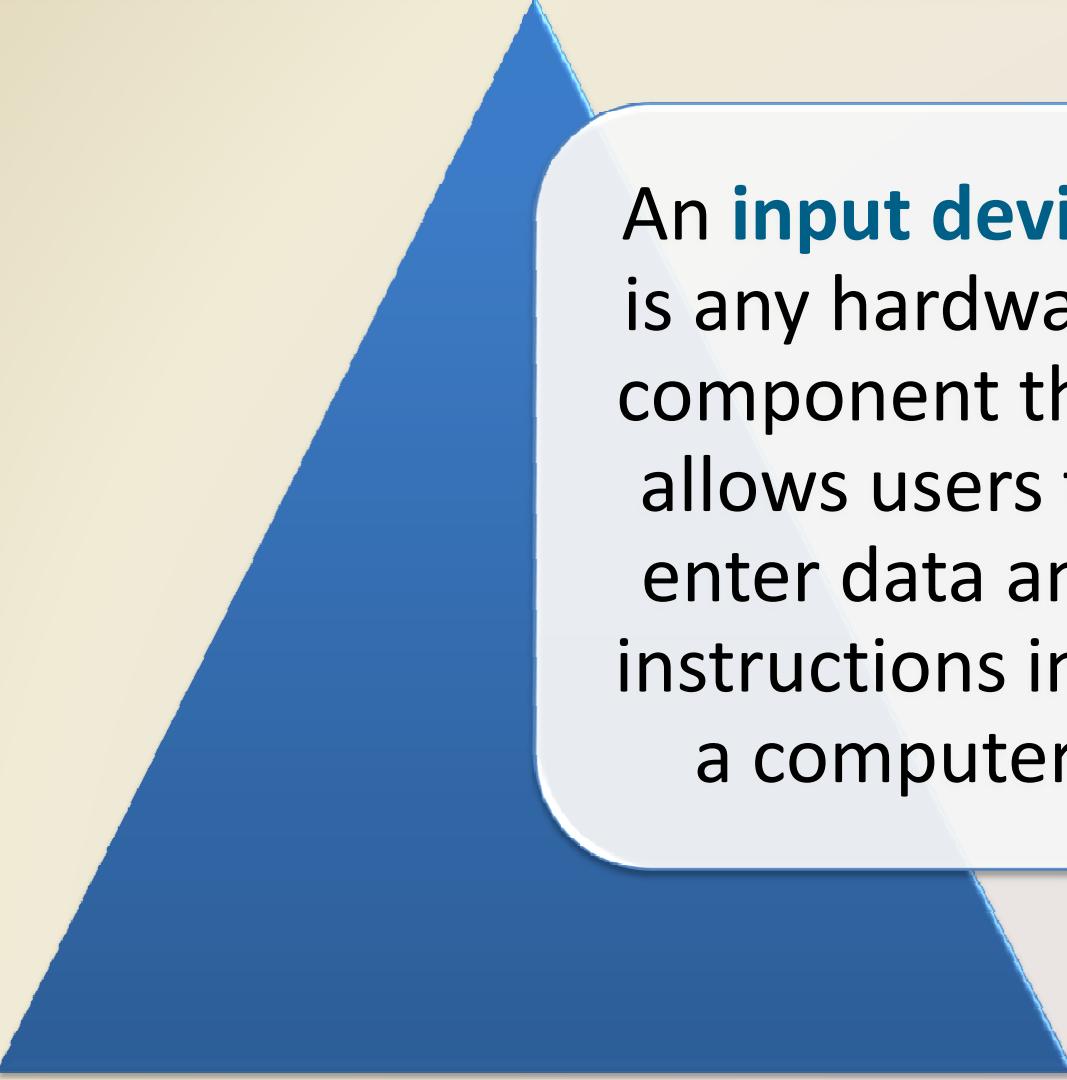


Programs respond to commands that a user issues



A user response is an instruction a user issues by replying to a question displayed by a program

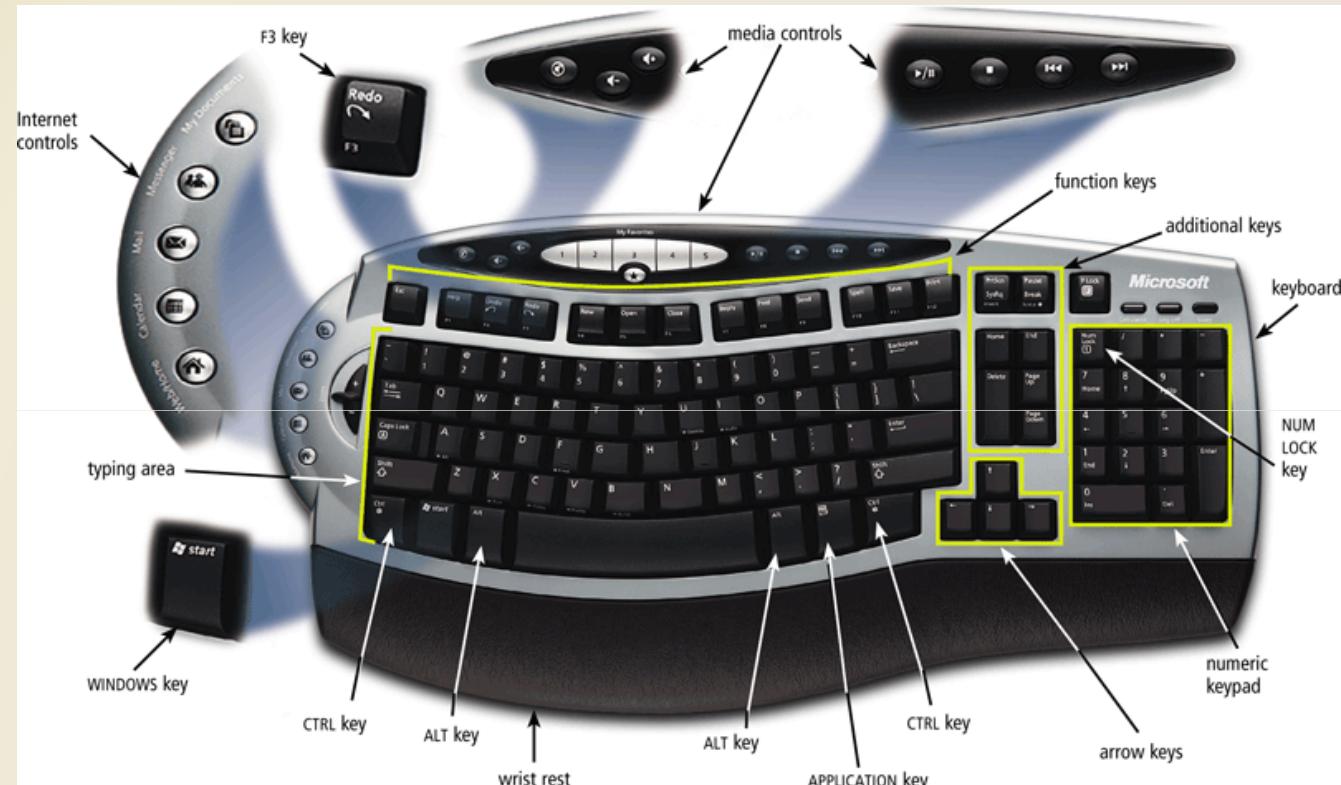
# What Are Input Devices



An **input device** is any hardware component that allows users to enter data and instructions into a computer

# The Keyboard

- A **keyboard** is an input device that contains keys users press to enter data and instructions into a computer



# The Keyboard

- Most desktop computer keyboards have...

Between 101 and  
105 keys

A numeric keypad  
on the right side of  
the keyboard

Function keys,  
CTRL keys, ALT  
keys, and arrow  
keys

WINDOWS key

APPLICATION key

Toggle keys



The three computer keyboard toggle keys:

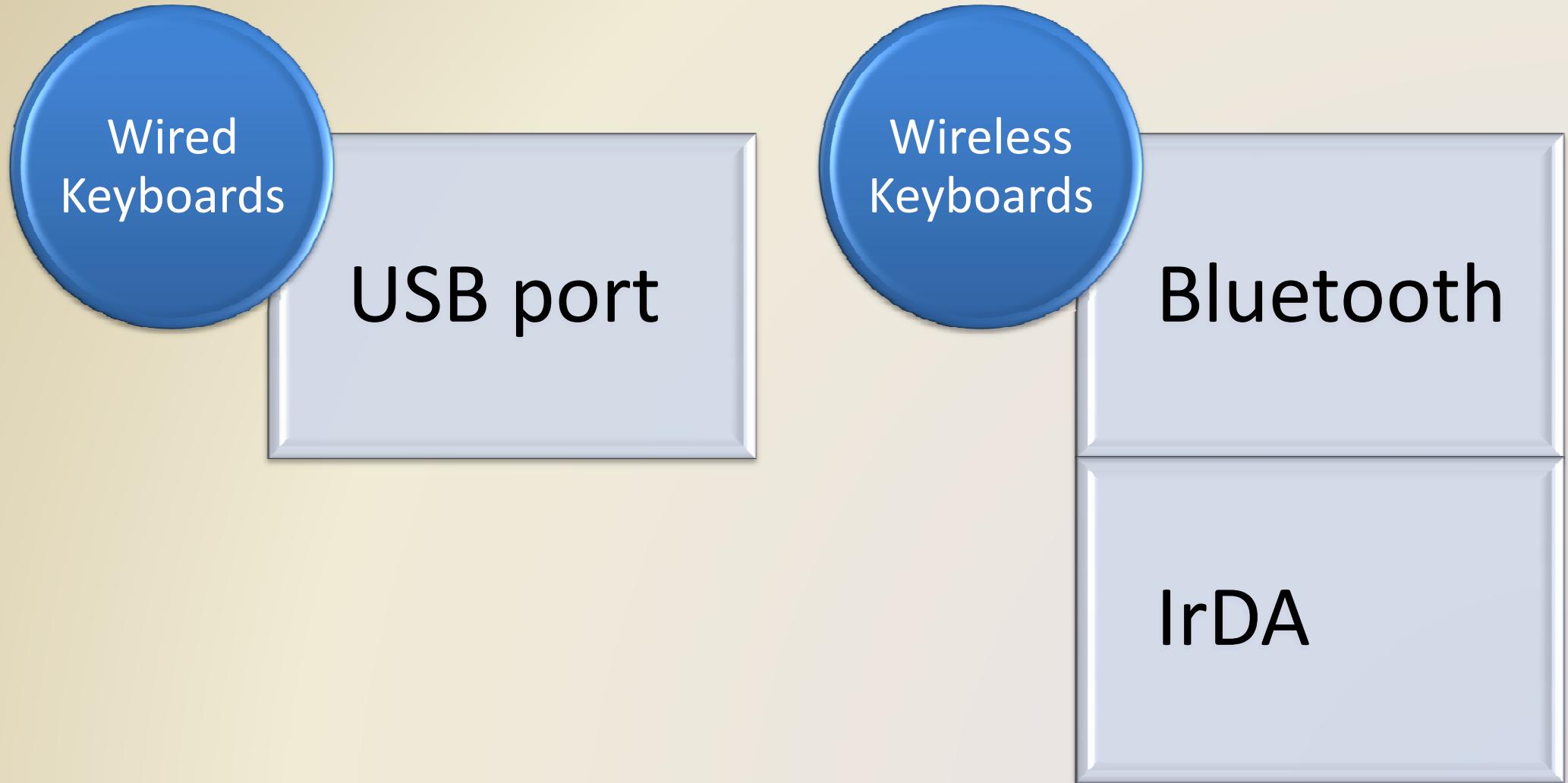
Caps Lock  
Num Lock  
Scroll Lock

# The Keyboard

- The **insertion point**, also known as the cursor, is a symbol on the screen that indicates where the next character you type will appear



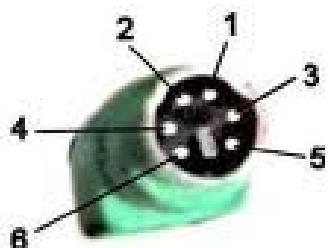
# The Keyboard





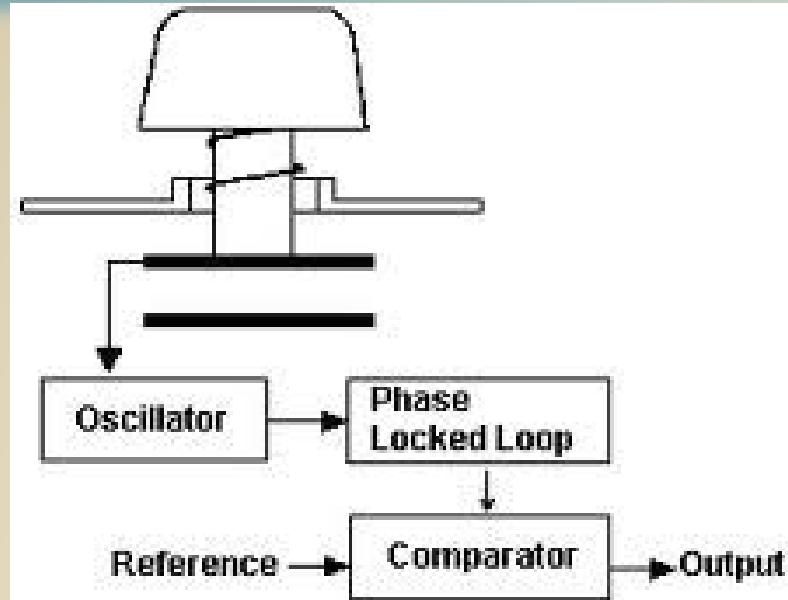
### PS/2 keyboard connector (MINI-DIN6)

Connector Pin #	Purpose
Pin 1	KBDAT (data)
Pin 2	not used
Pin 3	GND
Pin 4	VCC (+5V)
Pin 5	KBDCLK (clock)
Pin 6	not used



Mouse connector pinout is identical to PS/2 keyboard.

# Keyboard Switch



# The Keyboard

- An ergonomic keyboard has a design that reduces the chance of wrist and hand injuries
- **Ergonomics** incorporates comfort, efficiency, and safety into the design of the workplace



# The Keyboard

- Keyboards on mobile devices typically are smaller and/or have fewer keys
- Some phones have predictive text input, which saves time when entering text using the phone's keypad



# Pointing Devices

A **pointing device** is an input device that allows a user to control a pointer on the screen

A **pointer** is a small symbol on the screen whose location and shape change as a user moves a pointing device

# Mouse

- A **mouse** is a pointing device that fits under the palm of your hand comfortably
  - Most widely used pointing device on desktop computers
- A mouse can be wired or wireless



# Mouse

- Mouse operations

Point

Click

Right-click

Double-click

Triple-click

Drag

Right-drag

Rotate  
wheel

Free-spin  
wheel

Press wheel

Tilt wheel

Press thumb  
button



# Other Pointing Devices



## Trackball

- A **trackball** is a stationary pointing device with a ball on its top or side



## Touchpad

- A **touchpad** is a small, flat, rectangular pointing device that is sensitive to pressure and motion

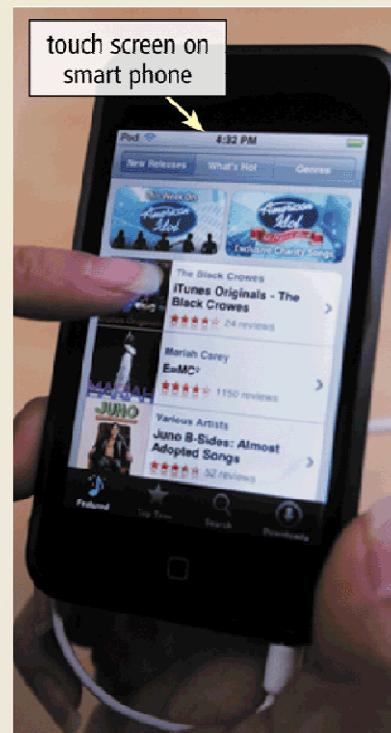
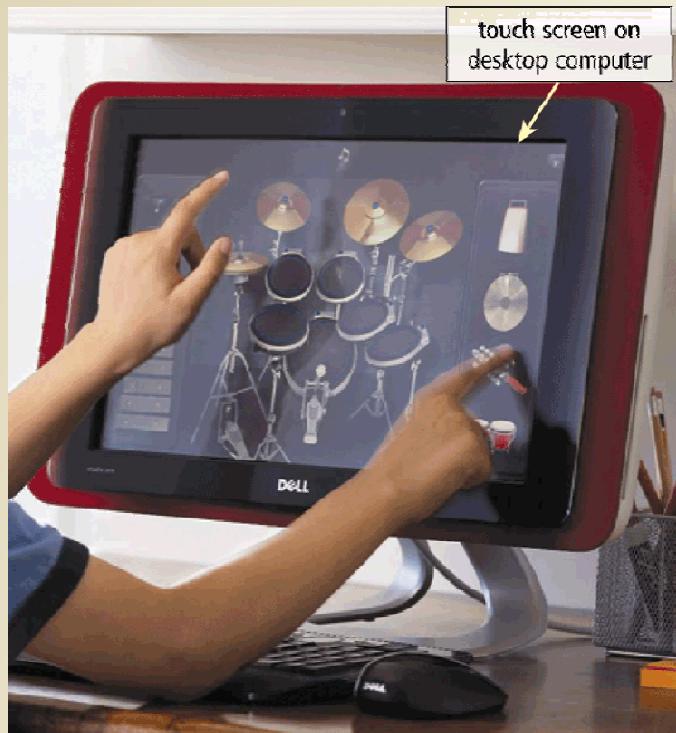


## Pointing Stick

- A **pointing stick** is a pressure-sensitive pointing device shaped like a pencil eraser that is positioned between keys on a keyboard

# Touch Screens and Touch-Sensitive Pads

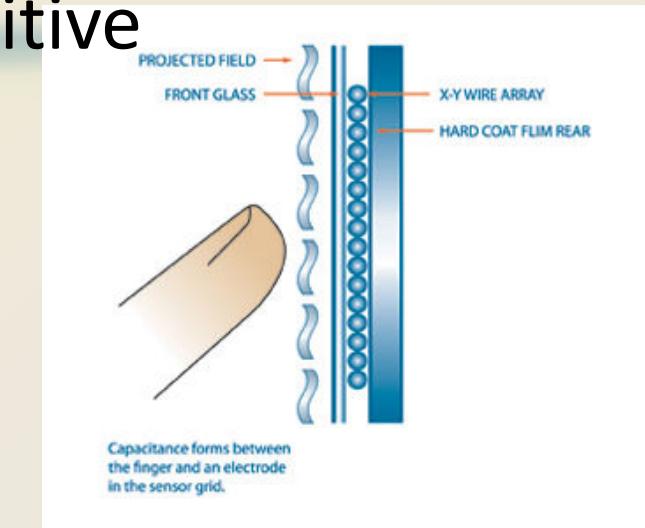
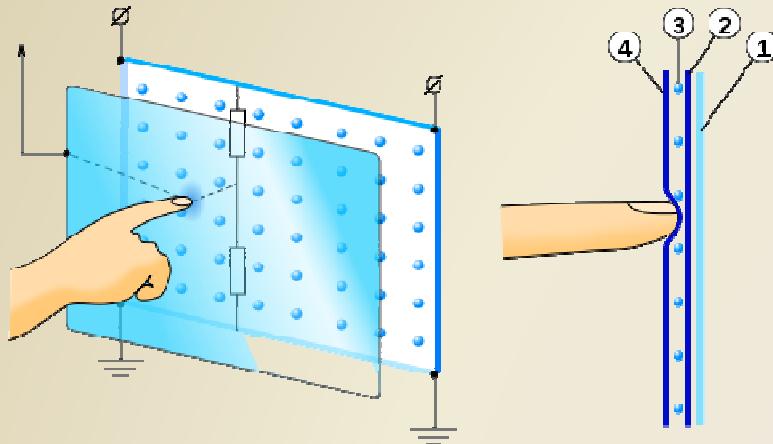
- A **touch screen** is a touch-sensitive display device



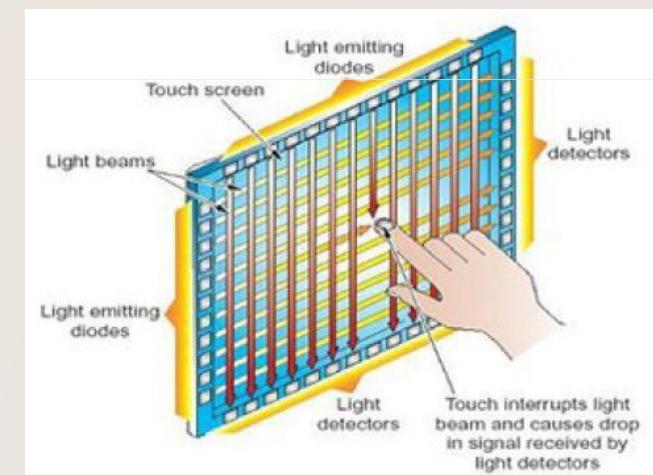
# Touch Screen Technologies

## Capacitive

### Resistive



### Infrared



# Touch Screens and Touch-Sensitive Pads

## Microsoft Surface



## Touch-sensitive pads



# Pen Input

- With **pen input**, you touch a **stylus** or **digital pen** on a flat surface to write, draw, or make selections



# Other Input for Smart Phones



# Game Controllers

- Video games and computer games use a **game controller** as the input device that directs movements and actions of on-screen objects

**Gamepads**

**Joysticks and Wheels**

**Light guns**

**Dance pads**

**Motion-sensing controllers**

# Game Controllers



# Digital Cameras

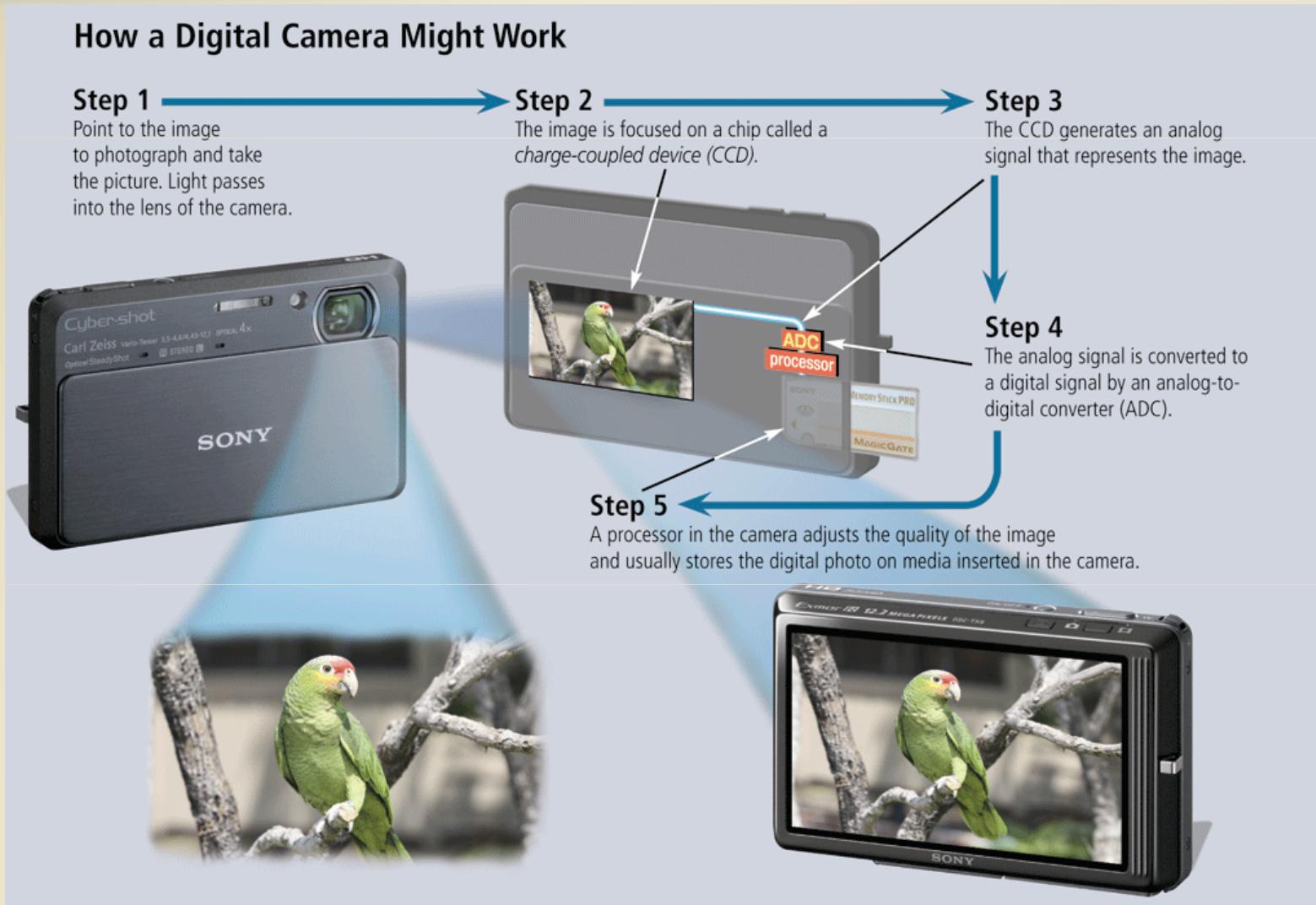
- A **digital camera** is a mobile device that allows users to take pictures and store them digitally

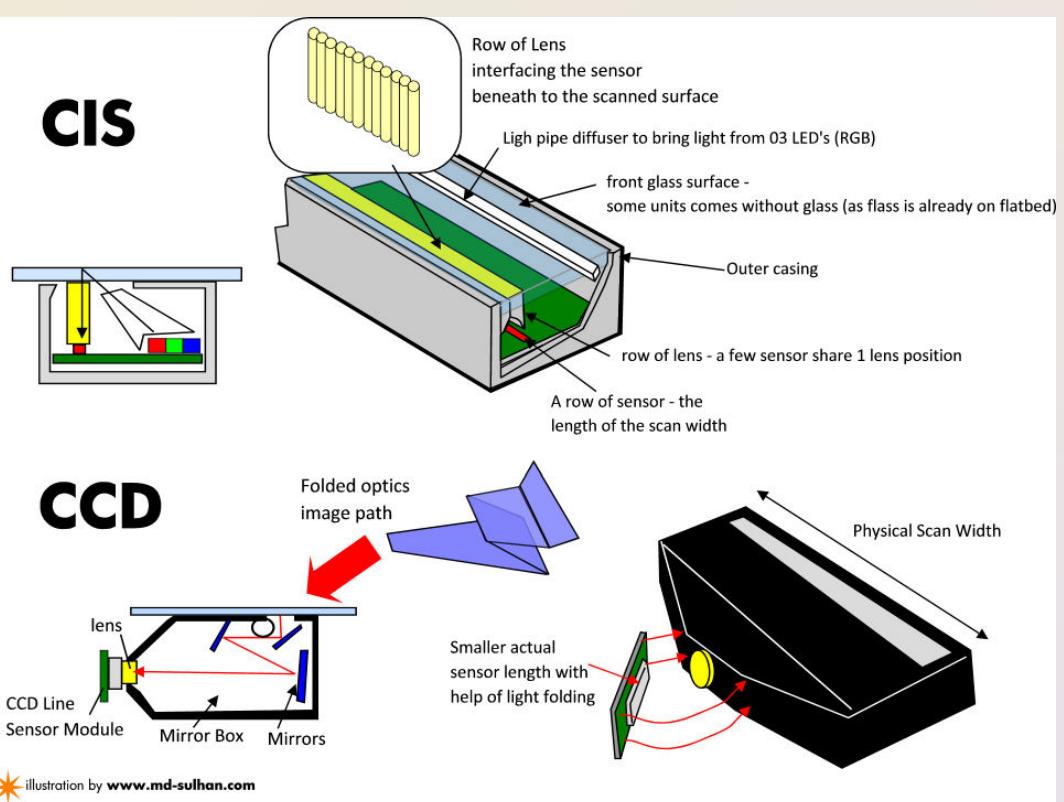
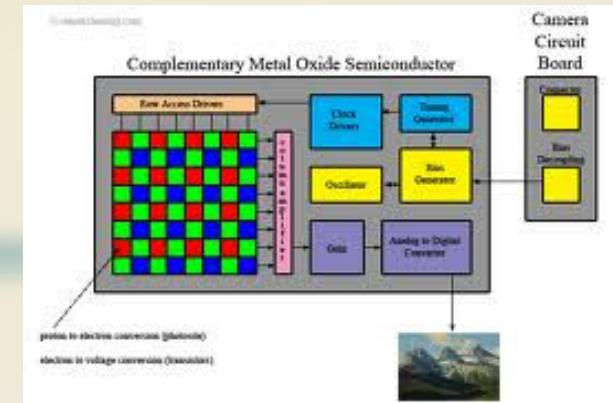
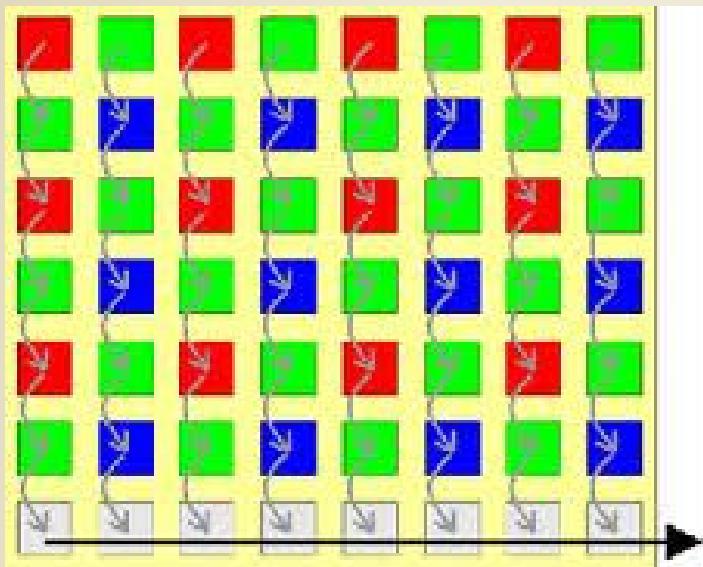
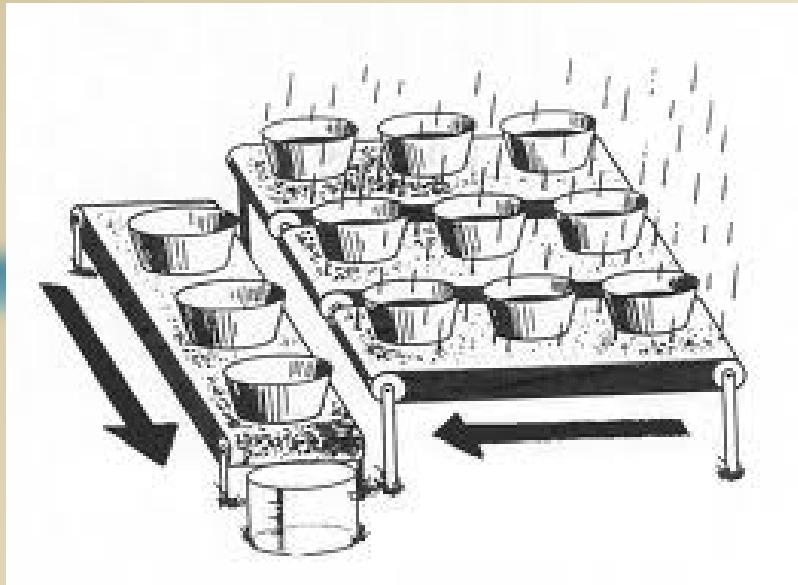
Studio cameras

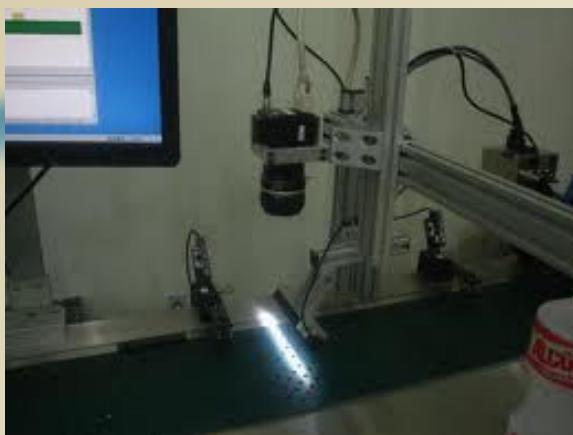
Field cameras

Point-and-shoot camera

# Digital Cameras







# Digital Cameras

- Two factors affect the quality of digital camera photos:

Resolution

- **Resolution** is the number of horizontal and vertical pixels in a display device
- A pixel is the smallest element in an electronic display

Number of bits stored in each pixel

- Each pixel consists of one or more bits of data
- The more bits used to represent a pixel, the more colors and shades of gray that can be represented

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## Gigapixel camera offers super sharp shots

A camera capable of creating images with "unprecedented detail" has been unveiled by US engineers.

The prototype machine - dubbed AWARE2 - has the potential to take pictures with resolutions of up to 50 gigapixels, equivalent to 50,000 megapixels, according to the team from Duke University in North Carolina.

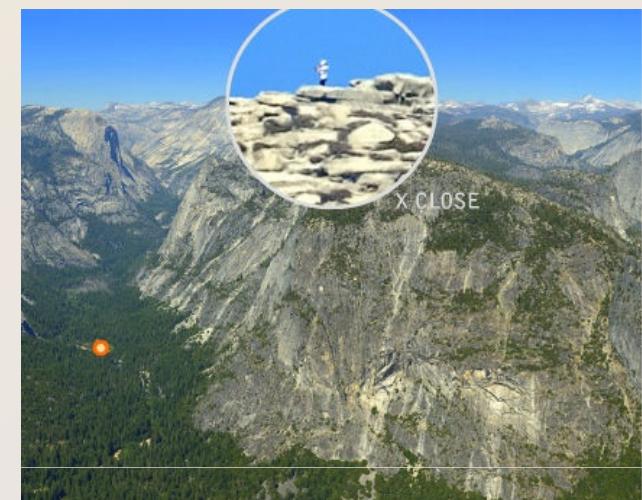
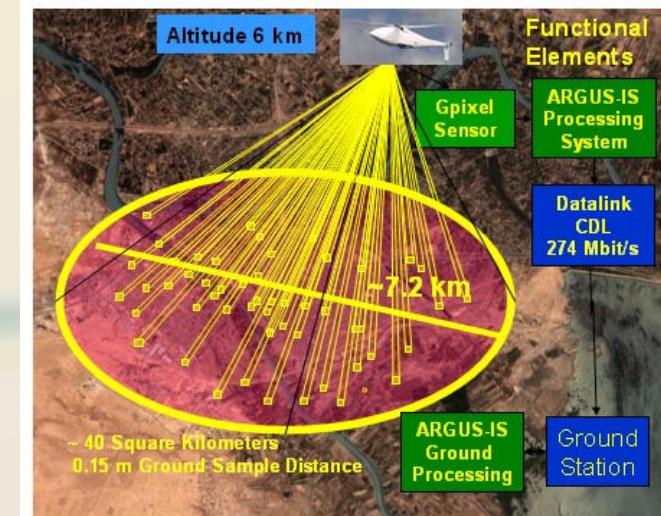
It works by synchronising 98 tiny cameras in a single device.

The machine is likely to be used first for military surveillance.

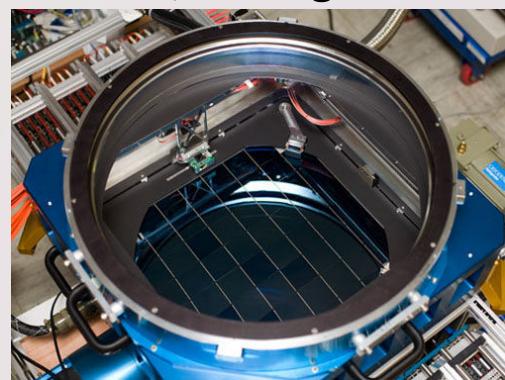
In its current state the researchers say it can take one-gigapixel images at up to three



The current camera is quite bulky

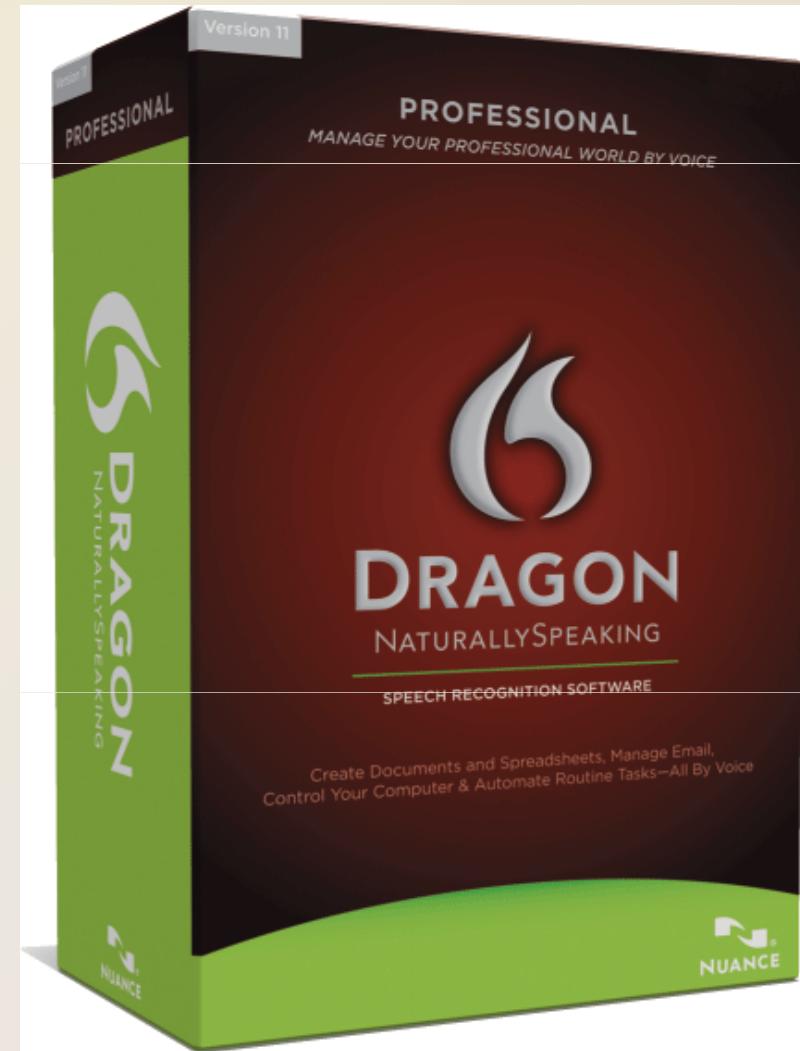


2008, 1.4GigaPixels



# Voice Input

- **Voice input** is the process of entering input by speaking into a microphone
- **Voice recognition** is the computer's capability of distinguishing spoken words



# Voice Input

- **Audio input** is the process of entering any sound into the computer

Speech

Music

Sound Effects

# Voice Input

- Music production software allows users to record, compose, mix, and edit music and sounds



# Video Input

- **Video input** is the process of capturing full-motion images and storing them on a computer's storage medium

Record video on a **digital video (DV) camera** or use a video capture card to convert analog signals to digital

Connect the camera to a port on the system unit

Transfer video and images

# Video Input



# Video: Video Editing on Your Computer



[CLICK TO START](#)

# Video Input

- A **Web cam** is a type of digital video camera that enables a user to:

Capture video and still images

Send e-mail messages with video attachments

Add live images to instant messages

Broadcast live images over the Internet

Make video telephone calls

# Video Input

- A **video conference** is a meeting between two or more geographically separated people



# Scanners and Reading Devices



Flatbed



Pen or Handheld



Sheet-fed



Drum



# Scanners and Reading Devices

## How a Flatbed Scanner Works

### Step 1

Place the document to be scanned face down on the glass window. Using buttons on the scanner or the scanner program, start the scanning process.



### Step 2

The scanner converts the document content to digital information, which is transmitted through the cable to the memory of the computer.

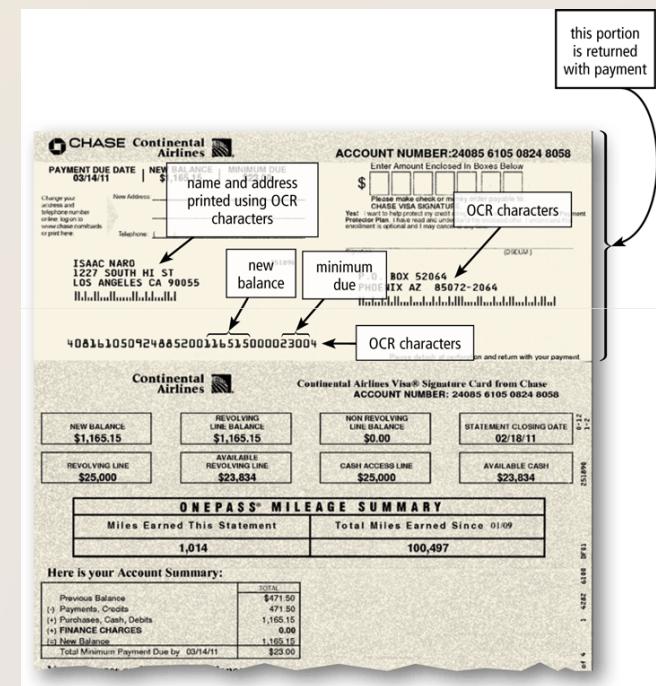


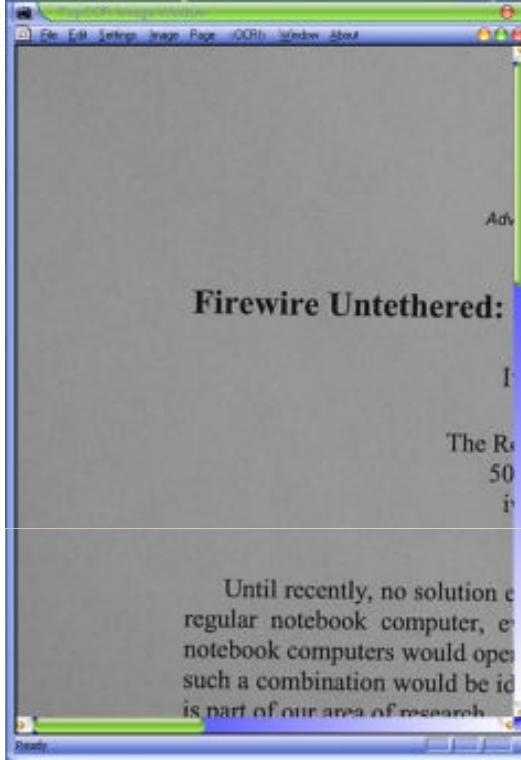
**Step 3** Once in the memory of the computer, users can display the image, print it, e-mail it, include it in a document, or place it on a Web page.

# Scanners and Reading Devices

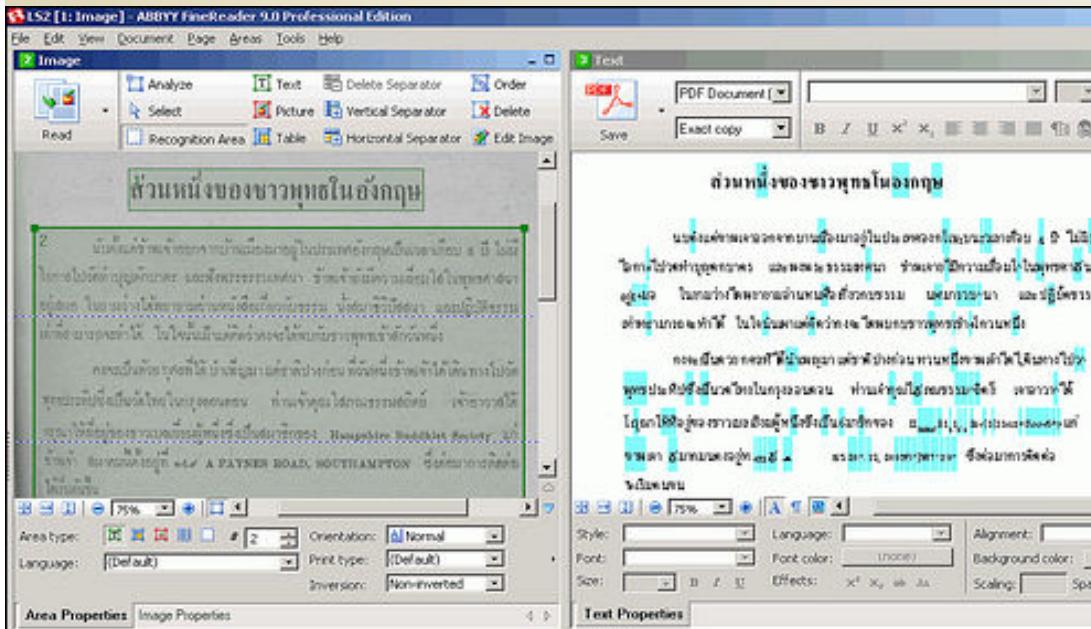
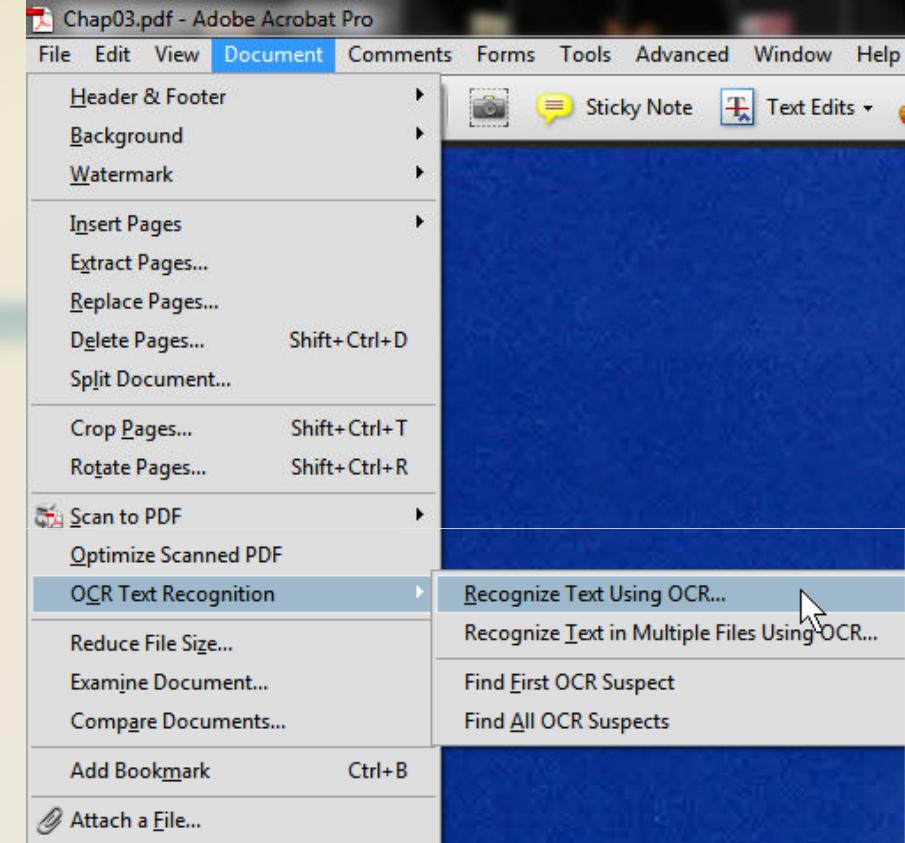
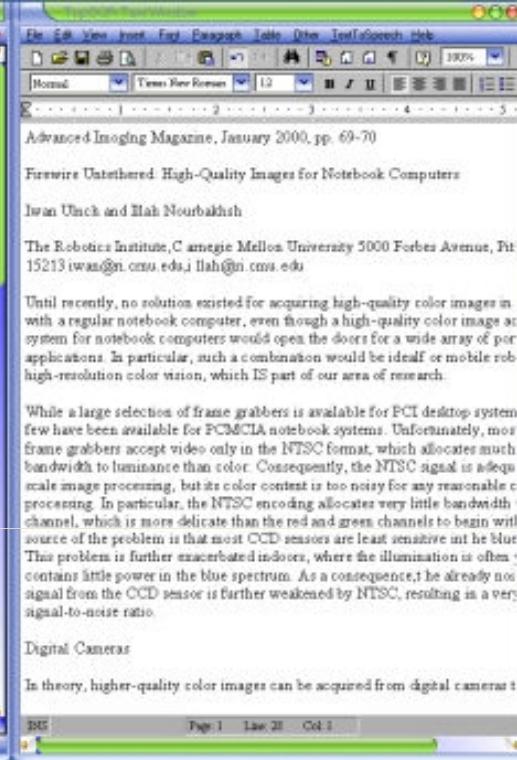
- **Optical character recognition (OCR)** involves reading characters from ordinary documents
- A **turnaround document** is a document you return to the company that creates and sends it

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
1234567890  
- = ; ' , . /





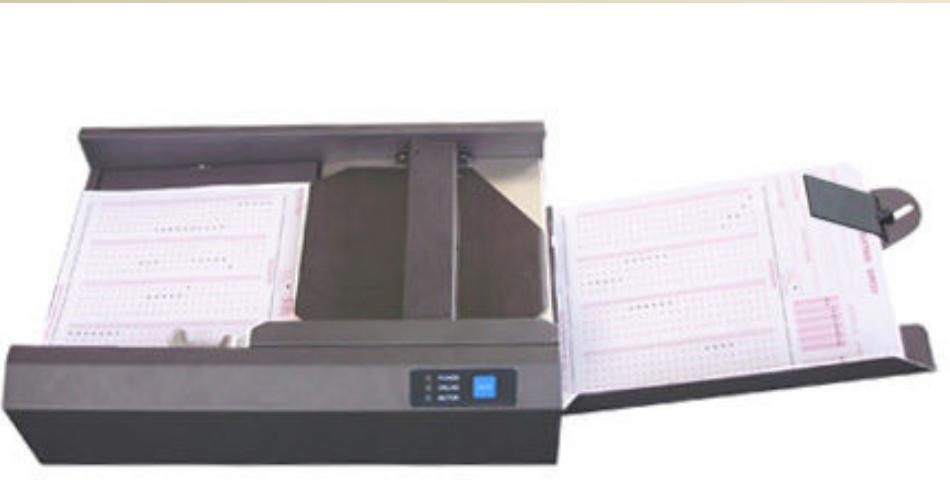
Ready



# Scanners and Reading Devices

- **Optical mark recognition (OMR)**  
reads hand-drawn  
marks such as small  
circles or rectangles
- An OMR device scans  
the documents and  
matches the patterns of  
light





**OMR (Optical Mark Reader) Answer Sheet**  
**ALL INDIA OPEN**  
**MATHEMATICS SCHOLARSHIP EXAMINATION**  
**Answer Sheet**

**IPM**  
SINCE-1990

<b>EXAMPLE</b> <b>WRONG METHODS</b>		<b>SEAT NO.</b>									
1	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	2	5	4	8	9	0	2	5	4	8
2	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	3	0	1	0	1	0	1	0	1	0
3	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	4	0	1	0	1	0	1	0	1	0
4	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	5	0	1	0	1	0	1	0	1	0
<b>CORRECT METHODS</b>											
1	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	2	0	1	0	1	0	1	0	1	0
<b>INSTRUCTIONS</b>											
1. There is only one correct answer for each question 2. All entries in the circle must be made by BLUE or BLACK Ink Ball Pen only. Do not try to alter the entry. 3. Circle should be darkened completely so that the numeral inside the circle is not visible. 4. Do not use any stray marks on the sheet for rough work use sheet provided separately for it. 5. Mark your answer as shown in the example.											
1	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	11	<input type="radio"/> <input type="radio"/> <input type="radio"/>	21	<input type="radio"/> <input type="radio"/> <input type="radio"/>	31	<input type="radio"/> <input type="radio"/> <input type="radio"/>	41	<input type="radio"/> <input type="radio"/> <input type="radio"/>	51	<input type="radio"/> <input type="radio"/> <input type="radio"/>
2	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	12	<input type="radio"/> <input type="radio"/> <input type="radio"/>	22	<input type="radio"/> <input type="radio"/> <input type="radio"/>	32	<input type="radio"/> <input type="radio"/> <input type="radio"/>	42	<input type="radio"/> <input type="radio"/> <input type="radio"/>	52	<input type="radio"/> <input type="radio"/> <input type="radio"/>
3	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	13	<input type="radio"/> <input type="radio"/> <input type="radio"/>	23	<input type="radio"/> <input type="radio"/> <input type="radio"/>	33	<input type="radio"/> <input type="radio"/> <input type="radio"/>	43	<input type="radio"/> <input type="radio"/> <input type="radio"/>	53	<input type="radio"/> <input type="radio"/> <input type="radio"/>
4	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	14	<input type="radio"/> <input type="radio"/> <input type="radio"/>	24	<input type="radio"/> <input type="radio"/> <input type="radio"/>	34	<input type="radio"/> <input type="radio"/> <input type="radio"/>	44	<input type="radio"/> <input type="radio"/> <input type="radio"/>	54	<input type="radio"/> <input type="radio"/> <input type="radio"/>
5	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	15	<input type="radio"/> <input type="radio"/> <input type="radio"/>	25	<input type="radio"/> <input type="radio"/> <input type="radio"/>	35	<input type="radio"/> <input type="radio"/> <input type="radio"/>	45	<input type="radio"/> <input type="radio"/> <input type="radio"/>	55	<input type="radio"/> <input type="radio"/> <input type="radio"/>
6	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	16	<input type="radio"/> <input type="radio"/> <input type="radio"/>	26	<input type="radio"/> <input type="radio"/> <input type="radio"/>	36	<input type="radio"/> <input type="radio"/> <input type="radio"/>	46	<input type="radio"/> <input type="radio"/> <input type="radio"/>	56	<input type="radio"/> <input type="radio"/> <input type="radio"/>
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# Scanners and Reading Devices

- A **bar code reader**, also called a **bar code scanner** uses laser beams to read **bar codes**



# Scanners and Reading Devices

- **RFID** (radio frequency identification) uses radio signals to communicate with a tag placed in or attached to an object
- An **RFID reader** reads information on the tag via radio waves
- RFID can track:

Tracking times of runners in a marathon

Tracking location of soldiers

Employee wardrobes

Airline baggage

Checking lift tickets of skiers

Managing inventory

Gauging pressure and temperature of tires

Checking out library books

Tracking toll payments

# Scanners and Reading Devices

- **Magnetic stripe card readers** read the magnetic stripe on the back of cards such as:

Credit cards

Entertainment cards

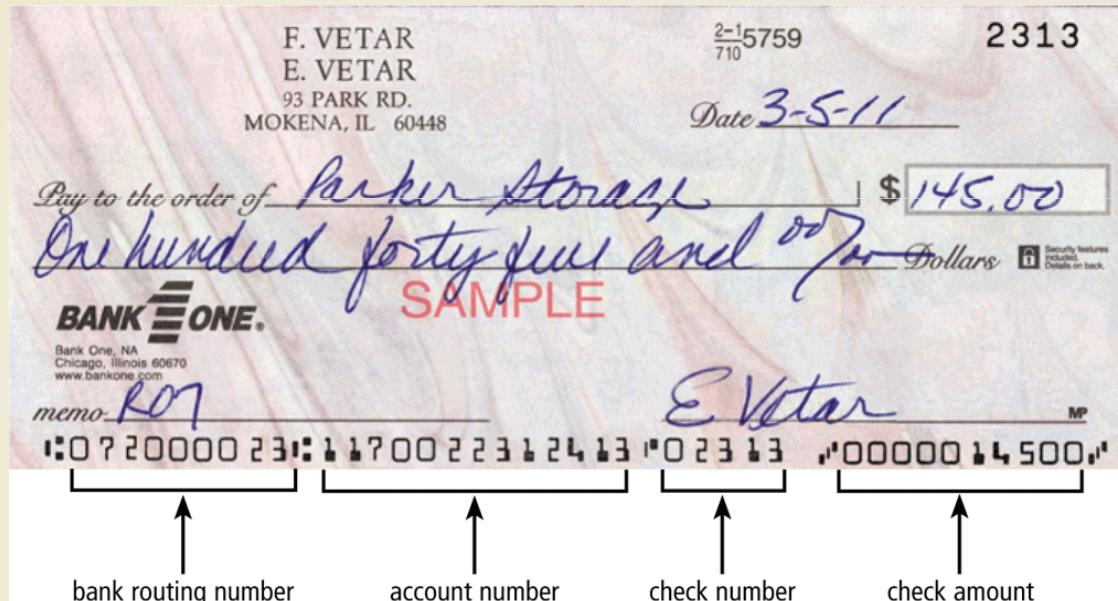
Bank cards

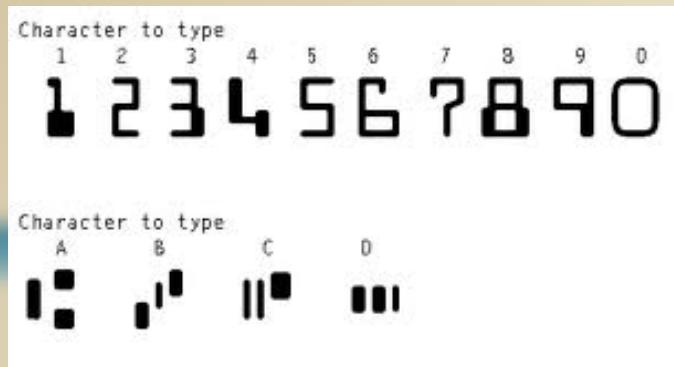
Other similar cards



# Scanners and Reading Devices

- **MICR** (magnetic ink character recognition) devices read text printed with magnetized ink
- An **MICR reader** converts MICR characters into a form the computer can process
- Banking industry uses MICR for check processing





# Scanners and Reading Devices

- Data collection devices obtain data directly at the location where the transaction or event takes place
- Used in:
  - Restaurants
  - Grocery stores
  - Factories
  - Warehouses
  - The outdoors



# Biometric Input

- Biometrics authenticates a person's identity by verifying a personal characteristic

Fingerprint reader

Face recognition system

Hand geometry system

Voice verification system

Signature verification system

Iris recognition system

Retinal scanners

# Biometric Input



fingerprint  
reader



hand  
geometry  
system



# Terminals

- A terminal is a computer that allows users to send data to and/or receive information from a host computer



**A POS terminal** records purchases, processes payment, and updates inventory

**An automated teller machine (ATM)** allows users to access their bank accounts

**A DVD kiosk** is a self-service DVD rental machine

# Putting It All Together

Suggested Input Devices by User	
User	Input Device
<b>Home</b> 	<ul style="list-style-type: none"><li>• Enhanced keyboard or ergonomic keyboard</li><li>• Mouse</li><li>• Stylus for smart phone or other mobile device</li><li>• Game controller(s)</li><li>• 30-bit 600 × 1200 ppi color scanner</li><li>• 7 MP digital camera</li><li>• Headphones that include a microphone (headset)</li><li>• Web cam</li><li>• Fingerprint reader</li></ul>
<b>Small Office/ Home Office</b> 	<ul style="list-style-type: none"><li>• Enhanced keyboard or ergonomic keyboard</li><li>• Mouse</li><li>• Stylus and portable keyboard for smart phone or other mobile device, or digital pen for Tablet PC</li><li>• 36-bit 600 × 1200 ppi color scanner</li><li>• 8 MP digital camera</li><li>• Headphones that include a microphone (headset)</li><li>• Web cam</li></ul>

# Putting It All Together

## Suggested Input Devices by User

User	Input Device
<b>Mobile</b> 	<ul style="list-style-type: none"><li>• Wireless mouse for notebook computer</li><li>• Touchpad or pointing stick on notebook computer</li><li>• Stylus and portable keyboard for smart phone or other mobile device, or digital pen for Tablet PC</li><li>• 7 or 8 MP digital camera</li><li>• Headphones that include a microphone (headset)</li><li>• Fingerprint reader for notebook computer</li></ul>
<b>Power</b> 	<ul style="list-style-type: none"><li>• Enhanced keyboard or ergonomic keyboard</li><li>• Mouse</li><li>• Stylus and portable keyboard for smart phone or other mobile device</li><li>• Pen for graphics tablet</li><li>• 48-bit 1200 × 1200 ppi color scanner</li><li>• 9 to 12 MP digital camera</li><li>• Headphones that include a microphone (headset)</li><li>• Web cam</li></ul>

# Putting It All Together

Suggested Input Devices by User	
User	Input Device
<b>Enterprise</b> 	<ul style="list-style-type: none"><li>• Enhanced keyboard or ergonomic keyboard</li><li>• Mouse</li><li>• Stylus and portable keyboard for smart phone or other mobile device, or digital pen for Tablet PC</li><li>• Touch screen</li><li>• 42-bit 1200 × 1200 ppi color scanner</li><li>• 9 to 12 MP digital camera</li><li>• OCR/OMR readers, bar code readers, MICR reader, or data collection devices</li><li>• Microphone</li><li>• Video camera for video conferences</li><li>• Fingerprint reader or other biometric device</li></ul>

# Input Devices for Physically Challenged Users

- Several input devices are available to assist physically challenged users:

Keyguard

Keyboards  
with larger  
keys

On-screen  
keyboard

Various  
pointing  
devices

Head-  
mounted  
pointer

Gesture  
recognition

Computerized  
implant  
devices

# Input Devices for Physically Challenged Users

Keyboard with larger keys



Head-mounted pointer



# Summary

Various techniques of entering input

Several commonly used input devices

Keyboard, mouse, and other pointing devices; touch screens, pen input, other input for smart phones, game controllers, digital cameras, voice input, video input, scanners and reading devices, biometric input, and terminals

Input devices for physically challenged users

## Chapter Five

# Input

**Discovering  
Computers 2012**

**Your Interactive Guide  
to the Digital World**

**Chapter 5 Complete**

