

# COMPUTER HARDWARE

Hardware refers to any physical/tangible part of the computer that you can touch, feel, see and pickup.

# **CLASSIFICATION OF COMPUTER HARDWARE**

- a) Input devices
- b) Output devices
- c) Processing devices
- d) Storage devices
- e) Communication devices

# INPUT DEVICES

Computer input refers to any data and instructions entered/fed into a computer for processing.

Computer input devices are components/devices that enable a user to enter/feed data and instructions into a computer for processing.

**The two types of computer input are:**

- a) Data
- b) Commands

# There are two different types of input devices:

- **Manual Input Devices**

Data is input into the computer **by hand** (people have to do most of the work)

- **Direct input devices**

Data is input into the computer directly by a **machine/device** (there is minimal input by people)

Keyboard

Mouse

Touchpad

Trackball

Stylus and graphics  
tablet

Joystick

Microphone

Light pen

Pointing stick

Scanner

MIDI device

Sensor and remote  
sensor

Digital camera

Bar code reader

Digital video camera

Web camera

PC camera

Electronic whiteboard

Magnetic stripe reader

Optical mark recognition  
(OMR) reader

Magnetic ink character  
recognition (MICR) reader

Optical character recognition  
(OCR) reader

Touch screen

# KEYBOARDS

- Keyboards are one of the most commonly used manual input devices.
- keyboards are used to input text, numbers and instructions into the computer.
- Most keyboards use a **QWERTY** key layout. The name '**QWERTY**' comes from the first five lettered keys on the top row of the keyboard - Q-W-E-R-T-Y.
- Special keyboards called 'Ergonomic Keyboards' have been developed to help reduce health problems (such as repetitive strain injury) linked with typing.
- Ergonomic keyboards have a more natural shape to them with reduces stress on the wrist and hands.
- Ergonomic keyboards also come with a built-in hand-rest which further helps prevent health issues such as RSI (Repetitive Strain Injury).



# USES OF THE KEYBOARD

- Keyboards are used to input data into applications.

## For Example

Entering text into word processing applications like Microsoft Word,

Entering numbers into spreadsheet applications like Microsoft Excel

- Keyboards can also be used to enter commands into the computer.

## For Example -Keyboard shortcuts:

- Ctrl+P to print
- Ctrl+S to save
- Ctrl+O to open



# ADVANTAGES OF KEYBOARDS

1. Keyboards are more reliable and produce fewer errors than other input methods since information you input instantly appears on the screen so it is easy to know whether it is correct.
2. Entering data and instructions with keyboards is generally faster than with pointing devices.
3. It is not necessary to buy additional equipment because most computer systems are normally supplied with keyboards

# DISADVANTAGES OF KEYBOARDS

- People with wrist and hand problems find using keyboards painful to use.
- Typing speeds are still very slow when compared to computer speeds.
- It takes a lot of time to practice in order to type quickly and accurately.

# NUMERIC KEYPADS

- Numeric keypads are used for **entering numbers into a computer system** ('**Numeric**' means number)
- Some numeric keypads also allow you to enter **simple text and symbols.**



# USES OF NUMERIC KEYPADS:

- **ATM (Automatic teller machines)** - Entering personal identification numbers (PIN) into an ATM to allow us to access our cash.
- **Withdrawing from ATM** -Keying in how much money you would like to withdraw from an ATM.
- **Telephones**-These use numeric keypads to allow us to enter phone numbers.
- **Chip and Pin devices** - These have numeric keypads to allow users to enter PIN numbers and payment amounts when we buy goods and products.

# **ADVANTAGES OF USING NUMERIC KEYPADS:**

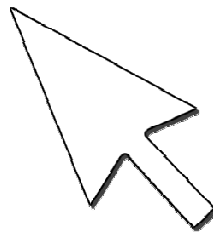
1. Faster than QWERTY keyboards when used for entering numbers.
2. Numeric keypads are small so they can easily fit on smaller devices like mobile phones.

# **DISADVANTAGES OF USING NUMERIC KEYPADS:**

- 1. People with large hands can find them hard to use because of their small keys.**
- 2. Difficult (but not impossible) to enter text information.**

# POINTING DEVICES

- Pointing devices are part of hardware that are used to **control a pointer** (cursor) on a screen.
- Pointing devices are frequently **used with Graphical User Interface (GUI)** operating systems where pointers are used to **input commands** by selecting icons.





# MOUSE

A mouse is the most widely used pointing device on personal computers

**There are three different types of mice:**

- a) A mechanical (ball) mouse is prone to clogging which can affect accuracy. A ball mouse uses a ball to detect movement.
- b) An optical mouse is more accurate than ball mice and are better for editing images. An optical mouse uses light to detect movements.
- c) Cordless mice use wireless technology in order to communicate with the computer and are powered by batteries.



Mice have two buttons and a scroll wheel. These provide users with different functions:

- **Left button is used to select icons and click options**
- **Right button is used to call up a drop-down menu of options**
- **Scroll wheel is used to move up and down through a document.**



# USES OF THE MOUSE

1. **Opening, closing, maximising and minimising** programs and files.
2. **Moving, grouping and deleting** files.
3. Controlling a pointer on screen to **select icons** or **move around the page**.
4. **Editing images** in terms of size and position on the screen.

# ADVANTAGES OF MICE:

1. Faster to select icons and options when compared to a keyboard.
2. Very easy to move a pointer around a screen and to navigate through documents even for beginners.
3. It does not take time to master the techniques of using the mouse.
4. Mice fit comfortably below the palm and their wheels below fasten movements

# DISADVANTAGES OF MICE:

1. Mice need a **flat surface** in order to work properly
2. Ball mice can **pick up dirt** which will **affect the accuracy** of pointer movement.
3. A mouse needs more desk space to operate compared to a touchpad or trackball.
4. You need to move a hand from the key board to move the pointer or execute a command given
5. It is not easy and convenient to input text with a mouse
6. Issuing commands by using a mouse is slower than by using a keyboard
7. A mouse is not accurate enough when it comes to drawings that require high precision

## **Major problems that often affect the proper functioning of the mouse**

1. Dirt disrupts motion of the ball in the mechanical mouse
2. Nature of the surface-not too rough or too smooth
3. Disconnection of the chord in case the mouse falls down
4. Connecting the mouse to the system unit one must be very careful to follow the directions of the pins

## **Solutions to the problems**

1. Cleaning the ball and rollers regularly
2. Providing the correct roll surface or mouse pad
3. Avoid mouse falling or hanging on the chord by tying twists on both the mouse and keyboard

# TOUCHPADS

- Users lightly brush their finger over the touchpad in order to control a pointer.
- Touchpads are built into laptops and perform the same functions as mice and as a replacement to a mouse .
- The touchpad allows us to control a screen pointer and the buttons allow us to select icons and call up options.



# ADVANTAGES OF TOUCHPADS:

1. **Easier than QWERTY keyboards** when used to select options and icons.
2. Touchpads are **built into laptops** so there is no need for a separate mouse. This helps improve portability.
3. Can be used even when there is no flat surface available.
4. **Won't get clogged with dirt** (as can happen with ball mice) so performance is never reduced.



# **DISADVANTAGES OF TOUCHPADS:**

- 1. More difficult to control** a mouse pointer when compared to a mouse.
- People with **wrist and hand problems** (like RSI) can find touchpads **painful** to use.
- Some operations are more difficult to perform when compared to a mouse. Drag and Drop for example.

# TRACKBALLS

- Track balls are similar to mice but the ball is on the top of the device instead of the bottom.
- Screen pointers are controlled by rotating the large ball with your hand.
- The buttons on Track balls perform the same functions as those on mice and touchpads.
- Track balls are, however, much more comfortable to use than mice.
- Track balls are more comfortable than mice because there is less wrist movement required. Track balls are more ergonomic.



# ADVANTAGES OF TRACKBALLS

1. Pointer can be positioned more exactly which makes trackballs very useful for image editing.
2. Can be used even when there is no flat surface available.
3. Good for limited desk space because the user does not have to move the entire device.

# **DISADVANTAGES OF TRACKBALLS**

1. More expensive than mice.
2. More difficult to learn to use than a mouse.
3. The ball mechanism of trackballs also requires more frequent cleaning than a mouse.

# REMOTE CONTROL

Remote controls are used to control other devices using infra-red signals.

Buttons on the remote control can be used to perform functions such as:

# Uses of Remote Controls:

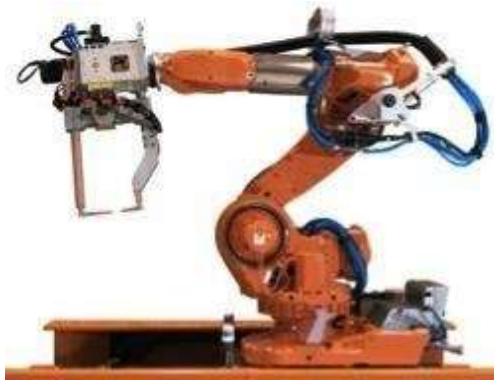
**Home entertainment systems** use remote controls. Examples are:

- Hi-Fi systems (music centers).
- DVD / Blu-ray Players.
- Satellite systems.
- Some overhead projectors.



In Industries remote controls are used to **operate machinery** that might be too dangerous to get near to. Examples include:

- Cranes with heavy loads.
- Activating explosives in demolition.
- Operating robot arms in hazardous chemical plants.



# ADVANTAGES OF REMOTE CONTROLS:

1. Devices can be operated **without having to go to them**. This is useful for people with disabilities.
2. Remote controls can operate devices that are in an **unsafe environment**. **For example:** Explosives to demolish a building can be set off at a safe distance.



# **DISADVANTAGES OF REMOTE CONTROLS:**

1. People with limited hand movement can find them difficult to use.
2. The signal between the remote control and the device it operates can become blocked by obstacles.

# JOYSTICKS

Joysticks are used to control a pointer on a screen.

Joysticks are also popular devices for gaming. The handle allows gamers to control on-screen characters and the buttons are used for things like firing weapons.

## **Uses of Joysticks:**

- Joysticks can control characters or objects in video games.
- Can control industrial machinery (cranes for example)
- Joysticks are used in simulators. For example flight simulators use joysticks in order for trainee pilots to control the simulated plane.



# ADVANTAGES OF JOYSTICKS:

1. Easier to control an on-screen cursor or move an in-game character than it is when using a keyboard.
2. Very simple to get used to and can be used by disabled people since Joysticks can be operated by hands or even feet.
3. The joystick allows fast interactions required in most games

# DISADVANTAGES OF JOYSTICKS:

1. Difficult to use a joystick to select objects accurately on the screen.
2. People with hand/wrist issues (like RSI) can find them painful to use.
3. Difficult (but not impossible) to enter text. For example: some games allow you to select individual letters using the joystick in order to spell out your name when entering a high score.

# TOUCH SCREENS

- Touch screens allow users to input commands into a computer by pressing or touching buttons/icons on the screen.
- Giving users this ability to touch or press icons on the screen removes the need to use a mouse.
- Touch screens are more suitable for use with a limited amount of options.

# USES OF TOUCH SCREENS:

1. Mobile phones and PDA's use touch screens as a way of saving space (a separate keyboard would make the devices quite large).
2. Public information systems at airports or tourist information offices.
3. Interactive whiteboards in schools.
4. On-screen multiple choice tests (like driving theory tests) sometimes use touch screens.



# **ADVANTAGES OF TOUCH SCREENS:**

1. With a touch screen, no extra peripheral is needed except the monitor.
2. The touch screen allows easy access to commands which are identified by words or symbols on the screen.



# **DISADVANTAGES OF TOUCH SCREENS:**

1. Limited number of options available on the screen (Only items already on the screen can be selected).
2. Expensive compared to other input devices.
3. Touch screens are not suitable for inputting a large amount of data because touch screens require a lot of arm movements

# SCANNERS

- Scanners are used to enter information on paper (hard copies) into a computer.
- Scanners can convert hard copies (printed documents, photographs) into digital data.
- This digital data can then be stored and manipulated on your



# USES OF SCANNERS:

1. Used to scan hard copy / printed documents into a computer.
2. **Old photos and important documents** (like birth certificates) can be scanned into the computer. This means you **still have a copy** if the original is damaged or lost.

# **ADVANTAGES OF SCANNERS:**

1. Very fast to enter hard copies into the computer (compared to retyping with a keyboard).
2. Digital copies of the stored data can easily be duplicated and backed up.
3. Old photos that may be damaged can be scanned into the computer then repaired using Graphics Editing Software.

# **DISADVANTAGES OF SCANNERS:**

1. Scanned images are usually of lesser quality than the original document.
2. Scanned images can take up a lot of disk space (especially if you scan them at a high resolution).

# GRAPHICS TABLET AND STYLUS

- Graphics tablets are used by **artists** and **designers** to easily create and store digital graphics in a computer.
- A graphics tablet can be drawn on with a special pen called a '**stylus**'.
- Whatever is drawn onto the tablet can be seen on a computer screen.
- Anything drawn onto the tablet can be saved into the computer as images.



# **USES OF GRAPHICS TABLETS:**

1. Allow designers to produce digital images much more accurately than if they were using a mouse.



# **ADVANTAGES OF GRAPHIC TABLETS:**

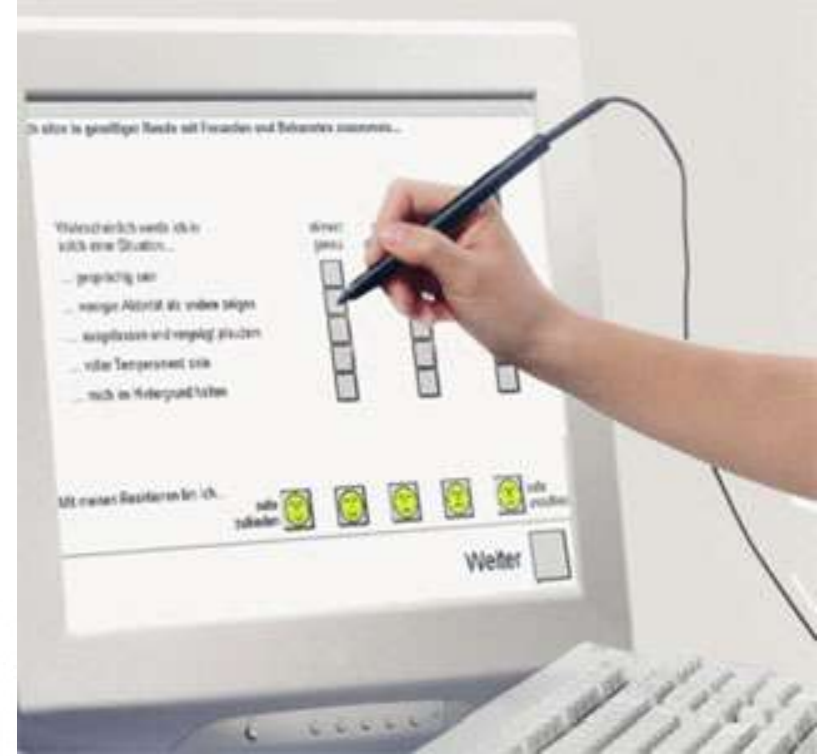
1. The stylus can be pointed to different positions on the tablet quickly.
2. Very accurate drawings can be produced.
3. Useful where drawings and symbols are used instead of text

# **DISADVANTAGES OF GRAPHIC TABLETS:**

1. Very expensive when compared to a mouse.
2. Not useful for some input needs like entering data into the computer by clicking icons or menus.
3. The stylus and graphics tablet normally have to work together and cannot work separately.

# LIGHT PENS

- Light pens are used by **directly drawing or selecting icons** on a **computer screen**.
- Light pens work by **picking up light from the computer screen** and then signaling to the computer exactly where the light was picked up.
- This allows the computer to **'draw'** on the part of the screen where the pen picked up the light.



## **USES OF LIGHT PENS:**

- 1. Used for selecting objects on a computer screen.**
- 2. Used for directly drawing onto a computer screen**

# **ADVANTAGES OF LIGHT PENS:**

1. More direct and precise than using a mouse.
2. Convenient for applications with limited desktop space.

# **DISADVANTAGES OF LIGHT PENS:**

1. Normally require a specially designed monitor to work with.
2. Can be quite uncomfortable to use as you have to hold your hand raised up to the computer screen for long periods.

# MICROPHONES

- Microphones are used to **input sounds** into a digital computer.





# USES OF MICROPHONES:

1. Used to input sounds/speech for use in a range of applications. For example: Narration (spoken words) in presentations or in web sites, Speaking over the Internet using VoIP (Voice over Internet Protocol)
2. Used in voice recognition software. For example: Converting speech into text, Issuing commands
3. Hands-Free mobile phones use a microphone to allow people to hold conversations without using their hands (this makes driving much safer).
4. Used (along with headphones) in gaming so that gamers can talk to each other.

# **ADVANTAGES OF MICROPHONES:**

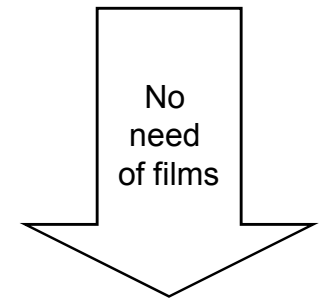
- 1. Faster** to read text into a computer than to type it in using a keyboard.
- 2. Microphones** are relatively **cheap** to buy.

# **DISADVANTAGES OF MICROPHONES:**

1. Sound files can take up a lot of computer storage space.
2. Speaking words into a computer is not as accurate as typing.
3. Background noise can interfere with input of data using microphones.

# DIGITAL CAMERAS

- Digital cameras capture and store images on a memory card and these images can easily be transferred onto a computer for viewing or editing.



# USES OF DIGITAL CAMERAS:

1. Used to capture digital images
2. Easy to transfer images to a computer for editing.
3. Images can be printed easily by Uploading to a computer and then printing.
4. Most digital cameras also allow for short, high-quality video clips to be produced.

# ADVANTAGES OF DIGITAL CAMERAS:

1. No film to develop. This means that producing the photo is much quicker, less costly and money is saved.
2. Unwanted images can easily be deleted from the memory card.
3. Because the images are digital it is easy to make copies of them.
4. No need to print at all because the images can be viewed a computer screen. This saves paper and is better for the environment.
5. Memory cards can store thousands of digital photographs. Traditional photographs can take up a lot of physical storage space.
6. Digital images can easily be transferred using Bluetooth, email attachments and mobile phones.
7. Digital images can be improved and edited easily using software (sharpening the image for example)

# **DISADVANTAGES OF DIGITAL CAMERAS:**

1. Digital cameras are more sensitive to shocks and dropping.
2. Digital cameras are normally more expensive than ordinary film cameras.
3. Photo printing costs for digital cameras is generally higher.
4. Not all digital cameras produce images as high-quality as traditional cameras.
5. Camera user needs to have computer skills to be able to transfer and print digital photographs.

# WEB CAMERAS (WEBCAMS)

- Web cameras can capture both digital images and video that are sent over the internet.
- Images / video are sent directly to the computer where they can be stored and used.
- Many modern computing devices (such as laptops) come with built-in web cams.





# USES OF WEB CAMERAS:

1. Used to conduct face-to-face conversations with friends and family on the internet.
2. Used to hold video-conferencing meetings over the Internet.
3. Can capture image and video content for presentations and web sites
4. Web Cameras are sometimes used by parents to keep an eye on their children when they are in another room.
5. Some people use web cams as a cheap alternative to security cameras.
6. Sometimes used to allow drivers to view the traffic conditions on roads.

# **ADVANTAGES OF WEB CAMERAS:**

1. Allow for long-distance face-to-face conversations. This removes the need for people to travel.
2. Video conference business meetings and job interviews can be conducted very cheaply over long distances.
3. Parents can keep an eye on their children from a different location.
4. Web cams can be left running constantly which makes them useful as security devices on properties.

# **DISADVANTAGES OF WEB CAMERAS:**

1. The image/video quality can sometimes be poor (low resolution).
2. Webcams do not have their own storage and so must be permanently fixed to the computing device.
3. Are usually in a fixed position and so cannot be easily moved around.

# MAGNETIC STRIPE READER

- Reads information from magnetic stripes found on Bank Cards, Membership Cards and Hotel Door Cards etc.
- Data contained on the card's stripe is read by pulling the card through the magnetic stripe reader. This is known as 'swiping'.
- The magnetic stripe reader then sends data from the card into the computer for processing.



# **USES OF A MAGNETIC STRIPE READER:**

1. ATM's use these readers to process the information on bank cards.
2. EFTPOS (Electronic Funds Transfer Point of Sale) use the readers to transfer customer's money from their bank accounts when they purchase goods in stores.
3. Hotel rooms sometimes use magnetic stripe readers in place of door keys.

# **ADVANTAGES OF USING A MAGNETIC STRIPE READER:**

1. Entering data is very fast. You just swipe the card through the machine.
2. No possibility of data entry errors as there is no typing involved.
3. The stripes on cards are not affected by water and so are not easily damaged.
4. Data held on the card cannot be read by eye so bank details etc are safe.

# **DISADVANTAGES OF USING A MAGNETIC STRIPE READER:**

1. The magnetic stripe on cards can only hold a small amount of data.
2. Can be damaged easily by exposure to a strong magnetic field.
3. Magnetic stripes on cards are easily duplicated (known as card cloning). (if this happens you are prone to theft of funds in your bank)

# CHIP AND PIN READER

- These allow people to pay for goods and services electronically at EFTPOS terminals (electronic funds transfer point of sale).
- The chip and pin reader works by inserting a bank/credit card into a slot and then entering a PIN (personal identification number).
- If the correct PIN is entered, the cost of goods/services will be taken from the card holder's bank and transferred to the companies (restaurant, store etc)





# USES OF CHIP AND PIN READERS:

Used to make secure payments for goods/services in places such as:

- **Restaurants**
- **Supermarkets**
- **Cafes**
- **Buying petrol**

# **ADVANTAGES OF USING CHIP AND PIN READERS:**

1. More secure than magnetic stripe readers as the user needs to know the correct PIN.
2. Information contained on the chip is harder to clone (copy) than it is to copy magnetic stripes.
3. Chips can hold more data than magnetic stripes can.
4. Chip and PIN Readers are portable so they can be brought to you (waiter in a restaurant for example)

# DISADVANTAGES OF USING CHIP AND PIN READERS:

1. It is possible to **forget your PIN** which means you cannot make payments with your card .
2. People can **look over your shoulder** as you enter your PIN. This makes it possible to access your money if they ever stole your card.

# BARCODE READER

- Used to read information that is stored on product's barcodes.

**The barcode is present on products and holds information about each product including:**

- Product ID number
- Manufacturer
- Country of origin

A bar code reader reads a bar code by using light patterns that pass through the bar code lines.



# USES OF BARCODE READERS:

1. Used in **supermarkets, stores** and **warehouses** where goods are marked with a barcode.
2. Used in **libraries** to **scan in library cards** and read **ISBN numbers** on books to find out which ones are on loan.
3. Used in **keeping track of packages** that are being delivered to different locations.
4. Also used in **organising luggage in airports** (helps ensure that luggage is loaded onto the correct plane).

# **ADVANTAGES OF BARCODE READERS:**

1. Very accurate as there is no manual typing involved.
2. Bar codes can be printed by normal printing methods
3. There is no need to write down the name of the item or its actual price.

# **DISADVANTAGES OF BARCODE READERS:**

1. Quite an expensive way to gather information.
2. Rely on undamaged bar codes in order to function (A bar code reader can misread if there is any dirt).
3. Only numbers can be coded
4. Bar codes cannot be read directly by people



# OPTICAL MARK READER (OMR)

- This is a system which automatically reads marks made in pen or pencil.
- Typically used to read multiple choice examinations where students shade in (mark) answers that they think are correct.
- Optimal Mark Readers can input the data held on forms (such as multiple choice exams) very fast.



# USES OF OMR

Used to read the shaded areas on documents such as:

- **Multiple choice examinations**
- **Multiple choice questionnaires**
- **Lottery tickets**

# ADVANTAGES OF OMR

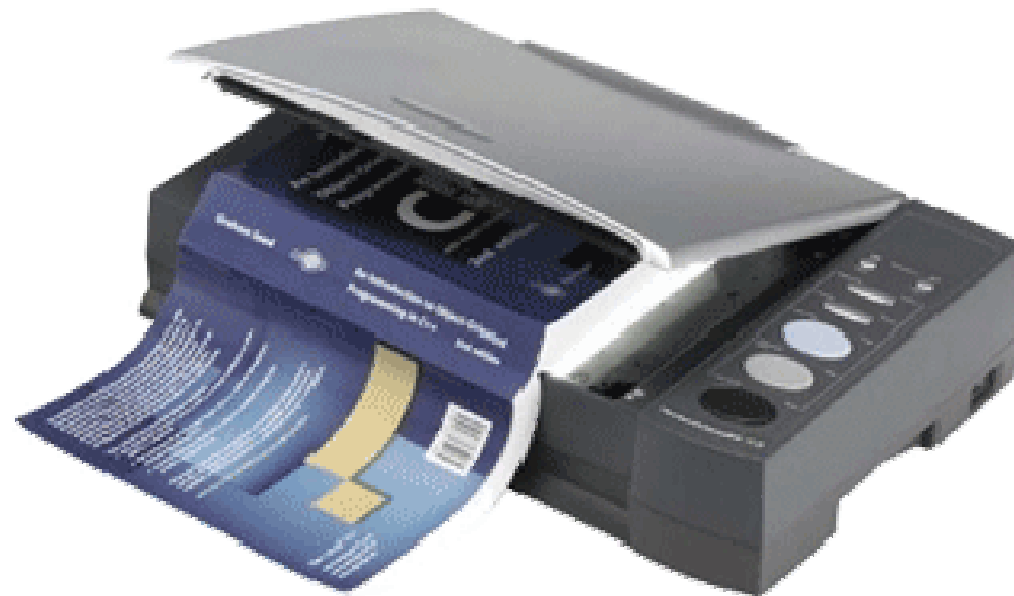
1. **Extremely fast** way of inputting information into a computer.
2. **Very accurate** as document's data is fed into the computer automatically with no manual typing.
3. **Can save money** as there is no need to employ workers to enter form information into a computer.
4. Large volumes of data can be collected quickly and easily without the need for specially trained staff

# DISADVANTAGES OF OMR

1. Documents for OMR are difficult to design
2. The OMR reader needs to be reprogrammed for each new document design
3. OMR readers are relatively slow
4. The person putting marks on the documents must follow the instructions precisely
5. Any folding or dirt on a form may prevent the form from being read correctly

# OPTICAL CHARACTER READER (OCR)

- OCR's allow us to **scan text on paper** (hardcopy) into a computer.
- Once into the computer, OCR software **converts the scanned text** into a **digital format**.
- OCR devices read special pre printed characters and convert them in a form which can be understood by the computer.
- Optical Character Recognition (OCR) readers convert images of text into an actual text file that can then be edited.



## GEORGE A. AKERLOF and ROBERT J. SHILLER

The global financial crisis has made it painfully clear that powerful psychological forces are impacting the wealth of nations today. From blind faith in ever-rising housing prices to plummeting confidence in capital markets, "animal spirits" are driving financial events worldwide. Acclaimed economists George Akerlof and Robert Shiller challenge the economic wisdom that got us into this mess, and put forward a bold new vision that will transform economies and restore prosperity.

Akerlof and Shiller stress the necessity of an active government role in economic policymaking by resurrecting the idea of animal spirits, a term John Maynard Keynes used to describe the gloom and despondence that led to the Great Depression and the changing psychology that accompanied recovery. Like Keynes, Akerlof and Shiller know that managing these animal spirits requires the steady hand of government—simply allowing markets to work their will is not the case for a more robust, behaviorally informed Keynesianism; they detail the real, pervasive effects of animal spirits in contemporary economic life—such as confidence, fear, bad faith, corruption, a pro-

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# USES OF OCR'S:

1. Used in the **processing of Passports and Identity Cards.**
2. OCR is also used in the process of **digitizing books.**

# ADVANTAGES OF OCR'S:

1. Written data and printed data can be read at the same time
2. Hard copies of documents can be read directly into a computer without retyping
3. The characters converted can be later edited by word processing software
4. **Very fast** way of entering hard-copy text into a computer.
5. **Cheaper** than paying an employee to manually re-type printed text into a computer.
6. **Avoids typing errors** as the process is automatic (no typing involved)

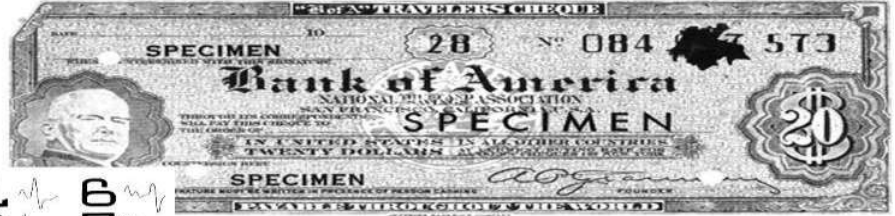


# DISADVANTAGES OF OCR'S:

1. OCR readers often do not work well with handwritten characters or those in unusual fonts.
2. **Not 100% accurate.** (relies on being able to read the original text)
3. As it is not 100% accurate, information needs to be **manually checked for errors.** This is **time consuming.**

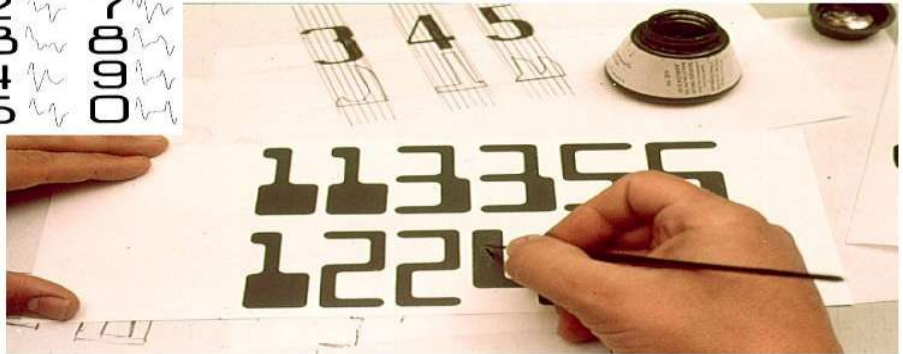
# MAGNETIC INK CHARACTER RECOGNITION (MICR)

- MICR is a system which can read information printed in a **special ink** (the ink contains iron particles).
- This special ink is used to write **customer account numbers** on the bottom of **cheques**.
- The MICR device reads the account numbers then **converts it** to a form the computer can understand.
- The converted information is then **sent to the computer** so the cheque can be **processed**.



1  
2  
3  
4  
5

0  
7  
0  
0  
0



\*0041012345-004101234-1234567\*

Cheque number    \* Transit (Branch) number    Financial Institution number    Designation number    Account number

# USES OF MICR:

1. MICR devices are mainly used to **process cheques.**
2. Some countries also use MICR devices to read the **passport number on passports.**

# ADVANTAGES OF MICR:

1. Cheques. can be **processed very quickly** (up to 300 per minute).
2. **Greater security** than OCR because the special ink characters cannot be changed or forged.
3. No manual input therefore **less errors**.
4. Information can **still be read** even if someone writes over the magnetic ink characters.
5. Reading is accurate.

# **DISADVANTAGES OF MICR:**

1. MICR readers and encoders are expensive.
2. The system can only accept a few different character sets.

# VOICE RECOGNITION SYSTEMS

- These provide the computer with the capability to distinguish spoken words.



- Note that voice recognition implies only that the computer can take dictation, not that it understands what is being said.

# **ADVANTAGES OF VOICE RECOGNITION**

1. No typing of data is necessary
2. The system can be used by telephone or by people whose hands are occupied or disabled.
3. Are ideal for blind or visually impaired users.



# DISADVANTAGES OF VOICE RECOGNITION

1. Error rate is still high at the moment
2. Recognition of words is slow
3. Words sound the same-see, sea cannot be distinguished
4. Not suitable for use in noisy places
5. Software must be trained to recognize specialist or technical words
6. Many people find it difficult to speak in a 'writing style'

# ELECTRONIC WHITEBOARD

- The interactive whiteboard is a touch-sensitive presentation tool.
- Instructors can use their finger as a mouse and close the presentation to open a video or get on the Internet and do many other tasks.



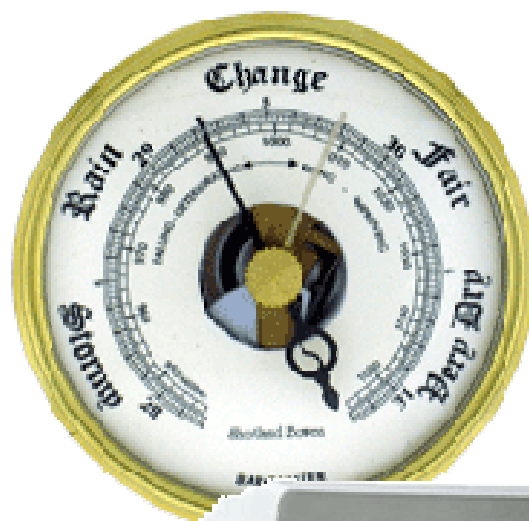
# **MIDI (MUSICAL INSTRUMENT DIGITAL INTERFACE) DEVICE**

- MIDI devices can be used to create, record and play back musical compositions.
- MIDI is a standard that allows musical instruments to connect to the system unit.



# **SENSOR AND REMOTE SENSOR**

- A sensor and remote sensor is an input device that can detect external changes in an environment.



# USES OF SENSORS

1. Monitoring and control applications- burglar detection
2. Data collection and everyday applications-measuring pollution and environmental changes





# ADVANTAGES OF SENSORS

1. More accurate readings can be taken.
2. Monitor information constantly.
3. Respond to information immediately.
4. No need of humans to operate sensors in dangerous conditions like monitoring radiation levels.

# DISADVANTAGES OF SENSORS

1. Faulty sensors can give incorrect results



# **DIGITAL VIDEO CAMERAS**

- Digital video cameras record motion digitally on a disk and have the capability to take still images as well.



# PC CAMERA

- A PC camera allows home users to record, edit and capture video and still images and to make phone calls on the Internet.



[www.chinatraderonline.com](http://www.chinatraderonline.com)

# TERMINALS

- A terminal is a device with a monitor and a keyboard.
- A terminal is also a device that sends and receives computer data.





# EXAMPLES OF TERMINALS

1. A **dump** terminal has no processing power and is connected to a server to operate.
2. An **intelligent** terminal memory and a processor so can process data.
3. An electronic point of sale terminal (EPOS) is used to record purchases.
4. An electronic funds transfer point of sale (EFTPOS) terminal transfers funds from a customer bank account to a retailer's account.
5. An automated teller machine (ATM) is a self service banking machine attached to a computer.



# POINTING STICK

- A pointing stick is located in the middle of the keyboard and to control the pointer, you direct the stick with your finger.
- Most pointing sticks are pressure-sensitive, so the pointer moves faster when more pressure is applied.



