**Touch screen**

A touch screen is the only device which works as both an input and an output device. You view the options available to you on the screen (output) and you then use your finger to touch the option that you have chosen (input).

There are different touch screen technologies;

- Capacitive touch screen - uses a finger.
- Resistive touch screen - uses a stylus

**Uses of Touch screen:**

- Touch screens work particularly well with a menu driven interface. For example, a cashpoint (ATM) at a bank.
- Smart phones and modern tablet computers. Each 'app' is accessed by an icon on the touch screen.
- Touch screens are often found in public places such as ticket collection terminals at theatres or airports, information centres at museums.

**Advantages of Touch screen:**

- Easy to use - intuitive, don't need much training
- No extra peripherals such as a mouse are needed
- Software can alter the screen while it is being used, making it more flexible than a concept keyboard which has a permanent overlay.

**Disadvantages of Touch screen:**

- Not suitable for inputting large amounts of data
- Not very accurate - selecting detailed objects can be difficult with fingers
- Tiring to use for long periods
- More expensive than alternatives such as a mouse
**Automatic input devices**

1. OMR
2. OCR
3. Barcode Reader/Scanner
4. Magnetic Stripe Readers
5. Chip & Pin
6. Biometric Devices
7. Sensors

**1. OMR**

OMR stands for Optical Mark Recognition. It uses light to detect the position of black marks on white paper. The documents to be read have empty boxes pre-printed onto them. They detect the presence of your pencil mark by reflecting light onto it. Less light is reflected where a mark has been made.

![OMR example image]

Eg: multiple-choice examination

**Uses of OMR:**

- Examinations – such as multiple choice question (MCQ), true/false and extended matching assessments,
- Surveys – such as staff, patients, students and customers, allowing you to really gauge the temperature with anonymous or personalised feedback.
Advantages of OMR:

- A fast method of inputting large amounts of data - up to 10,000 forms can be read per hour depending on the quality of the machine used.
- Only one computer needed to collect and process the data
- OMR is much more accurate than data being keyed in by a person

Disadvantages of OMR:

- If the marks don't fill the space completely, or aren't in a dark enough pencil, they may not be read correctly
- Only suitable for recording one out of a selection of answers, not suitable for text input
- The OMR reader needs the answers to be on the prepared forms which will all be identical to one another

2. OCR

OCR stands for Optical Character Recognition. OCR is used for reading characters from paper, using scanners, and inputting them into a computer.

An OCR system consists of a normal scanner and some special software. The scanner is used to scan text on a document or piece of paper into the computer. The OCR software then examines the page and changes the letters into a form that can be edited or processed by a normal word processing package.
The shapes of different characters are detected by shining light on them, and sensing the patterns of reflected light. Each pattern is compared with a set of stored patterns until the closest match is found.

**Advantages of OCR:**

- Cheaper than paying someone to manually enter large amounts of text
- Much faster than someone manually entering large amounts of text
- The latest software can recreate tables and the original layout

**Disadvantages of OCR:**

- Not 100% accurate, there are likely to be some mistakes made during the process
- If the original document is of poor quality or the handwriting difficult to read, more mistakes will occur
- Not worth doing for small amounts of text

### 3. Bar Code Reader/Scanner

Bar code is a set of parallel printed lines of differing thicknesses which are used to store coded information about an item. Bar codes are read using a Bar Code Reader, which can be in the form of a hand-held ‘wand’ or a stationary laser scanner over which the bar code is
passed. This method of data entry is used in big shops and supermarkets and in libraries.

The barcode is a series of vertical bars of varying widths that give information about:

1. the country of manufacture
2. the name of the manufacturer
3. a product code
4. a check digit

The barcode does NOT contain the **price** of the item - this is held on the company database. Any price change only needs to be made to the database and not every single product package.

**ISBN**

An International Standard Book Number consists of 4 or 5 parts:

The parts of an ISBN barcode for a 13 digit ISBN, a GS1 prefix: 978 or 979, the **group identifier code**, the **publisher code**, the **item number**, a **check digit**.

**4. Magnetic Stripe**

A magnetic stripe is a short length of magnetic tape sealed onto the surface or embedded in a card. The stripe usually contains information to identify the ticket or card or its user. The magnetic strip can hold personal details about the card such as account number, name and Personal Identification Number (PIN).
Uses of Magnetic stripe:

Using Credit / Debit Cards you can pay for your shopping using credit/debit cards. When you swipe the credit/debit card at the counter your account details and cost of goods are transferred into banking system. This type of system is EFTPOS.

Advantages of Magnetic stripe Reader:

- Data can be altered if necessary
- Low cost
- Data capacity - higher than barcode
- Ease & speed of use - making them ideal for transit and other application

Disadvantages of Magnetic stripe Reader:

- Very limited storage capacity for data
- Data can be easily destroyed by strong magnetic fields
- Not always secure as thieves can obtain the readers and read the data on the card.

5. Chip & Pin (Smarts cards)

Smart cards are similar in size and shape as of Magnetic Strip Cards. The only difference is that Smart cards are embedded with MICROPROCESS chip, which is a more safe and programmable device. Bank and Credit Cards use Smart Cards or CHIP and PIN (Personal Identification Number). Smart cards with PIN and Chip devices, provide more security and safe to use especially when withdrawing cash from ATM, PIN helps to protect the theft.
**Uses of Smart Cards:**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Application</th>
</tr>
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<tbody>
<tr>
<td>Accountants</td>
<td>Business cards, client ID cards</td>
</tr>
<tr>
<td>Airports</td>
<td>Employee access cards, security ID badges</td>
</tr>
<tr>
<td>Car Wash</td>
<td>pre-paid car wash cards</td>
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<tr>
<td>Clubs</td>
<td>Membership cards</td>
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</tbody>
</table>

**Advantages of smart Cards:**
- Often used as a form of identification
- Data recorded is electronic and can only be input directly into the computer
- Data recorded on micro chip is more secure than magnetic stripe
- Data can be updated during transactions

**Disadvantages of smart Cards:**
- Data recorded on the chip can be affected by the electromagnetic radiation
- Data recorded on the chip can be copies or edited by expert criminals

**NB:** Need to know differences between magnetic stripe card and chip & pin cards.

**6. Biometric Scanners**

It is a pattern recognition software. Used for face recognition, finger print matching, iris and retina scan, hand geometry, voice recognition. Finger print and retinal identification are being used in many places now and even facial recognition systems are starting to be introduced.
Special devices are needed to capture the biometric data which is then passed onto the computer for processing and identification.

**Uses of biometric Scanners**

- Control access to buildings/rooms
- laptops/PC’s.
- Replace keys in cars.

**Advantages of biometric scanner:**

- No need to remember to carry personal identification.
- The person has to be present.

**Disadvantages of biometric scanner:**

- Not sufficiently accurate
- Sometimes permitted users will not be recognised and blocked users will be permitted.

**7. Sensors**

Sensors are used to detect physical quantities outside a computer such as light, temperature and pressure. Analogue signals would need to be converted to digital signals by an analogue-to-digital converter (ADC), before the computer can process the readings.
**Uses of sensors:**

- temperature e.g. to control a heating system
- light e.g. to control automatic street lighting
- sound e.g. to measure noise pollution
- infra red e.g. photo cells may be used to detect a break in a beam in a burglar alarm system.
- proximity e.g. to make sure robots do not crash into walls
- pressure e.g. to make sure robotic 'hands' do not grip an object too tightly.
- humidity e.g. to control an environment in a tropical greenhouse.
- Moisture e.g. dampness/dryness
- Water-level e.g. how full/empty a container is

**Advantages of sensors:**

- Can be placed in dangerous locations where people would be hurt
- Can record data 24 hours a day without manual interruption
- Data can be recorded in a form that can be processed by a computer.

**Disadvantages of sensors:**

- Cannot interpret data
- Senses only limited amount of data.