Output Devices
Flat-panel display screens
Flat panel display screens

Two types of Flat-panel display screens:

1. LCD (Liquid Crystal Display) screens
2. LED (Light Emitting Diode) screens
Flat panel display

How it works

• Made of two glass plates that contain a liquid crystal material between them

• A backlight is used as a light source
  ▪ LCD screens use fluorescent tubes as backlight
  ▪ LED screens use a matrix of tiny LEDs

• Light passes through the first piece of glass

• Applying an electric current causes the crystals to align in specific directions

• The alignment of crystals allows only the necessary light to pass through

• Varying levels of light pass through the second piece of glass and create the images.
Flat panel display

Light Source

First glass plate

Second glass plate

liquid crystal molecules

red, green, blue filters

colour light coming out
Difference between LED and LCD screens

LCD and LED monitors work using the same principle (i.e. liquid crystals between two glass plates)

EXCEPT that they use different sources as backlight

• LCD screen uses a cold cathode fluorescent lamp (CCFL) to provide the backlight

• LED screen uses LEDs to provide the backlight

• What is a LED?
  ▪ An electronic device that lights up when electricity is passed through it.
**Difference between LED and LCD screens**

**LCD - Liquid Crystal Display**

Today's dominant flat display technology produces images by blocking or allowing light to pass from the light source behind the LCD display.

- Colour filter
- Liquid Crystal
- TFT and electrodes
- Fluorescent backlight
- Cover glass
- Glass filters with polarising films

**LED - Light Emitting Diode**

LEDs are LCD TVs that replace the cold cathode fluorescent lamps (CCFL) used in conventional LCD displays.

- Colour filter
- Liquid Crystal
- TFT and electrodes
- LED backlight
- Cover glass
- Glass filters with polarising films
1. Warm up time

- LEDs reach their maximum brightness almost immediately (there is no need to warm up) whereas,

- CCFL in LCD needs some time to warm up to reach its maximum brightness.
2. Image sharpness and colours.

Light from CCFL (LCD screen) has a slight yellow tint.

Light from LEDs is **whiter** hence the **image** is **sharper**. LEDs provide a **brighter** light which helps to produce **vivid colours**.
3. Bulkiness

Monitors using **LED** technology are **much thinner** than monitors using CCFL technology because LED lights are less bulky.
5. Durability

LED screens are long lasting as LED lights last for a very long time and are a more reliable product. CCFL light used in LCD screens do not last as long as LEDs.
6. Power efficiency

LEDs consume very little power which means they produce less heat as well as use less energy. LCD screens use CCFL light which is less energy efficient than LED.
Uses of LED and LCD screens

Where are LCD and LED screens used?

1. TV screens
2. Computer monitors, laptop screens
3. Aircraft cockpit displays
4. Store signs
5. Billboards and advertising (outdoor use)
6. Destination signs on public transport vehicles
7. Mobile phone screens.
Newest technology for screens

Future LED technology is making use of:

• ORGANIC LIGHT EMITTING DIODES (OLED)

• OLEDs generate their own light - do not require backlighting like LCD/LED screens

• OLEDs give a brighter light than LEDs

• OLED technology allows to bend screens to any shape
  ▪ Curved TV screens
  ▪ Foldable Mobile Phones
Tasks to complete at home:

- Computer Science Workbook
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  - Page 36 Q 7(b)