Your notes

GCSE Computer Science: revision notes

Input devices, output devices and sensors

Contents

1. Start here: input, output and sensors
2. Input devices
3. Output devices
4. Sensors
5. Exam tip
6. Key terms
7. Quick questions
8. What to do next

Start here: input, output and sensors

- An **input device** sends data into a computer. An **output device** takes data from a computer and turns it into something people can see, hear or use, or into movement.
- A **sensor** is an **input device** that measures something in the real world, such as temperature or light, without a person having to enter it.

Input devices

- Barcode scanner: a light shines on the barcode, the white bars reflect more light than the black ones, and the pattern of reflections is turned into a number.
- QR code scanner: reads a two-dimensional pattern of squares, which holds far more data than a barcode, such as a web address.
- Digital camera: light passes through the lens onto a **sensor** made of millions of light-sensitive cells, and each one becomes a pixel.
- Microphone: sound waves make a diaphragm vibrate, which makes a varying electrical signal. An analogue-to-digital converter (ADC) turns it into binary.
- Optical mouse: a light shines on the surface, and a **sensor** takes many pictures a second to work out how the mouse has moved.
- Touch screens: resistive screens have two layers that touch when pressed (cheap, work with gloves). Capacitive screens detect the change in charge when a finger touches them (sharp, allow several fingers). Infra-red screens have a grid of invisible beams that a finger breaks.
- 2D and 3D scanners: a 2D scanner makes an image of a flat document. A 3D scanner measures the shape of an object, for example with lasers, so it can be copied or printed.

Output devices

- **Actuator**: a motor or other device that turns an electrical signal into movement, such as opening a valve.
- Projectors: a DLP projector uses millions of tiny mirrors that tilt to make the image; an LCD projector shines bright light through LCD panels.
- Inkjet printer: tiny drops of liquid ink are sprayed through nozzles onto the paper. Good for photos, but slow for large numbers of copies.
- Laser printer: a drum is given a pattern of electric charge, powdered toner sticks to the charged parts, and heat fuses it onto the paper. Fast and cheap for many pages.
- 3D printer: builds a solid object layer by layer from melted plastic or other materials.
- LCD and LED screens: an LCD screen is made of pixels lit from behind, usually by LEDs. Speakers turn a varying electrical signal into movement of a cone, which makes sound.

Sensors

- **Sensors** include temperature, light, moisture, humidity, pH, pressure, gas, flow, level, proximity, infra-red, acoustic (sound), magnetic field and accelerometer **sensors**.
- Most **sensors** give an analogue signal, so an ADC turns it into digital data. A microprocessor compares the data with values it has stored and can switch on an **actuator**, for example a heater, if the reading is too low.

Exam tip

- When asked how a device works, describe the steps in order, and say what is converted into what (light into an electrical signal, then into binary).

Key terms

Input device	A device that sends data into a computer.
Output device	A device that turns data from a computer into something seen, heard or into movement.
Sensor	An input device that measures a physical quantity, such as temperature.
Actuator	An output device, such as a motor, that turns a signal into movement.
Analogue-to-digital converter (ADC)	Turns a continuously varying signal into binary data.
Capacitive touch screen	A screen that detects the change in charge where a finger touches it.

Your notes

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. Why do the white bars of a barcode give a different reading from the black ones?
2. Which holds more data?
3. Which touch screen detects a change in charge from a finger?
4. Which touch screen works when pressed with a gloved finger, because two layers touch?
5. What does an ADC do?
6. Which printer fuses powdered toner onto the paper with heat?
7. Which device builds an object layer by layer?
8. What is an actuator?

Answers

1. They reflect more light
2. A QR code
3. Capacitive
4. Resistive
5. Turns an analogue signal into digital data
6. Laser printer
7. 3D printer
8. A device that turns an electrical signal into movement

What to do next

Practise 10 questions on this topic

Try 3 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

Your notes