ICT Level 2 – Automated Systems and Other Devices

1 of 17 – Welcome

Welcome to this session on automated systems and other devices. In this session we will outline what is meant by automated systems and look at some real-life examples.

By the end of this session you will:

* Understand what is meant by automated systems
* Know two examples of these systems, and understand how they work in practice
* Know a number of other devices now used in technology systems

2 of 17 – Introduction to automated systems

**What is meant by automated systems?**

Automated systems are new technologies being introduced by companies across a number of different business sectors. Automated systems are sometimes called automated technology systems, or automated computer systems.

Beyond the normal work done by a computer system, automated systems are usually specialised systems that are designed specifically to improve the company’s service somehow – this might mean building a better product, distributing it more efficiently, or any number of other possible improvements.

3 of 17 – What do automated systems do?

Generally, automated systems provide two key services:

* They **perform** various activities, in place of humans
* They **monitor** activities and performance rates

For example, think about how central heating systems will turn on and off at different temperature levels, depending on the time of year, the type of weather or temperature outside.

For an even bigger example, you could consider the robotic systems that are sent into space to explore various different locations that humans have not yet been to.

There are many different uses for these automated systems on a day-to-day basis.

4 of 17 – Automated system: self-service checkout

It is likely that you’ve seen, or maybe even used, self-service checkouts in your local supermarket. These systems are installed in many food outlets up and down the country.

They work by allowing customers to **scan their own purchases** through an automated till system and then pay for them, **without** the need for a human operator.

This new style of service has seen many improvements, for customers and businesses alike. The systems are thought to be both **cost and time efficient**, as the companies don’t have to pay people to operate them, and the consumer can, in theory, scan and pay for their shopping with fewer queues of people.

Input and output devices are the devices used to allow data to go into, and be transferred out of, a technology system. The input and output devices for a self-service checkout can be seen in the table below:

|  |  |
| --- | --- |
| Input devices | Output devices |
| Scales – these will weigh goods before and after they have been scanned | Screen and speakers – these will deliver instructions for using the system |
| Scanner – this will read barcodes, and loyalty cards | Printer – this will print receipts for purchases |
| Payment input – this must allow for cards, coins and notes | Money distributor – this must be equipped to deliver the correct change after purchases |

5 of 17 – Automated system: production line

**A production line** is an automated system that is made up of a number of different elements.

Things such as robots – or robot arms, at least – and various different types of controlling software all work together to make the automated system as a whole.

This style of production is often found inside factories, where car parts and similar mechanical instruments are being put together.

In this situation, not only is the automated system (the production line) more time efficient, it is also considered a safer alternative, as some of the parts being built are too heavy for a human alone to handle.

Input and output devices are the devices used to allow data to go into, and be transferred out of, a technology system. The input and output devices for a production line can be seen in the table below:

|  |  |
| --- | --- |
| Input devices | Output devices |
| Optical sensors – these can be used to locate different parts of a product | Robots – more specifically, controlling robots, in order to build and manufacture different parts of a product |
| Pressure sensors – these can be used to feel and weigh different parts of a product |  |

6 of 17 – Question 1

Indicate whether the following statements are true or false.

The main reason for using an automated system is so companies can lower their employment rates and save money.

True

False

The correct answer is: False

Automated systems can also be called automated computer systems.

True

False

The correct answer is: True

Automated systems are useful for performing and monitoring activities.

True

False

The correct answer is: True

Automated systems have been known to damage a company’s products and efficiency.

True

False

The correct answer is: False

7 of 17 – Question 2

Self-service checkouts have a number of input and output devices.

Categorise the devices below according to their type, either **input** or **output**.

Screen

Scanner

Printer

Money distributor

Payment input

Scales

The correct answers are:

Scanner, payment input and scales are types of **input** devices.

Screen, printer and money distributor are types of **output** devices.

8 of 17 – Question 3

Using the following choice of words; **production line**, **factories**, **dangerous**, **controlling** and **safer**, fill in the blanks for the paragraph below:

A **blank** is a type of automated system, which is made up of different types of **blank** software. This type of system is often found inside **blank**, where heavy machinery is involved. These systems are thought to be a **blank** alternative to human operators, as some work is too **blank** for human staff to complete.

The correct paragraph should read:

A **production line** is a type of automated system, which is made up of different types of **controlling** software. This type of system is often found inside **factories**, where heavy machinery is involved. These systems are thought to be a **safer** alternative to human operators, as some work is too **dangerous** for human staff to complete.

9 of 17 – Introduction to other devices

**Automated systems** are an important part of technology systems now. Another important part of technology systems is data, specifically the different ways in which we capture and then securely store it.

There are a number of different devices designed for this job:

* Magnetic strip readers
* Optical mark readers (OMR)
* Optical character readers (OCR)
* Radio frequency identification systems (RFID)

We’ll talk about these in more detail in the following sections.

10 of 17 – Magnetic strip readers

You might be familiar with the magnetic strip that sits on the back of some cards – like debit cards and loyalty cards, for example. That strip encodes information, which is then read by a special strip reader, sometimes called a **magstrip reader**.

These readers are broken down into different categories, depending on the way that they process the information – or data – that is stored on the card being used.

Common examples that you will have probably seen used in shops and supermarkets are **insertion readers** and **swipe readers**. Insertion readers need the card to be fully inserted into the reader, while swipe readers need the card to be passed through the reader, in order for them to read the stored data.

11 of 17 – Optical character readers and optical mark readers

**Optical character readers (OCR)** allow for a document of printed or written text to be recognised, and transcribed in a sense, by a computer.

This is particularly useful for scanning a document into text, as a photo scan of the text or image will take place that allows the computer to analyse it, and then translate it into a digital document.

**Optical mark readers (OMR)** work in a similar way to character readers, but they have a more specific purpose.

While OCRs read a full document scan, mark readers are designed to pick up pencil or pen marks that are made on a document – think of the ticks you might put on a survey, or the crosses on a multiple-choice form.

12 of 17 – Radio frequency identification systems

A **radio frequency identification system** is made up of three parts: an antenna, a transceiver, and a transponder.

The system itself is entirely **wireless** and works by attaching a tag – we can think of these in terms of bar codes, or even smart labels – to an object. These tags can also be attached to humans or animals in some cases, too.

The system relies entirely on radio waves, using radio-frequency electromagnetic fields, in order to transfer data from the tag attached to the object back to the point of origin (where the tag was attached).

While **RFID** might sound quite complicated in theory, in practice we encounter this kind of technology on an almost daily basis.

It is most commonly used for **automatic identification** and **tracking purposes**, and if we consider some more specific examples then we’ll find **RFID** used in:

* Merchandise tags – such as clothing and books to prevent theft
* Stock management – warehouses may tag their stock to make it easier to monitor
* Luggage, especially when flying – tags may be used here to make tracking baggage easier
* Animals tags – these are tags that can be put into collars, for example, to monitor your animal’s whereabouts

13 of 17 – Question 4

Read the following statement and decide whether it is true or false.

Optical character readers and optical mark readers are the same thing.

Choose the correct answer:

1. True, they both refer to a system that transcribes full documents into your computer by photo scanning the original text
2. False, character readers can transcribe whole documents whereas mark readers look for pen and pencil marks added to a form or document

The correct answer is B, false, character readers can transcribe whole documents whereas mark readers look for pen and pencil marks added to a form or document.

14 of 17 – Question 5

Which of the following are authentic types of magnetic strip readers?

Choose all that apply:

1. Insertion reader
2. Immersion reader
3. Swipe reader
4. Data reader

The correct answers are A and C, insertion reader and swipe reader.

15 of 17 – Question 6

Using the following choice of words; **radio waves**, **three**, **wireless**, **identification**, **tag** and **clothing shops**, fill in the blanks for the paragraph below:

A radio frequency identification system is made up of **blank** main parts, and the system itself works through **blank** technology. It begins by attaching a **blank** to an object – or to a human or animal – which then transfers data through **blank**. This type of technology is most commonly used for automatic **blank** and tracking purposes, and it can be found in a number of everyday settings, such as **blank** or warehouses.

The correct paragraph should read:

A radio frequency identification system is made up of **three** main parts, and the system itself works through **wireless** technology. It begins by attaching a **tag** to an object – or to a human or animal – which then transfers data through **radio waves**. This type of technology is most commonly used for automatic **identification** and tracking purposes, and it can be found in a number of everyday settings, such as **clothing shops** or warehouses.

16 of 17 – End

Well done. You have completed this session on automated systems and other devices.

In this session we have looked at:

* What is meant by automated systems
* Two examples of these systems in practice
* A number of other devices also used in technology systems

If you have any questions about any of these topics, make a note and speak to your tutor for more help.