

Introduction to user interfaces

GETTING STARTED

In pairs, identify what tasks the following users would carry out on their device.

- 1 A shop assistant who uses an electronic bill to serve a customer.
- 2 An individual who is using a self-service ticket machine in a train station.

KEY TERMS

User interface is a piece of software that allows users to interact with their devices.

Software allows users to complete tasks or to create something. There are different types of software to control hardware and applications such as word processing.

Hardware is the name for physical components of a device that you can actually touch, such as the mouse and keyboard.

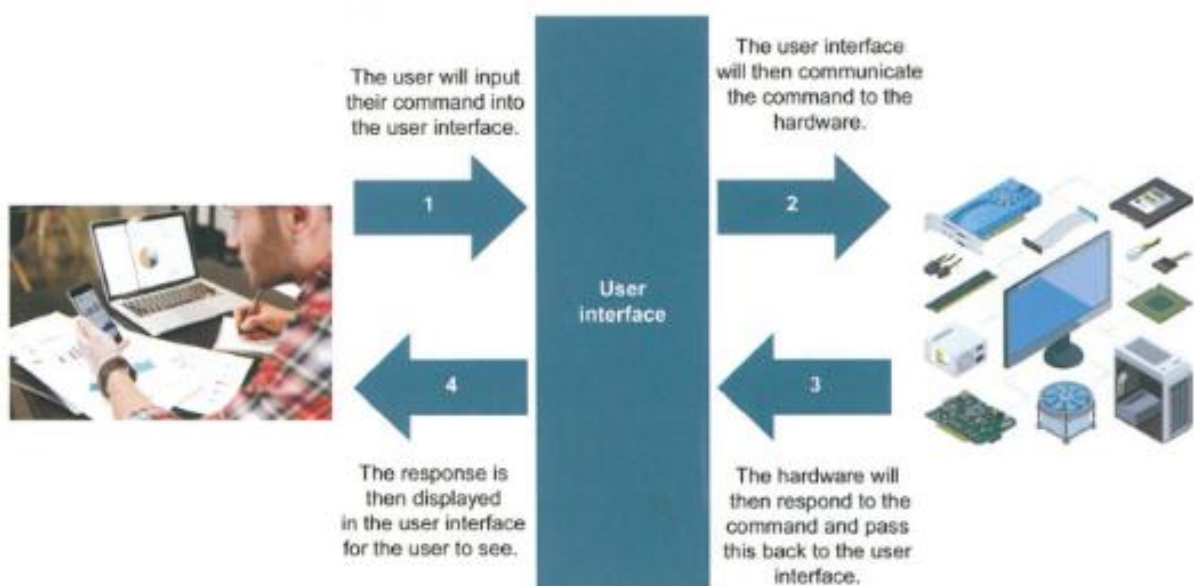
A **user interface** is the software that sits between humans and devices. It allows the user to operate a device to carry out tasks.

What is a user interface?

A user interface is the **software** that you can see when using a device. It allows you to respond to a device by entering information. This can include using a mouse, keyboard or touchscreen. You can now also use sound with some modern devices, where you enter commands by using your voice.



❑ What user interfaces are you familiar with?



❑ Can you apply the diagram above to a device that you regularly use?

Example uses of user interfaces

User interfaces are installed across a vast range of different devices. Table 1.1 gives some examples of devices with user interfaces.

Table 1.1: The different uses of user interfaces

Type of device	Definition	Example devices with a user interface
Computers	These are general computers that are used within the home or workplace. These usually have a monitor, mouse, keyboard, speakers and the actual computer.	<ul style="list-style-type: none"> • Desktop computers • Laptop computers
Handheld devices	These are small devices that are usually portable. All of the different components such as the screen, speakers are usually all integrated into the device.	<ul style="list-style-type: none"> • Smartphones • Tablets • Laptops • E-readers
Entertainment systems	These are devices that are often used in the home for leisure activities.	<ul style="list-style-type: none"> • Game consoles • Home theatre systems
Domestic appliances	These are devices that are used to complete household tasks. We usually have many domestic appliances in our homes and each one needs a user interface to be able to use it.	<ul style="list-style-type: none"> • Air conditioners • Dishwashers • Tumble dryers • Freezers • Washing machines • Microwave ovens
Controlling devices	These are devices that are used to control other devices automatically. These tend to be devices that sit in the background and we may only interact with them once or twice a day.	<ul style="list-style-type: none"> • Security lights • Central heating controllers
Embedded systems	These are much smaller computer systems that sit inside a larger system.	<ul style="list-style-type: none"> • Electronic parking meters • Traffic lights • Vending machines • Smartwatches/digital wristwatches • Robotic vacuum cleaners

ACTIVITY

- 1 Think of different devices that you often use. In pairs, discuss your experiences of using these devices. You should include:
 - what tasks you have carried out on the device
 - what methods you used to interact with the device
 - how successfully the device understood what you wanted to do.
- 2 Column 3 in Table 1.1 lists example devices with a user interface. In pairs, list other example devices for each row in the table.

CHECK MY LEARNING

What is meant by the term 'user interface'? Give three features of a user interface. Describe three different example interactions with a user interface.

GETTING STARTED

Seven example commands follow. Give yourself 20 seconds to try and memorise as many as you can. Then try to write out the commands without looking.

Commands: ls, cd, mkdir, grep, chmod, passwd, symlink

How did you find this task?

How many commands did you manage to remember?

What might happen if you had hundreds of commands to remember?

DID YOU KNOW?

Microsoft Windows[®] has a text interface. It's known as the command prompt and has over 280 commands. An early version of this was developed in the 1980s as the only user interface until a graphical version of Windows was released in the early 1990s.

BEST PRACTICE

As an IT technician, you may prefer to use a text-based interface. This is because they are much faster, and it allows technicians to solve technical problems a lot faster than using graphical user interfaces.

KEY TERM

Form controls include buttons, tick boxes and option boxes to enable the user to enter information.

Basic user interfaces

There are many different types of user interface. In this lesson you will explore text-, forms- and menu-based interfaces.

Text interfaces

A text interface works by the user entering specific commands with the keyboard. When these have been entered, the user interface will then respond with an output.

Features of text interfaces

- The user interface is made up of text and does not contain any graphics.
- The user enters commands with a keyboard. These commands need to be spelled correctly, otherwise the text interface will not understand them.
- The user interface will respond instantly with an output.
- Text interfaces do not require powerful hardware as they do not contain graphics.

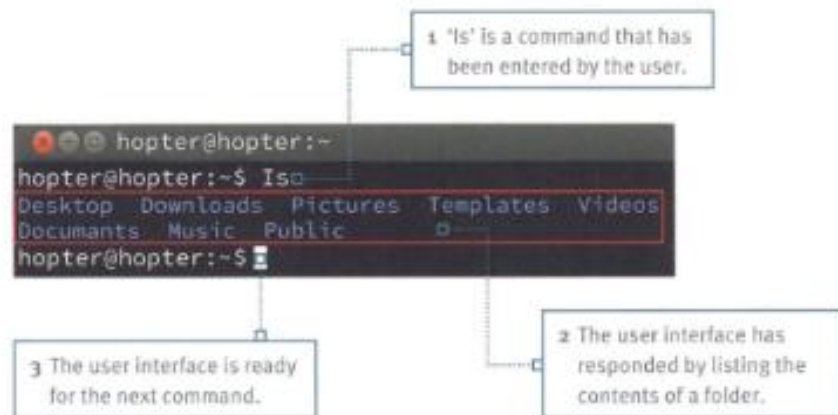


Figure 1.1: How would you feel if every device you used had a textual interface? What impact would that have?

When would text interfaces be used?

Text interfaces would be designed and used by experienced users who know all of the commands. They are often used by computer technicians when trying to solve problems with computer systems. This is because they are quick and can go directly to a specific location rather than going through lots of different menus.

Form interfaces

A form interface works by the user entering information using various **form controls**.

Features of form interfaces

- The user interface usually takes up a small part of the screen.
- It allows the user to enter information.
- It includes labels so the user knows what the different parts of the form mean.
- It uses form controls, such as buttons, tick boxes and drop-down lists, to enter information. These are often used to input data into a database.

When would form interfaces be used?

Form interfaces are used when you know what kind of data you want the user to enter. For example, if you want to add a friend to your contacts list, you will enter their first name, surname and telephone number. Form interfaces are also used when data needs to be inserted into a device in a specific order. For example, when buying a product online you select which product you want and then how many you want.

Menu interfaces

A menu interface is a way of selecting options by clicking on a graphic on the device screen.

Features of menu interfaces

- The user interface displays a list of options for the user to select. This can be by using the mouse cursor or by tapping on the screen.
- It can pop down, pop up, pop across or take up the whole screen.
- It can be cascading, which means when the user selects an item, another sub menu can appear.
- All options listed within a single menu are usually related to each other.

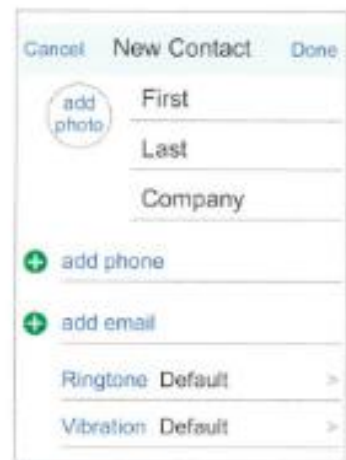


Figure 1.2: When was the last time you used a form interface? What was it for?



1 A list of options will appear on the screen for the user to select.

2 The user selects the option they want by pressing a button.

Why do cash machines use a menu rather than a text-based interface?

When would menu interfaces be used?

Menu interfaces are used when the user is either not experienced with using devices or is not expected to type in specific commands using a keyboard. Menu interfaces are also used when there is only a small range of options that the user can select.

ACTIVITY

In pairs, find an example of a text, forms and menu-based user interface.

- 1 For each user interface, explain its suitability for the task it is being used for.
- 2 Find four example uses of each type of user interface.
- 3 Give three benefits and drawbacks of each type of user interface.

CHECK MY LEARNING

Poppy has bought a smartwatch. Would this have a text, forms or menu-based user interface? Discuss this with a partner and justify the reasons for your choice.

GETTING STARTED

Your teacher will give you a specific task to complete using your computer or phone, for example to find a certain program/file or to change a specific setting. How well did you manage to achieve this? What strategy did you use to complete the task?

KEY TERM

Navigate/Navigation is how a user works their way around the software.

Complex user interfaces

User interfaces that are easier to use are often complex because they need powerful hardware to make them work. This is because they have more features that allow users to interact easily with the device.

Graphical user interfaces

A graphical user interface allows users to interact with devices through windows, icons, menus and the mouse pointer.

Features of graphical user interfaces

- It's a visual interface and therefore made up of graphics.
- Users can **navigate** around the user interface logically.
- Contains different windows to show different tasks that are currently open.
- Contains icons for users to select with the mouse or touchscreen.
- Contains menus to display options for the users to select.
- Contains a mouse pointer that allows the user to select options including icons.



- A graphical user interface used within Microsoft Windows. What other graphical user interfaces are you familiar with?

When would graphical interfaces be used?

Graphical user interfaces are common in everyday devices that have a wide range of uses, such as PCs and games consoles. They are used when the functions of a device cannot be limited to a menu. They are also used when the interface needs to be easy to use, therefore allowing users to interact with a device on their own.

Sensor interfaces

Sensor interfaces have commonly been used within the home, but this technology is increasingly used in our personal devices.

Features of sensor interfaces

- They have built-in **sensors** that are constantly monitoring what is happening around the device.

KEY TERM

Sensors detect and respond to the environment around them. They can be responsive to heat, light, sound, movement or patterns.

- When a certain condition has been met, the interface will automatically trigger something to happen. For example, an alarm may sound if the sensor has detected somebody inside a house.

When would sensor interfaces be used?

Sensor interfaces are used when actions performed by a device need to be automatic. For example, a smartphone may automatically unlock when it detects the correct facial features of the user. These types of interfaces have little physical human interaction.

Speech interfaces

Speech interfaces on devices are becoming increasingly popular in the home and respond directly to voices and sound.

Features of speech interfaces

- They allow users to input commands using their own voice.
- They use a built-in microphone that will listen for the user to say different commands.
- They often connect to the internet to find out information.
- They respond to the user through speakers.



❏ Have you ever talked to a device? How well did it understand you?

When would speech interfaces be used?

There are many reasons why speech interfaces may be used. They can be used when users may not always be able to use the mouse or keyboard to enter commands. They are also increasingly being used to make the interactions between humans and devices feel more natural.

ACTIVITY

In pairs, find an example of a graphical, sensor and speech-based user interface.

- 1 For each user interface, explain its suitability for the task it is being used for.
- 2 Find four example uses of each type of user interface.
- 3 Give three benefits and drawbacks of each type of user interface.

CHECK MY LEARNING

Describe two ways that a self-service checkout in a supermarket could make use of a graphical, sensor and speech-based interface.