Year 7 Computing Distance Learning Quiz and Learn Booklet Summer 2

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Week 1: Online Safety

The internet is a fantastic tool and resource. By taking simple precautions, online dangers can largely be avoided and we can stay safe while online.

Online dangers

The internet is a fantastic resource that helps us to learn, share, communicate and find entertainment. It has billions of users who use it for legitimate reasons. However, there are others who use the internet for illegal and unsavoury purposes.

There are several dangers that we might come across when online:

- malware
- phishing
- unsavoury characters
- cyberbullying

Taking simple precautions can help to reduce or prevent exposure to such dangers.

Malware

Malware (short for malicious software) are programs that install and run on your computer without your knowledge or consent. Malware is often downloaded from email attachments or websites that are not properly protected. Some websites are designed to trick you into downloading and installing malware. Once installed, malware usually (but not always) causes harm to the computer or user by deleting data or gaining access to personal information.

Some malware is designed to copy itself and spread to other computers via email attachments that are sent from the infected computer. This type of malware is known as a virus. Another type of malware spies on users’ activities, usually to steal financial details and passwords. This type of malware is known as spyware. Other types of malware include trojans and zombies.

Once infected, it can be difficult to rid a computer of malware. Special programs called anti-virus software are required to clean malware off a computer.
Phishing

You might receive emails from someone pretending to be someone you know. The emails are designed to trick you into giving away personal information, such as your usernames and passwords. For example, an email might appear to be sent from a social media website. It might say that a password needs resetting, and might provide a link to reset it. The link would lead to a fake website which looks exactly like the real site. This site will capture your details, allowing an unsavoury character access to your accounts.

Phishing emails are often quite easy to spot. Although at first glance they may look very much like a genuine email from a company or website, on closer examination they often contain spelling or grammatical errors. Always remember that it is rare that a website will genuinely send you an email asking for your username and password.

Unsavoury characters and cyberbullying

Most people use the internet safely and responsibly, but some use it for illegal or unsavoury activities. They do it to make money or to behave badly in a situation where they think that no-one can identify them.

It is not always possible to be sure who sends emails or posts a comment to a social media account. Many people pretend to be someone else online, sometimes for fun but sometimes because they intend to harm others, through cyberbullying, theft or trolling.
**Trolling** is the term given to people who visit other peoples’ social media accounts and leave distasteful messages.

**Cyberbullying** is the bullying of another person using the internet, mobile phones and other digital devices. Cyberbullying can take the form of posts on forums or social media, text messages or emails, all with the aim of hurting the victim.

**How to stay safe online**

**Staying safe from malware**

There are a number of ways to protect against malware:

- antivirus software
- firewall
- showing caution, by:
  - not opening emails from senders who we do not recognise
  - not installing programs downloaded illegally

**Antivirus software protects the computer from malware such as viruses and spyware.** Antivirus software scans the computer for known malware. If it finds malware, it safely removes it. To remain effective, antivirus software must be regularly updated so that it can recognise and remove as many forms of malware as possible.

**A firewall is either a piece of hardware or software that monitors communications coming in from and going out to the internet.** Both forms work on a similar basis. The firewall looks for unauthorised communications from malware. Any such communications are blocked by the firewall, preventing the malware from completing its task.

Through the course of a day you may receive emails from senders that you do not recognise. Such emails often contain malware hidden in attachments, or links to fake websites where malware can be downloaded and installed without your knowledge. **Delete such emails without opening them.**

Lots of programs and games that can be illegally downloaded using file-sharing tools and websites contain malware. As well as breaking the law by downloading these, you could be installing malware onto your computer.

**Staying safe from phishing**

Phishing emails are often quite easy to spot. If in doubt about an email, delete it immediately. **Do not follow any links contained in the email.** Instead, **go to the website directly**, and try to log in there.
Staying safe from unsavoury characters and cyberbullying

The easiest way to stay safe online is to stay in control of personal information given out.

Never disclose important details such as name, telephone number, address or school. Never accept someone as a ‘friend’ on social media simply because they claim to know another friend of yours. Always be cautious about what you say online.

Never agree to meet anyone in person that you’ve only known online. If somebody does start sending you messages that offend or upset you, tell an adult that you trust.

Protection from online bullying and harassment

Cyberbullying is an extremely unpleasant and upsetting experience. There are several authorised websites that offer advice on how to stay safe online and what to do if cyberbullying occurs:

- BBC Webwise
- Childline
- ThinkUKnow run by the Child Exploitation and Online Protection Centre (CEOP)

The Bullying UK helpline is available on 0808 800 2222, and Childline can be contacted on 0800 1111.

If you are being bullied or harassed, visit these websites, call these numbers or tell someone about what is happening to you. Find a friend, a teacher or a trusted adult and let them know what you are going through, so that they can support you in finding help.
Week 2: The law and ethics

Computer-related laws exist to protect users. By being aware of the laws we can stay safe whilst online.

Computers and the law

Computers are fantastic - they help us to learn, share, communicate and find entertainment. However, it is also possible for computers to be used to aid illegal activities. An understanding of computer-related laws in the United Kingdom is needed to make sure we stay on the right side of the law.

Computers might be used unlawfully in many ways, for example:

- allowing someone to illegally share your personal data
- helping to steal financial information, such as credit card numbers or bank account details
- helping to illegally copy and distribute films, television programmes and music
- extorting information or blackmailing someone

Additionally, the internet allows people to commit crimes remotely, for example a hacker could gain access to a computer on the other side of the world. Laws are required to help deter such activities.

There are three laws to consider:
Computer Misuse Act

The Computer Misuse Act attempts to discourage people from using computers for illegal purposes. There are three separate parts to the Act:

1. It is illegal to access data stored on a computer unless you have permission to do so. Unauthorised access is often referred to as hacking.
2. It is illegal to access data on a computer when that material will be used to commit further illegal activity, such as fraud or blackmail.
3. It is illegal to make changes to any data stored on a computer when you do not have permission to do so. If you access and change the contents of someone’s files without their permission, you are breaking the law. This includes installing a virus or other malware which damages or changes the way the computer works.

The maximum punishment for breaking this law is a £5000 fine or several years’ imprisonment.

However, one key part of the law is that **intent must be proved**. If a computer is not well protected, someone could accidentally access its data without meaning to. Someone might also accidentally change a document without realising it. For anyone to be found guilty, it has to be shown that they intentionally accessed and changed data.

**In order to make a successful prosecution under the Computer Misuse Act, the prosecutor must be able to prove intent.**

Copyright, Designs and Patents Act

The Copyright, Designs and Patents Act exists to protect our creations.

When anyone creates something, they own it. What they create might include:

- a picture, drawing or photograph
- a video, television programme or film
- text, such as a book, article or report
- a game

Copyright is a legal means of ensuring that content creators can protect what they create. **Copyright is applied automatically - it is not necessary to register copyright or to use a © symbol.** Work is automatically protected by copyright unless the copyright holder chooses to give that right away.

Copyright gives the copyright holder exclusive rights to publish, copy, distribute and sell their creation. No one else can use the work without permission. Copyright on a piece of work lasts for a long time, although the rules about how long are quite complicated and vary from country to country.
When you buy something, such as a book, film or music CD, the copyright holder grants permission for you to use it as part of the sale. This is called a licence. The licence is generally only for you to use.

When using computers, unless you have permission with regard to a particular copyrighted material, it is illegal to:

- make copies
- publish
- distribute
- sell copies

This applies to any copyrighted material, such as music, films, games and television programmes. The internet has made it extremely easy to access copyrighted material illegally. If you download a music track, film, game or programme without the copyright holder’s permission, you are breaking the law.

Supermarkets earn their money by selling food and other products. If someone takes their products without paying, the supermarket doesn’t make any money. In the same way, musicians, photographers, film makers and artists earn their money by selling products. If someone takes their products without paying, the person who created the work doesn’t make any money.
There are some situations where it is legal to copy, publish, distribute or sell material. These are:

- when you are the copyright holder
- when you have the copyright holder’s permission
- when the copyright holder has chosen to give up their copyright

**Data Protection Act**

It is increasingly common for personal details to be stored on computers. The Data Protection Act exists to protect such details. This personal data includes items such as:

- name and address
- date of birth
- medical records
- school and employment records
- religion

Personal data is private and should only be accessible by authorised people. Also, digital files stored on computers can be easy to access, copy and share. Protection is needed to make sure that our personal data is kept private and not altered or deleted. The Data Protection Act exists to ensure our data is properly looked after.

In addition, everyone has the right to see what data is held about them by an organisation, and to have that data corrected or deleted if incorrect.

The Data Protection Act is built around eight principles which state how personal data should be treated:

1. **Personal data must be fairly and lawfully processed.** This means that an organisation must be truthful about what personal data they wish to collect and what they want to use it for.

2. **Personal data must be obtained for specified and lawful purposes.** This means that an organisation cannot use personal data for any purpose other than that stated when they collected the data. For example, if a company wanted your exam records to see if you were qualified for a job, it could not use those records to try and sell you revision guides that it thinks you might need. Also, the company cannot pass on your data to any other organisation without your permission.

3. **Personal data must be adequate, relevant and not excessive.** This means that an organisation cannot ask for any data that is not immediately needed. For example, when applying for a bank account, the bank cannot ask you where you went on holiday last year.

4. **Personal data must be accurate and up to date.** If data held about you is wrong or out of date, you have the right to have it corrected or deleted. This is extremely important, as incorrect or out of date data might, for example, prevent you from getting a job, a loan or from being able to buy a house.
5. **Personal data must not be kept for longer than is necessary.** As soon as an organisation no longer needs your data, they must delete it.

6. **Personal data must be processed in line with our rights.** Your rights include the right to see any data held on you, and the right to correct inaccurate data.

7. **Personal data must be held securely.** This means safe from unauthorised access (eg with usernames and passwords), but also safe from accidental loss (by making back ups).

8. **Personal data must not be transferred to other countries outside the European Economic Area, unless those countries have similar data protection laws.**

An organisation can face a large fine if they are found to be in breach of the Data Protection Act.
Week 3: Bias and reliability

Bias and reliability

The internet contains a wealth of information. This information can be used to learn about new things or to verify facts.

However, much of the information on the internet is either biased in some way or incorrect.

Information that is biased or incorrect loses its value. When information has no value, it is of no use to us. **We need to be able to distinguish between information that is valuable (of use to us) and that which is not.**

What is bias?

**Biased information is information that is written from a particular perspective or point of view.**

When we write, we often – either purposefully or accidentally – introduce bias. Information that contains bias may be:

- personal opinion
- a statement that has no factual basis
- prejudiced in favour of or against a person, product, situation or idea

Examples

Look at the following examples of information about a film:

- “I think this film is the best animated film of all time.” This statement is clearly personal opinion, and as such should be treated with caution. Someone else might say the film is poor.
- “In twenty years’ time, people will say this film is the best animated film ever.” There is no factual basis to this statement. How can the person who wrote it know what people will think in the future?
- “Like all animated films, this one is great!” This information contains prejudice – the writer clearly has a passion for animation. Someone who does not like animation may say all animated films are poor.

In each case, bias has distorted the information about the film.
What is reliability?

Incorrect information is information that is wrong, out of date or inaccurate.

Websites may contain information that is incorrect for any of these reasons:

- **wrong** – the facts stated are incorrect
- **out of date** – the facts may have been correct when the website was produced, but are no longer correct
- **inaccurate** – the facts may be largely correct, but may contain some errors

When information is correct, it is ‘reliable’. Reliable information has value. The less reliable the information, the less valuable it is.

Recognising bias and unreliability

Why is it important to watch for bias?

Biased information also loses its value. Information of little value may:

- mislead us
- misinform us
cause us to make an incorrect deduction

cause us to make a poor decision

Suppose we used the internet to research the health benefits of cleaning our teeth. One website, owned and produced by a dental company, might tell us that we need to clean our teeth ten times every day. Another website, written by an individual, might state that cleaning our teeth is a waste of time. By following the advice from the first one, we might spend more money than we need to on teeth-cleaning products and damage our teeth by cleaning them too much. By following the advice from the other, we might suffer from poor dental hygiene.

Factors to consider

Biased information is influenced by a point of view. When analysing information for bias, there are certain factors to look for:

- **Source – who has produced the information?** Information from an authoritative, well-known organisation or person is likely to have value. Information from wikis and blogs may be less valuable because they are not authoritative – anyone can update a wiki or write a blog. As such, they may contain bias or inaccuracies. Remember, though, that a company may overstate claims about their products or services, whilst understating those of their competitors.

- **Opinion or fact – does the website state facts or opinions?** Opinions are points of view, not facts. Whilst opinions should be considered and may be interesting, as information they have less value than facts.

- **Statements without facts – does the website contain statements that cannot be backed up by facts?** Such statements are opinions, and have little value.

- **Date of publication – when was the website last updated?** Websites that have not been updated for a long time may no longer be accurate.
Week 4: Search Engines

The internet contains billions of pages of information. You use search engines to help you filter through the pages to find the information you need.

Search engines

The internet is a fantastic tool that helps you to learn, to share, to communicate and to find entertainment. It has billions of pages filled with information, in the form of words, images, videos and sound. Finding the information you need from these billions of pages can be tricky. If you had to look through each page, it would take many years to find the information you seek. Search engines make the task much simpler.

Search engines are programs that are designed to search the internet for us. They scour through all the billions of webpages, looking for information that matches what you are seeking. By using a search engine you can find information in seconds.

How search engines work

When you use a search engine to find information, you type in a search term which consists of one or more keywords that are specific to the information you seek. For example, if you wanted to learn more about how to eat healthily, your search term might include the keywords ‘eating’ and ‘healthily’. The search engine would look through all the webpages on the internet and create a list of links (or results) to all pages that contain these keywords. The list is sorted into order, with the most popular (or most visited) results at the top. You can then choose to follow any of the listed links and websites to see what information they contain.

Search engines such as Google use very complex page ranking algorithms to decide the exact order in which results should appear. The biggest factor is the number of sites linking to that web page.

Refining searches using Boolean expressions
Keywords are used to tell a search engine what information you are looking for. However, the resulting list of websites a search engine returns is often not quite what you want. Boolean expressions, such as AND, OR and NOT, allow you to make your search terms more specific.

Suppose you live in Manchester, and want to go to the cinema to watch a film. You might search for this information using the search term ‘films’. This would generate millions of results, because the keyword ‘films’ is very common – lots of websites would mention that word.

Boolean expressions, such as AND, OR and NOT, allow you to refine your searches further:

- **AND** narrows down the search by adding more keywords that need to appear in your results, eg ‘film’ AND ‘Manchester’. The results will contain both these keywords.
- **OR** widen the search by including alternate words, eg ‘film’ OR ‘movie’. The results will contain either of these words.
- **NOT** excludes certain information, eg ‘film’ AND NOT ‘Transformers’. The results will contain the word ‘film’ but not ‘Transformers’.

Using these expressions often gives you a better chance of finding what you are looking for.

**Using ‘AND’**

Search engines use the Boolean expression ‘AND’ to refine searches by combining two or more keywords in a search term.

If you were looking for films to watch at the cinema in Manchester today, you could use a search term with two keywords, ‘films’ and ‘cinema’. To the search engine, the search term would look like this:

- **films AND cinema**

The search engine would then look for any web pages that contain both keywords. This would narrow down the results, but you would find that many of them are not relevant as they would include cinemas from all around the country. Refining your search using two more keywords, ‘manchester’ and ‘today’ would give much more specific results. To the search engine, the search term would look like this:

- **films AND cinema AND manchester AND today**

From your refined results you could find a cinema close by and see what films are showing.
Because we combine keywords so often, search engines use the Boolean expression ‘AND’ automatically. You do not have to type it in – although it causes no harm to do so.

Using ‘OR’

The expression ‘OR’ allows you to search for more than one piece of information at the same time.

Suppose that you wanted to either go cycling or play tennis in Manchester.

To go cycling in Manchester you might use this search term:

- cycling manchester

To play tennis in Manchester, you might use this search term:

- tennis manchester

To find either cycling or tennis in Manchester you could use this search term:
cycling tennis manchester

However, this might not work, because the search term you have specified is actually:

- cycling AND tennis AND manchester

The search engine would look for webpages that contain all three keywords, ie places in Manchester where you can both cycle AND play tennis. Such a place might not exist.

A better way is to combine the two searches by using the Boolean expression ‘OR’:

- cycling OR tennis AND manchester

This search term would give you results showing you where you could cycle OR play tennis in Manchester, giving you a better chance of finding what you are looking for.
Using ‘NOT’

The expression ‘NOT’ allows you to eliminate specific results that you know you don’t want.

Suppose you live in Didsbury, near Manchester and want to play tennis somewhere different. You could use ‘NOT’ to tell the search engine to find places to play tennis in Manchester, but not in Didsbury.

In most search engines, ‘NOT’ is represented with a minus sign. Your search term would look like this:

- tennis manchester - didsbury

Using this search term you would get a list of results for places to play tennis in Manchester, but excluding anywhere in Didsbury.

Using quotes to remove results

You can use the Boolean expression ‘NOT’ to remove results from your searches. You can also use quotes for a similar purpose.

Suppose you wanted to play tennis in Manchester but your racquet is broken. You can use the internet to find out where you can buy a new racquet. To do this, you could use the search term:

- buy AND tennis AND racquets AND manchester

This would work, but your results might not be too specific - some websites may not refer to buying tennis racquets at all, because the search engine simply finds any website that contains all four keywords.

By using quotes, you can tell the search engine to specifically look for sites that tell you where you can buy tennis racquets in Manchester:

- “buy tennis racquets” AND manchester

This search term only finds websites that contain the exact phrase “buy tennis racquets” along with the word ‘manchester’.
Week 5: Internet and Communications

As a society we need to communicate and share. The internet allows us to communicate and share information in a matter of seconds.

**What is the internet?**

The internet has revolutionised the way we work and play. It allows us to communicate, to share data and to seek information in a matter of seconds. All this is possible through the use of computers and networks.

The internet is a global network of computers. All computer devices (including PCs, laptops, games consoles and smartphones) that are connected to the internet form part of this network. Added together, there are billions of computers connected to the internet, all able to communicate with each other.

Today, the internet is a massive part of our daily lives.
How did the internet originate?

In the 1950s, the United States Defence Department formed several agencies, such as the Advanced Research Projects Agency (ARPA, now known as DARPA) with the purpose of developing technology. However, since they were based at universities around the country, ARPA’s scientists could not easily communicate or share information. To solve this problem, ARPA created a network of computers, which they called ARPANET. Realising how useful ARPANET was, other organisations built their own networks. However, these individual networks could not easily communicate with each other.

In the 1970s, a protocol was developed. Called TCP/IP, this protocol allowed the separate networks to communicate with each other. The joining of these individual networks created a huge wide area network (WAN) which came to be known as the internet.

Since then the use of the internet by organisations and individuals has grown year upon year. In the beginning, ARPANET consisted of just four computers. Now billions of computers are connected to the internet.

When we connect to the internet, we are said to be ‘online’. Today the internet has many online facilities, for example:

- communication via email and VoIP
- sharing of information such as text, images, sounds and videos
- storage of information
- streaming television programmes, films, videos, sounds and music
- playing online games
- shopping
- social networking
- banking

Most of these online facilities are available through the use of websites on the World Wide Web.
What is the World Wide Web?

The internet is a global network of computers. The World Wide Web is the part of the internet that can be accessed through websites. Websites consist of webpages which allow you to see information.

Websites are accessed using a web browser. A browser is a program designed to display the information held on a website. Every website has an address at which it can be found, a bit like a house address.

A website’s address is known as its URL. A website can be visited by typing its URL into a web browser. Each address contains the prefix ‘http:’ which tells the computer to use the hyper text transfer protocol for communicating with the website. The browser then connects to the internet, finds the website at its address and downloads the information stored there onto our computer for us to view.
Websites and webpages are joined together using hyperlinks. Clicking on a hyperlink takes us to another site or page.

**Transferring information via the internet**

The internet is a global network of computers, some of which are called web servers. A web server is a computer which holds websites for other computers linked to the internet to access. Holding a website is known as ‘hosting’. A web server may host one or many websites and webpages. Sending information to a web server is known as uploading. Receiving information from a web server is known as downloading.

When you make a telephone call, a direct connection is formed between you and the person you are calling. While you are making the call, no-one else can communicate with you. A web server needs to be able to communicate with many different computers at the same time. When information is uploaded to, or downloaded from, a web server it is broken up into tiny pieces called data packets. Each packet is a very short communication between the client computer and the web server. Because each communication lasts only milliseconds, the web server can seemingly communicate with many computers at the same time. It is a bit like having several conversations at the same time, but only saying one word to each person in turn.

**Using HTML to create websites**

All web pages on the internet are created using a language called Hypertext Markup Language (HTML). HTML describes:

- what information appears on a webpage
- how it appears on the page (formatting)
- any links to other pages or sites

HTML can be written in specialist software, or in a simple text editor like Notepad. As long as the document is saved with the file extension ‘.html’ it can be opened and viewed as a webpage from a browser. This example HTML code displays a message on a webpage:
Over the years there have been several versions of HTML. Each successive version has more tags, allowing the programmer to build more advanced webpages. The latest version, released in 2012, is HTML5.

**Using email to communicate**

Two of the main ways in which people use the internet for communication are email and VoIP.

Email (short for electronic mail) is the digital equivalent of sending a letter. Each email has a sender, a receiver and a message. The big difference is that instead of waiting for our posted letter to be delivered by the post office, an email is sent and received almost immediately.
Advantages and disadvantages of email

Aside from speed, email has several other advantages:

- It costs virtually nothing to send an email, whereas you need to buy stamps to post a letter.
- The same email can be sent to many people at the same time.
- Assets, such as text, videos or sound clips, can be attached to email.
- A record is kept of each sent email, so it is possible to refer back to check what was sent.
- When emails are sent, the recipient doesn’t have to be there. Emails can be sent late at night and the recipient will see it when they check their email the following day. This has great benefits when sending emails to another part of the world.
• Emails can be sent at any time or day of the year. Post is not usually delivered on Sundays or bank holidays.

• Emails can be sent and received on various internet connected devices, eg PCs, laptops, games consoles, tablets or smartphones.

• Emails can be automatically forwarded on to another address.

Using email has its disadvantages too:

• The recipient can only receive the email if they are connected to the internet.

• Emails can sometimes contain viruses in the form of attachments.

• Spam emails can be a problem. So can phishing emails, which are designed to trick people into giving away personal information.

• Because emails can be delivered to internet-connected digital devices anywhere, they can be hard to get away from.

Email is a hugely popular form of communication for businesses and individuals alike. Nearly 200 billion emails are sent each day.

Using VoIP and video conferencing

A video conference is live video streamed over the internet so that people can communicate face to face without being in the same room. Although this was mainly used by businesses and academics at first, video conferencing is now used socially by many people. Voice over Internet Protocol (VoIP) is the technology that allows us to video conference. Many companies offer free VoIP services, including Skype, Apple Facetime and Google Hangouts.

To video conference with another person, both people need an internet-connected computer with a monitor, webcam, microphone and speakers. The webcam allows video images to be sent, which are seen on the monitor, and the microphone allows sound to be transmitted, which is heard through speakers. A program called a VoIP client handles the communication.

Video conferencing technology is built into many modern laptops, tablets and smartphones, and VoIP apps are available to use, often for free.

Advantages and disadvantages of video conferencing

Video conferencing has several advantages:

• Seeing as well as hearing the other person.

• Showing others what is going on around us.

• Reducing time to travel to see and speak with someone. This has even greater benefits if the other person is on the other side of the world.

• Saving money, in travel costs.

• The ability to video conference several people in different locations, at the same time.
Using video conferencing also has its disadvantages:

- Everyone who wants to video conference must have suitable hardware and software.
- Video conferencing from smartphones can be expensive because of the high data usage.
- Streaming video two ways requires a good deal of bandwidth. You might struggle to video conference if your connection to the internet is of poor quality.
Week 6: Digital Devices

Computers exist in many digital devices that we use on a day-to-day basis. Digital devices may be input, output or storage devices. On a basic level, they all operate through the use of logic gates.

Computer devices

The invention of the computer has had a huge impact on our day-to-day lives, and they are now present everywhere – at home, at work and in education.

It is easy to recognise that personal computers, laptops and mobile devices are computers, but computers are also hidden in many more devices. Computers are found in many of the devices we use on a daily basis. Because they are relied on so heavily, knowing what they are and how to use them is valuable.

Input devices

An input device is any piece of computer hardware used to provide data to a computer system. Examples include:

- keyboard
- mouse
- scanner
- digital camera
- webcam

Output devices

An output device is any piece of computer hardware used to communicate the results of data that has been processed. Examples include:

- monitor
- printer
- speaker
- headphones

Storage devices

A storage device is a piece of computer equipment which can be used to store data. Examples include:

- hard disk drive
- DVD drive
- USB stick

What is a logic gate?
A circuit board can be found inside most digital devices. It is a flat, thin board that has tiny electrical components built onto it. These components make up an electric circuit and include:

- resistors
- capacitors
- diodes
- transistors
- integrated circuits

Many electronic circuits have to make decisions. They look at one or more inputs and use these to determine the outputs from the circuit. The process of doing this uses electronic logic, which is based on digital switches called gates. Each input and output of the logic gates must be one of two states:

- True or 1 or on
- False or 0 or off

**A single digital signal has only two states - on or off.** However, if you use two inputs you can double the number of possible states, to four.

<table>
<thead>
<tr>
<th>Number of states</th>
<th>Input A</th>
<th>Input B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

In a logic gate, each combination of input signals can be made to produce a different outcome. Binary numbers reflect the two states - on and off, 0 and 1. Logic gate calculations can also be represented as truth tables.

**Types of logic gates**

Logic gates use Boolean operators. The most common Boolean operators are **AND, OR and NOT**. Each operator has a standard symbol that can be used when drawing logic gate circuits.

**AND gate**

An **AND** gate usually has two inputs. **AND tells us that both Input A AND Input B have to be 1 (or ON) in order for the output to be 1. Otherwise the output is 0.**

The Boolean expression can be written as \( Q = A \text{ AND } B \).

The truth table would look like this:
Logic gate diagrams would look like this:

<table>
<thead>
<tr>
<th>Input A</th>
<th>Input B</th>
<th>Input Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

The Boolean expression can be written as $Q = A \lor B$.

The truth table would look like this:

<table>
<thead>
<tr>
<th>Input A</th>
<th>Input B</th>
<th>Input Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Logic gate diagrams would look like this:

**OR gate**

An OR gate has two inputs. OR tells us that EITHER Input A OR Input B has to be 1 (or ON) in order for the output to be 1. Otherwise the output is 0.

The Boolean expression can be written as $Q = A \lor B$.

The truth table would look like this:

<table>
<thead>
<tr>
<th>Input A</th>
<th>Input B</th>
<th>Input Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Logic gate diagrams would look like this:

**NOT gate**
A NOT gate has just one input. NOT tells us that Input A has to be 0 (or OFF) in order for the output to be 1. Otherwise the output is 0. A NOT gate is sometimes called an inverter.

The Boolean expression is written as $Q = \text{NOT } A$.

The truth table would look like this:

<table>
<thead>
<tr>
<th>Input A</th>
<th>Input Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Logic gate diagrams would look like this:
The internet is a fantastic tool and resource. By taking simple precautions, online dangers can largely be avoided and we can stay safe while online.

1. Please enter your name (first name and last name)

Enter your answer

2. What is malware?
   - Hardware that controls a computer without the user’s knowledge
   - A program that installs and runs on a computer without the user’s knowledge
   - Faulty software

3. What is a virus?
   - A program which replicates itself and spreads to other computers via attachments
   - A program that stops a computer from working
   - A program that makes the user feel unwell

4. What is spyware?
   - A program which replicates itself and spreads to other computers via attachments
   - Hardware that controls a computer without the user’s knowledge
A program which monitors computer activity in an attempt to steal passwords or financial information

5. What should be used to remove malware from a computer?
   - Anti-virus software
   - A firewall
   - A filter

6. What is phishing?
   - Sending an email designed to trick the recipient into giving away personal information
   - Controlling a computer without the user’s knowledge
   - Sending a program which replicates itself and spreads to other computers via attachments

7. What is a troll?
   - A person who leaves distasteful messages on someone’s social media account
   - Someone who spies on a computer
   - Someone who sends a virus

8. What is used to prevent unauthorised communications from a computer?
   - A filter
   - Anti-virus software
   - A firewall

9. Which of the following is a simple way to stay safe online?
Don't connect the computer to the internet
Don't leave the computer on overnight
Don't give out personal information

10. Which of the following helps to safeguard against phishing?

- A firewall
- Anti-virus software
- Not following links from an email

11. Which of the following is a way to help keep a computer free of malware?

- Not opening emails from unknown or unfamiliar sources
- A filter
- A firewall

Submit
Y7 SUM2 Week 2: The law and ethics

Computer-related laws exist to protect users. By being aware of the laws we can stay safe whilst online.

Required

1. Please enter your name (first name and last name)

   Enter your answer

2. What is the purpose of the Computer Misuse Act?
   - To deter people from using a computer to commit a crime
   - To deter people from not looking after their computers
   - To ensure that all data is properly looked after

3. How many sections are there in the Computer Misuse Act?
   - Two
   - Four
   - Three

4. What is the key factor that must be proved for a successful prosecution under the Computer Misuse Act?
   - Previous conviction
   - That a computer was accessed
5. What is copyright?
   - A legal means of ensuring that all original works can be protected
   - A restriction on using, copying or distributing a file
   - Permission to use, copy or distribute a file

6. What is a licence?
   - A restriction on using, copying or distributing a file
   - A legal means of ensuring that all original works can be protected
   - Permission to use, copy or distribute a file

7. Which of the following is true with relation to a copyrighted file?
   - Copying it without the copyright owner's permission is legal
   - Copying it with the copyright owner's permission is illegal
   - Copying it without the copyright owner's permission is illegal

8. Under what circumstance is it acceptable to copy or share a file?
   - When the file is on a personal computer
   - If you are the copyright owner or no copyright exists
   - When the file is on the internet

9. What is the purpose of the Data Protection Act?
   - To deter people from not looking after their computer
   - To deter people from using a computer to commit a crime
10. How many principles are there in the Data Protection Act?
   - Seven
   - Eight
   - Six

11. What can be done if someone holds data about you that is incorrect?
   - The data can be corrected by you
   - You can ask for the data to be corrected or deleted
   - There is nothing that can be done
We use the internet to find information. However, finding information that is reliable and free of bias is as important as finding the information itself.

Required

1. Please enter your name (first name and last name)

Enter your answer

2. What is biased information?
   - Information that is inaccurate
   - Information that contains a point of view
   - Information that is out of date

3. What is incorrect information?
   - Information that contains a perspective
   - Information that contains a point of view
   - Information that is wrong or inaccurate

4. Which of the following is an example of biased information?
   - A family photograph
   - A music CD review
   - An out-of-date music sales chart
5. Which of the following is an example of incorrect information?
   - A music CD review
   - A family photograph
   - An out-of-date music sales chart

6. What might information of little value result in?
   - Making a poor decision
   - Making a good decision
   - Getting information for free

7. What term is given to information that has value?
   - Expensive
   - Valid
   - Reliable

8. Which of the following is a way to judge the reliability of information?
   - Trying a different web browser
   - Checking the source of the information
   - Paying for the information

9. Which of the following is a way to judge the reliability of information?
   - Checking how expensive it is
   - Checking when the information was published
10. Which of the following is a way to judge whether information is biased?
   - Checking whether it contains a point of view
   - Checking the source of the information
   - Checking when the information was published

11. Which of the following is a way to judge whether information is biased?
   - Assessing whether the information has a factual basis
   - Checking when the information was published
   - Checking the source of the information

Submit
The internet contains billions of pages of information. You use search engines to help you filter through the pages to find the information you need.

2. What is a search engine?
   - Software that searches the internet for information
   - A computer that searches the internet for information
   - Hardware that searches the internet for information

3. Why use search engines?
   - To find relevant information among billions of webpages
   - To sort existing content into an order
   - To find irrelevant information among billions of webpages

4. What is a keyword?
   - A type of search engine
   - A link to a website
   - A word relevant to the information being searched for
5. Which Boolean expression would be used to search for websites that feature both of two keywords?

- OR
- AND
- NOT

6. Which Boolean expression would be used to omit a keyword from a search?

- NOT
- AND
- OR

7. Which Boolean expression would be used to look for two keywords but not necessarily websites that feature both?

- AND
- NOT
- OR

8. Which of the following searches would find information on computer games?

- computer AND games
- "computer games"
- computer games

9. Which of the following searches would find information on computers but not games?
10. Which of the following searches would find information on films playing at the cinema, today, in Hull?

- films NOT cinema AND today OR hull
- films NOT cinema AND today AND hull
- films AND cinema AND today AND hull

11. How is the Boolean expression NOT often represented in searches?

- With a minus sign
- OR
- Using quotes
As a society we need to communicate and share. The internet allows us to communicate and share information in a matter of seconds.

1. Please enter your name (first name and last name)

Enter your answer

2. What is the internet?
   - A wired network
   - A global network
   - A local area network

3. From what did the internet originate?
   - The World Wide Web
   - Google
   - ARPANET

4. What is a protocol?
   - A rule of communication
   - A method of transmission
5. What is the World Wide Web?
   - The information available on the internet
   - A website that informs us about the internet
   - A website we access for information

6. How is the World Wide Web accessed?
   - Using VoIP
   - Using a web browser
   - Using email

7. What name do we give to a computer that hosts websites?
   - A server
   - A webserver
   - A protocol

8. What is a data packet?
   - A rule of communication
   - A computer that hosts websites
   - A small chunk of data to be communicated

9. What does HTML stand for?
   - Hypertext Media Language
   - Hypertext Markup Language
10. Which of the following is an advantage of using email?

- Letters can be handwritten
- Video can be streamed
- Attachments can be included

11. Which of the following is an advantage of using VoIP?

- Travel costs can be saved
- An old computer can be used
- Attachments can be sent

Submit
Computers exist in many digital devices that we use on a day-to-day basis. Digital devices may be input, output or storage devices. On a basic level, they all operate through the use of logic gates.

2. What is an input device?

- A piece of computer equipment on which data can be stored
- Any piece of computer hardware that is used to communicate the results of data that has been processed by a computer system
- Any piece of computer hardware used to provide data to a computer system

3. What is an example of an input device?

- A microphone
- A speaker
- A monitor

4. What is an output device?

- A piece of computer equipment on which data can be stored
- Any piece of computer hardware used to provide data to a computer system
Any piece of computer hardware that is used to communicate the results of data that has been processed by a computer system

5. What is an example of an output device?
   - A keyboard
   - A mouse
   - A monitor

6. What is a storage device?
   - A piece of computer equipment on which data can be stored
   - Any piece of computer hardware used to provide data to a computer system
   - Any piece of computer hardware that is used to communicate the results of data that has been processed by a computer system

7. What is an example of a storage device?
   - A monitor
   - A hard drive
   - A keyboard

8. What is a logic gate?
   - A storage device
   - A type of programming language
   - A digital electronic device that allows an electronic system to make decisions based on inputs

9. How can logic gate calculations represented?
10. For an AND gate, how many of the inputs have to be 1 for the output to be 1?
- both
- 1
- 0

11. If the input of a NOT gate is 1, what will the output be?
- 2
- 1
- 0

Submit