What is a hacker?

- A hacker is a person who gets access to a computer system without permission
- They can use this access to:
  - make the computer run different programs such as a virus or a botnet
  - steal information
  - damage files by corrupting or deleting them
- A hacker who misuses computers is known as a 'black hat' hacker

Reasons for attacking systems

- Fun/challenge
  - Hacking systems can be fun or a challenge
  - There is a sense of achievement
  - Friends may give respect of hacking achievements
- Financial gain
  - Ransoms can be made to prevent attacks from happening
  - Ransomware can be used to encrypt a computer until you pay
- Disruption
  - Attacks such as Denial-of-Service stop websites working
  - Viruses can slow down computers and delete files

Reasons for attacking systems

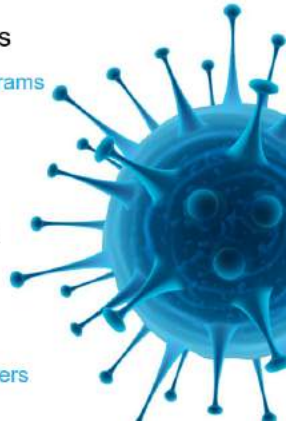
- Industrial espionage – spying in companies
  - The aim is to find intellectual property such as designs or blueprints for products, business strategies or software source code
- Personal attack
  - Employees that are unhappy may attack the company
  - Friends / family may attack each other if upset over something
- Information / Data theft
  - Credit card and financial details are stolen to gain money
  - Company information may also be stolen

Malware

- Malware comes from two words:
  - **Mal**icious – to cause an act of harm
  - Soft**ware**
- Malware are executable programs that run on a computer
- One type of malware that exists is a computer virus

Malware - Viruses and worms

- Computer viruses infect computers
  - They replicate their code in other programs
  - They infect other computers
  - They harm the computer by deleting, corrupting or modifying files
- A worm replicates itself in order to spread to other computers
  - They might cause no damage to the attacked computers
  - They slow down networks and computers



Malware - Trojan horses

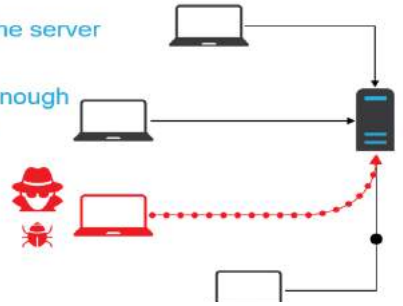
- During the Trojan War there is a story that the Greeks made a wooden horse and hid men inside
  - The Trojans brought the horse into the city, allowing the Greeks to open the city gates letting the army in to destroy Troy
- Computer Trojans are similar:
  - They have a program, game or cracked file which is something the user wants
  - They have negative program code which causes damage, takes control, or provides access to the computer

Malware - ransomware

- Ransomware is software which:
  - Holds a computer hostage by locking or encrypting access to it
  - If the data is encrypted, not even a cyber security professional will be able to recover the data unless backups are available
  - Once a ransom is paid to the attacker, access is restored

Denial of Service (DoS)

- In a denial of service attack, a hacker will use or infect a computer so that:
  - it sends as many requests to the server as it can (known as a flood)
  - the server can't respond fast enough so slows down or goes offline
- In a distributed denial of service attack (DDoS), many computers are used to send the requests



Botnet

- Botnet comes from robot network
- In a botnet, a hacker will first infect machines to make zombie devices
- These computers can then be controlled by one central computer
- This gives a hacker free and anonymous access to computers
- Common uses for botnets are:
  - Denial of service attacks
  - Sending spam

Year 7 Learning Sheet

Social engineering

- Social engineering is the ability to obtain confidential information by asking people for it

Biometrics

- Every person is unique. You can be uniquely identified by some body parts
- Many smartphones and businesses already make use of biometric data such as:
  - Iris scanners
  - Fingerprint scanners
  - Facial recognition

Firewalls

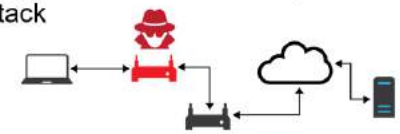
- Separate a trusted network from an untrusted network (normally the Internet)
- Data is sent around a network in small packets of information
- These packets are checked to see where they are coming from and going to
  - Packets that don't match filtering rules are dropped
  - This is known as a packet filter
- Firewalls can be run on dedicated hardware or as software

Shoulder surfing

- Shoulder surfing is the ability to get information or passwords by observing as someone types them in
- The following are two examples:
  - Looking over someone's shoulder
  - Using a CCTV camera

Man-in-the-middle attack

- A man-in-the-middle attack (MITM) allows the attacker to intercept communications between the user and server. The attacker can then:
  - eavesdrop to find passwords and personal information
  - add different information to a web page or other communication such as email
- Connecting to unencrypted Wi-Fi makes it easy to perform a MITM attack



Ethical hacking

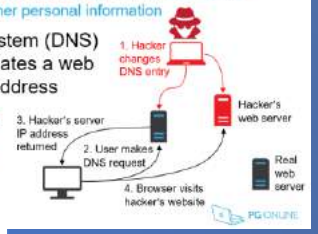
- A team of cyber security professionals will be employed to try and break into a company's systems
  - Penetration testing will be used to discover weaknesses
- Penetration teams are often employed by industries that deal with large amounts of money or highly valuable intellectual property. They are often used in:
  - Financial companies and banks
  - Pharmaceuticals
  - Military and intelligence services

Phishing

- Phishing is a type of social engineering technique
- Emails, texts or phone calls are sent to users commonly pretending to be from a bank or website
  - The 'From' email address may be forged
- These messages will try to get personal information such as:
  - Usernames
  - Passwords
  - Credit cards details
  - Other personal information

Pharming

- Pharming is a way of redirecting a legitimate websites' visitors to a fake website run by a hacker
  - The hacker can then use this site to discover usernames and passwords or other personal information
- A Domain Name System (DNS) server is what translates a web address into an IP address
  - The hacker changes the entry to point to their server instead



Making good passwords

- Increase password length
- Use characters other than lowercase ones such as:
  - Uppercase
  - Numbers
  - Symbols such as #(*$£"
- Use truly random passwords: X^&Q32/4Lz
- Never write down a password
- Never share a password with anyone
- Change default passwords

Anti-virus software & Encryption

- Anti-virus software will detect malware such as viruses, worms, trojans, and spyware
  - When a virus is detected it is sent to the anti-virus company
  - They verify it is malware then create a signature of the virus
  - They then add it to their virus database and tell computers to run an update
- Viruses can morph to avoid detection. This makes it harder to create a signature
- Encryption is used to keep data secret and only possible to read by people or computers who have the key or password required to view it
- Encryption encodes the data so that it can only be read with a password
  - Passwords that decode encrypted data are often referred to as keys

Computer Misuse Act 1990 (CMA1990)

- The computer misuse act is a law. **It must be followed.**
- It ensure that people do not use computers to commit crimes.
- It was first introduced in 1990
- There are 3 rules that make up the CMA 1990
  - A computer can not be accessed without the persons permission
  - Data and files can not be accessed, removed or changed without the persons permission
  - A computer can not be used to commit or intend to commit a crime

Computer viruses

- A computer virus is very much like a normal virus like a cold or the flu. However, computer viruses are code that have been created to damage a computer or 'make it sick'. This stops the computer being used correctly.
- Computer viruses can damage the data and files on a computer or reduce its security so that people can then hack into them.
- **Viruses can get onto your computer through naughty websites, downloading software, opening email attachments from people you don't know or from an infected storage device.**
- To stop a computer virus, make sure that you have ant virus software on your computer and that it is updated!
- Don't go on or download from naughty websites.

Grooming

There's a chance that your child may meet people online that aren't who they say they are. Grooming is a word used to describe people befriending children in order to take advantage of them for sexual purposes.

Cyberbullying

is when someone bullies others using electronic means, this might involve social media and messaging services on the internet, accessed on a mobile phone, tablet or gaming platform.

Sexting

The term 'sexting' is used to describe the sending and receiving of sexually explicit photos, messages and video clips, by text, email or posting them on social networking sites.

Radicalisation – the process by which a person comes to support terrorism and forms of extremism leading to terrorism

Extremism – a vocal or active opposition to fundamental British values, including democracy, the rule of law, individual liberty and mutual respect and tolerance of different faiths and beliefs.

Terrorism – an action that endangers or causes serious violence damage or disruption and is intended to influence the Government or to intimidate the public and is made with the intention of advancing a political, religious or ideological cause.

Spotting the signs of radicalisation

Radicalisation can be really difficult to spot. Signs that may indicate a child is being radicalised include:

- isolating themselves from family and friend
- stalking as if from a scripted speech
- unwillingness or inability to discuss their views
- a sudden disrespectful attitude towards others
- increased levels of anger
- increased secretiveness, especially around internet use

- **Health**: this concerns your own individual physical and mental health when using IT

- **Safety:** This concerns everyone's safety when using IT

HTML

<u> </u>	<u>Underlines the text</u>
<head></head>	Encloses the head of the HTML document
<body></body>	Encloses the body of the HTML document
	Creates a new paragraph of text
	Formats the text to heading 1
	Creates a link to another webpage
	Makes the text **BOLD**
	Makes the text *italic*

HTML (Hypertext Markup Language)
HTML is the language for describing web pages.

CSS (Cascading Style Sheets)
A style sheet is a file that describes how a HTML file should look.

The difference: HTML describes a webpage but CSS describes how it will look.

< > = opening tag
</> = closing tag

Image

Paragraph (left align)

 example

Paragraph (right align)

 example

Paragraph (centre align)

 example <br