

HALF TERM 1: Online Threats and Prevention Methods		Articles detailing occasions where the security
KQ1 - What are the threats posed to a network?		the consequences.
-Malicious software designed to harm the computer/user.		Explanation of the threats that are posed to the
-Designed to access/delete/modify files.		network of a home user and how the threats
Scareware - informs you your computer is infected with		can be reduced.
damaging viruses – tricking you to pay to fix.		
Ransomware - locks your files, encrypting them – forced to		Explanation justification of the method used to
bay money for the decryption key. Encryption – scrambling	$\bigcirc$	prevent each threat, through peer discussion.
iles so that they cannot be read without a key.	20	
Spyware - monitors users – e.g. key presses and sends to	74 1	
acker. Hackers can get access to passwords etc.		Links to PSHE – staving safe on the internet
/iruses – Activated when a user opens infected file.		
-Worms - self replicate through a network.	Q.	
-Trojans - malware disguised as legitimate software.	0	
Don't replicate, but users install by believing it is a real		Homework: (All homeworks are revision-based
piece of software.	$\frown$	unless otherwise stated)
)) Brute-force attack	Š	
Jsed to gain information by 'cracking' passwords	, <b>5</b> 7	Week 1: KO1 - Threats knowledge from
hey do this by trial and error	/*~*/	knowledge organiser
Jse of automated software which tests thousands of		knowledge ofganiser.
ommon passwords – using combinations of letters,		Week 3: KO2 – Prevention methods knowledge
umbers and common words/passwords.		from knowledge organiser
) Denial of service attacks		
Hackers try to stop users from accessing part of a network		Week 5 <sup>.</sup> Encryption activities worksheet based
r website.		around KO3 knowledge from knowledge
A website/network is flooded with useless data/traffic		organiser
emotely, making it slow or inaccessible		
A distributed denial-of-service (DDoS) - Occurs when		
ultiple systems flood the targeted system. A DDoS attack		
ses more than one machine - dubbed zombies or bots –		
which have been infected with malware by the attacker who		
ill use it them launch a DDoS attack. The network of		
ombie machines is sometimes known as a Botnet.		
d) Phishing		
A form of attack via email/telephone/text message.		
An email/text/phone call is received pretending to be a		
rge company e.g. a bank etc., which people believe to be		
enuine.		
The email/text/phone call is made to look real so that a		
erson enters/gives their information/password, which is		
hen used.		
Q2 - How can threats posed to a network be reduced?		
a) Anti-malware software -Reduces the risk of malware		
Designed to detect and delete malware that may have been		
nstalled.		
Allow users to scan their computer and 'quarantine' or		
lelete files that are infected.		
<u>b) Firewalls</u> – reduces the risk of DoS attack		
Can be a physical device or piece of software that will block		
inexpected connections/data coming in to a network/to a		
omputer		
Allows you to accept or decline connections that are being		
nade		
Can also detect and block your computer from connecting		
to the internet without you being aware.		



<ul> <li>-Most operating systems have a firewall built in <ul> <li>(c) Strong Passwords – reduces the risk of brute force attack</li> <li>-A weak password makes it easy for someone to try to guess login details – brute force attack.</li> <li>-A strong password has a mix of upper and lower case letters, numbers and special characters</li> <li>-Having a limited amount of login attempts would help prevent a brute force attack.</li> <li>-Other methods: biometrics e.g. finger print, facial recognition / picture passcode.</li> <li>(d) Education/Training</li> <li>-Look for, poor grammar, spelling mistakes, dodgy looking email addresses or links to website which are not the genuine domain e.g. email@natwestbank.com not</li> <li>email@natwest.com.</li> <li>-Covering passwords/pin codes when entering them.</li> <li>-Not writing passwords down/not telling passwords to attacted.</li> </ul> </li> </ul>	
others.	
-Strong passwords reduce the threat of someone looking over your shoulder as they are hard to follow/remember.	
KQ3 - How can data be protected from unauthorised	
(a) Data interception and theft -Intercepting data packats as	
they are transferred between two devices to canture	
data/information that is being sent over a network/the	
internet	
(b) Encruption – reduces the risk of data interception	
The process of disguising a message so that it cannot be	
understood by anyone but its intended recipient	
The data is scrambled so that it cannot be read	
A key is peeded to desput a message and get it back to	
-A key is needed to decrypt a message and get it back to	
plain text.	
-A Caesar cipner is a simple method of encryption.	
-The cipher works by moving each letter in the alphabet	
along by a certain number of places.	
The key would be the number that the letters have been	
moved along by.	
-Most communications sent via the internet are encrypted:	
purchases made online are encrypted to try to prevent theft	
of credit card details, documents, such as a spreadsheet	
emailed to colleagues, satellite TV transmissions are	
encrypted to prevent users who are not subscribed from	
watching TV shows.	
Kall Fence cipher – Kall fence of size 2 (2 lines).	
-Rewrite the message on two lines dropping every second	
letter:	
H I O T E E	
e I _ h r	
-close up the gaps and write the second line immediately	
after the first: Hioteeel_nr.	
LINK TO AIAN TURING/ENIGMA MACHINE	
Kay Words	
Ney words	
• Maiware	
<ul> <li>Malicious</li> </ul>	
o Scareware	
<ul> <li>Ransomware</li> </ul>	



<ul> <li>Spyware</li> </ul>		
<ul> <li>Virus</li> </ul>		
o Worm		
• Replicate		
o Trojan		
<ul> <li>Disguised</li> </ul>		
<ul> <li>Legitimate</li> </ul>		
Brute-force		
<ul> <li>Cracking</li> </ul>		
<ul> <li>Password</li> </ul>		
Data Interception		
<ul> <li>Packet</li> </ul>		
Denial of service		
<ul> <li>Flooded</li> </ul>		
<ul> <li>Distributed</li> </ul>		
<ul> <li>Botnet</li> </ul>		
<ul> <li>Social engineering</li> </ul>		
<ul> <li>Manipulating</li> </ul>		
<ul> <li>Phishing</li> </ul>		
<ul> <li>Shouldering</li> </ul>		
Anti-malware		
• Firewalls		
Onerating system		
• Operating System		
<ul> <li>Strong Password</li> </ul>		
Biometrics		
Encryption		
<ul> <li>Decrypt</li> </ul>		
<ul> <li>Cipher</li> </ul>		
<ul> <li>Caesar cipher</li> </ul>		
<ul> <li>Rail Fence cipher</li> </ul>		
HALF TERM 2: Data Manipulation/Modelling		Reading of a case study to enable students
		complete a data manipulation/modelling
KQ1 – How do you format data using Microsoft Excel?		activity
(a) When should Microsoft Excel be used – purpose, when		
Excel should be used, types of documents created in Excel.	•	Explanation of the findings from a data
(b) Microsoft Excel Tools – cells, rows, columns, alignment,		modelling activity – explanation of profit/loss
format painter, cell formatting, number formatting,		etc.
changing decimal places, use of percentages, sort, merging		
Cells, wrapping text.		
RQ2 – How do you perform calculations using Microsoft	$\bigcirc$	Peer discussion of the findings from a data
Excere	$\leq$	modelling activity – explanation of profit/loss
sing +    / *	$\mathcal{N}$	etc.
KO2 - How do you perform data modelling using Microsoft	<i>/ • •</i>	
Fycal?		Links to business studies and mathematics –
(a) Functions	$\mathbf{a}$	formulas/functions.
Sum max min average if count countif concatenate		
KQ4 – How do you present information using Microsoft	U U	
Excel?	-	
(a) Presenting Data		Homework: (All homeworks are revision-based
Using graphics: bar, column, line.	$\frown$	unless otherwise stated)
KQ5 – How do you work collaboratively online?	Ě	
(a) What is SharePoint – purpose, how can SharePoint be	<u>, 571</u> .	Week 1: Practice using formulas to perform
used.	/\~~'\	calculations
(b) Working collaboratively using SharePoint – editing		
documents collaboratively using Excel.		

Keywords       • Excel         • Formula       • Function         • MIN       • MAX         • MAX       • AVERAGE         • IF       • COUNT         • COUNT       • COUNT         • CONCATEMATE       • Graph         • Die       • Alignment         • Formating       • Pre-         • Marging       • Formating         • Pre-explanation       • Colaborate         • MakF TERM 3: Computer Programming using Python         KQ1 – How do you input/output data in python?         (a) Ent command       • Due tot in input as avariable         (b) input command to output text and numbers         • Storing an input as avariable       • Ameny location where a piece of data is stored.         • Concatenation of variables.       • Markeese esterion performed in Python?         (a) Estaments       • Structuring an if statements using #, else and elif         • If statements using #, else and elif       • Inksta to Languages/English – Syntax. How th		
<ul> <li>Excel</li> <li>Formula</li> <li>Function         <ul> <li>Function</li> <li>Function</li> <li>MIN               <ul></ul></li></ul></li></ul>	Keywords	Week 3: Practice using functions to perform
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KQ1 – How do you input/output data in python?       programming language to create programs.         (a) Print command       -Use of the print command to output text and numbers         (b) Input command       -Use of the input command to input text and numbers         -Use of the input command to input text and numbers       Written explanation of a Python program th has been created         -Use of the input command to input text and numbers       Peer explanation/discussion of code that has been created         -A memory location where a piece of data is stored.       -Assigning values to a variable         -Concatenation of variables.       (a) Casting         -Concerting a variable from one data type to another.       -stri(), int()         (e) Data Types       Links to Languages/English – Syntax. How th language is written.         String, integer, real, Boolean.       KQ2 – How is selection performed in Python?         (a) IF Statements       String, including len()         KQ5 – How can random numbers       -structuring an if statements using if, else and elif         -if statements       -structuring string manipulation in Python?         (a) Random Numbers       -structuring string manipulation in Python?         (a) Manipulating strings       -word.upper()         -word.lower()       -word.lower()         -Week 5: KQ3 String Manipulation knowledge       Week 5: KQ3 String Manipulation knowledge	HALF TERM 3: Computer Programming using Python	Reading of guides for how to use the Pythor
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<ul> <li>Assigning values to a variable</li> <li>-Concatenation of variables.</li> <li>(d) Casting</li> <li>-Converting a variable from one data type to another.</li> <li>-str(), int()</li> <li>(e) Data Types</li> <li>String, integer, real, Boolean.</li> <li>KQ2 – How is selection performed in Python?</li> <li>(a) IF Statements</li> <li>-Structuring an if statements using if, else and elif</li> <li>-if statements using ==, &gt;, &lt;, including len()</li> <li>KQ5 – How can random numbers be generated in Python?</li> <li>(a) Random Numbers</li> <li>-import random</li> <li>-random.randomint(0,9)</li> <li>KQ4 – What is string manipulation in Python?</li> <li>(a) Manipulating strings</li> <li>-len()</li> <li>-word.lower()</li> <li>-word.lower()</li> <li>-("Helio World"[13:7])</li> <li>or, variablename[3:7]</li> </ul>	-A memory location where a piece of data is stored.	Deer evelopetion /discussion of code that he
<ul> <li>-Concatenation of variables.</li> <li>(d) Casting</li> <li>-Converting a variable from one data type to another.</li> <li>-str(), int()</li> <li>(e) Data Types</li> <li>String, integer, real, Boolean.</li> <li>KQ2 – How is selection performed in Python?</li> <li>(a) IF Statements</li> <li>-Structuring an if statements using if, else and elif</li> <li>-if statements using ==, &gt;, &lt;, including len()</li> <li>KQ5 – How can random numbers be generated in Python?</li> <li>(a) Random Numbers</li> <li>-import random</li> <li>-random.randomint(0,9)</li> <li>KQ4 – What is string manipulation in Python?</li> <li>(a) Manipulating strings</li> <li>-len()</li> <li>-word.lower()</li> <li>-("Hello World"[3:7])</li> <li>or variablename[3:7]</li> </ul>	-Assigning values to a variable	heen created
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Image:	-str(), int()	Links to Languages/English – Syntax. How th
KQ2 - How is selection performed in Python?         (a) IF Statements         -Structuring an if statements using if, else and elif         -if statements using ==, >, <, including len()	<u>(e) Data Types</u>	language is written.
(a) IF Statements         -Structuring an if statements using if, else and elif         -if statements using ==, >, <, including len()	KO2 – How is selection performed in Python?	Y I
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KQ5 - How can random numbers be generated in Python?       unless otherwise stated)         -import random	-if statements using ==, >, <, including len()	Homework: (All homeworks are revision-based
(a) Random Numbers         -import random         -random.randomint(0,9)         KQ4 – What is string manipulation in Python?         (a) Manipulating strings         -len()         -word.upper()         -word.lower()         -("Hello World"[3:7])         -("Hello World"[3:7])	KQ5 – How can random numbers be generated in Python?	O unless otherwise stated)
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KQ4 – What is string manipulation in Python?       Week 3: KQ2 Selection knowledge from knowledge organiser. Using selection writte activities.         -len()       activities.         -word.lower()       Week 5: KQ3 String Manipulation knowledge	-random.randomint(0.9)	knowledge organiser.
(a) Manipulating strings       Week 3: KQ2 Selection Knowledge from         -len()       knowledge organiser. Using selection writte         -word.upper()       activities.         -word.lower()       Week 5: KQ3 String Manipulation knowledge		Week 2: KO2 Selection lunguile des fram
-len() -word.upper() -word.lower() -("Hello World"[3:7]) or variablename[3:7] Week 5: KQ3 String Manipulation knowledge	KQ4 – What is string manipulation in Python?	
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<ul> <li>Command</li> <li>Radius</li> <li>Diameter</li> <li>Angles</li> <li>Axis</li> </ul>		
UALS TERMA & Dither and remains using Turtle Creation		Deading of guides for how to use the Duther
HALF TERM 4: Python programming using Turtle Graphics		programming language to create programs.
KQ1 - How do you move Tracy using Python? -The interface structure used within codehs.com -Syntax - the rules that define the structure of the language		
(a) Commands		Written explanation of a Python program that
-forward()		has been created
-circle() - radius KO2 - How do you control when Tracy draws using Bython?		
-Coordinates/pixels are used within the drawing space in		Deen ovelegation /discussion of eads that has
Turtle graphics	$\bigcirc$	Peer explanation/discussion of code that has
(a) Commands	<u>ZO</u>	been created.
-penup()	<i>PV</i> 1	
-pendown()		
-backward()	•	Links to Languages/English – Syntax. How the
KQ3 - How do you change the direction of Tracy using	Q	language is written.
Python?	T T	
(a) Commands	Ŭ	
_left()		Homowerky (All homowerks are revision based
-right()	$\sim$	Homework: (All homeworks are revision-based,
KQ4 – How do you repeat commands using Python?	$\underline{O}$	uniess other wise stated)
-The concept of for loops – A loop that repeated a definite		Week 1: Practice using commands from KO1 and
number of times/the number of times that it is programmed	/*~*/	2 from knowledge organiser. Knowledge from
to.		KQ1 and KQ2 from knowledge organiser.
-Used to change the flow of the program e.g. repeat certain		
instructions before moving to execute the next instructions.		Week 3: Practice using commands from KQ4 and
(a) Commands		5 from knowledge organiser. Knowledge from
-for i in range(x,y):		KQ4 and KQ5 from knowledge organiser.
Advantages:		
-Shorten code / Makes code more encient		Week 5: Practice using commands from KQ6
KO5 - How do you change the position of Tracy using		commands and KQ7 Functions from knowledge
python?		knowledge organiser
(a) Commands		knowledge organiser.
-left()		
-right()		
-setposition(x,y)		
-speed()		
KQ6 - How can you make your programming code easier to		
follow?		
<u>(d) comments</u>		
-Describe the code so that it can be understood by		
vou/others		
# comments here (Single line comment)		
Comments here (Multi-line comment)		
(b) Naming Conventions		
-Descriptive names		
-Underscores replace spaces		



<ul> <li>-Only lowercase letters</li> <li>-Cannot start with a number</li> <li>KQ7 - How can commands be grouped using Python?</li> <li>(a) Use of Functions</li> <li>-Functions group sets of commands together.</li> <li>-They are then 'called' using one line of code.</li> <li>-They shorten the code/make parts of the program reusable.</li> <li>-You can 'call' (run) a function as many times as you want to.</li> <li>(b) Commands</li> <li>-def name_of_function()</li> <li>-name_of_function()</li> </ul>		
Key Words		
<ul> <li>Syntax</li> <li>Command</li> <li>Radius</li> <li>Diameter</li> <li>Angles</li> <li>Axis</li> <li>Iteration</li> <li>Convention</li> <li>Comments</li> <li>Functions</li> <li>Calling</li> <li>Reusable</li> </ul>		
HALF TERM 5: Hardware / Software / Networks		Technical information relating to how
		computers communicate/some of the main
KQ1 - What is a computer system?		networking components.
(a) Computer systems		An explanation of the computer components
data. Store data. Output data.		home/networking devices which they own/use.
-Input/output devices – keyboard, mouse, buttons, touch		
screen, microphone, screen, printer, speakers, etc.		
-Central Processing Unit - Process instructions/data inside	$\bigcirc$	Discussion of the need for/use of networks and
the computer.	30	the benefits connecting devices to a network.
-Processing – this can be performing calculations, searching,	1 24	
-Examples of a computer system – microwave, smart phone.		
smart watch, smart TV, PS4 etc.	$\mathbf{a}$	
KQ2 – How do computers process data/instructions? (a) Fetch-Decode-Execute Cycle –	Q	
-The RAM stores instructions that need to be processed /		Homework: (All homeworks are revision-based,
data that the CPU is currently using.	0	unless otherwise stated)
-CPU fetches data/instructions from the RAM.		Week 1: KO2 processing and KO2 CDU
taken to the CPU.	/~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	knowledge from knowledge organiser
-Decode: The CPU decodes the instruction to determine		
what needs to be done.		Week 3: KQ4 software knowledge from
-Execute: The instruction is performed by the CPU.		knowledge organiser.
KQ3 - How can the performance of a CPU be affected? (a) Number of cores:		Week 5: KQ5 networks knowledge from knowledge organiser.



r		
	-The number of processors in the CPU.	
	-Each processor can perform an instruction simultaneously.	
	improve CPU performance	
	(h) Clock Speed:	
	<u>(D) Clock Speed.</u>	
	- The humber of histractions that the CPO can process per	
	-1 hertz = 1 instruction 1 mergahertz = 1 million instructions	
	- 1 regaler tz = 1 hillion instructions	
	-Higher clock speed can improve CDU performance	
	-figher clock speed can improve cr o performance.	
	KQ4 – What role does software have in a computer	
	system?	
	(a) Operating Systems	
	-The software that manages and allows us to interact with	
	the hardware.	
	User interface: Provides us with an interface through which	
	we interact with the computer.	
	-Manages processing: Manages the order in which data is	
ļ	processed by the CPU.	
	-Manages memory: Manages the process of loading/storing	
ļ	data in the RAM.	
	-Manages peripherals: Manages communication with any	
	devices that are connected to the computer.	
	<u>(b) Utilities</u>	
	- Pieces of software which have a specific task, which usually	
	to maintain your computer/ make it perform better.	
	-Anti-virus/malware, Backup, Compression, Encryption, File	
	management	
	(c) Applications	
	-Allows/help the user to complete the task (often producing	
	sometning)	
	-word processor, graphic editing, spreadsheet, presentation	
	-Software applications are often referred to as 'apps'	
	narticularly when referring to smart devices	
	KO5 – How do computers communicate?	
	(a) What is a network?	
	Network: Multiple devices that are connected together and	
	exchange data.	
	(b) Benefits of networking –	
	-Data can be sent between computers.	
	-Files can be shared.	
ļ	-Resources such as printers can be shared.	
	-Connection to the internet can be shared.	
	<u>(c) Data packets</u> –	
ļ	-Data is split into packets before it is sent across a network.	
	-Packets are small pieces of data.	
	-Each packet is numbered, contains the recipients IP address	
ļ	and the senders IP address.	
	-Data is sent as packets as it helps efficiency and helps	
ļ	ensure each section is transmitted successfully.	
	KQ6 – What hardware is needed to create a network?	
	(a) Hardware –	
	Router: Send data packets between networks, across the	
	Internet.	
	switch: Send data packets around a network between	
	computers.	



Wireless	s Access	Point: Transmits signals, wirelessly. Allows		
wireless devices to connect to a network,				
(b) LAN and WAN –				
LAN: A network that covers one single geographical location				
e.g. hon	ne, a sch	pol etc.		
WAN: A	network	that covers multiple geographical		
location	s. Often	multiple LANs connected together.		
Keywor	ds			
•	Input			
•	Output			
•	Process			
•	Storage			
•	CPU			
•	Fetch			
	Decode			
	Execute			
	Drocoss	or		
	Clock or			
•	CIOCK SP	Hortz		
	0	Heriz Magabartz		
	0	Vieganeriz Cigabortz		
	Cara	Gigariertz		
•	Core	Dual		
	0	Dual		
	Ctorage	Quau		
•	Storage			
•	Methor	y hoord		
•	Nother	board		
•	Graphic	s card		
•	Hard dr	ive		
•	Randon	n Access Memory		
•	Periphe	ral		
•	Hardwa	re		
•	Softwar	e		
•	Applica	tion		
•	Utility			
	0	Compression		
	0	Encryption		
•	Operati	ng system		
•	Interfac	e		
•	Sensor			
•	GUI			
•	Comma	nd		
•	Menu			
•	Networ	k		
	0	LAN		
	0	WAN		
	0	Signal		
	0	Geographical		
	0	Internet		
•	Networ	k hardware		
	0	Switch		
	0	Router		
	0	Wireless Access Point		
	0			
	0	WIRELESS		
1	0	wired	1	



HALF TERM 3: Binary/Boolean Logic, Computational Maths and Searching/Sorting Algorithms KQ1 – How can decisions be made from binary values?		A biography of George Boole, the creator of Boolean logic.
<ul> <li>(a) Logic gates/circuits –</li> <li>Building block of a circuit in a CPU.</li> <li>Used to process electronic signals (binary) and make decisions, store etc.</li> <li>AND gate – both inputs must be true to output true.</li> </ul>		An explanation of how the concept of binary links to Boolean logic.
-OR gage – if either input is true, the output is true. -NOT gate – inverts the input. (b) Follow Logic Diagrams – -Follow logic diagrams up to two levels, stating the output for a given input.		Peer discussion/ explanation of logic circuits which students have drawn/created.
KQ2 – How are the outputs of a logic diagram represented? (a) Truth Tables – -Are used to show all possible inputs and their outputs, for a given logic diagram.	Ø	Links to Science – Electronic circuits Links to Maths – Mathematical operators
<ul> <li>-Complete a truth table for the AND, OR and NOT gates.</li> <li>-Complete a truth table for a logic diagram to two levels.</li> <li>KQ3 – What other calculations does a CPU perform?</li> <li>(a) Exponential</li> <li>-How to calculate the exponential – 3^4</li> <li>(b) Modulo</li> <li>-How to calculate the modulo – 9 MOD 2</li> <li>(c) Quotient/Remainder Division</li> <li>-How to calculate the quotient – 10 DIV 3</li> <li>KO4 – How does a CPU perform?</li> </ul>		Homework: (All homeworks are revision-based, unless otherwise stated) Week 1: Practice following logic gates symbols and KQ1 knowledge from knowledge organiser. Week 3: Practice completing truth tables and KQ1 knowledge from knowledge organiser. Week 5: Practice demonstrating binary search
<ul> <li>(a) Binary Search</li> <li>-How to search for a value in a list of values using a binary search.</li> <li>(b) Bubble Sort</li> <li>-How to sort a list of values into order using a bubble sort.</li> </ul>		and bubble sort algorithms and KQ4 knowledge from knowledge organiser.