2023-24 CURRICULUM MAP FOR Computing YEAR 9

HALF TERM 1: App Interface Design

KQ1 – How are interfaces designed?

(a) Graphical User Interface –

-Most widely used type of GUI are WIMP systems.

-WIMP stands for Windows Icons Menu Pointer.

-Options are represented by small pictures or 'icons' arranged inside rectangular boxes called windows.

-Very easy to use, especially for a beginner.

-Very intuitive

-Needs lots of space/memory to be able to run due to the amount of graphics.

(d) Voice Controlled Interface

-Users interact with these through their voices.-

-Most smart assistants—e.g., Siri, Alexa etc.

-Very easy to use

-No physical controls, good for users with additional needs

-Cannot be used easily by users with hearing difficulties

KQ2 – How do design principles influence how information should be presented?

(a) Design Principles: Colours

-How colour is used can have practical/emotional implications e.g. how do these colours make you feel?

-Opposite colours. Make sure colours contrast well/stand out

(b) Design Principles: Font style/sizes

-A font needs to be easy to read and clear at all sizes

-Two families of fonts

- Serif – Better for printed text
- Sans-Serif – Better for onscreen text

-Avoid decorative text

(c) Design Principles: Amount of information

-Ensure a text provides enough information for the reader but does not overload them. Text needs to retain the user's attention.

-Make good use of white/empty space

(d) Design Principles: Language

-Use of appropriate language for age/user skill level

(e) Design Principles: Layout

-Organisations have their own house style. This ensures consistency so that customers recognise the organisation.

Elements included: colour scheme, font styles, layouts, logo, templates e.g. letterheads

KQ3 – How are apps created using App Lab?

(a) Tools

The app lab interface, how to add design elements, how to add code, how to link code and design elements.

Key Words

- User interface
  - Menu interface
  - Sensor interface
  - Graphical user interface
  - Command line interface

Use of articles detailing userbility features/ design principles e.g.
https://www.usability.gov/what-and-why/user-interface-design.html
https://www.invisionapp.com/design-defined/principles-of-design/

An evaluation of a created interface against a given criteria.

Discussion of the importance of design principles on the user. Presentation of how these concepts have been adhered to within their final designs.

Links to Photography/Art/Graphics – Graphic design.

Homework: (All homeworks are revision-based, unless otherwise stated)

Week 1: KQ1 Interfaces knowledge from knowledge organiser.

Week 3: KQ2 Design Principles knowledge from knowledge organiser.

Week 5: Evaluation of app against a given criteria.

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• Intuitive
• Principle
• Contrast
• Serif
• Sans-Serif
• Consistency
• Skill level
  ○ Novice
  ○ Occasional
  ○ Regular
  ○ Expert
• Accessibility (needs)
• Social
• Fonts		

HALF TERM 2: Computer Programming using Python **KQ1 – How do you input/output data in python?** <u>(a) Print command</u> -Use of the print command to output text and numbers <u>(b) Input command</u> -Use of the input command to input text and numbers -Storing an input as a variable <u>(c) Variables</u> -A memory location where a piece of data is stored. -Assigning values to a variable -Concatenation of variables. <u>(d) Casting</u> -Converting a variable from one data type to another. -str(), int() <u>(e) Data Types</u> String, integer. **KQ2 – How is selection performed in Python?** <u>(a) IF Statements</u> -Structuring an if statements using if, else and elif -if statements using ==, >, <, including len() **KQ3 – What is string manipulation in Python?** <u>(a) Manipulating strings</u> -len() -word.upper() -word.lower() -(“Hello World”[3:7]) or variablename[3:7] **KQ4 – How can code be repeated?** <u>(a) For Loops</u> – -Iteration through the use of for loops -for i in range(0,9) : -for i in range(0,20,2) : -for i in word: **KQ5 – How can random numbers be generated in Python?** <u>(a) Random Numbers</u> -import random -random.randomint(0,9) **KQ6 – How can data be stored using Python?** <u>(a) Text files</u> – -file = open(“filename”, “w”)		Reading of guides for how to use the Python programming language to create programs.
		Written explanation of a Python program that has been created
		Peer explanation/discussion of code that has been created.
		Links to Languages/English – Syntax. How the language is written.
		**Homework: (All homeworks are revision-based, unless otherwise stated)** Week 1: KQ1 Inputs/Ouputs knowledge from knowledge organiser. Week 3: KQ4 Iteration knowledge from knowledge organiser. Using iteration written activities. Week 5: KQ6 Files knowledge from knowledge organiser.

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-"r", "w", "a" -file.write("") -file.write(variablename) -file.read()		
HALF TERM 3: Data Representation **KQ1 – How is text represented in a computer system?** <u>(a) Character representation -</u> -Each character is represented using a unique binary number. <u>(b) ASCII</u> – -We use the ASCII character set. -8 bits but only makes used of 7 with a leading 0. -This allows for 127 (128 with 00000000) characters. -There are other character sets which allow more characters to be represented – Extended ASCII (256) and Unicode (65,000) **KQ2 – How are images represented in a computer system?** <u>(a) Image Representation</u> - -Each colour is given a unique binary value. -Images are divided into pixels. -A pixel is only ever a single colour. -The binary value for the colour of each pixel needs to be stored. <u>(b) Colour depth:</u> -Colour depth is the number of bits used to store/represent each pixel. -Each colour requires its own unique value. -If more colours are used, move unique values are needed. -1 bit, 2 colours, 1 and 0. 2 bits, 4 colours, 00, 10, 01, 11 etc. -A bigger colour depth increases the size of the file as more data needs to be stored. -A bigger colour depth increases the image quality as more colours can be used. <u>(c) Resolution:</u> -Resolution is how clearly each pixel can be seen / the number of pixels in an inch of space (<u>D</u>ots <u>P</u>er <u>I</u>nch). -Higher resolution means more pixels, which means more binary digits need to be stored. This increases file size. -As pixels are harder to see, the quality of the image improves. **KQ3 - What is the binary number system and why is it used?** <u>(a) Why binary is used</u> – computers are circuits/two state systems, flow of electricity is represented as 1/0, on/off. <u>(b) The binary number system</u> – counting in binary, converting from binary to denary, converting from denary to binary, binary to represent text, binary addition. **<u>Keywords</u>**	    	Explanation of the differences between the way that characters can be represented – ASCII, Extended ASCII and Unicode, including why they are needed. Explanation detailing the main graphical concepts – resolution and colour depth. Peer discussion of instances when the choice of image resolution and colour depth are important e.g. streaming files, playing games, watching films etc. Links to Science – sound waves, frequency, amplitude etc. Homework: (All homeworks are revision-based, unless otherwise stated) Week 1: KQ1 Image Representation knowledge from knowledge organiser. Week 3: KQ2 Text Representation knowledge from knowledge organiser. Week 5: KQ3 Numbers knowledge from the knowledge organiser. Practice of binary convertion.

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- Representation
- Binary
- ASCII
- Character
- Extended ASCII
- Pixel
- Colour depth
- Bits
- Represent
- Resolution

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HALF TERM 4: IT Project
KQ1 – Emerging Technologies - Which technologies will be using next?
(a) Emerging Technologies
-Sensing and mobility / Virtual/Augmented reality / Artificial intelligence / Autonomous Driving / Internet of Things
(b) Autonomous Cars
Uses of, advantages, disadvantages/safety concerns.
(c) AR/VR
Uses of, advantages, disadvantages.
KQ2 – Why is planning important when creating digital products?
(a) Design principles
Use of colour, use of font styles/sizes, amount of information, use of white/empty space, use of appropriate language for age/user skill level
(b) Storyboarding
-A visual representation, usually drawn using shapes or created graphically.
-Advantages: Graphical representation of the interface, allows you to see the interface before creating it which can save wasted money etc
KQ3 – How do you create documents using Microsoft Publisher?
(a) When should Microsoft Publisher be used – purpose, when Publisher should be used, types of documents created in Publisher.
(b) Microsoft Publisher Tools
Shapes, auto shapes, shape formatting, text boxes, text formatting, inserting images, cropping images, rotating images, removing image background colour, layering.

- Augmented Reality
- Virtual Reality
- Artificial intelligence
- Autonomous Driving
- Internet of Things

- Colour
- Font
- Information
- White/empty space
- Appropriate
- Skill level

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<td>Emerging technologies in 23/24 article: https://www.weforum.org/agenda/2023/06/emerging-technologies-innovation-2023/</td>
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<td>Writing of article to be used in magazine.</td>
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<td>Discussion of the potential advantages and disadvantages of different emerging technologies.</td>
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<td>Links to Photography/Art/Graphics – Graphic design.</td>
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<td>Homework: (All homeworks are revision-based, unless otherwise stated)

Week 1: Revision of KQ1 Emerging Technologies knowledge from knowledge organiser.

Week 3: Completion of designs and writing of article for the magazine cover and inside page.

Week 5: Evaluation of magazine cover and article against a given criteria.</td>
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• Storyboard • Shapes • Formatting • Text box • Inserting • Cropping • Rotating • Layering		
HALF TERM 5: Computing Ethics / Laws **KQ1 – Why are computers creating moral/ethical concerns?** <u>(a) Morals</u> – -An individual's standards of behaviour/principles of what is right and what is wrong. -Unauthorised access – should not access files without permission/use them to cause harm. -Unauthorised use of software - should not use software that you have not purchased etc. -Inappropriate behaviour - should behave 'correctly' when using the internet, social media etc. -Inappropriate content - should not create/distribute inappropriate content. -Freedom of speech – The internet gives individuals a way of being heard by millions of people. <u>(b) Ethics</u> – Principles that govern a person's behaviour – given by an organisation e.g. ethical code of practice. -Ensuring public safety - ensuring software that is 'safety critical' is robust and free from errors. -Data security - companies should ensure that individual's data is stored securely and only used for the correct purposes. -Environmental Issues - using of goods that are harming the planet. -Ethical sourcing of goods - using of goods/materials that are sourced from child/forced labour. -Artificial Intelligence - computers can make 'decisions' for themselves, is this right? -Privacy - administrators/organisations have access to individual's data, how should they act? **KQ2 – What are the legal implications of Computer Science/ICT?** <u>(a) Data Protection Act</u> – -The purpose of the act is to ensure that data held about an individual is used in the correct way. -The 8 data protection principles - Fair and lawful, specific for its purpose, adequate and only for what is needed, accurate and up to date, not kept longer than needed, take into account people's rights, kept safe and secure, not be transferred outside the EEA. <u>(b) Computer Misuse Act</u> – -The purpose of the act is to ensure that it is illegal to use a computer to cause harm. -What contravenes the act – accessing data without permission (hacking), editing data without permission,	    	Articles detailing ethical, moral or legal concerns within computing. Written argument for/against a given environmental or ethical issue. Verbal discussion/debate/ argument for/against a given environmental or ethical issue. Links to RS – Ethical issues Links to Geography – Environmental issues, e-waste etc. Link to English – writing to argue **Homework: (All homeworks are revision-based, unless otherwise stated)** Week 1: KQ1 Morals knowledge from knowledge organiser. Week 3: KQ2 Ethics knowledge from knowledge organiser. Week 5: KQ2 Legislation knowledge from knowledge organiser.

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accessing data with the intent of committing further crime, making, supplying or obtaining anything which can be used in computer misuse offences (viruses, spyware etc.) (c) Copyright Design and Patents Act – -The purpose of the act is to ensure that an individual has the right to control the ways in which their material can be used. -Types of work covered - literary, dramatic, musical, artistic, typographical, sound recordings, films -Duration of rights - for literary, dramatic, musical or artistic works, for sound recordings and broadcasts, for films, for typographical arrangement of published editions **Keywords** • Morals • Unauthorised • Inappropriate • Freedom • Ethics • Environmental • Artificial Intelligence • Privacy • Data Protection Act • Rights • Computer Misuse Act • Contravenes • Copyright Design and Patents Act • Patent		
HALF TERM 6: Microsoft Office Skills **KQ1 – How do you present information in Microsoft Word?** (a) When should Microsoft Word be used – purpose, when Word should be used, types of documents created in Word. (b) Microsoft Word Tools – Shapes/auto shape, text boxes, text formatting, bullets, numbering, alignment, page layout, cut, copy, paste. (c) Presenting Data – Presenting a letter **KQ2 – How do you create documents using Microsoft Publisher?** (a) When should Microsoft Publisher be used – purpose, when Publisher should be used, types of documents created in Publisher. (b) Microsoft Publisher Tools Shapes, auto shapes, shape formatting, text boxes, text formatting, inserting images, cropping images, rotating images, removing image background colour, layering. **KQ3 – Show is Microsoft Excel used to analyse data?** (a) When should Microsoft Excel be used – purpose, when Excel should be used, types of documents created in Excel	    	- Writing of letter within week 1 Microsoft Word lesson. Peer discussion/evaluation of digital products created within the half-term. Links to English – letter writing. Homework: (All homeworks are revision-based, unless otherwise stated) Week 1: Drawn designs for the ticket to be created in week 3.

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<u>(b) Microsoft Excel Tools</u> – cells, rows, columns, alignment, cell formatting, number formatting, changing decimal places, use of percentages, merging cells, wrapping text.
<u>(c) Formulas:</u>
Using +, -, /, *
<u>(d) Functions</u>
Sum, max, min, average,
<u>(e) Conditional Formatting</u>
How to set cell rules, how to add data bars, how to add icon sets.
 	
Keywords
 	
• Word
• Formatting
• Font
• Alignment
• Margins
• Paragraphs
• Page layout
 	
• Publisher
• Shapes/auto shapes
• Shape formatting
• Text box
• Text formatting
• Inserting
• Cropping
• Rotating
 	
• Excel
• Formula
• Function
  ○ SUM
  ○ MIN
  ○ MAX
  ○ AVERAGE
• Alignment
• Formatting
• Percentage
		Week 3: Evaluation of digital product against a given criteria.
		
		Week 5: Revision of KQ3 Microsoft Excel knowledge from the knowledge organiser. Practice of using formulas and functions.