



Computer Science Guide Revision Programme 2020

Week start	Topic	Revision tasks (Read pages, learn definitions (where '-' is used) and complete questions using GCSE Books (EP – Exam Practice Workbook, RG—Revision Guide) and Revision Question Cards)	Guide Pages
24.02.20	Representing algorithms	Algorithm – a sequence of steps that can be followed to complete a task. Is not a computer program Decomposition - means breaking a problem into a number of sub-problems, so that each sub-problem accomplishes an identifiable task, which might itself be further subdivided. Abstraction - is the process of removing unnecessary detail from a problem.	RG 1-2 EP 4
02.03.20		Representing algorithms using: pseudo-code and Flowcharts Explain simple algorithms in terms of their inputs, processing and outputs. Determine the purpose of simple algorithms by Trace tables and Visual inspection	RG 2-3 EP 5-7
09.03.20		Linear search , Binary search. Compare search algorithms, know how they work. Advantages and disadvantages of both. Merge Sort, Bubble Sort. Compare sort algorithms.	RG 4-7 EP 8-12
16.03.20	Programming	Data types integer, real, Boolean, character, string. Concepts variable declaration, constant declaration, assignment, iteration, selection, subroutine (procedure/function). Data structures Arrays (1 and 2 dimensional), Records	RG 8-23 EP 13-30
23.03.20		Use arithmetic. Add +, Subtraction -, Multiplication *, Division /, eg 11/2, (11 DIV 2) = 5, (11 MOD 2) = 1 Relation operators. equal to =, not equal to ≠, less than <, greater than >, less than or equal to ≤, greater than or equal to ≥. String Handling, Random number generator Subroutines (procedures and functions) - An 'out of line' block of code that may be called by simply writing its name in a program statement. Advantages of subroutines, Parameters in subroutines, Return values from subroutines, Local variables, . Structured programming, Authentication program. Test data Normal (typical) – should be accepted, Boundary (extreme) – should be accepted, Erroneous– should NOT be accepted	RG 8-28 EP 31-35
30.03.20	Programming Languages	Levels Low level—Machine and Assembly language, High level – used to write most computer programs eg Python, VB, C++ Translators Interpreter – one instruction at a time, needed to run code, show errors when happens Compiler – all code at same time, creates an exe. File, reports errors at end Assembler – converts assembly code (eg LDA 10) into machine code (eg 10000100)	RG 29-30 EP 36-37
06.04.20	Data Representation	Bases Decimal (base 10 eg 178), Binary (base 2 eg 0010), Hexadecimal (base 16 eg 3D) Computers use binary to store data and instructions Text 7-bit ASCII and Unicode Image Pixel, Bitmap image, Size(Resolution), Colour depth, File size Sound Analogue to digital, Sampling, Sampling rate, Sample resolution, File size Integer Decimal to binary, binary to decimal, decimal to hexadecimal, hexadecimal to decimal. Units Bit (b), Byte (B), kilo (kB), Mega (MB), Giga (GB), ,Tera (TB) Compression —Making file sizes smaller. Lossy, Lossless, Huffman Code, Run Length (RLE)	RG 34-44 EP 42-51
13.04.20	Hardware and Software	Hardware – physical components of the system. Software -programs that run of the hardware. Gates NOT, AND, OR. Construct truth tables. Create, modify and interpret simple logic circuit diagrams. System Software – enables the computer to function eg Operating System Utility software (Operating system , manages: user interface, memory, processor(s), I/O, applications, security.) Application Software – enables a user to perform a task.	RG 31-33, 46-55 EP 39-41, 52-53, 59-64
20.04.20	Systems architecture	Von Neumann —The CPU runs programs where both instructions and data is stored in memory. Components of CPU: main memory, arithmetic logic unit, control unit, clock, bus. Factors effecting CPU performance: clock speed, number of processor cores, cache size, cache type. Fetch-Execute cycle —The CPU continuously reads instructions stored in main memory and executes them as required: Fetch, Decode, Execute.	RG 46-50, 53-55 EP 55-58, 61-64



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27.04.20	Main memory and Secondary storage	<p>Volatile – temporary memory, loses contents when power switched off</p> <p>Non-volatile – permanent memory, keeps contents when power is switched off</p> <p>Main memory – where all the data, files and programs are stored while they are being used. Volatile.</p> <p>Secondary storage – any non-volatile storage mechanism not directly accessible by the CPU</p> <p>RAM (Random Access Memory) usually the main memory. Volatile.</p> <p>ROM (Read Only Memory) used for 'boot up' BIOS. Non-volatile.</p> <p>Different types of secondary storage:</p> <p>Solid state: SSDs use electrical circuits to persistently store data</p> <p>Optical: CD/DVD/Blue Ray</p> <p>Magnetic: HDD</p> <p>'cloud storage' - uses magnetic and increasingly solid state storage at a remote location.</p> <p>'embedded system' – computers built into other devices eg dishwashers, dedicated to a single task.</p>	RG 49-52 EP 59-60
	Fundamentals of computer networks	<p>Computer network - a collection of computers linked together to communicate and share resources.</p> <p>Benefits and Risks</p> <p>Types of network: Personal Area Network (PAN), Local Area Network (LAN), Wide Area Network (WAN).</p> <p>Wireless v wired</p> <p>Topologies: Star and Bus</p> <p>Network protocol – set of rules that allow devices to communication on a network.</p> <p>Ethernet, Wi-Fi , TCP, IP, HTTP, HTTPS, FTP, Email protocols:SMTP, IMAP.</p> <p>4 layer TCP/IP model: Application layer, Transport layer, Internet layer, Link layer</p> <p>Network security: Authentication, Encryption, Firewall, MAC address filtering</p>	RG 57-61 EP 65-70
04.05.20	Fundamentals of cyber security (For Paper 2)	<p>Cyber security—consists of the processes, practices and technologies designed to protect networks, computers, programs and data from attack, damage or unauthorised access.</p> <p>Social engineering techniques (eg blagging, phishing, pharming, shouldering) - Is the art of manipulating people so they give up confidential information.</p> <p>Malicious code/Malware—a variety of forms of hostile or intrusive software (eg Computer virus, Trojan, Spyware, Adware)</p> <p>Weaknesses: Weak and default passwords, Misconfigured access rights, Removable media, Unpatched and/or outdated software</p> <p>Penetration testing - the process of attempting to gain access to resources without knowledge of usernames, passwords and other normal means of access.</p> <p>White-box simulate a malicious insider. Black-box to simulate an external hacking or cyber warfare attack.</p>	RG 62-65 EP 71-75
	Ethical, legal and environmental impacts of digital technology on wider society, including issues of privacy (For Paper 2)	<p>Understand and explain the general principles behind:</p> <p>cyber security</p> <p>mobile technologies</p> <p>wireless networking</p> <p>cloud storage</p> <p>theft of computer code</p> <p>issues around copyright of algorithms</p> <p>cracking</p> <p>hacking</p> <p>wearable technologies</p> <p>computer based implants.</p>	RG 34-44 EP 66-72
11.05.20		EXAMS	



Computer Science

Student: _____

Target Grade:

Predicted Grade:

Subject Paper 1/2 - December (2019) mock grade:

Subject Paper 1/2 - March (2020) mock grade:

Key Dates

Paper 1

Computational thinking and problem-solving 1h 30m 1 May 2020 am

Paper 2

Written assessment 1h 30m 14 May 2020 pm

Extra support available



**KEEP CALM
AND
START REVISION**