OCR Computing J276 – Check List

Suggestions for resources that will help you revise are as below.

- Cambridge Elevate on line resource https://elevate.cambridge.org/Elevate/Login.aspx#b (All students can create free accounts on line)
- GCSE OCR Computer Science (For the Grade -9-1 Course) The Revision Guide. (All students should have a copy)
- GCSE OCR Computer Science (For the Grade -9-1 Course) Exam Practice Workbook– (All students should have a copy)
- BBC Bitesize - http://www.bbc.co.uk/education/subjects/z34k7ty

1. **Written Paper 1 – 1.5 Hour exam - Content of Computer systems (J276/01) 50%**
2. **Written Paper 2 – 1.5 Hour exam - Content of Computational thinking, algorithms and programming (J276/02) 50%**

Written Paper 1 - Content of Computer systems (J276/01)			
1.1 Systems architecture	☺	😐	☹
• the purpose of the CPU			
Von Neumann architecture: • MAR (Memory Address Register) • MDR (Memory Data Register) • Program Counter • Accumulator			
common CPU components and their function: • ALU (Arithmetic Logic Unit) • CU (Control Unit) • Cache			
the function of the CPU as fetch and execute instructions stored in memory			
how common characteristics of CPUs affect their performance: • clock speed • cache size • number of cores			
embedded systems: • purpose of embedded systems • examples of embedded systems.			
1.2 Memory	☺	😐	☹
• the difference between RAM and ROM			
• the purpose of ROM in a computer system			
• the purpose of RAM in a computer system			
• the need for virtual memory			
• Flash memory			
1.3 Storage	☺	😐	☹
• the need for secondary storage			
• data capacity and calculation of data capacity requirements			

common types of storage:			
- optical - magnetic - solid state			
suitable storage devices and storage media for a given application, and the advantages and disadvantages of these, using characteristics:			
capacity			
speed			
portability			
durability			
reliability			
Cost.			

1.4 Wired and wireless networks

types of networks:	☺	😐	☹
LAN (Local Area Network)			
WAN (Wide Area Network)			
factors that affect the performance of networks			
the different roles of computers in a client-server and a peer-to-peer network			
the hardware needed to connect stand-alone computers into a Local Area Network:			
wireless access points			
routers/switches			
NIC (Network Interface Controller/Card)			
transmission media			
the internet as a worldwide collection of computer networks:			
DNS (Domain Name Server)			
hosting			
the cloud			
the concept of virtual networks.			

1.5 Network topologies, protocols and layers	☺	😐	☹
star and mesh network topologies			
Wifi:			
- frequency and channels - encryption - ethernet			
the uses of IP addressing, MAC addressing, and protocols including:			
TCP/IP (Transmission Control Protocol/Internet Protocol)			
HTTP (Hyper Text Transfer Protocol)			
HTTPS (Hyper Text Transfer Protocol Secure)			
FTP (File Transfer Protocol)			
POP (Post Office Protocol)			
IMAP (Internet Message Access Protocol)			
SMTP (Simple Mail Transfer Protocol)			

	☺	😐	☹
• the concept of layers			
• packet switching.			
1.6 System security	☺	😐	☹
• forms of attack			
threats posed to networks:			
• malware			
• phishing			
• people as the 'weak point' in secure systems (social engineering)			
• brute force attacks			
• denial of service attacks			
• data interception and theft			
• the concept of SQL injection			
• poor network policy			
• malware			
identifying and preventing vulnerabilities:			
• penetration testing			
• network forensics			
• network policies			
• anti-malware software			
• firewalls			
• user access levels			
• passwords			
• encryption			

1.7   Systems software

	☺	😐	☹
the purpose and functionality of systems software			
operating systems:			
• user interface			
• memory management/multitasking			
• peripheral management and drivers			
• user management			
• file management			
• user interface			
utility system software:			
• encryption software			
• defragmentation			
• data compression			
• the role and methods of backup			
1.8 Ethical, legal, cultural and environmental concerns	☺	😐	☹
how to investigate and discuss Computer Science technologies while considering:			
• ethical issues			
• legal issues			
• cultural issues			
• environmental issues			
• privacy issues			

	☺	😐	☹
• how key stakeholders are affected by technologies			
• environmental impact of Computer Science			
• cultural implications of Computer Science			
• open source vs proprietary software			
legislation relevant to Computer Science:			
• The Data Protection Act 1998			
• Computer Misuse Act 1990			
• Copyright Designs and Patents Act 1988			
• Creative Commons Licensing			
• Freedom of Information Act 2000.			
Written Paper 2 - Content of Computational thinking, algorithms and programming (J276/02)	☺	😐	☹
2.1 Algorithms			
computational thinking:			
• abstraction			
• decomposition			
• algorithmic thinking			
standard searching algorithms:			
• binary search			
• linear search			
standard sorting algorithms:			
• bubble sort			
• merge sort			
• insertion sort			
how to produce algorithms using:			
• pseudocode			
• using flow diagrams			
• interpret, correct or complete algorithms			
2.2 Programming techniques	☺	😐	☹
• the use of variables, constants, operators, inputs, outputs and assignments			
the use of the three basic programming constructs used to control the flow of a program:			
• sequence			
• selection			
• iteration (count and condition controlled loops)			
• the use of basic string manipulation			
the use of basic file handling operations:			
• open			
• read			
• write			
• close			
• the use of records to store data			
• the use of SQL to search for data			
• the use of arrays (or equivalent) when solving problems, including both one and two dimensional			
• arrays			
• how to use sub programs (functions and procedures) to produce structured code			
the use of data types:			
• integer			
• real			
• Boolean			
• character and string			

	☺	😐	☹
• casting			
• the common arithmetic operators			
• the common Boolean operators.			
2.3 Producing robust programs	☺	😐	☹
defensive design considerations:			
• input sanitisation/validation			
• planning for contingencies			
• anticipating misuse			
• authentication			
maintainability:			
• comments			
• indentation			
• the purpose of testing			
types of testing:			
• iterative			
• final/terminal			
• how to identify syntax and logic errors			
• selecting and using suitable test data			
2.4 Computational logic	☺	😐	☹
• why data is represented in computer systems in binary form			
• simple logic diagrams using the operations AND, OR and NOT			
• truth tables			
• combining Boolean operators using AND, OR and NOT to two levels			
• applying logical operators in appropriate truth tables to solve problems			
applying computing-related mathematics:			
• +			
• –			
• /			
• *			
• Exponentiation (^)			
• MOD			
• DIV			
2.5 Translators and facilities of languages	☺	😐	☹
• characteristics and purpose of different levels of programming language, including low level languages			
• the purpose of translators			
• the characteristics of an assembler, a compiler and an interpreter			
common tools and facilities available in an integrated development environment (IDE):			
• editors			
• error diagnostics			
• run-time environment			
• translators.			
2.6 Data representation	☺	😐	☹
unit			
• bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte			
• how data needs to be converted into a binary format to be processed by a computer.			
Numbers			
• how to convert positive denary whole numbers (0–255) into 8 bit binary numbers and vice versa			

• how to add two 8 bit binary integers and explain overflow errors which may occur			
• binary shifts			
• how to convert positive denary whole numbers (0–255) into 2 digit hexadecimal numbers and vice versa			
• how to convert from binary to hexadecimal equivalents and vice versa			
• check digits.			
• Characters			
• the use of binary codes to represent characters			
• the term 'character-set'			
• the relationship between the number of bits per character in a character set and the number of			
• characters which can be represented (for example ASCII, extended ASCII and Unicode).			
• Images			
• how an image is represented as a series of pixels represented in binary			
• metadata included in the file			
• the effect of colour depth and resolution on the size of an image file.			
• Sound			
• how sound can be sampled and stored in digital form			
how sampling intervals and other factors affect the size of a sound file and the quality of its playback:			
• sample size			
• bit rate			
• sampling frequency.			
• Compression			
• need for compression			
types of compression:			
• lossy			
• lossless			