OCR J277
TOPIC CHECKLIST

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Specific knowledge required for 1.1 Systems Architecture	Need to Revise	Revised Once	Got it!
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	☐	☐	☐

Specific knowledge required for 1.2 Memory & Storage	Need to Revise	Revised Once	Got it!
The need for primary storage	☐	☐	☐
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	☐	☐	☐
The need for secondary storage	☐	☐	☐
Common types of storage:	☐	☐	☐
optical	☐	☐	☐
magnetic	☐	☐	☐
solid state	☐	☐	☐
Suitable storage devices and storage media for a given application	☐	☐	☐
The advantages and disadvantages of different storage devices and storage media relating to these characteristics:	☐	☐	☐
capacity	☐	☐	☐
speed	☐	☐	☐
portability	☐	☐	☐
durability	☐	☐	☐
reliability	☐	☐	☐
cost	☐	☐	☐

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Specific knowledge required for 1.2 Memory & Storage	Need to Revise	Revised Once	Got it!
Units:	☐	☐	☐
bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte	☐	☐	☐
how data needs to be converted into a binary format to be processed by a computer	☐	☐	☐
Data capacity and calculation of data capacity requirements	☐	☐	☐
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	☐	☐	☐
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 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, resolution on the size, quality 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	☐	☐	☐

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Specific knowledge required for 1.3 Computer Networks	Need to Revise	Revised Once	Got it!
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	☐	☐	☐
Web servers and clients	☐	☐	☐
Star and Mesh network topologies	☐	☐	☐
Modes of connection:	☐	☐	☐
Wired	☐	☐	☐
Ethernet	☐	☐	☐
Wireless	☐	☐	☐
Wi-Fi	☐	☐	☐
Bluetooth	☐	☐	☐
Encryption	☐	☐	☐
The uses of IP addressing, MAC addressing	☐	☐	☐
Standards	☐	☐	☐
Common 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	☐	☐	☐

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Specific knowledge required for 1.4 System security	Need to Revise	Revised Once	Got it!
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	☐	☐	☐
Identifying and preventing vulnerabilities:	☐	☐	☐
penetration testing	☐	☐	☐
anti-malware software	☐	☐	☐
firewalls	☐	☐	☐
user access levels	☐	☐	☐
passwords	☐	☐	☐
encryption.	☐	☐	☐
Physical security	☐	☐	☐

Specific knowledge required for 1.5 Systems software	Need to Revise	Revised Once	Got it!
The purpose and functionality of operating systems	☐	☐	☐
Operating systems:	☐	☐	☐
user interface	☐	☐	☐
memory management/multitasking	☐	☐	☐
peripheral management and drivers	☐	☐	☐
user management	☐	☐	☐
file management	☐	☐	☐
The purpose and functionality of utility software	☐	☐	☐
Utility system software:	☐	☐	☐
encryption software	☐	☐	☐
defragmentation	☐	☐	☐
data compression	☐	☐	☐

Specific knowledge required for 1.6 Ethics	Need to Revise	Revised Once	Got it!
Impacts of digital technology on wider society including:	☐	☐	☐
ethical issues	☐	☐	☐
legal issues	☐	☐	☐
cultural issues	☐	☐	☐
environmental issues.	☐	☐	☐
privacy issues	☐	☐	☐
Legislation relevant to Computer Science:	☐	☐	☐
The Data Protection Act 1998	☐	☐	☐
Computer Misuse Act 1990	☐	☐	☐
Copyright Designs and Patents Act 1988	☐	☐	☐
Software licences (Open source vs proprietary software)	☐	☐	☐

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Specific knowledge required for 2.1 Algorithms	Need to Revise	Revised Once	Got it!
Computational thinking:	☐	☐	☐
abstraction	☐	☐	☐
decomposition	☐	☐	☐
algorithmic thinking	☐	☐	☐
Identify the inputs, processes, and outputs for a problem	☐	☐	☐
Structure diagrams	☐	☐	☐
Create, interpret, correct, complete, and refine algorithms using:	☐	☐	☐
Pseudocode / Reference language / high level programming language	☐	☐	☐
Flowcharts	☐	☐	☐
Identify common errors	☐	☐	☐
Trace tables	☐	☐	☐
Standard searching algorithms:	☐	☐	☐
binary search	☐	☐	☐
linear search	☐	☐	☐
Standard sorting algorithms:	☐	☐	☐
bubble sort	☐	☐	☐
merge sort	☐	☐	☐
insertion sort	☐	☐	☐

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Specific knowledge required for 2.2 Programming Fundamentals	Need to Revise	Revised Once	Got it!
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 common arithmetic operators	☐	☐	☐
The common Boolean operators AND, OR and NOT	☐	☐	☐
The use of data types:	☐	☐	☐
integer	☐	☐	☐
real	☐	☐	☐
Boolean	☐	☐	☐
character and string	☐	☐	☐
casting	☐	☐	☐
Applying computing-related mathematics:	☐	☐	☐
+	☐	☐	☐
–	☐	☐	☐
/	☐	☐	☐
*	☐	☐	☐
Exponentiation (^)	☐	☐	☐
MOD	☐	☐	☐
DIV	☐	☐	☐
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	☐	☐	☐
Random number generation	☐	☐	☐

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Specific knowledge required for 2.3 Producing robust programs	Need to Revise	Revised Once	Got it!
Defensive design considerations:	☐	☐	☐
input validation	☐	☐	☐
anticipating misuse	☐	☐	☐
authentication	☐	☐	☐
Maintainability:	☐	☐	☐
Use of subprograms	☐	☐	☐
Naming conventions	☐	☐	☐
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	☐	☐	☐
Normal	☐	☐	☐
Boundary	☐	☐	☐
Invalid / Erroneous	☐	☐	☐
Refining algorithms	☐	☐	☐

Specific knowledge required for 2.4 Boolean logic	Need to Revise	Revised Once	Got it!
Simple logic diagrams using the operations AND, OR and NOT	☐	☐	☐
Truth tables	☐	☐	☐
Combining Boolean operators using AND, OR and NOT	☐	☐	☐
Applying logical operators in appropriate truth tables to solve problems	☐	☐	☐

Specific knowledge required for 2.5 Programming languages & IDEs	Need to Revise	Revised Once	Got it!
Characteristics and purpose of different levels of programming language:	☐	☐	☐
High level languages	☐	☐	☐
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	☐	☐	☐

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If you found this useful, drop a follow to help me out!

THANK YOU!

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