

OCR GCSE Computer Science

Revision Checklist



OCR Component 01

Computing Systems

80 marks – 1 hour and 30 minutes, Written paper
(no calculators allowed)

1.1 – Systems Architecture

1.2 – Memory

1.3 – Storage

1.4 – Wired & Wireless Networks

1.5 – Network Topologies, Protocols & Layers

1.6 – Systems security

1.7 – Systems Software

1.8 – Ethical, Legal, Cultural & Environmental Concerns

OCR Component 02

Computational Thinking, Algorithms & Programming

80 marks – 1 hour and 30 minutes, Written paper
(no calculators allowed)

2.1 – Algorithms

2.2 – Programming Techniques

2.3 – Producing Robust Programs

2.4 – Computational Logic

2.5 – Translators & Facilities of Languages

2.6 – Data Representation

Credits:

1. Video tutorial links from craigndave.org

1.1 – Systems Architecture



Video tutorial links: https://www.youtube.com/watch?list=PLCiOXwirraUCaPt5zN4xJTlgKvzVYWa_5&v=t8H6-anK0t4

Specific knowledge required for GCSE Computer Science J276	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	☐	☐	☐

1.2 Memory and 1.3 Storage



Video tutorial links: Click for [1.2 Memory](#) and [1.3 Storage](#) tutorial video links

Specific knowledge required for GCSE Computer Science j276	Need to Revise	Revised Once	Got it!
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	☐	☐	☐
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



Video tutorial links: https://www.youtube.com/watch?list=PLCiOXwirraUCTooN8MYg4RDWF3FUC7JBU&v=ZAMbMcYqK_0

Specific knowledge required for GCSE Computer Science j276	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	☐	☐	☐
The concept of virtual networks	☐	☐	☐

1.5 Network topologies, protocols and layers

Video tutorial links: <https://www.youtube.com/watch?list=PLCiOXwirraUCzDEOPQiBSLIPTkDfFBiOO&v=vW3PeQ0XYc>

Specific knowledge required for GCSE Computer Science j276	Need to Revise	Revised Once	Got it!
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



Video tutorial links: <https://www.youtube.com/watch?list=PLCiOXwirraUBmdNk9YTirPOmCc-J3KP4W&v=v6Qgr1wT4uE>

Specific knowledge required for GCSE Computer Science j276	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	☐	☐	☐
poor network policy	☐	☐	☐
Identifying and preventing vulnerabilities:	☐	☐	☐
penetration testing	☐	☐	☐
network forensics	☐	☐	☐
network policies	☐	☐	☐
anti-malware software	☐	☐	☐
firewalls	☐	☐	☐
user access levels	☐	☐	☐
passwords	☐	☐	☐
encryption.	☐	☐	☐

Video tutorial links: https://www.youtube.com/watch?list=PLCiOXwirraUCX30hYq0CvNt47_ZTPMqcj&v=dJH_ev7DR5I

Specific knowledge required for GCSE Computer Science j276	Need to Revise	Revised Once	Got it!
The purpose and functionality of systems software	☐	☐	☐
Operating systems:	☐	☐	☐
user interface	☐	☐	☐
memory management/multitasking	☐	☐	☐
peripheral management and drivers	☐	☐	☐
user management	☐	☐	☐
file management	☐	☐	☐
Utility system software:	☐	☐	☐
encryption software	☐	☐	☐
defragmentation	☐	☐	☐
data compression	☐	☐	☐
the role and methods of backup:	☐	☐	☐
full	☐	☐	☐
incremental	☐	☐	☐

1.8 Ethical, legal, cultural and environmental concerns

Video tutorial links: https://www.youtube.com/watch?list=PLCiOXwirraUCHoD2tVSJ6ZmnHUayVr3WT&v=A_6NfRS3nt0

Specific knowledge required for GCSE Computer Science j276	Need to Revise	Revised Once	Got it!
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	☐	☐	☐
How key stakeholders are affected by technologies	☐	☐	☐
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.	☐	☐	☐

2.1 Algorithms



Video tutorial links: <https://www.youtube.com/watch?list=PLCiOXwirraUAF7ueVPI99gktxzJNElyCC&v=TVUvDdpml70>

Specific knowledge required for GCSE Computer Science j276	Need to Revise	Revised Once	Got it!
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



Video tutorial links: https://www.youtube.com/watch?list=PLCiOXwirraUDRk5TIB2uIS3V2-0tB3vcS&v=AaLk_fEVCiY

Specific knowledge required for GCSE Computer Science j276	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 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	☐	☐	☐

Video tutorial links: https://www.youtube.com/watch?list=PLCiOXwirraUDRk5TlB2ulS3V2-0tB3vcS&v=AaLk_fEVCiY

[illegible]

2.3 Producing robust programs



Video tutorial links: <https://www.youtube.com/watch?list=PLCiOXwirraUD62R4SNX3Uud5y4dIDh1P&v=Jylki33P9g0>

Specific knowledge required for GCSE Computer Science j276	Need to Revise	Revised Once	Got it!
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	☐	☐	☐

Video tutorial links: https://www.youtube.com/watch?list=PLCiOXwirraUDIUDRlk21mH1Y_wCpYaMii&v=KUfPsCJ-zzE

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Video tutorial links: <https://www.youtube.com/watch?list=PLCiOXwirraUBgpr9LxH3oQhRZ2yhflhH7&v=piohfOMhb0g>

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2.6 Data representation



Video tutorial links: <http://student.craigndave.org/videos/2-6-data-representation> (Videos to come)

Specific knowledge required for GCSE Computer Science j276	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	☐	☐	☐
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).	☐	☐	☐

2.6 Data representation



Video tutorial links: <http://student.craigndave.org/videos/2-6-data-representation> (Videos to come)

Specific knowledge required for GCSE Computer Science j276	Need to Revise	Revised Once	Got it!
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	☐	☐	☐