Year 11 GCSE: Revision Guidance

Circulation	Year 11 Students
Title	Y11 Revision Guidance for Computer Science
Purpose	To provide revision information for GCSE Examinations

You will sit two papers for your GCSE exam. The numbers below are links to the specification. Links to each section of the specification can be access by clicking on the subject below.

Paper 1: Computer Systems

- ***1.1 – Systems architecture***
  - *1.1.1 Architecture of the CPU (Purpose of CPU, Components of the CPU, Register and Von Neuman architecture)*
  - *1.1.2 CPU performance*
  - *1.1.3 Embedded systems*

- ***1.2 – Memory and storage***
  - *1.2.1 Primary storage (RAM, ROM, Virtual and Cache Memory)*
  - *1.2.2 Secondary storage (Need for secondary storage, Types of secondary storage and advantages/disadvantages of different secondary storage)*
  - *1.2.3 Units (Data Capacity Conversions, Binary Conversion, Hex Conversion, Binary addition and Binary shifts)*
  - *1.2.4 Data storage (Character Sets, Images, Sound and Compression)*

- ***1.3 – Computer networks, connections and protocols***
  - *Types of network (LAN and WAN)*
  - *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*
  - *The Internet as a worldwide collection of computer networks (DNS, Hosting, Cloud, Web Servers and Clients)*
  - *Star and Mesh network topologies*

- ***1.3.2 Wired and wireless networks, protocols and layers***
  - *Modes of connection (Wired and Wireless)*
  - *Encryption*
  - *IP addressing and MAC addressing*
  - *Standards*
  - *Common protocols including TCP/IP, HTTP, HTTPS, FTP, POP, IMAP, SMTP*
  - *The concept of layers*
- ***1.4 – Network security***

- *Forms of attack (Malware, Social Engineering, Brute-force-attacks, DDOS, Data Interception/Theft, SQL injection)*
- *Common prevention methods (Penetration Testing, Anti-malware, firewalls, user access levels, passwords, encryption and physical security)*

- ***1.5 – Systems software***
  - *The purpose and functionality of operating system (Memory Management, User Interface, Multitasking, Peripheral Management / Drivers, User Management, File Management)*
  - *Utility Software (Encryption, defragmentation and data compression software)*

- ***1.6 Ethical, legal, cultural and environmental impacts of digital technology***
  - *Impact of technology on wider society including:*
    - *Ethical issues*
    - *Legal issues*
    - *Cultural issues*
    - *Environmental issues*
    - *Privacy issues*
  - *Legislation relevant to Computer Science:*

Paper 2: *Computational Thinking, Algorithms and Programming*

- ***2.1 Computational Thinking***
  - *Principles of computational thinking (Abstraction, Decomposition,* Algorithmic thinking)

- **2.1.2 Designing, creating and refining algorithms**
  - Identify the inputs, processes, and outputs for a problem
  - Structure diagrams
    - Create, interpret, correct, complete, and refine algorithms using Pseudocode and Flowcharts.
    - Reference language/high-level programming language
  - Identify common errors
  - Trace tables

- **2.2 – Programming fundamentals**
  - 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

  - **2.2.2 Data types -**
    - The use of data types (Integer, Real, Boolean, Character and string, Casting)

  - **2.2.3 Additional programming techniques**

- 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-dimensional (1D) and two-dimensional arrays (2D)
- How to use sub programs (functions and procedures) to produce structured code
- Random number generation

- **2.3 – Producing robust programs**
  - **2.3.1 Defensive design**
    - Defensive design considerations (Anticipating misuse, Authentication)
    - Input validation
    - Maintainability (Use of sub programs, Naming conventions, Indentation, Commenting)
  - **2.3.2 Testing**
    - The purpose of testing
    - Types of testing (Iterative, Final/terminal)
    - Identify syntax and logic errors
    - Selecting and using suitable test data (Normal, Boundary, Invalid/Erroneous
    - Refining algorithms

- **2.4 – Boolean logic**
  - Simple logic diagrams using the operators AND, OR and NOT
  - Truth tables
  - Combining Boolean operators using AND, OR and NOT
  - Applying logical operators in truth tables to solve Problems

- **2.5 – Programming languages and Integrated Development Environments**
  - **2.5.1 Languages**
    - Characteristics and purpose of different levels of programming language (High-level languages, Low-level languages)
    - The purpose of translators
    - The characteristics of a compiler and an interpreter
  - **2.5.2 The Integrated Development Environment (IDE)**
    - Common tools and facilities available in an Integrated Development Environment /IDE (Editors, Error diagnostics,Run-time environment, Translators)

All Computer Science papers will be 1 hour and 30 minutes. The papers will contain a variety of question types including multiple choice, short answer questions, longer answer questions and practical skills questions. You must answer all questions in the paper.

You will need a black pen, pencil and ruler for the exam. You are now allowed calculators

Further detail and revision materials can be found here:
Past Papers: GCSE Computer Science Past Papers - PMT (make sure to select OCR)
Revision to learn/recap previous topics: OCR GCSE Computer Science Revision - Craig 'n' Dave
Revision to Check Understanding: https://smartrevise.online/
Other Revision Resources: Computer Science Team **->** Files **->** Revision Folder