AQA AS/A Level Computer Science

Bridging the Gap Year 11 – Year 12

Specification at a glance

Paper 1

On-screen exam: 1 hours 45 minutes
50% of AS

What's assessed:
This paper tests a student's ability to program, as well as their theoretical knowledge of Computer Science from subject content 1-4 below.

Questions:
Students answer a series of short questions and write/adapt/extend programs in an Electronic Answer Document provided by AQA.

AQA will issue Preliminary Material, a Skeleton Program (available in each of the Programming Languages) and, where appropriate, test data, for use in the exam.

- **1 Fundamentals of programming: Programming**
  - **Data types**
  - **Programming concepts**
  - **Arithmetic operations in a programming language**
  - **Relational operations in a programming language**
  - **Boolean operations in a programming language**
  - **Constants and variables in a programming language**
  - **String-handling operations in a programming language**
  - **Random number generation in a programming language**
  - **Exception handling**
  - **Subroutines (procedures/functions)**
  - **Parameters of subroutines**
  - **Returning a value/values from a subroutine**
  - **Local variables in subroutines**
  - **Global variables in a programming language**
  - **Procedural-oriented programming**
  - **Structured programming**

- **2 Fundamentals of data structures:**
  - **Data structures**
  - **abstract data types**
  - **Single- and multi-dimensional arrays (or equivalent)**
  - **Fields, records and files**

- **3 Systematic approach to problem solving**
- **Aspects of software development**
    - **Analysis**
    - **Design**
    - **Implementation**
    - **Testing**
    - **Evaluation**
- **4 Theory of computation** o **Abstraction and automation**
    - **Problem-solving**
    - **Following and writing algorithms**
    - **Abstraction**
    - **Information hiding**
    - **Procedural abstraction**
    - **Functional abstraction**
    - **Data abstraction**
    - **Problem abstraction/reduction**
    - **Decomposition**
    - **Composition**
    - **Automation** o **Finite state machines (FSMs) without output**

Paper 2

Written exam: 1 hours 30 minutes

50% of AS

What's assessed:

This paper tests a student's ability to answer questions from subject content 5-9 below.

Questions:

Compulsory short-answer and extended-answer questions.

- **5 Fundamentals of data representation**
    - **Number systems**
    - **Number bases**
    - **Units of information**
    - **Binary number system**
    - **Information coding systems**
    - **Representing images, sound and other data**

- **6 Fundamentals of computer systems**
    - **Hardware and software**
        - **Relationship between hardware and software**
        - **Classification of software**
        - **System software**
        - **Role of an operating system (OS)**
        - **Classification of programming languages**
        - **Types of program translator**
        - **Logic gates**
        - **Boolean algebra**

- **7 Fundamentals of computer organisation and architecture**
    - **Internal hardware components of a computer**
    - **The stored program concept**
    - **Structure and role of the processor and its components**
    - **The processor and its components**
    - **The Fetch-Execute cycle and the role of registers within it**
    - **The processor instruction set**
    - **Addressing modes**
    - **Machine-code/assembly language operations**
    - **Interrupts**
    - **Factors affecting processor performance**
    - **External hardware devices**
    - **Input and output devices**
    - **Secondary storage devices**
- **8 Consequences of uses of computing**
    - **Individual (moral), social (ethical), legal and cultural issues and opportunities**
- **9 Fundamentals of communication and networking**
    - **Communication methods**
    - **Communication basics**
    - **Network topology**
    - **Types of networking between hosts**
    - **Wireless networking**

Full Specification PDF:
http://filestore.aqa.org.uk/resources/computing/specifications/AQA-7516-7517-SP-2015.PDF

There's an online wiki style textbook here
https://en.wikibooks.org/wiki/A-level_Computing/AQA

There are excellent videos covering much of the course content. We recommend these as a starting point
https://student.craigndave.org/aqa-alevel-videos

In order to improve your Python skills you may consider purchasing the "Learning to Program in Python" book. Here is the link:
https://amzn.to/2Ktt0PW

There's also an excellent **free online** version of a book entitled: *"How to think like a Computer Scientist"* You can find it here: http://openbookproject.net/thinkcs/python/english3e/

You should also practice some Python exercises. Here are a couple of good websites:

http://www.practicepython.org/ https://snakify.org/ https://www.tutorialspoint.com/python/index.htm

PG Online's AQA AS and A Level Computer Science textbook is our official course textbook:

https://amzn.to/2yNJv4X

Thanks everyone,

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