

AQA Computer Science A Level: Study Tasks

Past Paper Questions

All available past papers can be found at the following link, with both questions and mark schemes:

<https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/assessment-resources>

Programming

Seneca learning has Python 3 course if you feel you need to brush up on the basics:

Coding: Introduction to Python v3

There are lots of free online programming tutorials, such as:

- <https://www.learnpython.org/>
- <https://www.codecademy.com/learn/learn-python-3>
- <https://www.w3schools.com/python/>
- <https://thepythonguru.com/>

There are lots of online coding challenges to really push your programming knowledge to the limit, such as:

- <https://www.topcoder.com/>
- <https://coderbyte.com/>
- <https://projecteuler.net/>
- <https://www.hackerrank.com/>
- <https://www.codewars.com/>

Revision Sites

This website has notes on the main topics for the course:

<https://www.physicsandmathstutor.com/computer-science-revision/a-level-aqa/>

Podcasts

1. **Reasons to be Cheerful:** The ABC of AI: How Can Technology Help Humanity
<https://play.acast.com/s/reasonstobecheerful/b9b4ad7d-cc15-47b3-9a55-a212d619a5d7>
2. **Software Engineering Radio:** can help with understanding what work is like making software:
<https://www.se-radio.net/>

Videos

The following channels provide a variety of topics from Computer Science:

- <https://www.youtube.com/user/Computerphile>

The following channels provide revision material specifically for the course:

- <https://www.youtube.com/channel/UC0HzEBLIJxlrwBAHJ5S9JQg>

The following are interesting TED talks related to issues in computer science:

- Computer science is for everyone (<https://www.youtube.com/watch?v=FpMNs7H24X0>)
- The internet is on fire (<https://www.youtube.com/watch?v=QKe-aO44R7k>)
- Can we build AI without losing control over it? (<https://www.youtube.com/watch?v=8nt3edWLgIq>)
- How AI can save our humanity (<https://www.youtube.com/watch?v=ajGgd9Ld-Wc>)
- Gaming can make a better world (<https://www.youtube.com/watch?v=dE1DuBesGYM>)

Books

We have digital copies of subject-related books in Student Shared:

Student Shared\Subjects\Computer Science\KS5\Computer Science\Computer Science Books

Research Tasks

STUDY /RESEARCH TASKS 1:

- 1) Explore the concept of computational thinking and consider examples that predate the invention of the computer.
- 2) Models have been built to predict how many gold medals Britain will win during the Olympic Games. Find out what variables go into these models and how accurate the predictions have been.
- 3) Research what data and algorithms are used in order to predict: A) weather B) tornados C) tsunamis.
- 4) Find examples, other than those in this chapter, where an algorithm developed to solve one problem has been used to solve a different problem.

STUDY /RESEARCH TASKS 2:

- 1) Research the 'Busy Beaver' and how it can be solved using a Turing machine.

STUDY RESEARCH TASKS 3:

- 1) Use BNF to try and explain some of the rules of constructing a sentence using the English Language.
- 2) Research Extended Backus-Naur Form (EBNF).
- 3) Look into the work of Panini and the Sanskrit Language. How does this relate to BNF?

STUDY / RESEARCH TASKS 4:

- 1) Find out about the irrational numbers called 'Euler's number' and 'the Golden Ratios'.
- 2) Apart from 2, 3 and 99, identify some other square roots that are irrational numbers.
- 3) Why do programming languages often have several different data types for an integer?
- 4) Find out which number types are supported as data types in a programming language of your choice.
- 5) The Ancient Greeks did not recognise the number zero. How did their number systems work without it?

STUDY / RESEARCH TASKS 5:

- 1) Explain why the Computer Misuse Act is inadequate as a measure for preventing hacking.
- 2) There is currently a lot of pressure on the government to update the laws relating to computer misuse. Why is the current legislation considered by some to be ineffective and what could be done to improve it?
- 3) Do you consider the RIP Act to be an infringement of civil liberties?
- 4) Should the Internet be censored?
- 5) Some countries do censor the Internet. Find a country that does impose censorship and describe how they do it.

READING TASKS:

Read any of the following short stories and consider the ethical issues we face in the modern age of computer science. Write a short review containing what you thought of the story and your thoughts on the issues being raised.

1. <https://www.apex-magazine.com/welcome-to-your-authentic-indian-experience/>
2. <https://www.kasmamagazine.com/here-and-now.html>
3. http://clarkesworldmagazine.com/shoemaker_08_15/

USEFUL WEBSITES:

1. <https://www.physicsandmathstutor.com>
2. <https://www.mrbckly.com>
3. https://en.wikibooks.org/wiki/A-level_Computing/AQA