



COMPUTER SCIENCE: BRIDGING ACTIVITY

Computers and computer systems (hardware and software) are everywhere in our society: mobile phones, games consoles, social media, design, manufacturing, commerce, scientific research, medicine – and many other places! Computer science is a large and dynamic field to study, and it leads to future opportunities in many different areas.

Below are some tasks for you to complete over the summer to introduce you to and prepare you for study of this exciting subject area. These tasks have been created to get you thinking about the broader topic of computer science, its applications and where the qualification might take you, rather than mapping to the specific exam specification.

However, more information about subject content for this course and assessment can be found here: <https://www.ocr.org.uk/Images/170844-specification-accredited-a-level-gce-computer-science-h446.pdf>

Bridging tasks

Task 1: Watch this overview of the field of computer science. **[30-60 minutes]**

Map of Computer Science

While watching, take some notes and jot down your thoughts on the following:

- A. Have you heard of any of the things mentioned? What do you know about them?
- B. What elements would you be most interested in exploring further?

Task 2: Watch the TEDTalks below.

For each talk, write a 250-500 word synopsis of the content. With reference to the video from Task 1, write a second short paragraph (250 words) about which element(s) of the field of computer science you feel it relates to. **[2-3 hours total]**

- Matt Langione - This talk on the quantum computing - The promise of quantum computers
- Gary Marcus - This talk on potential risks of AI - The urgent risks of runaway AI -- and what to do about them
- Emma Hart - This talk which explores some of the philosophical ideas surrounding

artificial intelligence. Self-assembling robots and the potential of artificial evolution

Task 3: Do some independent research and take notes on **at least two** computer science topics that interest you. You should aim to have 3-5 pages of notes for each chosen topic. You will use these for the fourth task. **[2-3 hours total]**

Below are some topics you might wish to research, but feel free to choose another computer science topic if you wish:

- **Cybersecurity/Cryptography** (what is it; what is hacking; what is the risk to governments/businesses/individuals)
- **Big Data and Personal Privacy** (impact of social media on personal privacy; who is big brother – who has access to your data; advantages and disadvantages of sharing your information with large corporations)
- **Artificial Intelligence** – (what are the different kinds of AI, will computers take over the world; advantages/disadvantages; what is machine learning; ethical considerations)
- **Advances in Hardware** – (how have my gaming consoles changed through the years and what might the next gen look like; the future of input/output devices; what can you make with a 3D printer?)
- **Deep Fakes** – How are they produced? What impact might they have on society/governments? How can they be identified?
- **Quantum Computing** – what is it? How will it change the future of computing?
- **Virtual or Augmented Reality** (what is it; what are the current/future applications)
- **Robotics** (current advances in robotics; what is the future of robotics; ethical considerations about creating robotic systems; advantages/disadvantages)

Task 4: Make a TED Talk about one of the subjects that you did your independent research in. These **must** be ready to present to the class in the second week of the first term in Year 12. **[2-3 hours]**

Task 5: We will be learning to program with Python.

If you have not done programming with Python before, complete the Solo Learn “Introduction to Python” course <https://www.sololearn.com/>

If you have done programming in Python, you can complete the Solo Learn course “Python Intermediate” or one of the introductory courses on C, C++, C# or Java