



St. Anne's Sixth Form

Get Ahead Tasks

Computer Science A Level

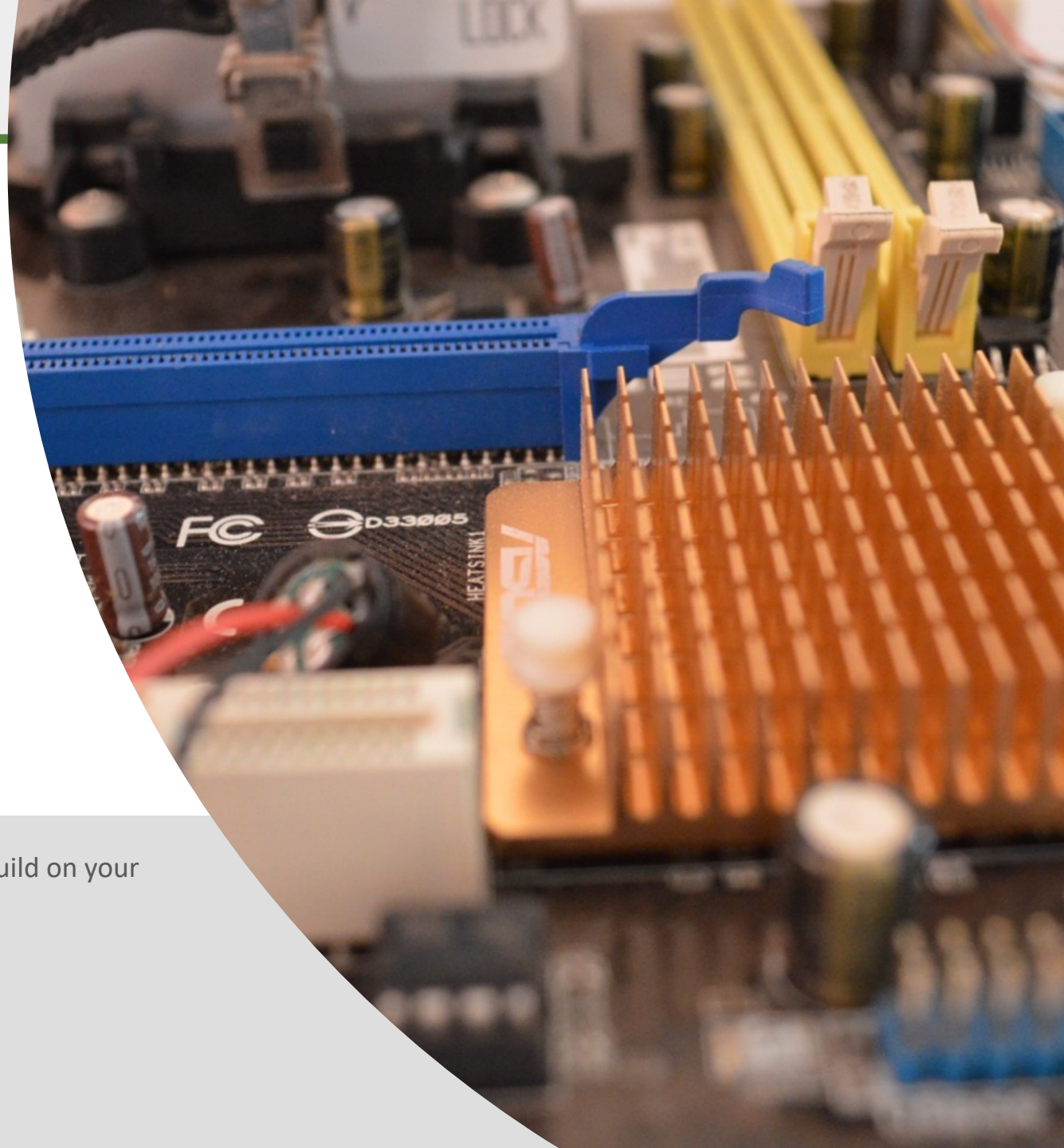


Computer Science Transition workbook

- The topic of **Computer Science** is at the heart of the modern world
- Studying it can make you extremely sought after in today's job market
- The transition from GCSE to A level is significant, this includes:
 - An increased emphasis on **technical content**
 - An increased emphasis **independent research**

This workbook is designed to allow you to practice some of these skills and build on your existing knowledge.

Please complete by your first lesson back in September.



1 “Tell me about yourself”

Why did you choose Computer Science?

Expected time to complete: ½ hour

In this simple task you get the opportunity to tell me your choices and reasons behind choosing to study Computer Science. Please answer all questions as best you can.

1. Why did you choose to study A level Computer Science?

2. What other courses have you chosen to study at Key Stage 5, and what made you choose this combination?

3. What are you hoping to achieve from studying Computer Science?

4. How would you describe yourself as a learner at GCSE? What skills were you good at, what areas would you like to improve on?

5. What are your other hobbies and interests outside of school? Anything related to Computing?

Emerging computer technology

Expected time to complete: 1 hour

In this task you get to investigate any area of emerging computer technology which interests you.

You can pick any area which interests you, but examples could be:

- Artificial intelligence
- Robotics
- Automated self driving cars
- Quantum computing

In no more than ONE side of A4 summarise the area you have chosen under the following four headings:

1. What is it?
2. What are the possible Social, Moral, Cultural and Ethical **benefits** of this technology on society
3. What are the possible Social, Moral, Cultural and Ethical **risks** of this technology on society
4. My conclusion on this technology and what it will mean for our world 10 years from now

Additional help:

For additional help and support in structuring your answer you might like to watch some of the videos from the following Craig 'n' Dave playlists:

OCR:

SLR 17 – Ethical, morale and cultural issues

<https://student.craigndave.org/videos/slr-17-ethical-moral-and-cultural-issues>

AQA:

SLR 19: Moral, social, legal, cultural issues

<https://student.craigndave.org/videos/slr19-moral-social-legal-cultural-issues>

3 Note taking practice task

The Cornell method of note taking

The expectation to do independent research at A Level will increase dramatically from GCSE.

There is a real skill to taking decent notes outside of lesson which are of value. Research has proven that one of the most effective methods is the “Cornell” note taking method.

- To start download the “Cornell note taking template” from Craig n Dave:
 - <https://craigdave.org/cornell-note-taking/>
- Pick any two of the following videos from Craig ‘n’ Dave:
 - AQA: <https://student.craigdave.org/videos/aqa-alevel-sl06-procedural-functional-data-abstraction>
 - AQA: <https://student.craigdave.org/videos/aqa-alevel-sl13-sample-resolution-and-rate>
 - AQA: <https://student.craigdave.org/videos/aqa-alevel-sl13-encryption-vernarn-cipher>
 - AQA: <https://student.craigdave.org/videos/aqa-alevel-sl20-bit-rate-baud-rate-bandwidth-and-latency>
 - OCR: <https://student.craigdave.org/videos/ocr-alevel-sl01-alu-cu-registers-and-buses>
 - OCR: <https://student.craigdave.org/videos/ocr-alevel-sl04-paging-segmentation-and-virtual-memory>
 - OCR: <https://student.craigdave.org/videos/ocr-alevel-sl05-stages-of-compilation>
 - OCR: <https://student.craigdave.org/videos/ocr-alevel-sl14-data-structures-part-2-graphs>
- Write the title of the video and its topic in the top boxes (use a different sheet for each video).
- In the main “Notes” section, write notes from the video. You can do this in any way you like, a suggestion might be to rewind slightly when the canvas changes, thinking carefully about what was important in the previous few minutes.
- Having recorded the notes, review them:
 - Turn each part into a question in the section on the left.
 - For example, the notes may say, “The value of the program counter is passed to the memory address register”.
 - The question then becomes, “which register is the value of the program counter passed to?”
 - Sometimes these questions are easy, and at times they are more difficult to write.
 - There may also be more than one valid question.
 - You will need to decide for yourself which are the most appropriate questions for revision.
- Finally pull out all the key words and their definitions words the notes and list them in the bottom section.

Expected time to complete: 1 hour

Video Title:		Topic/SLR:	
Questions	Notes		
Keywords & Definitions			

Getting to grips with terminology

An important aspect of being successful with your study of Computer Science is getting to grips with subject related terminology. There are over 240 specific terms you will need to learn!

Below are a handful of the key terms you will need to become familiar with.

Control Unit	Register	Busses
Von Neuman Architecture	Optical Storage	Operating System
Intermediate Code	Device Driver	Compiler
Assembly Language	Machine Code	Lossy Compression
Hashing	Normalisation	TCP/IP Stack
Packet Switching	ASCII	Problem Decomposition

1. Research each of the key terms and write a definition.
2. Resist the urge to simply cut and paste a definition from the first website you find. Many definitions found on The Internet are overly complicated and wordy.
3. Ask yourself:
 - Does my definition make sense?
 - Is it succinct, to the point?
 - Does the definition have appropriate depth and detail for A'Level?
 - Could I give this definition to another student so they could revise from it?

Expected time to complete: ½ hour





Programming basics

Expected time to complete: 1 hour

Learning to “code” is a fun and essential part of A Level Computer Science. This task is ideal if you haven't done the GCSE in Computer Science or you simply want a nice refresher ahead of starting your A Level course.

1. Head over to the web site: <https://www.learnpython.org/>
2. Complete the following python tutorials under the heading:
 - Hello, World!
 - Variables and Types
 - Lists
 - Basic Operators
 - String Formatting
 - Basic String Operations
 - Conditions
 - Loops
 - Functions
3. Each section presents you with theory, code to run and exercises to try out.
4. If you want to practice writing your own python programs you can download and install a simple python development tool here: <https://www.python.org/downloads/>



Additional note:

This task is most suited to students who intend to do the A Level and have not previously gained much / or any programming experience from the GCSE Computer Science course.

Although the language chosen here is Python, and that may not be what you will be using at A Level, it is the underlying programming concepts which are important.

The list of topics above cover the standard set of programming concepts you would be expected to know having completed a GCSE and Computer Science and so will prepare you well for the A level.