

Year 12 Computer Science Induction Task

Introduction

OCR A Level Computer Science (H446)

Deadline: First lesson in September

Purpose: To get you ready for the challenges and expectations of A-Level Computer Science.

Part 1: Programming Foundations (Python)

Complete the following tasks using Python (or another language if confident). Submit your code (printouts or digital files) and screenshots of working programs.

1. Write a program that:
 - Asks the user for a number
 - Tells them whether it is even or odd
 - Repeats until they enter 0 to quit
2. Write a program that:
 - Stores 5 student names and 5 test scores in a dictionary
 - Calculates and displays the average score
 - Displays the name of the highest-scoring student

Extension:

Can you write a bubble sort function to sort the scores in ascending order?

Part 2: Computer Science Concepts – Research & Write-up

Write short, clear explanations (around 150–200 words each) for the following:

1. What is the difference between a compiler and an interpreter?
Include examples of programming languages that use each.
2. Describe the Fetch-Decode-Execute Cycle
Include a labelled diagram.
3. What is abstraction and why is it important in computer science?
Give a real-world and programming example.

Part 3: Logic & Algorithms

1. Create a truth table for this logic expression:
(A AND B) OR (NOT A AND C)
2. Explain step-by-step how a binary search algorithm works.
Include a visual example using a list of 9 sorted numbers.
3. Convert the following from binary to denary and vice versa:
 - 10110101 (to denary)
 - 158 (to binary)

Part 4: Personal Task – Why Computer Science?

Write a one-page personal statement explaining:

- Why you've chosen Computer Science A Level
- What areas of the subject interest you most (e.g., AI, cybersecurity, software development)
- Any experience you have (coding clubs, online courses, personal projects)

Part 5: Online Learning – Harvard CS50's Introduction to Programming with Python

Visit the Harvard CS50's Introduction to Programming with Python course:

<https://cs50.harvard.edu/python/>

This free, world-renowned course offers an excellent foundation in Python programming.

You are required to:

- Create an account on the site
- Follow along with all video lectures and complete the problem sets
- Make notes on key concepts covered in each lecture
- Submit a short summary (300 words) of what you learned and found most interesting

You will be asked to reflect on this experience in your first lesson. This task is designed to develop your independent learning and programming skills.

Submission Checklist

- ☐ Python source code and screenshots
- ☐ Research write-up (typed or neatly handwritten)
- ☐ Logic and algorithms answers
- ☐ Personal statement
- ☐ Harvard CS50 – Python Programming write-up