WILBERFORCE
sixth form college

**SUMMER BRIDGING WORK 2025**

Summer Bridging Work is an important part of your transition to Wilberforce Sixth Form College. This piece of work will count towards your initial effort grade. Please complete your summer bridging work in time for the start of term.

**You are required to present evidence electronically and submit this to your subject teacher during your first lesson.**

# A-Level Computer Science

**OVERVIEW OF SUBJECT**

The world of computer science continues to develop at an astonishing rate. The challenge for you as a computer scientist is to be able to respond to this fast-changing world and to develop the high-level knowledge and skills that will help you to understand technology that will be developed in the future.

Maybe you have always liked to solve problems or decipher codes. Perhaps you have a knack for learning new languages, or maybe you were intrigued enough about your computer to rip the cover off and tinker with the inner workings. If so, computer science might be an ideal career choice for you.

The most important aspect of computer science is problem solving, an essential skill for life. Computer scientists theorise, design, develop, and apply the software and hardware for the programmes we use day in day out. Computer scientists are in demand and their salaries reflect this.

**ENTRY CRITERIA**

You must have a minimum of five GCSE grades 9-4. These should include a grade 4 in GCSE English Language, a grade 5 in GCSE Maths and a grade 5 in a Science subject.

**TASK 1 – VISION AND LITERACY TASK (MAX. 300 WORDS)**

Computer Science is all about building systems and solving problems that have a direct influence on people's lives.

Write a paragraph **describing one area of Computer Science** that you are particularly interested in and in which you could imagine yourself working. Examples include Programming, Games Design, AI Engineer, Problem Solving, Computer Graphics, Web Page building, Big Data, Machine Learning etc.

After completing the paragraph discuss **why** you would like to work in that area.

**TASK 2 – NUMERACY TASK - Understanding Bits, Bytes, and Binary**

Computers store data using bits, where each bit can be either 0 or 1. A group of 8 bits forms 1 byte. Bytes are used to represent characters, numbers, and other data.

The table below shows how to convert an 8-bit binary number (11010110) to decimal:

| **Bit Position** (Power of 2) | $2^7$ 128 | $2^6$ 64 | $^{25}$ 32 | $2^4$ 16 | $2^3$ 8 | $2^2$ 4 | $2^1$ 2 | $2^0$ 1 |
|---|---|---|---|---|---|---|---|---|
| **Binary Digit** | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| **Value** (include if bit = 1, not if bit = 0) | 128 | 64 | 0 | 16 | 0 | 4 | 2 | 0 |

Answer: **214**

**QUESTIONS:**

1. Convert the following 8-bit binary number to its decimal value: 01101011
2. How many different values can be represented by 1 byte?
3. If a file is 5 kilobytes (KB) in size, and 1 KB = 1024 bytes, how many bits does the file contain?

**TASK 3 – PROGRAMMING CHALLENGE**

Coding is an important part of A Level Computer Science. Use the following resource to develop your knowledge and experience of the Python programming language:

https://www.learnpython.org/en/

To get a really good start on programming, work through the exercises up to 'Functions':


**PROGRAMMING TASK:**

Create a Python program for the following task. You can use an Online IDE (Integrated Development Environment) such as pythononline.net to create your program.

Take a **screenshot of your code** to submit for your summer work. **Don't worry if it doesn't fully work!** Share a screenshot of how far you got with it.

**TASK BREAKDOWN:**

- Make a Python program in which the computer randomly chooses a number between 1 to 100.
- The program should then ask the user to guess the number until they guess correctly (HINT: while loop)
    - If the user guesses too low, the program should output "HIGHER!"
    - If the user guesses too high, the program should output "LOWER!"
    - When the user guesses correctly the program should output a "Well Done!" message and exit.

If you have any queries regarding your Summer Bridging Work, please contact me via email **DJH@wilberforce.ac.uk** I will aim to respond before your enrolment appointment.

Kind regards,

Mr. David Hastings
**Faculty Head for Digital and Engineering**