

A Level Computer Science Summer Step Up Work

Welcome to A Level Computer Science! This set of tasks will help you bridge the gap between GCSE and A Level and give you a solid start with the programming language we'll be using: **Visual Basic (VB.NET)**. These tasks vary from easy to challenging and will take approximately 4 hours to complete. Attempt to complete all tasks where possible and feel free to use other resources to help you.

Task 1: What is A Level Computer Science?

1. CS Research Task:

- Find out what is covered in A Level Computer Science (Eduqas: https://www.eduqas.co.uk/qualifications/computer-science-asa-level/#tab_keydocuments).
- Write a short summary (100–200 words) of the following topics:
 - Algorithms
 - Programming
 - Data structures
 - Computer systems
 - Networks and communication
 - The legal and ethical impact of computing

Task 2: Get Started with Visual Basic

For the programming part of your lessons, we will be using VB. In this task, you will need to install and run your first VB program.

1. Set-Up Instructions:

- Download and install **Visual Studio 2022**:
<https://visualstudio.microsoft.com/downloads/>
- During installation, select **.NET desktop development** as a workload.

2. First Program:

- Create a new **Windows Forms App (.NET Framework)** project.
- Add a Button to the form and change its text to Click Me!
- Double-click the Button and add this code:
`MessageBox.Show("Hello, world!")`
- Run the program.

3. **Extension:** Try changing the message text or adding another button.

Task 3: Basic VB Programming Exercises

You are now going to try practicing VB syntax and logic.

1. Task A – Variables & Input:

- Create a program that asks the user for their name and age, then shows a message like:
`Hello [Name], you are [Age] years old.`

2. Task B – If Statements:

- Ask the user to enter a number.
- Show a message saying whether the number is **even** or **odd**.

3. Task C – Loops:

- Ask the user to enter a number.
- Use a loop to count from 1 up to that number, showing each number using:
lstOutput.Items.Add(i) ' If using a ListBox called lstOutput

Task 4: Logic & Algorithms

Time to develop thinking skills for problem solving.

1. Trace the Algorithm:

- Predict the output of the following pseudocode:
- total = 0
- FOR i = 1 TO 5
- total = total + i
- NEXT i
- OUTPUT total

2. Write an Algorithm (Pseudocode or Flowchart):

- Write a step-by-step algorithm for:
 - Converting a temperature from Celsius to Fahrenheit.
 - Hint: Formula is $F = (C \times 9/5) + 32$

3. Challenge Task:

- Write a VB program that implements the temperature converter.

Task 5: Stretch Coding Challenges

Now's the time to tackle more complex logic-based VB tasks. Choose **2 of the 3** challenges below:

1. Times Table Generator:

- Ask the user for a number.
- Display the multiplication table for that number from 1 to 12.

2. Guess the Number Game:

- The computer picks a random number between 1 and 100.
- The user guesses until they get it right.
- After each guess, the program tells them if the guess is too high or too low.

3. Simple Calculator:

- Create a calculator that lets the user:
 - Input 2 numbers
 - Choose an operation (add, subtract, multiply, divide)
 - Display the result.

Task 6: Explore Computer Science in the Real World

1. Research a Real-World Application of Computer Science:

Choose one:

- Self-driving cars

- Artificial intelligence (e.g. ChatGPT!)
 - Cybersecurity
 - Robotics
 - Data science in health
2. Write a short paragraph on:
- What it is
 - How it works at a basic level
 - How computer science is involved

Task 7: Reflect and Prepare

Time to set goals and reflect on your progress.

1. What did you enjoy most from this step-up work?
2. What did you find most challenging?
3. What are 2 goals you have for A Level Computer Science?
4. Optional: List any questions you have about the course.

Submission Instructions

Please bring your notes, screenshots of programs, or typed documents to your first A Level CS lesson. You can submit these as printed copies, handwritten or digital files.