



Welcome to Computer Science!



Your course

You will be studying OCR Computer Science H446. Details of the specification and course assessment can be found here:

https://www.ocr.org.uk/Images/170844-specification-accredited-a-level-gce-computer-science-h446.pdf

We encourage you to become familiar with the course specification as soon as you start your course in September.

Course Textbook

We recommend that you procure this text book to supplement the course.

OCR AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-05-6

Approximately £32.00



NB This is the textbook we will be using in September. If you are planning on applying to the bursary due to financial difficulties, then the school will be purchasing these on your behalf at the beginning of the academic year.

Summer bridging work

Read through carefully to make sure you understand what you are required to hand in. You will need to hand in this work during your first lesson in September.

TASK 1: Vision

Computer Science is all about building systems and solving problems that have a direct influence on people's lives. As you start the course, write a single paragraph describing one area of Computer Science that you are particularly interested in, and one in which you could imagine yourself working in the future. Examples include Programming, Games Design, 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, what specifically interests you about it?

It is important that you understand the subject related terminology if you are to be successful in this course.

The following are some of the key terms that will need to be learnt in order for you to form a better understanding of Computing. Research a brief definition for each and add to your document (Use your own words – do not copy and paste).

Von Neuman Architecture Assembly Language Hashing

Compiler Machine Code Packet Switching

Object Oriented Programming Lossy Compression ASCII

TASK 2: Programming Knowledge Audit

Programming Technique	Explanation	How confident are you in this?
Input and output	Being able to gather input from the user and cast this to different data types. Being able to output data to the screen. This should include combining text and outputting the values stored in variables	
Using variables and constants	Being able to store values in variables, overwrite these values and recall these values.	
Mathematical operators	The ability to use /,*,-,+, MOD (% in python) and DIV (// in python) to perform a range of mathematical calculations. You should be able to increase/decrease the value stored in a variable e.g. how to increase a score by 10 or reduce a number stored in a variable by 1	

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String manipulation	Can you use a range of methods on a string to for example, select a sub set of the string, find only the character at a certain position in the string, split a string up by a certain character etc. This is a very useful and overlooked technique	
If statements	Being able to use If statements to take different paths through code. This should include the use of IF, ELIF and ELSE. At A Level we are also looking to see that you can use them efficiently.	
Loops	Can you use a While loop and a For loop to iteration through code. Do you know the difference between conditional and count controlled loops and can you design suitable conditions that show when to enter the loop or not.	
Nested loops and if statements	A nested loop is where you have a loop inside a loop and a nested If statement is where you have an if statement inside another. You need to be very careful with your indentation here but you should be able to combine multiple loops and if statements with each other	
Arrays to 1D	In Python we do not use arrays but use lists. These are similar but do have differences that will be explained early in the course. Can you store data in a list and access the data at different positions in the list? Can you loop through the items in a list? Can you overwrite the values stored at certain positions in a list? There are a number of methods that can be used with a list and you should be familiar with these.	

TASK 3: Python Programming Practice

Coding is an important part of A Level Computer Science. Your task is to produce a fully working program. You have 3 options of projects to attempt below. Don't worry though if you don't get a fully working program, or if you come across some technical difficulties – but please do give it a good attempt as it will help with your **program design skills** and developing your creativity.

You need to find a programming environment where you can write and run Python programs. We use replit.com regularly on the course

1) Setup your replit.com account and start a blank Python project:

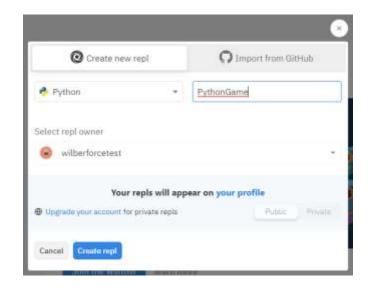
Visit: https://replit.com/

Sign up with your email – create a Username and Password.

Once logged in, select + New repl to create a new programming project:

Choose Python as the language, and give your project a name, then select Create Repl:





You should see these sections:

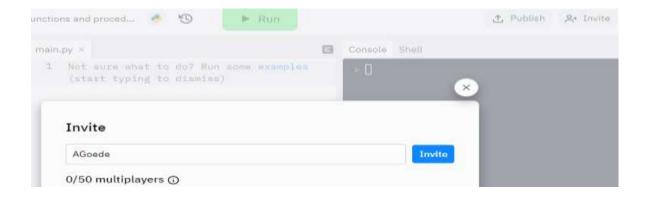


Main.py – this is where you write your Python code.

Console – this is where the output of your code is displayed when you run it.

2) You can 'invite' us to your project so we can see your code. Feel free to do this at any time during the summer.

Click Invite and invite the user AGoede and SDarby as below:



3) Choose **one of the following** projects and have a go at creating a working version. Go for it and have fun!

Project Choice 1 - Medium - Dice Rolling Simulator

As the name of the program suggests, we will be imitating a rolling dice. This is one of the interesting python projects and will generate a random number each dice the program runs, and the users can use the dice repeatedly for as long as he wants. When the user rolls the dice, the program will generate a random number between 1 and 6 (as on a standard dice).

The number will then be displayed to the user. It will also ask users if they would like to roll the dice again. The program should also include a function that can randomly grab a number within 1 to 6 and print it. This project will help build a strong foundation for fundamental programming concepts.

Project Choice 2 - Medium - Number Guessing

Make a program in which the computer randomly chooses a number between 1 to 10, 1 to 100, or any range. Then give users a hint to guess the number. Every time the user guesses wrong, they get another clue, and their score gets reduced. The clue could be multiples, divisible, greater or smaller, or a combination of all.

Project Choice 3 - Harder - Hangman Game

This is more of a "guess the word" game. The core concepts you have to use while developing this project are variables, random, integer, strings, char, input and output, and boolean. In the game, users have to enter letter guesses, and each user will have a limited number of guesses (a counter variable is needed for limiting the guesses). You can create a pre-organised list of words that users can grab words from. You must include specific functions such as those to check whether or not a user has entered a single letter, if the input letter is in the hidden word, if the user has actually inputted a single letter, and to print the correct letters as they are guessed.

Computer Science Additional Reading and Resources

Computer Science is progressing rapidly and is used widely within different industries, below is a list of resources that may be helpful to improve your knowledge of current and future technologies.

Job roles within the Computing and ICT industry - Planit Careers - Computing and IT

Overview of the UK's IT Industry - Overview of the UK's IT industry | Prospects.ac.uk

A-level resource for the course - A-Level Isaac Computing

Craig and Dave videos - Craig and Dave

Python Programming - https://www.learnpython.org/en/

Upon completion

When you have completed the tasks please email them to <u>a.goede@roundwoodpark.co.uk</u> and <u>s.darby@roundwoodpark.co.uk</u>