A-Level Computer Science
Bridging Project

Computer Science is a practical subject where you will apply the academic principles learned in the classroom to real world systems. It is an intensely creative subject that combines invention and excitement, and can look at the natural world through a digital prism. OCR's A Level in Computer Science will value computational thinking, helping you to develop the skills to solve problems, design systems and understand the power and limits of human and machine intelligence.

This bridging project has two parts, a programming challenge and a research project.

Part 1 – Programming challenge

Choose **1** of the following challenges and solve it using:

- A flowchart
- Pseudocode
- Programme code (any high-level language will do, you may wish to try out a different language to test yourself, but Python is fine)

Challenge 1:	**Useful Resources:**
Password reset program Only accept a new password if it is: 1. At least eight characters long 2. Has lower case and upper case letters. The password reset program should also make the user input their new password twice so that the computer knows that the user has not made any mistakes when typing their new password. **Extensions:** 1.Make some sort of algorithm to suggest how strong the password is (Weak, Medium, Strong) depending on length, whether or not the password has special characters in etc. 2.Let the user input their username. The program should go to a text file with a list of usernames and old passwords, and the program should only let you change your password if you input your old password.	• **OCR Python Guide** https://www.ocr.org.uk/Images/390478-programming-techniques-python-teacher-guide.docx • **OCR Pseudocode guide** https://www.ocr.org.uk/Images/260952-pseudocode-guide.pdf • **School shared area**

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Challenge 2:

Text based game

Create a text based game like Zork. Have the programme take the users name and use it to tell the story. Have the programme allow a non-linear progression through the various rooms. The user should have at least 2 choices per room. You will want to plan this one with a flowchart first!

Extension:

• Have each room as a separate function.

• Add an inventory system so you must collect a key to get through a certain door etc.

https://classicreload.com/zork-i.html

Useful Resources:

- **OCR Python Guide** https://www.ocr.org.uk/Images/390478-programming-techniques-python-teacher-guide.docx
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Notes:

- Challenge 2 is like a more advanced version of the woodland stories we did in year 9, personally I'd choose this one and then use it as an opportunity to look back and see how much better you lot have become at programming, problem solving, debugging etc!
- You should make sure your project has robust validation making it hard to break
  - Look into how to stop crashes when letters are input when you are expecting numbers, and vice versa.
- Your code should use functions and procedures to make it more efficient. (remember that you must pass variables across to the functions or you could crash the program saying it isn't defined)
- Your code should be commented
- Where possible make use of external files
  - In Challenge 1 store the username and passwords in either the same or even different files
  - In challenge 2, consider having some sort of inventory, or health stats – this can get really big really quick, but experiment, we don't mind if some of it doesn't work, but use it as an opportunity to problem solve and hone and improve your programming skills 😊

Part 2 – Research project

Types of processor

Research and explain the main features of the **Von Neumann Architecture** and the **Harvard Architecture**. Draw suitable diagrams for each, identifying the main differences.

Next, Look into the differences between **RISC** and **CISC** Processors, Draw out tables to show the differences between the two.

Finally, Research into the uses of **GPUs**, obviously graphics, but what else?

Legal, Moral, Ethical and Cultural Issues

Networking sites frequently feature angry, violent or inaccurate content.
Should Facebook, Twitter, Ask.com and others take responsibility for content posted on their sites? What sort of content should be allowed? Would it be possible to develop software to facilitate such a task? Discuss.

Some of the jobs likely to disappear over the next decade owing to computerisation include manufacturing jobs, clerical jobs and even service jobs, where people will be replaced by robots. Give examples of other jobs which may be lost owing to computerisation. What will be the social effects of the job losses?

Want more?

There are currently a lot of free resources floating around the internet waiting to be explored. Have a look into:

This is a link to a lot of university standard courses you might want to consider dipping into: https://www.classcentral.com/report/new-courses-october-2018/?fbclid=IwAR3N6Nfc_sH9fC_0dMT_C2CgJOleD5HWKrtA8dFleYx4sIu1h1ZycfzhunI

Youtube tutorials – there are so many programming languages out there, and Repl is a great place for you to practise them. Choose a language, choose a tutorial and give it a go. Maybe try HTML, CSS and Javascript if you fancy trying some web development?

App Inventor and App Lab – Give these a looksee if you fancy trying some app development.

Ask us – if you are unsure what else to do, but want to do more, ask us and we'll give you some ideas; admittedly, Mr M will probably just tell you to go and do some gardening, but it's worth a try right!?

Any issues?

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