The job/student gap in computer science

60% Computing Jobs

40% All other math & sciences

Jobs

98% All other math & sciences

2% Computer science students

Students

Less than 2.4% of college students graduate with a degree in computer science. And the **numbers have dropped since** last decade.

Welcome to **A-Level Computer Science**. Choosing Computer Science (OCR exam board) places you at the cutting edge of opportunities, making you extremely sought after at job interviews. Our course consists of 2 exams (40% each exam) and a project (20%). Completing our transition task will help us understand your programming skills. Please complete by your first lesson back in September.

TRANSITION TASK

For the following two tasks you are required to develop algorithms and code your algorithms. If you have not done any coding, then we MUST see your algorithms. Your algorithms are the most important part of this task. You can use any programming language.

These tasks are not about getting it correct (if you do then fantastic), it is about <u>developing your thinking and allowing us to get an idea of the type of research you have done</u>.

For the following scenario analyse the detailed requirements for each situation and, using suitable algorithms, design a solution to be coded in a suitable high-level programming language. Show the iterative development of the individual solutions.

Each of the tasks may be solved as a separate system.

<u>Stock control.</u>

Products are identified by a GTIN-8 (Global Trade Item Number), this is often represented using a barcode.

1324 5627

In the barcode above, the GTIN-8 is 1324 5627.

The GTIN-8 uses a seven digit code plus a check digit for validation. The eighth digit of a GTIN-8, the check digit, is calculated as follows:

	Position of Digit (D)							
GTIN-8	D1	D2	D3	D4	D5	D6	D7	D8
Multiply the seven digits in order alternately by 3 then 1								
	×3	×1	×3	×1	×3	×1	×3	
Add the outcomes together to get a sum								
Subtract the sum from the nearest equal or higher multiple of 10								
The result is the eighth digit of the GTIN-8, the check digit								

For example, the seven digits 1324562:

GTIN-8	1	3	2	4	5	6	2	D8
Multiply the seven digits in order alternately by 3 then 1								
	×3	×1	×3	×1	×3	×1	×3	
	3	3	6	4	15	6	6	
The sum is 43								
Subtract 43 from 50 to get the check digit 7								
The resulting GTIN-8 is 13245627								

Repeating the process of multiplying by 3 then 1 will give a sum that is a multiple of 10 that can be used to check the validity of the GTIN-8 product code.

For example, the eight digits 13245627:

GTIN-8	1	3	2	4	5	6	2	7
Multiply the eight digits in order alternately by 3 then 1								
	×3	×1	×3	×1	×3	×1	×3	×1
	3	3	6	4	15	6	6	7
The sum is 50, a multiple of 10, therefore valid								

Task 1

Analyse the requirements for this system and design an algorithm to:
• Calculate the GTIN-8 product code from a seven digit number
• Check the validity of an eight digit GTIN-8 code

When you have designed your algorithm, attempt to code the algorithm.

Task 2

Create a suitable text file to use with a high-level programming language containing a list of product details, including a GTIN-8 product code, a product description and price.

The program should allow a user to enter GTIN-8 codes for a list of products they wish to purchase and the quantity required of each product. The program should search the stock file to produce a list of products with their descriptions, prices, cost for each of the quantity selected and the total cost for all of the products. The program should also identify products not found.

```
34512340    plain brackets          4       0.50    2.00
98981236    product not found
56756777    100mm bolts            32       0.20    6.40
90673412    L-shaped brackets       6       1.20    7.20

Total cost of order                                 15.60
```

Want a challenge? Design an algorithm and code your solution.

Should you require any help with this transition task please contact kgovender@cardinalnewmanschool.net