Summer Task: To be completed and returned by first lesson.

Produce design algorithms (Flowcharts / Pseudocode) and a coded solution in Python for the following 3 tasks:

The results for a task may be used without further testing in any subsequent task, or each of the tasks may be solved as a separate system. Please annotate / put notes in your code to explain how you are developing your solution.

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

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, develop, test and evaluate a program to:
 • Calculate the GTIN-8 product code from a seven-digit number
 • Check the validity of an eight-digit GTIN-8 code

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.

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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
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Task 3

Develop a program that will update stock levels following an order. In the stock file include a current stock level, re-order level and target stock level (the number of products required in stock after the product is re-stocked). The program should, when instructed to do so, calculate which products are out of stock or below the re-order level and create a file. This file will contain orders for re-stocking that will bring the current stock level of these products up to the target stock level. Analyse the requirements for this system and design, develop, test and evaluate a program to update stock levels following an order and create an order for re-stocking that brings the stock levels for products that are out of stock or below the re-order level up to the target stock level. You will need to create a suitable stock file and a series of orders to test this system.

Computing Theory Review:

Research, investigate and familiarise yourself with the section of your course Fundamentals of Computer Systems which can be found in the AQA specification document: **https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-computer-systems** particularly the sections on: Logic Gates and Boolean Algebra.
There will be resources available on the school shared area to support work on these topics.

Create a brief PowerPoint presentation (4-5 slides) to give an overview of Logic Gates and Boolean Algebra.