H446: OCR A Level Computer Science

Specification details and Holiday homework

Specification link:
https://www.ocr.org.uk/qualifications/as-and-a-level/computer-science-h046-h446-from-2015/

Binary Tasks:

Convert Following Binary digits to Denary

1: 11011011

2: 0001011

Convert Following Denary number to Binary

1: 126

2: 76

Convert following denary number to Hexadecimal value

1: 48

2: 75

Perform addition on following values:

1: 11001100

+00110110

2: 00111001

+11100111

Perform 2 bit binary left shift on following value

1: 00111100

2: 11001100

Convert binary number to Hexadecimal number

1: 1100 0011

2: 0010 1111

Sorting – Searching algorithms

1: Implement Bubble sort on the following given numbers

12 7 8 2 11 9 1

2: Implement Insertion sort on the following given numbers

12 7 8 2 11 9 1

3: Implement merge sort on the following given numbers

12 7 8 2 11 9 1

4: Implement linear search on the following to find 11

12 7 8 2 11 9 1

5: Implement linear Binary on the following to find 12

4 5 6 8 11 14 15 18 20

Logic gates:

1: Draw AND, OR and NOT gates with truth tables

2: Draw logic gate for the following

(A AND B) OR (C AND D)

3: Draw logic gate for the following

NOT A OR (B AND C)

2: Draw logic gate for the following

NOT A OR NOT B

DATABASE

Task 1

Go to http://sqlzoo.net/wiki/SQLZOO:SELECT_basics and work your way through the tasks. For each task below, tick when you have managed to complete it and copy-and-paste the code you needed below. The first one has been done for you:

Number	**Correct Code (that works!)**	**Tips**
1	SELECT population FROM world WHERE name = 'Germany'	It isn't France we're looking for!
2		It isn't population/area we're looking for!
3		Check the names of the countries you need.
4		Check the numbers you need!

Task 2 (continues overleaf)

You have completed the first 4! Well done ☺ Click on the following hyperlink to move to more challenging SELECT activities:
http://sqlzoo.net/wiki/SQLZOO:SELECT_from_WORLD_Tutorial

Number	Correct Code (that works!)	Tips
1	SELECT name, continent, population FROM world	Just click Submit SQL ☺
2		Check the numbers !
3		Try using the code from #2 in Task 1. We need gdp/population…
4		We need the continent to be 'South America' and the population to be divided by 1000000
5		Look at the code you wrote for #3 in Task 1. We need France, Germany and Italy…

6		A tough one! Try **LIKE ‘ %United%’** then it includes all words with United inside it…
7		You will need two statements with a big OR between them…
8		You will need to show countries where (population OR area) AND NOT (population AND area)…
9		The ROUND function looks like **ROUND(population/1000,2)**
10		You can use ROUND to reduce the number of decimal places by using - (eg -5, -7)…

Programming: Write pseudocode for following programs (email programs @n.ramanandi@bristolfreeschool.org.uk)

1: Double Number

Write a function called double that asks the user to input a number. The function should double the number and print the result. The function should keep asking for a number until the number doubled is larger than 20.

2: OCR Theme Park

OCR Land is a theme park aimed at children and adults. One ride in OCR Land has a minimum height of 140 cm to ride alone or 120 cm to ride with an adult.
Create an algorithm that:

- asks the user to input the height of the rider, in centimetres
- if needed, asks if they are riding with an adult
- outputs whether or not they are allowed to ride
- repeats this process until 8 people have been allowed to ride

3: Prices for tickets to OCR land are as follows.

Adults £35

Children - £28

If there are 4 or more children, there is a discount of £35 per order.

Write a procedure called family that will take the number of adults and children as two inputs from the main program and output the correct price based on the conditions above.

4: At OCR Cinemas, entrance tickets are sold online. An adult ticket to OCR Cinema costs £15.99, with a child ticket costing £8.99. A booking fee of £2.50 is added to all orders.

A function, ticketprice(), takes the number of adult tickets and the number of child tickets as parameters from the main program. It calculates and returns the total price to be paid.

Use a high level programming language to create an algorithm for the function ticketprice(). The algorithm should call the function ticketprice() into the main program and out put the following message “Your total ticket price is “

5: A delivery company charges 80p per mile for deliveries. If the order is over £20, they add on an additional 10%. Write a function called delivery that will take the number of miles and order price as parameters and work out the delivery charge. The delivery charge should be returned to the main program. In the main program, the delivery charge should be output to the screen with a suitable message.