6-A-Day – Computer Science GCSE (50)

Q1

Perform the following binary addition

$$\begin{array}{r} 01101011 \\ +\ 01011011 \\ \hline \end{array}$$

[2]

Q2

A memory game is played where:

- three players (A, B and C) have to choose a number between 0 and 100
- if the number has already been chosen, a message is displayed that says `"taken"`
- if the number has not already been chosen, the player's letter is placed next to it
- the quantity of numbers that have not yet been chosen is displayed.

The winner is the player who has chosen the most unique numbers by the end of the game.

The numbers are stored in an array; `numbers()`. A number that has not yet been chosen is stored as an empty string `""`. The players are represented by `"A"`, `"B"` and `"C"`.

Fig. 5 shows an extract from the array:

Number:	0	1	2	3	4	...	...	99	100
Player:	A	C	B		A			B	

Fig. 5

You have been asked to program part of the game.

Write an algorithm for player A's turn, which;

- takes as an input the number that player A chooses
- if it has not already been chosen, stores an `"A"` in that array element
- if it has already been chosen, outputs `"taken"`
- counts and outputs the quantity of numbers left that have not been chosen. **[6]**

Q3

Ann wants to purchase a new computer and is looking at two models. The specification of the CPU in each computer is shown in **Fig. 1**.

Fig. 1

Computer 1	Computer 2
Clock Speed: 1 GHz	Clock Speed: 1.4 GHz
Cache size: 2 MB	Cache size: 2 MB
Number of Cores: 4	Number of Cores: 2

(a) When running a 3D flight simulator, Computer 1 is likely to run faster than Computer 2.

Using the information in **Fig. 1**, identify **one** reason for this.

.....

.....

[1]

Q4

(b) Identify **two** internal components that are not in **Fig. 1**, which could improve the performance of the computers.

.....

.....

[2]

Q5

(c) Explain **one** reason why the cache size affects the performance of the CPU.

.....

.....

[2]

Q6

(d) Identify **four** events that take place during the fetch-execute cycle.

.....

.....

.....

.....

[4]