GCE Computer Science
# SUMMER TASKS 2017

### Task #1

Research and find out what the following are*:

1. Von Neumann, Harvard and contemporary processor architecture.
2. The differences between and uses of CISC and RISC processors.
3. Multicore and Parallel systems

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### Task #2

Research and find out what the following algorithms are*:

Bubble sort

Insertion sort

Merge sort

Quick sort

Dijkstra's shortest path algorithm

A* algorithm

Binary search

Linear search

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### Task #3

Sample exam questions:

Q1
*Intensive Care Units in hospitals are for patients in need of round the clock monitoring and support. Computerised systems can be used to monitor patients' vital signs (temperature, heart rate, blood pressure and breathing). They can then alert medical professionals to any significant changes. These systems usually run on an embedded, real-time, operating system.*

State what is meant by the term real-time. [1 mark]

Explain why a real-time operating system would be suitable for this purpose. [2 marks]

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Q2
*The hospital would like to update the system so that it automatically delivers doses of certain drugs to patients based on the readings taken rather than leave delivery to medical staff.*

Discuss the ethical benefits and drawbacks of this approach, explaining whether you would recommend making this update. [9 marks]

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### *Task #4*

Basic logic tutorials
Useful resources for teaching about logic circuits and truth tables are available from
http://www.cambridgegcsecomputing.org/computing-hardware-main

Logic simulator
Once the basic concepts are identified you can experiment with logic gates using a suitable simulator: Useful free logic gate simulator is available for Windows operating systems from Steve Kollmansberger at South Puget College: http://www.kolls.net/gatesim/

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Task #5

Physical models for logic circuits
1. An excellent demonstration of physical models for this can be found in the youtube video
http://www.youtube.com/watch?v=H-53TVR9EOw

Watch the video and create your own versions of these logic 'machines' with lego, plastic track and marbles or use the domino based demonstrations.

2. It is relatively straightforward to appreciate the AND and NOT statements from these but OR is often used as an exclusive 'either or' construct and using the dominoes demonstration for the OR gate may help to show what OR means in Boolean logic.
http://www.youtube.com/watch?v=SudixyugiX4  (Neil Fraser)

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*Help and advice:*

For Tasks 1 and 2 - In a document (Word, Publisher, PowerPoint, email) explain what each are and what they do. Also provide an image to illustrate your research.  Include a reference for the web sites that you may have used.

When completed email ALL the documents to mark.hamilton@nobel.herts.sch.uk . In the subject line of your email type in 'Summer tasks'.

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