THIS PAPER IS NOT TO BE REMOVED FROM THE EXAMINATION HALL

UNIVERSITY OF LONDON

CM1030

BSc EXAMINATION

COMPUTER SCIENCE

How Computers Work

Wednesday 4 September 2019 : 10.00 – 12.00

Time allowed: 2 hours

DO NOT TURN OVER UNTIL TOLD TO BEGIN

INSTRUCTIONS TO CANDIDATES:

This examination paper is in two parts: Part A and Part B. You should answer **ALL** of question 1 in Part A and **TWO** questions from Part B. Part A carries 40 marks, and each question from Part B carries 30 marks. If you answer more than **TWO** questions from **Part B** only your first **TWO** answers will be marked.

All answers must be written in the answer books, answers written on the question paper will not be marked. You may write notes in your answer book. Any notes or additional answers in the answer book(s) should be crossed out.

The marks for each part of a question are indicated at the end of the part in [.] brackets. There are 100 marks available on this paper.

PART A

Candidates should answer **ALL** of Question 1 in Part A.

Question 1

For each sub-question, select only **ONE** answer.

(a) What is RAM? [4]

a) a network protocol
b) mass storage
c) main memory
d) all of the above

(b) When Apple's Siri voice recognition software was first released in the UK, many people in Scotland were reporting that it could not understand their accent. This is likely to be because: [4]

a) The algorithm was not powerful enough
b) The features used were not informative enough
c) The iPhone's CPU was not powerful enough
d) The dataset used was not representative enough

(c) Why does turning a computer off and on again often resolve problems? [4]

a) it clears the contents of mass storage
b) it resets the computer's state
c) it changes the network protocol that a computer is using
d) it deletes all the applications' resource files

(d) What is the output of machine learning classification? [4]

a) one of several categories
b) a number
c) several numbers
d) an image

(e) What layer does the IP protocol implement? [4]

a) application
b) transport
c) network
d) link

(f) Given what you know about their hardware architecture, will virtual memory cause more of a slowdown on a smart phone or a cheap desktop PC? [4]

a) smart phone
b) cheap PC
c) both will have the same slowdown
d) computers do not slow down when using virtual memory, they speed up

(g) What type of file format is mp3? [4]

a) uncompressed
b) lossless compressed
c) lossy compressed
d) can be either compressed or uncompressed

(h) When I work on neural networks, I often use TensorFlow, which is code developed by Google that implements a lot of important neural networking functionality. Including TensorFlow in my applications means that I don't have to implement neural network algorithms myself. TensorFlow is an example of [4]

a) an executable
b) a resource file
c) a device driver
d) a library

(i) Bluetooth is typically used for which type of network? [4]

a) PAN
b) LAN
c) WAN
d) all of the above

(j) You are writing some machine learning software that has two phases: (1) downloading thousands of images and extracting features from them; (2) training a model. The process is very slow on your single core PC and you think you might be able to speed it up by running one of the phases in multiple processes. Which will have the biggest speed up? [4]

a) downloading images and extracting features

b) training the model

c) you could do either, they will both speed up about the same

d) neither will be speeded up significantly

PART B

Candidates should answer any **TWO** questions from Part B.

Question 2

(a) What are ASCII and Unicode? Describe how each of them works. [7]

(b) Describe the steps you would take when carrying out a machine learning project. [7]

(c) Describe what happens behind the scenes when you take a quiz on the Coursera platform. [16]

Question 3

(a) Explain the purpose and function of the System Bus. [5]

(b) What causes deadlock? [9]

(c) You are playing a video game using a typical video game controller, which allows you to move around the game using a small joystick. Explain what happens between you pressing the joystick and you seeing your character move on screen. [16]

Question 4

(a) Describe each part of the following URL and how it is used in the network and on the web server. [14]

`http://www.buymyt-shirts.com/products/search.php?color=black&size=12`

(b) Many modern mobile phone photo apps include face recognition, in which people are automatically recognised in images to make searching easier. Describe what happens between taking a photo and searching for it using face recognition. [16]

END OF PAPER

.