



Oxford Cambridge and RSA

AS Level Computer Science

H046/01 Computing Principles

Monday 6 June 2016 – Morning

Time allowed: 1 hour 15 minutes



Do not use:

- a calculator



First name										
Last name										
Centre number						Candidate number				

INSTRUCTIONS

- Use black ink.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Write your answer to each question in the space provided.
- If additional space is required, use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the bar codes.

INFORMATION

- The total mark for this paper is **70**.
- The marks for each question are shown in brackets [].
- Quality of extended responses will be assessed in questions marked with an asterisk (*).
- This document consists of **16** pages.

Answer **all** the questions

1 See And Believe is a company that specialises in computer-generated imagery (CGI) for films.

Producing CGI requires lots of processing power and so the company has a large number of high-performance computers.

(a) Explain why See And Believe would use a distributed operating system.

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..... [3]

(b) The processors in the company’s powerful computers have fast clock speeds and large amounts of cache memory. Describe how each of these improves the processor’s performance:

(i) fast clock speed

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..... [2]

(ii) large cache memory

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..... [2]

(c) Elegant Bags prides itself on its ethical reputation.

(i) State **one** ethical issue the company may have considered when designing its website.

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..... [1]

(ii) State **one** action the company could take to address the ethical issue identified in part (i).

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..... [1]

3 A burglar alarm runs on a processor with the Little Man Computer (LMC) instruction set.

One of the instructions in the set is Branch if Positive (`BRP`).

(a) Describe what the instruction `BRP` does.

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..... [2]

A numeric PIN code entered into the burglar alarm is compared with the code stored at the memory location `passcode`.

If the codes match, the program jumps to the part of the program labelled `deactivate`.

If the codes do not match, the program jumps to the part of the program labelled `alarm`.

(b) Write the LMC code to meet the requirements above. (You don't have to write the code for labels `deactivate` and `alarm`, as you can assume this has already been written elsewhere.)

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..... [4]

4 A programmer spends her spare time contributing to an open source application that converts video files from a range of formats to one which uses lossy compression.

(a) Describe what is meant by the term 'open source software'.

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..... [2]

(b) Describe what is meant by the term 'lossy compression'.

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..... [2]

5 (a) Give the number 55 in binary as an 8-bit unsigned integer.

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..... [2]

(b) Represent the number 55 in normalised floating point binary notation, using 8 bits for the mantissa followed by 8 bits for the exponent, both in two's complement binary.

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..... [2]

(c) Represent the number 55 in normalised floating point binary notation, with the mantissa and exponent both in two's complement binary, using as few bits as possible.

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..... [2]

(d) State why a programmer might choose to declare a variable as a floating point number.

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..... [1]

11
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Turn over for the next question

A relational database is created with three tables:

- PrinterModel: this stores all the data about each model of printer
- PrinterInstance: this stores the data about each individual printer in the building
- Cartridge: this stores information about the toner cartridges.

(b) Draw an entity-relationship diagram to show the relationships between the three tables.

[4]

Most of the printers have their own on-board RAM.

(c) State what the printers' RAM is used for.

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END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page. The question number(s) must be clearly shown in the margin(s).

A large rectangular area with a solid vertical line on the left side and horizontal dotted lines across the rest of the page, providing space for writing answers.



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