OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE

A451/01

COMPUTING

Computer Systems and Programming

THURSDAY 12 JUNE 2014: Afternoon
DURATION: 1 hour 30 minutes
plus your additional time allowance

MODIFIED ENLARGED

Candidate forename		Candidate surname	

Centre number						Candidate number				

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

None

READ INSTRUCTIONS OVERLEAF

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INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.

Use black ink. HB pencil may be used for graphs and diagrams only.

Answer ALL the questions.

Read each question carefully. Make sure you know what you have to do before starting your answer.

Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 80.

The Quality of Written Communication is assessed in questions marked with an asterisk (*).

Any blank pages are indicated.

Answer ALL the questions.

1 Zoe is organising a LAN-party. Her friends will each bring a computer to the party so that they can play games against each other.

(a) Describe what is meant by a Local Area Network (LAN).

_____

_____

_____

_____ **[2]**

(b) Zoe plans to use the star topology in the LAN.

Describe the star topology.

You may use a diagram.

_____

_____

_____

_____ **[2]**

(c) State TWO OTHER topologies that can be used when creating a LAN.

1 _____

2 _____

[2]

2 A computer has 1024 megabytes of RAM.

(a) How many gigabytes of RAM does the computer have?

_____

_____ **[1]**

(b) State TWO items that will be stored in the RAM.

1 _____

_____

2 _____

_____

[2]

(c) The computer sometimes uses virtual memory.

Describe what is meant by virtual memory AND state why it is needed.

_____

_____

_____

_____

_____

_____ **[3]**

3 (a) Add the following two 8-bit binary numbers.

```
 1  0  0  1  1  0  1  1
 0  1  0  1  0  1  0  0
-------------------------

-------------------------
```

[2]

(b) An overflow error can occur when adding two 8-bit binary numbers.

Describe what is meant by an overflow error.

_____

_____

_____

_____ **[2]**

4 The Nena mountaineering club has a web page. The web page consists of an HTML file and some JPG and MPEG files.

(a) What does HTML stand for?

_____

_____ **[1]**

(b) Explain ONE purpose of the HTML file.

_____

_____

_____

_____ **[2]**

(c) State the purpose of the following file types:

JPG _____

_____

MPEG _____

_____

[2]

5 Apu has a handheld e-book reader that allows him to store and read electronic books.

(a) State ONE input and ONE output device that can be built into the e-book reader to allow users to read books.

Input device _____

_____

Output device _____

_____

[2]

(b) Types of secondary storage devices are magnetic, optical or solid state.

(i) State which type of storage is most suitable for storing the electronic books inside the e-book reader.

_____ **[1]**

(ii) Explain ONE reason why this type of storage is the most suitable.

_____

_____

_____

_____ **[2]**

(c) Apu gets a free e-book on a CD-ROM from a magazine.

(i) Give TWO reasons why a CD-ROM is suitable in this case.

1 _____

_____

2 _____

_____

[2]

(ii) State whether a CD-ROM is magnetic, optical or solid state storage.

_____ **[1]**

(d) The manufacturer of the e-book reader provides proprietary software, which Apu can use to transfer the e-book from the CD-ROM to the e-book reader.

(i) Describe what is meant by proprietary software.

_____

_____

_____

_____ **[2]**

(ii) Explain ONE advantage to the manufacturer of providing proprietary software instead of open source software.

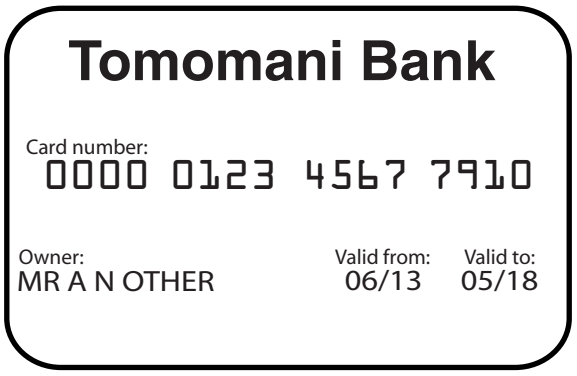
_____

_____

_____

_____ **[2]**

6 When customers pay using a card such as the one below, shops use computer systems to process the payment.



(a) Tick ONE box in each row, to show which of the data types given is the most appropriate data type for each of the following data items.

Data item	Date	Integer	Real	String
The amount paid				
The customer's card number				
When the payment is made				

[3]

(b)* Explain why it is important for computer systems that process card payments to be reliable.

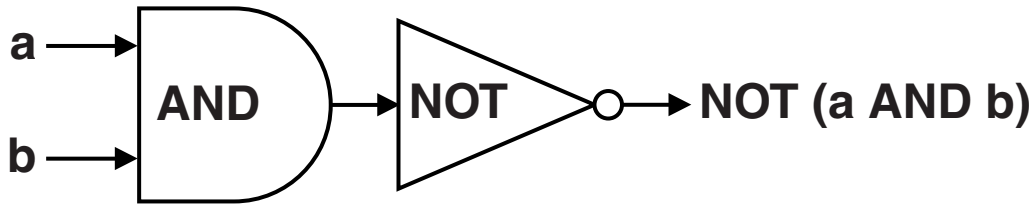
The quality of written communication will be assessed in your answer. [6]

_____

_____

_____

7 The following logic diagram shows the expression NOT (a AND b).



Complete the missing boxes in the truth table below to show the value of NOT (a AND b) that will be output for each possible set of values of a and b.

a	b	NOT (a AND b)
0	0	1
0		1
1	0	

[4]

8 Julian buys a new laptop with a system information utility and a diagnosis utility.

Describe, using examples, the purpose of the system information and diagnosis utilities.

System information utility

_____

_____

Example

_____

_____

Diagnosis utility

_____

_____

Example

_____

_____

[4]

9 (a) The number 62 could be a denary number or a hex number.

(i) If 62 is a hex number, calculate its value as a denary number.

You MUST show your working.

_____

_____

_____

_____ **[2]**

(ii) If 62 is a denary number, calculate its value as a hex number.

You MUST show your working.

_____

_____

_____

_____ **[2]**

(b) Explain why people sometimes use hex numbers to represent numbers stored in computers, even though computers do not use hex numbers.

_____

_____

_____

_____

_____

_____ **[3]**

10 Santos is writing a program that guesses the number of goals a team will score in a football match.

The algorithm for his program is shown below:

```
01  CONST Noise = 10
02  INPUT Wins
03  INPUT Losses
04  Goals = 0
05  Net = Wins - Losses
06  WHILE Net > Noise
07    Goals = Goals + 1
08    Net = Net - Noise
09  END WHILE
10  OUTPUT Goals
```

(a) State what is meant by a constant and give an example from the algorithm above.

_____

_____

_____

_____ **[2]**

(b) State what is meant by a variable and give an example from the algorithm above.

_____

_____

_____

_____ **[2]**

(c) State the number of goals that will be output by this algorithm for the following inputs. Explain how you obtained your answer in each case.

Wins = 30 Losses = 25

_____

_____

_____

_____

_____

_____ **[2]**

Wins = 20 Losses = 5

_____

_____

_____

_____

_____

_____ **[3]**

11 A school uses a database, which stores the attendance data of the pupils. The data is entered by teachers using a desktop data application and accessed by parents using a web page or mobile phone application.

(a) Define the term database.

_____

_____ **[1]**

(b) Explain ONE benefit of separating the data from the applications that use the school's attendance database.

_____

_____

_____

_____

_____

_____ **[3]**

(c) The school uses a database management system (DBMS) to separate the data from the applications that use it.

Describe ONE example of how each of the following features of a DBMS can be used in the school's attendance database.

The ability to run queries

_____

_____

_____

_____ **[2]**

The ability to set validation rules

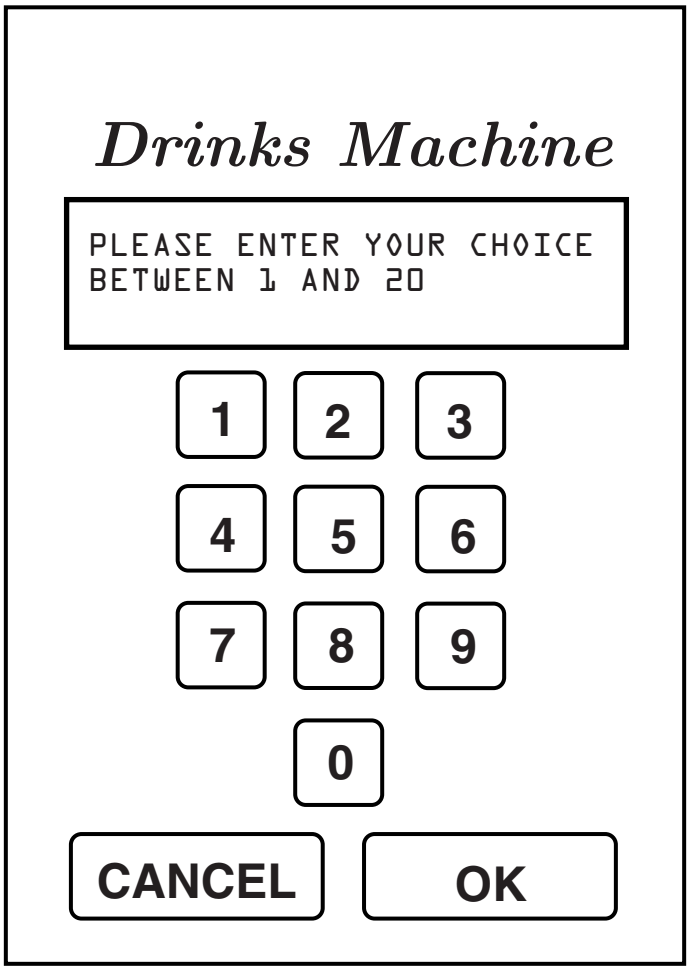
_____

_____

_____

_____ **[2]**

12* A free drinks machine in an office provides 20 different drinks.



The machine has a small keypad with keys 0 to 9, OK and CANCEL. It also has a small LCD screen, which can display a short message.

To get a drink, users select an item number between 1 and 20 with the keypad and confirm their choice by pressing OK. If they make a mistake they can press the CANCEL button and start again. If the selection is valid and the drink is available it dispenses the drink. The display screen is used to show suitable short messages throughout the process.

Write an algorithm for the process described above.

The quality of written communication will be assessed in your answer. [6]

END OF QUESTION PAPER