OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE

A451/01

COMPUTING

Computer Systems and Programming

THURSDAY 13 JUNE 2013: 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.**

BLANK PAGE

1 Here are some statements about the CPU of a computer.
Tick ONE box in each row to show whether each of the following statements is true or false. [5]

STATEMENT	TRUE	FALSE
CPU stands for Central Processing Unit.		
The CPU fetches and decodes instructions.		
The speed of a CPU is usually measured in GigaHertz (GHz).		
If a CPU has many cores, this slows down the computer.		
The hard disk drive is part of the CPU.		

2 Bob's computer has 512 kilobytes of ROM and 8 gigabytes of RAM.

(a) State how many bytes are in a kilobyte and a gigabyte.

a kilobyte _____

_____

a gigabyte _____

_____

[2]

(b) (i) Describe the purpose of the ROM in Bob's computer.

_____

_____

_____

_____

(ii) Describe the purpose of the RAM in Bob's computer.

_____

_____

_____

_____

[4]

(c) State ONE difference between ROM and RAM, other than the size and the purpose.

_____

_____ **[1]**

3* A game console and a desktop computer are two different types of computer system.

Describe how a game console is similar to a desktop computer, with reference to input, output and storage.

The quality of written communication will be assessed in your answer to this question.

[6]

4 (a) (i) State the purpose of an INPUT device in a computer system.

_____

_____ **[1]**

(ii) State the purpose of an OUTPUT device in a computer system.

_____

_____ **[1]**

(b) A railway company uses a computer terminal in the train station to sell train tickets.

Customers input their destination using a touch screen, pay by card and receive a printed ticket and receipt.

Describe TWO ways that the hardware in the computer terminal can be adapted so that blind customers can use it.

1 _____

_____

_____

_____

2 _____

_____

_____

_____

[4]

5 Numbers can be represented in denary, binary or hexadecimal.

(a) (i) Convert the binary number 01101001 to denary, showing your working.

_____

_____

_____

_____ **[2]**

(ii) Convert the denary number 154 to binary.

_____

_____

_____

_____ **[2]**

(b) The security code for an alarm system is a long binary number which begins

10001111100101111011 …

The technicians prefer to use hexadecimal to enter the security code.

(i) When the number is converted into hexadecimal, the first two digits are 8F as shown below.

Complete the gaps to show the next three digits.

Binary:	**1000**	**1111**	**1001**	**0111**	**1011**
Hexadecimal:	**8**	**F**	_____	_____	_____

[3]

(ii) Explain why the technicians prefer to use hexadecimal.

_____

_____

_____

_____ **[2]**

6 An MP3 player contains a database of songs. This database has only one table.

A sample of the data in this table is shown below.

TrackNo	Artist	Song	Length	TimesPlayed	Protected
001	Dave Eade	Holidays	3.7	3	True
002	Tail	Seeing You	2.7	0	True
003	Dave Eade	Truly Cool	4	11	False
004	Aries	Love	1.9	0	True
005	MC Nail	Skit	0.4	0	False
006	The Flies	Skit	0.6	4	False
007	MC Nail	Game Over	2.7	1	True

(a) State the most appropriate data type for each of the fields shown below.

FIELD	DATA TYPE
Song	
Length	
TimesPlayed	
Protected	

[4]

(b) The MP3 player allows users to create playlists by using queries.

For example if the query used is

Artist = "Dave Eade"

the MP3 player will play tracks number 001 and 003.

(i) State the TrackNo of the songs that will be played using each of the following queries.

Length > 2

_____

_____

(Artist = "MC Nail") OR (Protected = False)

_____

_____

(Song = "Skit") AND (TimesPlayed > 0)

_____

_____

[3]

(ii) Write down the query that will select all songs over 2.5 minutes, which have never been played.

_____

_____

_____

[3]

(c) The MP3 player can be connected to a computer from which songs can be added. The computer has a relational database with many tables.

Explain, using an example, what is meant by an entity and how entities relate to the tables.

_____

_____

_____

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_____ **[4]**

7 Julie is writing a computer game that simulates a 100 m race. Each time the space bar is pressed, the position of the player moves up by 1. When the position reaches 100, the player has won.

Here is Julie's algorithm for the program

```
CONST PlayerKey = " "
Position = 0
REPEAT
 INPUT KeyPressed
 If KeyPressed = PlayerKey THEN
  Position = Position + 1
 END IF
UNTIL Position = 100
```

(a) State an example of a constant and a variable in the algorithm above.

Constant _____

Variable _____

[2]

(b) State what is meant by selection and iteration using examples from Julie's algorithm.

Selection _____

_____

Example _____

_____

Iteration _____

_____

Example _____

_____

[4]

(c) To make the game more interesting, Julie changes the rules. Each time the spacebar is pressed, the position of the player will now move up by a random number.

State TWO changes that need to be made to include this new rule. Justify each change.

Change 1 _____

_____

Justification _____

_____

Change 2 _____

_____

Justification _____

_____

[4]

8 Files are often compressed before they are sent over the internet.

(a) State what is meant by compression.

_____

_____ **[1]**

State ONE advantage of compressing files before sending them over the internet.

_____

_____ **[1]**

(b) Two types of compression are lossy and lossless.

State which type of compression is most appropriate for each of the following and explain why it is appropriate.

(i) Downloading the source code of a large program

Type of compression _____

Explanation _____

_____

_____

_____ **[3]**

(ii) Streaming a large video file

Type of compression _____

Explanation _____

_____

_____

_____ **[3]**

9 A school uses off the shelf, proprietary software for managing pupils' attendance, and customised, open source software for managing pupils' examinations.

(a) Describe the difference between off the shelf and custom written software.

_____

_____

_____

_____ **[2]**

(b) Describe the difference between proprietary and open source software.

_____

_____

_____

_____ **[2]**

(c)* Explain the legal issues that the school should consider when choosing the software for managing pupils' attendance and examinations.

The quality of written communication will be assessed in your answer to this question.

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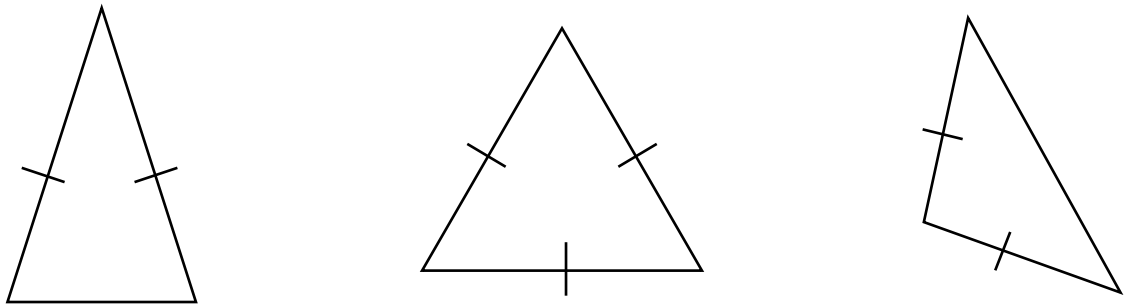
_____ **[6]**

10 An isosceles triangle is a triangle that has at least two equal sides. The diagram below shows examples of isosceles triangles. In each diagram the marked sides are equal.



Write an algorithm for a computer program that determines whether a triangle is an isosceles triangle.

The user inputs the lengths of the three sides as Length1, Length2 and Length3

If any two sides have the same length the program outputs "Isosceles"

Otherwise the program outputs "Not Isosceles" [5]

END OF QUESTION PAPER