CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Level

MARK SCHEME for the May/June 2014 series

9691 COMPUTING

9691/33 Paper 3 (Written Paper), maximum raw mark 90

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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CAMBRIDGE
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1 (a) (i) The rule is defined in terms of itself [1]

(ii) Rule 4 [1]

(b) (i) Valid – using rules 1 and 4 [1]

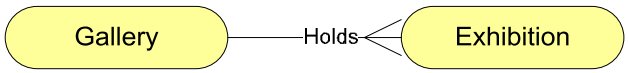
(ii) Invalid – use of rule 4 [1]

(iii) Invalid - `<VarName>` must start with a lower case character [1]

(iv) Valid – Use of all rules [3]

(c) `<Underscore> ::= _`
`<ConstName> ::= <VarName><Underscore>` [2]

2 (a) (i) [1]

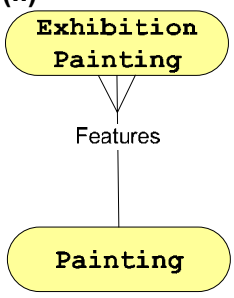


(ii) `Gallery(GalleryName, Country)`
2 attributes (1)
Primary key `GalleryName` (1)

`Exhibition (ExhibitionTitle, GalleryName, ArtistName, StartDate, CloseDate)`
Correct five attributes (only) (1)
Primary key `ExhibitionTitle` (1) [4]

(b) (i) `ExhibitionTitle + PaintingReferenceNo` [1]

(ii) [1]



(iii) Primary key `PaintingReferenceNo` in the `Painting` table (1)
Links to foreign key `PaintingReferenceNo` in the `Exhibition-Painting` table (1) [2]

(c) Displays the Painting reference number (1)
For all paintings by artists born after 1899 and died before 2001 (1) [2]

(d)
```
SELECT PaintingReferenceNo, PaintingTitle                    (1)
FROM Painting                                                (1)
WHERE ArtistName = 'Da Vinci';                               (1)  [3]
```

(e)
```
UPDATE ExhibitionPainting                                    (1)
SET LoanFee = 0                                              (1)
WHERE (ExhibitionTitle = 'Secrets and Silence')
                          AND PaintingRefNo = 9065;          (1)  [3]
```

3 (a) A class is the design / the blueprint (from which objects are later created)
The class definition consists of properties and methods
An object is an instance of a class
An object must be based on a class definition
Many objects can exist for the same class
Properties of an object can only be accessed using methods provided (in the class definition) [MAX 3]

(b) Properties and methods of a base class are available to a subclass
A subclass can have properties and methods of its own. [MAX 2]

(c) (i) Recognised notation for inheritance (1)

```
EVENTVENUE class  Address : STRING                           (1)
STADIUM + THEATRE class    (and no other subclasses)         (1)
STADIUM class    SportsPlayed : STRING                       (1)
                 Declared as an ARRAY                        (1)
                 Capacity  : INTEGER                         (1)
                 AllSeater : BOOLEAN                         (1)
                 TeamName : STRING                           (1)
                 Declared as an ARRAY                        (1)

THEATRE class    NoOfSeats : INTEGER                         (1)
                 EventType : STRING
                 Declared as an ARRAY                        (1)
                 Restarant : BOOLEAN                         (1)
```

[MAX 8]

Note: No mention of use of arrays scores MAX 7

(ii) *Mark as follows:*

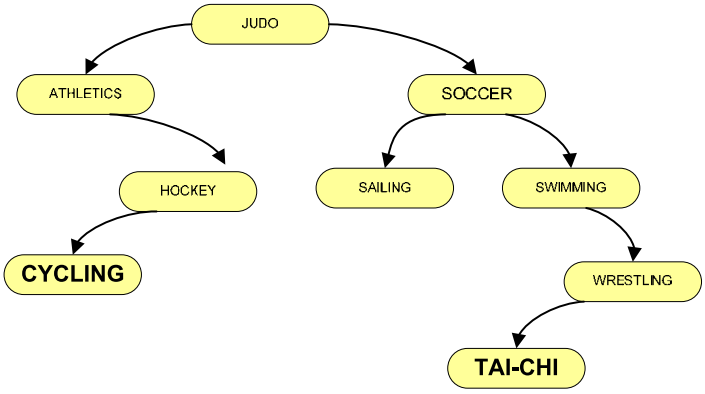
EVENTVENUE has Stadio Olympico + Rome (1)

STADIUM has:

Lazio + Roma + National rugby (1)
Football and rugby (1)
TRUE (all seater) (1)
80 000 (1) [5]

4 **(a)**
```
INTEGER
ARRAY[1 : 2000] OF (datatype>
OF STRING
```
[MAX 2]

(b)



[2]

(c)

RootPtr	**1**

	LeftPtr	Data	RightPtr r
1	5	JUDO	2
2	3	SOCCER	4
3	0	SAILING	0
4	0	SWIMMING	6
5	0	ATHLETICS	7
6	0	WRESTLING	0
7	0	HOCKEY	0

Root = 1 (1)
JUDO pointers 5 and 2 (1)
Six names entered (1)
Other pointers correct (1) [4]

(d)

SearchSport	IsFound	Current
LACROSSE	FALSE	1
		3
		6
	TRUE	

OUTPUT
Moving right
Moving left
Found

[MAX 5]

One mark per entry (MAX 5)

5 **(a)** –95 [2]
111

(b) 4057 [2]

(c) 6EF9 [2]

(d) **(i)**–1.75 give 3 marks
If answer incorrect mark as follows:
Exponent: +1 // move the pattern one place
Mantissa: –7/8
Answer: $-7/8 \times 2^1$ // or equivalent [3]

(ii) The mantissa starts with a 10 ... [1]

(iii) *2.0 normalised …*

Mantissa Exponent

0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0

[2]

(iv)

Mantissa

0	1	1	1	1	1	1	1

Exponent

0	1	1	1	1	1	1	1

Mantissa (1)
Exponent (1) [2]

(e) The precision/accuracy is decreased, but …
The range of possible numbers is increased [2]

6 **(a)** *Correct use of any of the following:*
Single segment of wire (1)
Terminators × 2 (1)
Printer (1)
File server (1)
Firewall / Proxy server + Indication of a connection to the Internet (1)
Router + Indication of a connection to the Internet (1)
Modem + Indication of a connection to the Internet (1)
[MAX 5]

(b) **(i)** *Intranet …*
Information system using Internet protocols
Provides service of web pages (to client computers)
// stores content on a web server
System only available to staff within the organisation [MAX 2]

(ii) *Benefits of an Intranet*
Localised content available to relevant users only
Uses standard protocols including HTTP/FTP and email protocols
Good control over the accuracy of content (unlike the Internet)
Provides centralised/single source of important company documents [4]

(c) **(i)** *Symmetric encryption …*
Plain text is changed
Into a cipher text message
using an encryption algorithm
The same algorithm (and key) is used to decrypt the message [MAX 2]

(ii)

Claude (W/X)	Sobi (Y/Z)
Claude's Public	Sobi's Private
Sobi's Public	Claude's Public

Any correct × 3 [MAX 3]