CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Level

MARK SCHEME for the May/June 2015 series

9691 COMPUTING

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

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1 (a) (i) The table has a repeated (group of) attributes

       (ii) Title, Genre, ReleaseDate and ReviewDate are repeated for each reviewer

   (b) (i)

ReviewerID	Location
510	London
808	New York
756	Dhaka

[1]

       (ii)

Title	Genre	ReleaseDate	ReviewDate	ReviewerID
Hits 36	P	12/01/2015	01-15	510
Popular Bach	C	12/01/2015	02-15	808
The Messiah	C	11/1/2014	11-14	756

             Or, any other row taken from the original table (ReviewID must be different)   **[2]**

             3 correct – 2 marks
             2 correct – 1 mark
             1 correct only – scores 0

       (iii) 9   **[1]**

       (iv) Many-to-one   **[1]**

       (v) Primary key/ReviewerID in the REVIEWER table   **[1]**

            Links to foreign key/ReviewerID in the REVIEW table   **[1]**

   (c) (i) Title   **[1]**

       (ii) There are non-key attributes which are dependent (may be stated as part of the attribute
             description)   (1)

             ReviewerName is dependent on ReviewerID //
             Fee is dependent on Genre   (1) **[2]**

(iii) REVIEWER(<u>ReviewerID</u>, Location, ReviewerName)
REVIEW(<u>Title</u>, Genre, ReleaseDate,
    ReviewDate, <u>ReviewerID</u>)
FEE(<u>Genre</u>, GenreFee)

Mark as follows:
new FEE table
containing Genre and GenreFee
Primary key for FEE correctly shown

REVIEW table has foreign key Genre
REVIEWER table contains ReviewerName   **[5]**

                                                                    [Total: 17]

2 (a) Syntax diagram   **[1]**

(b) (i) The rule is defined in terms of itself / calls itself   **[1]**

(ii) TRUE
FALSE
FALSE

CAO.   **[1]**

(c) (i) D175N

Invalid   (1)
5, 2   (1)   **[2]**

(ii) W058M

Valid   (1)

Rule 1 – 3 times
Rule 2 – once
Rule 3 – once
Rule 4 – once
Rule 5 – once   (1)   **[2]**

(iii) C86N

Invalid   (1)
<producttype><digit><digit><location>

Rule 1 – 2/3 times
Rule 2 – once
Rule 4 – once
Rule 5 – once   (1)   **[2]**

                                                                    [Total: 9]

3   (a)   *The class diagram includes:*

`Software + Network` **subclasses**   (1)

`Bespoke + OffTheShelf` **subclasses of** `Software`   (1)

Note: Two marks – correct class names only

Recognised notation for inheritance (from `Software` and `Network` only)   (1)

`Project` **class**	`StartDate    : DATE`	
	`ProjectLeader : STRING`	(1)

`Software` **class**	`ProgrammingLanguage : STRING`	
	`AlphaTesting       : STRING/CHAR`	(1)

For each of the following – <u>at least two</u> of the correct properties

`Bespoke` **class**	`CustomerName       : STRING`	
	`AgreedCost         : REAL/CURRENCY`	
	`AgreedDeliveryDate : DATE`	(1)

`OffTheShelf` **class**	`Title       : STRING`	
	`BetaTesting : STRING/CHAR`	
	`RetailPrice : REAL/CURRENCY`	
	`SalesForecast : INTEGER`	(1)

`Network` **class**	`ClientName  : STRING`	(1)
	`AgreedCost  : INTEGER/CURRENCY`	**[8]**

   (b)   (i)   *Class…*
             The definition of an object // The 'blueprint' from which objects are created.   **[1]**

         (ii) *Inheritance…*
             The ability of a subclass/child class to use properties and methods of a
             parent/super/base class   **[1]**

   (c)   (i)   *Instance …*
             –   A specific object created from a class   (1)

             –   Main program has created an instance of the `Network` class – referred to as
                 `ThisNetworkProject`   (1)   **[2]**

         (ii) *Method…*
             Something an object can do // Implemented with procedures/functions   (1)

             `Project` shows two methods – `get_ProjectID()` and `set_ProjectID()` (1) **[2]**

(iii) *Encapsulation…*
    Technique which restricts the programmer's access to the object's data   (
    Data values can only be read/written using methods provided by the class   (1)

    – The `ProjectID` value can only be read/written using the two methods provided
      `// ProjectID` is private to the class   (1) **[3]**

[Total: 17]

4 (a) Last item in is the first item out // First item in is the last item out
    R. LIFO   **[1]**

(b) `PROCEDURE InitialiseStack`
    `    FOR Index ← 0 to 99`
    `        Animal[`**`Index`**`] ← ""`   (1)
    `    ENDFOR`
    `    StackPointer ← `**`-1`**   (1)
    `ENDPROCEDURE`   **[2]**

(c) (i) `""` //empty string   (1)
    `1`   (1) **[2]**

(ii) `PROCEDURE Push`
    `    IF `**`StackPointer = 99`**   (1)
    `        THEN`
    `            OUTPUT "REFUSED – stack is full"`
    `        ELSE`
    `            INPUT `**`NewAnimal`**   (1)
    `                StackPointer ← `**`StackPointer + 1`**   (1)
    `                `**`Animal[StackPointer]`**` ← NewAnimal`   (1)
    `    ENDIF`
    `ENDPROCEDURE`   **[4]**

(d) `PROCEDURE Pop`
    `    IF StackPointer = -1`
    `        THEN`
    `            OUTPUT "Stack is empty"`
    `        ELSE`
    `            OUTPUT Animal[StackPointer]`
    `            StackPointer ← StackPointer – 1`
    `    ENDIF`
    `ENDPROCEDURE`

    Mark as follows …
    Test for empty with `StackPointer = -1`   **[1]**
    `OUTPUT 'EMPTY'` message   **[1]**
    `Animal[StackPointer]` is value removed   **[1]**
    Decrement `StackPointer`   **[1]**

[Total: 13]

5 (a) (i) –23

E9   (1)

(ii) 107   (1)

6B   (1)   [2]

(iii) 127   [1]

(iv) Fewer digits used to represent any number // long string difficult to interpret   (1)

Less likely to make a mistake <u>when copying/converting</u> a digit string   (1)

Easy to convert from binary/denary to hex (vice versa) (than binary to denary)   (1)

[Max 1]

(b)

99	0	1	1	0	0	0	1	1	
29	0	0	0	1	1	1	0	1	**+**
	1	0	0	0	0	0	0	0	

99 and 29 correct pattern   (1)

Correct addition // ft   (1)

Overflow has occurred // the expected answer is outside the possible range // the
answer is showing as –128   (1)   [3]

(c) (i) `1578`   [1]

(ii) `1101` is not a valid BCD digit string // `1101` represents '13'   [1]

[Total: 11]

6 (a) Systems flowchart   [1]

(b) • 1 – Text editor
     • 2 – on-screen errors
     • 3 – Compiler
     • 4 – Assembler
     • 5 – Linker
     • 6 – Program library code
     • 7 – Executable code   [7]

[Total: 8]

7 (a) *Correct use of any of the following:*
    Single segment of wire   (
    Computers connected to the cable X 4   (1)
    Terminators X 2   (1)
    Computer C has attached 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) Manage user accounts   (1)
    Authenticate all logons   (1)
    Manage the shared file storage   (1)
    Manage the installation and use of applications software   (1)

                                                                          [Max 3]

(c) *Intranet …*
    Information system using Internet protocols   (1)
    Provides service of web pages (to client computers)   (1)
    Information system only available to staff within the organisation   (1)

                                                                          [Max 2]

                                                                          [Total: 10]

8 (a) (i) `ChangeString`   (1)
          `ThisString1, ThisString2` (only)   (1)   **[2]**

   (ii) `Ali J`   **[1]**

   (iii) 7 // Error   if LEFT(`""`, 1) generates an error   **[1]**

   (iv) `JONES 8`   **[1]**

                                                                          [Total: 5]