

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Advanced Level**

**MARK SCHEME for the October/November 2013 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.

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(iv) CAR (CarRegistrationNo, CarMake, CarModel, HirePriceCode, DepotID) [1]  
 DEPOT (DepotID, DepotAddress, DepotManager ) [1]

If the primary key is no indicated, penalise once only

(e) avoids data duplication [1]  
 avoids data inconsistencies [1]

(f) SELECT HireID, CustomerID [1]  
 FROM HIRE [1]  
 WHERE CustomerID = 'C674' AND CarRegistration = '456431' [1]

[Total: 19]

3 (a) Temporary storage location [1]  
 Inside the (micro)processor [1]

(b) (i) 127 [1]

(ii) 123 [1]

(iii) less digits used to represent any number [1]  
 Less likely to make a mistake when copying/converting a digit string [1]  
 Easy conversion between binary and hex (vice versa) than binary and denary [1]  
 MAX 1

(c) (i) 2 bytes [1]

(ii) MAR ← [PC] // MAR given the contents of the PC [1]  
 PC ← [PC] + 1 // PC is incremented [1]  
 MDR ← [[MAR]] // The contents of the address in MAR is copied to MDR [1]  
 CIR ← [MDR] // The contents of MDR are copied to CIR [1]

OR, if the candidate uses the suggested instruction ....  
 MAR is given value 40 // PC contents of 40 are copied to MAR [1]  
 7324/The contents of address 40 is copied to the MDR [1]  
 PC is incremented from 40 to 41 [1]  
 7324/contents of location 40 is copied to CIR [1]  
 MAX 5

(d)

		Memory address			
ACC		153		160	
13				0	
13					
		13			
150					
151					
				151	
23					
36					
		36			
151					
152					
				152	

[4]

[Total: 15]

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- 4 (a) Rules are: 15 and 25 [1]
- (b) (i) Who = zhen  
Who = kong [1]
- (ii) false [1]
- (iii) false [1]
- (c) (i) has\_licence(X) AND passed\_theory\_Test(X) AND  
passed\_driving\_test(X, motorbike)  
each clause scores 1 [3]  
use of two AND operators [1]  
MAX 3
- (ii)  
9 ?- passed\_theory\_test(Who), not(passed\_driving\_test(Who, car)),  
not(passed\_driving\_test(Who, motorbike)).  
Who = yin ;  
  
OR (using the anonymous variable) ...  
10 ?- passed\_theory\_test(Who), not(passed\_driving\_test(Who, \_)).  
Who = yin ; [3]
- (d) has\_licence(ho) returns TRUE // clause 11 [1]  
age(ho, A) returns 15 // A=15 [1]  
minimum\_age(motorbike, L) returns L=15 // clause 2 [1]  
A >= L returns FALSE [1]  
able\_to\_drive(ho, motorbike) returns false [1]  
MAX 3

[Total: 12]

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- 5 (a) BOOLEAN [1]  
Flags when the book title is found [1]  
STRING (for SearchBook) [1]
- ```

OPENFILE Book.txt for Output
INPUT SearchBook [1]
IsFound ← FALSE

REPEAT
  READ next book data value and assign to NextBook
  IF NextBook = SearchBook [1]
    THEN
      IsFound ← TRUE
      OUTPUT "FOUND"
    ENDIF
UNTIL (IsFound = TRUE) OR EOF [1]

IF IsFound = FALSE // NOT IsFound [1]
  THEN
    OUTPUT "Book title was NOT FOUND"
  ENDIF
CLOSEFILE [1]

```
- (b) The search will read on average 125 records [1]
- (c) (i) The data items must be in order [1]  
(ii) The function makes a call to itself (in two places) [1]  
(iii) BinarySearch(BookTitle, "Tortoise Care", 1, 11)  
High < Low is FALSE  
Middle = 6  
BookTitle[6] > "Tortoise Care" is FALSE  
BookTitle[6] < "Tortoise Care" is TRUE  
BinarySearch(BookTitle, "Tortoise Care" 7, 11) [1]
- ```

High < Low is FALSE
Middle = 9 [1]
Booktitle[9] > "Tortoise Care" is FALSE
Booktitle[9] < "Tortoise Care" is TRUE
BinarySearch(BookTitle, "Tortoise Care" 10, 11) [1]

```

```

High < Low is FALSE
Middle = 10
BookTitle[10] > "Tortoise Care" is FALSE [1]
Booktitle[10] < "Tortoise Care" is FALSE
RETURN 10
ENDFUNCTION

```

```

ENDFUNCTION [1]

```
- ENDFUNCTION

[Total: 16]

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- 6 (a) *Boot file ...*
- Stored in the BIOS/ROM [1]
  - The initial sequence of instructions run when the computer is powered on [1]
  - Information on which drive to look for the operating system [1]
  - Triggers the loading of the operating system [1]
- MAX 3
- (b) (i) *An interrupt*
- a signal from some device [1]
  - to indicate that some event has occurred [1]
  - the device is seeking the attention of the processor [1]
- MAX 1
- (ii) *Hardware generated ...*
- reset [1]
  - multiprogramming 'end of time slice'
  - other valid answers ...
- Software generated ...* [1]
- Division by zero error
  - Other valid answers ...
- MAX 2
- (c) **RUNNING**
- The process currently has use of the processor [1]
- READY**
- The process would like to use the processor when the current process releases the processor [1]
- SUSPENDED**
- The process cannot currently use the processor// or by example, the job is currently using an I/O device [1]
- [Total: 9]**

7 (a) (i)

<b>Firewall</b>	←	Hardware or software to control unauthorised access to a private network
<b>Modem</b>	←	Hardware used to convert analogue signals to digital signals (and vice versa)
<b>Switch</b>	←	Hardware used to connect nodes in a circuit switching network
<b>Network Interface card</b>	←	Circuit board which connects the computer to a network
<b>Router</b>	←	Device to direct packets across a packet switched network
<b>Bridge</b>	←	Device used to connect two bus network segments to allow communication between all nodes

[5]

(ii) Network (Interface) card

[1]

- (b) (i) Copper wire/coaxial/twisted pair  
 Wire conducts electricity // changing current denotes different signals  
 Optic fibre cabling  
 Separate fibres used for separate signal  
 Data travels very fast  
 Signal transmitted as light pulses/travels at the speed of light  
 Radio/Microwave signals  
 Wireless communication // allows for mobile communication  
 Mark as 2 × 2

MAX 4

- (ii) Maximum possible distance  
 Speed of communication // data transfer rate

[1]

[1]

MAX 1

[Total: 11]