

MARK SCHEME for the October/November 2013 series

9691 COMPUTING

9691/33

Paper 3 (Written Paper), maximum raw mark 90

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

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- (iv) CAR(CarRegistrationNo, CarMake, CarModel, HirePriceCode, ...)
 DEPOT(DepotID, DepotAddress, DepotManager)

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

(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
Flags when the book title is found
STRING (for SearchBook)
- 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
 The initial sequence of instructions run when the computer is powered on
 Information on which drive to look for the operating system
 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)

Firewall	←	Hardware or software to control unauthorised access to a private network
Modem	←	Hardware used to convert analogue signals to digital signals (and vice versa)
Switch	←	Hardware used to connect nodes in a circuit switching network
Network Interface card	←	Circuit board which connects the computer to a network
Router	←	Device to direct packets across a packet switched network
Bridge	←	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]