

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)

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]