Version 1.0: 0708

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Computing 6510

CPT 5 Advanced Systems

Mark Scheme

2008 examination - June series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

Copyright © 2008 AQA and its licensors. All rights reserved.

COPYRIGHT
AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

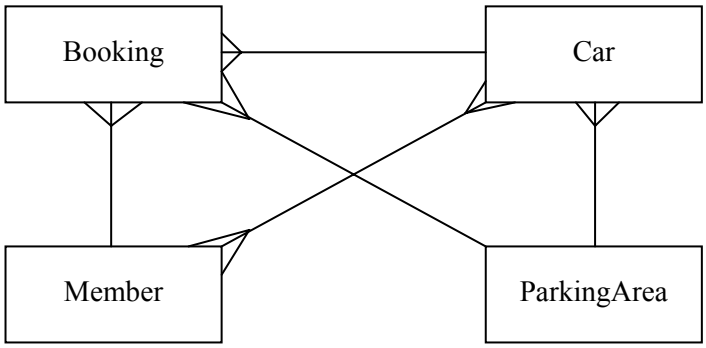
Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX *Dr Michael Cresswell Director General*

The following annotation is used in the mark scheme:

- ; - means a single mark
- // - means alternative response
- / - means an alternative word or sub-phrase
- A - means acceptable creditworthy answer
- R - means reject answer as not creditworthy
- I - means ignore.

Qu	Part	Sub Part	Marking Guidance	Mark
1	a		The car's RFID reader; will sense/detect/read the RFID/card (through windscreen); **R** answers that imply swiping/plugging in or use of keys **A** sending/transmitting of RFID On-board computer to check booking details; Car can be activated with a PIN (typed into a console);If someone has stolen the membership card they can't use it; **R** any answers using other devices such as barcode reader	3
1	b	(i)	member ID / user name ; password/PIN ; **A** account name instead of memberID; **A** answers to security questions;	2
1	b	(ii)	Member (MemberID, CreditCardNo, Member(Full)Name, Address, DrivingLicenceNo, EmailAddress, Mobile(Tel)No/TelNo); + attributes from b(i) **I** bars over attributes	1
1	b	(iii)	ParkingArea (LocationCode, ParkingAreaName, PostCode) ; **A** ParkingAreaID instead of LocationCode **R** ParkingArea **R** Name as attributes	1
1	b	(iv)	Car (CarRegNo, LocationCode) ; **A** RegNo/CarReg instead of CarRegNo Allow follow through on foreign key from (iii)	1
1	b	(v)	Booking (BookingRefCode, CarRegNo, MemberID, StartDateTime, EndDateTime, LocationCode) ; ; ; *1 mark for CarRegNo and MemberID;* *1 mark for StartDateTime and EndDateTime;* *1 mark for LocationCode;* *1 mark for BookingRefCode as primary key;* ***A** 2 separate attributes for DateTime* **A** BookingRef/BookingID instead of BookingRefCode Follow through on attribute names	Max 3

1	c		 *1 mark for each correct relationship,* *If 4 or 5 relationships given, mark as follows:* *All 4/4 or 5/5 correct: 3 marks* *3/4 or /54 correct: 2 marks* *2/4 or3/5 correct: 1 mark* *All other cases: 0 marks* **I** *relationship between Member and ParkingArea*	Max 3
1	d		SELECT MemberID, (MemberFullName,) CarRegNo, StartDateTime, (EndDateTime) FROM (Member,) Booking WHERE Member.MemberID = Booking.MemberID AND EndDateTime BETWEEN 1/12/07 AND 31/12/07 ORDER BY MemberID (ASC/DESC) A other attributes if present in candidate's booking table *Alternative Answer:* SELECT *; FROM Booking; WHERE EndDateTime LIKE "*/12/07" **A** StartDateTime instead of EndDateTime **P1** if attribute.table notaion used **P1** for extra punctuation or tbl in front of table name **I** punctuation around dates/times **I** case of keywords etc **A** other wildcard characters *Alternative Answer:* SELECT MemberID, MemberFullName, CarRegNo, StartDateTime, EndDateTime FROM Member INNER JOIN Booking ON Member.MemberID = Booking.MemberID WHERE EndDateTime >= 1/12/07 AND EndDateTime <= 31/12/07 ORDER BY MemberID	1 1 1 1 1 1 1 1 1 1 1 Max 4

1	e							6
StartDateTime			**EndDateTime**	**Mileage**	**OverdueHours**	**Normal**	**Erroneous**	**Boundary**
01/12/07 06:00			01/12/07 15:30	15	2	1		
06/12/07 18:00			12/12/07 09:00	237	3			
04/12/07 **23:00**			04/12/07 **08:30**	5	2		1	
03/12/07 08:00			03/12/07 09:00	**0**	**0**			1
01/12/07 06:00			01/12/07 15:30	0	1**.5**		1	I
01/12/07 06:00			01/12/07 15:30	0	**-2**		1	I
04/12/07 08:30			05/12/07 23:00	57	0	1		A
01/12/07 06:00			01/12/07 15:30	15	3			

2	(a)	(i)	*encryption*: converting/transforming plain text into cyphertext / secret code
			// applying an algorithm to plain text to produce an unreadable version
			// the process of changing/enciphering/encoding information in such a way that only the computer/person with the key can decrypt/decode it;
				1

2	(a)	(ii)	*symmetric key encryption:* the same key/process/algorithm is used for encrypting and decrypting; **A** *sending/receiving instead of encrypting/decrypting* *public key encryption:* a public key and a private key // a pair of keys are used in combination; one to encrypt, the other to decrypt;	3
2	b	(i)	*when:* the symmetric key is sent (from B to A) // when establishing the initial connection; *how:* B must encrypt the symmetric key; with A's public key; so A can decrypt (the symmetric key) with A's private key; **A** A must encrypt the symmetric key; with B's public key; so B can decrypt (the symmetric key) with B's private key;	Max 3
2	b	(ii)	anyone could intercept the message with the symmetric key (and then decrypt the personal data); distributing the symmetric key securely is not possible (unless it is encrypted); **R** unspecific answers such as 'easily hacked'	1
3			*Any three points at 1 mark each:* Bugs/Errors/Mistakes in software/system/code/program/it; Problem **NE** **R** data errors (T.O.) Requirements change // adding new tasks; *or by example* Parameters change e.g. VAT rate, No of users adjusted, No of licences change; Performance needs tuning // buffer size needs adjusting // indexing needs to be switched off or on // indexes need to be rebuilt; "Efficiency …" **NE**	

			Hardware is changed; System software is updated / upgrades; "Keeping up to date // update software" **NE** *Adaptive/Corrective/Perfective maintenance not enough without explanation*	Max 3
4	a		a computer program/software; that attempts to replicate the performance of a (human) expert; // responds like an expert; *must do more than just store and retrieve data AI not enough*	2
4	b		*typical application:* Natural Language modelling/translation; classification - insects, etc prediction/forecast - weather forecasting, stock market forecasts, mineral ore deposits, … face recognition // voice recognition; diagnosis - medical problems / large computer system faults; monitoring and control/Robotics - chemical processing plant/air traffic control / nuclear reactor; design - electronic circuit boards; planning systems - manufacturing capacity and inventory management; instructional systems - evaluation of student's performance & adjustment of teaching level; (*must refer to intelligent systems*) adaptive games - chess masters learn as they play; **R** answers that imply only data storage	Max 1
4	c		*3 constituent parts:* the knowledge base // facts and rules part; A database + rules; **R** database the inference engine // means of making deductions; **A** the programmed logic; **R** relationship between data // **R** calculations the user/human interface // means of communication between user and computer; **R** input & output	3
4	d		it explains its reasoning to the user; it can reason with uncertain data (can respond to 'don't know' answers); fuzzy logic (ability to state conclusions qualified by probability value); can store rules as well as facts / rules not just data; preserves expertise; will try different pathways to solution whereas user on a database would have to redefine the search / uses backtracking / uses logic; adaptive / it learns;	Max 2
5			Top down testing; Bottom up testing; Black-box testing; White-box testing; Dry-run / walk-through; Mark first 3 responses only BUT beware of expansion on same line	

			Unit/Module testing; **A** Prototyping; **R** Integration/Acceptance/Alpha/Beta/System/Performance/ Compatibility testing **R** anything clearly late in the development cycle	Max 3
6	a		A database is a pool/store/collection of data/records; **A** *collection of files // file(s) containing data;* A database management system (is a program/software that) acts as an interface between user and database // DBMS controls the structure/access // DBMS is a layer of software between database and applications; **A** manages access to data; **R** manages data	2
6	b		External / User / Local (Schema/View); **R** User Interface Conceptual / Logical (Schema); **A** The Schema; **R** Logic schema Internal / Storage / Physical (Schema);	3
6	c		CREATE TABLE // CREATE INDEX // CREATE DOMAIN // CREATE TRIGGER // CREATE VIEW // GRANT …; **R** CREATE DATABASE	1
7	a		scan head/sensory array moves slowly across the document; light illuminates document; image of document is reflected (via mirrors and lens); onto (an array of) light-sensitive cells // sensors; each cell/sensor produces an electrical signal; proportional to the strength of the reflected light that hits it; electrical signal is converted (into a binary value); binary values are stored as a matrix/bitmap *(or similar)*; binary value is stored in file; **I** pixel **I** colour scans // multiple scans *1 mark for each point*	Max 4
7	b		optical character recognition (software); OCR not enough **R** optical mark recognition **R** optical character reader	1
8	a	(i)	C – Router; **A** Brouter; **A** Gateway; E – Switch/hub ;	2

8	a	(ii)	B – 192.168.7.1 D – 192.168.8.1 } 1 mark **A** *other numbers between 2 and 254 inclusive as last byte* (not 0 or 255)	1
8	a	(iii)	255.255.255.0 R 255.255.255 R 255.255.255.x (where x is anything else)	1
8	a	(iv)	any in the range 192.168.8.2 to 192.168.8.254 *allow 192.168.8.1 if not used in (ii)* **R** *if same as 8a(ii) for D*	1
8	b	(i)		1
8	b	(ii)		2

(i)	(ii)
253;	Because only the final byte is available for hosts;* But 0, 1 and 255 are reserved;
254;	Because only the final byte is available for hosts;* But 0 and 255 are reserved // 1 and 255 are reserved // 0 and 1 are reserved;
255;	Because only the final byte is available for hosts;* But 0/ 1 / 255 is reserved;
256;	Because only the final byte is available for hosts;

*"Because only the final byte is available for hosts" *is equivalent to* "there are 256 possible combinations"

c:\my files aqa\summer 2008\id cpt5-6a-08 v 2.doc