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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Computing 6511

CPT5 Advanced Systems Development

Mark Scheme

2006 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.

INSTRUCTIONS TO EXAMINERS

The following forms of notation should be used on candidates' scripts:

- Ticks - To indicate what is accepted as correct or creditworthy, placed in the body of the answer, and on diagrams;
- Underscoring – To identify errors/irrelevance in written answers;
- Crosses – to indicate a wrong answer;
- Brief comments – placed at suitable points in the body of the text to amplify the marking;
- BOD – means benefit of the doubt and is used where the candidate's answer has been given a mark on the balance of probabilities that the candidate's answer has met the requirements of the mark scheme even though it could be interpreted differently;
- NE – means not enough and is applied to an answer that falls short of what is required;
- O/S – means outside the mark scheme. The candidate's answer is creditworthy but the answer does not match any of the answers on the mark scheme for the particular question. Nevertheless a mark is awarded;
- C/F – means carried forward. This arises when a candidate offers an answer which is not creditworthy in one question but is creditworthy in a later question. The mark is carried forward to the question which is creditworthy;
- C/B – means carried back. This is similar to a carry forward but the mark is carried back to an earlier question.
- T/O – means talked out. The candidate's answer is contradictory.
- ^ - means missing term or symbol.
- F/T – means followed through. If a candidate made a mistake in the earlier part of an answer, mar the answer using the correct method on their answer from the earlier part.
- P1 – penalise once

The following notation is used in the mark scheme

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

General Rules for Marking
Ignore Abbreviations
Ignore Brand Names

1 (a) record updated by two users simultaneously / at the same time;

first update is overwritten // one update getting lost; **R** erroneous data

A *field,table,file,data instead of record*

// data being changed at 2 workstations; but only one change being effected;

Editing by 2 users must at least be implied **max 2**

(b) record locking;

so 2nd user has record available as read-only; when 1st user has it open in R/W mode;

only allow one user to edit at a time; **max 2**

(c) database server receives queries from client stations and sends back the results of queries;

A database server performs ops / processes, client receives data **1**

Total 5

2 object-oriented databases offer DBMS facilities with object-oriented programming;

database can store complex data types / objects and their associated method of access;

collection of objects; **A** collection of properties/attributes/fields & methods;

objects are data stored, classes are data types; **BoD** stores data as objects;

A appropriate examples as complex data types + methods;

A collection of instances of a class / classes;

R Collection of classes; references to tables T.O. **max 1**

Total 1

3 1 mark for test data, 1 mark for justification for 3 sets of test data

£1, 50p, 20p, 10p, 5p; simple change of a single coin;

£3.85, 15p, 25p, 30p, 35p, 60p, 65p, 70p, 75p, 80p, 85p; change made up of one of several coins;

40p, 45p, 90p, 95p; change made up of more than one of the same coins: 2x20p;

0p; boundary data: no change / zero coins;

5p; minimum change that can be given;

£1.95; maximum change that can be given // extreme/boundary value;

a negative amount; although the routine that calculates how much change is due should not

allow erroneous change, this routine should still test for erroneous input;

3p; an amount that is not a multiple of 5p // erroneous data;
not all values need to be listed **max 6**

Total 6

R *justifications not referring to scenario*

R *answers which seem to test the coins inserted f the calculation of change*

4 Any two 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;

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;

Hardware is changed;

Software / system is updated // upgrades;

Adaptive/Corrective/Perfective maintenance not enough without explanation **max 2**

Total 2

"Keeping up to date" **NE**

5 (a) (i)

A HardwareItem

B EquipmentLoan

C 'is out on' ; *accept any wording with similar meaning*

1 mark

R one to many relationship

(ii) Entity-Relationship Diagram; **A** E-R diagram; **A** E-R D **R** E-A-R diagram

(b)

```
CREATE TABLE HardwareItem
(Description VARCHAR (30),
Make VARCHAR(15),
Model VARCHAR(15),
(Inventory)RefNo CHAR(20) PRIMARY KEY,
PurchaseDate DATE,
PurchasePrice CURRENCY,
Location VARCHAR(4))
```

1 mark **A** text/string instead of char/varchar

1 mark

A string/text/character/VARCHAR(20) instead of CHAR(20)

A DateOfPurchase DATE **A** Date/Time instead of Date

1 mark

A DECIMAL/MONEY/Number/Real/Float/Single instead of CURRENCY

A Room VARCHAR(4)
A INT/number instead of VARCHAR

Alternative for InventoryRefNo:

(Inventory)RefNo CHAR(20), PRIMARY KEY(InventoryRefNo),

(Inventory)RefNo CHAR(20), NOT NULL,, PRIMARY KEY(InventoryRefNo),

A VARCHAR(20) instead of CHAR(20)

Note: string lengths do not have to be exact/present except for InventoryRefNo

```
CREATE TABLE EquipmentLoan
( Inventory)RefNo VARCHAR(20),
Location VARCHAR(4),
(Staff)Initials VARCHAR(3),
DateRemoved DATE,
DateReturned DATE,
PRIMARY KEY (InventoryRefNo, DateRemoved),
FOREIGN KEY (InventoryRefNo) REFERENCES HardwareItem(InventoryRefNo))
```

A NOT NULL

If not DDL but composite key identified, give 1 mark

1 mark

A NOT NULL

1 mark

1 mark

6 marks

P1 for extra attributes

(c) SELECT (HardwareItem.)Description, (EquipmentLoan.)DateRemoved, 1 mark

EquipmentLoan. (Inventory)RefNo, 1 mark **A** HardwareItem.InventroryRefNo

FROM HardwareItem, EquipmentLoan 1 mark

WHERE HardwareItem. (Inventory)RefNo = EquipmentLoan. (Inventory)RefNo 1 mark

AND (EquipmentLoan.)DateRemoved > givenDate 1 mark **A** >= **A** =>

ORDER BY (EquipmentLoan.) (Inventory)RefNo; 1 mark

or

SELECT (HardwareItem.)Description, (EquipmentLoan.)DateRemoved, 1 mark

EquipmentLoan. (Inventory)RefNo 1 mark **A** HardwareItem.InventroryRefNo

FROM HardwareItem

INNER JOIN EquipmentLoan } 1 mark Note: can swap tables

ON HardwareItem. (Inventory)RefNo = EquipmentLoan. (Inventory)RefNo 1 mark

WHERE (EquipmentLoan.)DateRemoved > givenDate 1 mark **A** >= **A** =>

ORDER BY (EquipmentLoan.)(Inventory)RefNo; 1 mark **A** HardwareItem.InventroryRefNo

6 marks

Total 15 marks

F/T with attribute names

P1 for tbl prefix

P1 if table name after attribute name

I extra punctuation

6 (a) interview (key) staff/manager

observation of check-in process; system not enough

survey/questionnaire to rental car customers/staff; **NE** relevant people
examination of paperwork/current documentation

(booking form / car database / check-in form / invoice); **max 2**

(b) (i) A: Book a car;

B: Car Database;

C: Collect Car

D: Booking number, driving licence;

If action on arrow **T.O.**

E: Invoice;

F: Mileage, Fuel level, Condition; *must have all three*

6 marks

(ii) Data FlowDiagram; **A** DFD; **R** Flow diagram, **R** Flow chart **1 mark**

(c) *max 2 of the following (input) with different purposes:*

barcode reader: to read a barcode attached to the inside of the car to identify it;
to read/scan a barcode on the customer's booking form, to identify the customer;

smart card reader: to read the customer's credit card for final payment;

touch sensitive screen: to input the mileage / fuel level / condition of the car;
A to input data **A** operate the device

RFID tag reader: to read car's RFID to identify car (without having to look for label or number plate);

OCR: to read the number plate to identify the car // read mileage of car;

Max 1 of (output):

thermal printer: to print out the invoice for the customer;

max 1 of: (transmission)

wireless network card: to send/connect handheld device to database server / computer in the office;

Bluetooth: to send data to office via mobile phone and bluetooth connection;

Must cover input, output and transmission for full marks

max 4 marks

R *separate printer connected via Bluetooth or wireless*

Total 13 marks

7 (a) intranet: (Local area) private/organisation-wide internet;
an organisation-wide network where information is accessed through browsers;

A internal/organisation-wide web service; **1 mark**

(b) *ignore any head or title tags*

```
<BODY>
<H1 ALIGN = "CENTER">Topics</H1>
<P>Babbage's Analytical Engine
<P>The Stored Program Concept
<P>The Microprocessor
<HR>
<BR>Entrance free
<BR>Seats <B>must</B> be booked in advance
</BODY>
```

1 mark for body opening tag

1 mark for H1 tags **A** H2 instead of H1
1 mark for correct ALIGN
Accept CENTER without quotes, or spelt as CENTRE

optional

I closing tags </P>
A

 instead of <P>

1 mark 2 <P> in between 3 lines of text

Or <HR/>1 mark

optional

1 mark for <BR> between 2 lines of text
1 mark for bold tags around 'must'

1 mark for body closing tag

Ignore minor spelling mistakes

Ignore case

Ignore white space

8 marks

Total 9 marks

Allow instead of <B> and instead of </B>

Allow <CENTER> and </CENTER> instead of ALIGN = “CENTER”

Allow <BOLD> instead of <B> and </BOLD> instead of </B>

Allow an image instead of <HR> but must have <P> or <BR> to keep separate from text

Allow <FONTSIZE> instead of <H1> but must reset at end of heading

8 (a) LAN; because the buildings are on one site **2 marks**

(b) (i) pupils benefit: can access their work/resources on any computer;

can print on any printer;

can access information from any computer;

can use VLE/intranets/shared folder;

can submit work over network; **1 mark**

Some answers can occur in more than one section but can only be awarded once

Ignore references to Internet

(ii) teacher: can access pupil database/information from any computer;

can register pupils from any computer;

internal e-mail/communication between staff or between staff & pupils;

monitoring useage of network; **1 mark**

(iii) head of year / personal tutor: can access pupil attendance data directly;

can access pupil database from any computer;

internal e-mail/communication between staff or between staff & pupils; **1 mark**

(iv) head / principal: can get stats of attendance (more easily);

can get stats of pupils (on courses) (more easily);

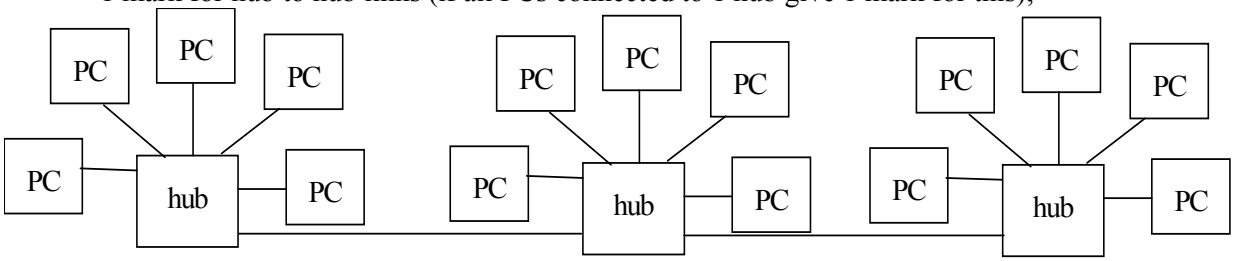
internal e-mail/communication between staff; **1 mark**

(c) 1 mark for PC/workstations linked to <u>hub</u>;

1 mark for 15 PCs connected to hub(s);

If hubs incorrectly labelled but topology ok, give 1 mark

1 mark for hub to hub links (if all PCs connected to 1 hub give 1 mark for this);



3 marks

components must be labelled. Accept PC/Computer as equivalent label

no arrows needed for physical diagram

allow connection between hubs via backbone

Accept hubs connected via another hub

***R** link via server*

Ignore a server connected to bus or hub

(d) (i) hub: collision domain involves all computers connected to hub;

switch: collision domain limited to 2 computers;

hub broadcasts packet to all computers; switch only sends packet to receiver; **2 marks**

(ii) no collisions possible with a switch // collisions reduced; **1 mark**

(e) to prevent unauthorised access to a private network

// to safeguard the school's network against hackers

to prevent unwanted intrusion from outside internal network;

to block internal access to specific external sites;

block certain ranges of IP addresses;

close ports; **max 2**

Total 14 marks

R references to viruses