



**General Certificate of Education**

**Computing 6510**

**CPT5      Advanced Systems Development**

**Mark Scheme**

*2007 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.

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## Instructions to examiners

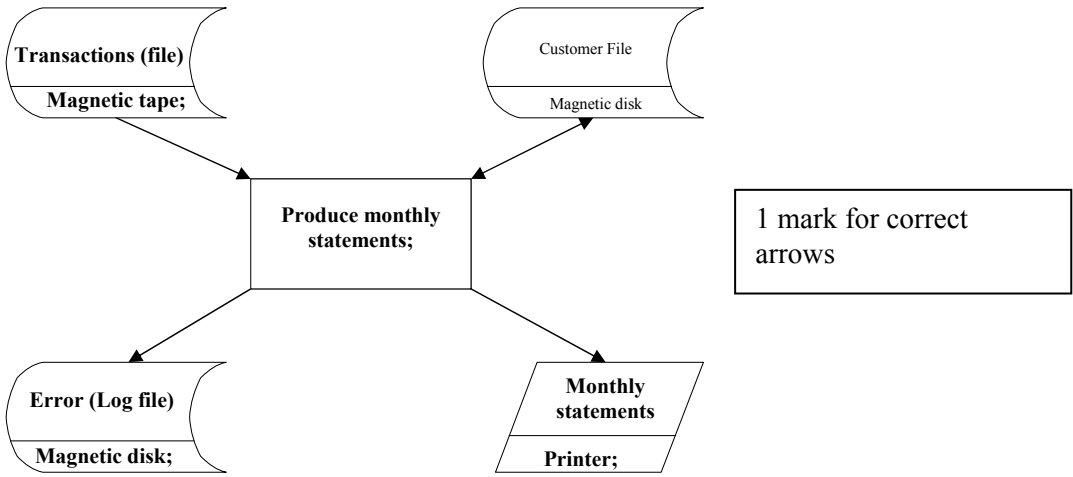
The following forms of notation should be used on candidates' scripts:

- **Ticks** - To indicate what is accepted as correct or creditworthy, placed in the body of the answer, and on diagrams;
- **Underscore** – To identify errors/irrelevance in written answers;
- **Crosses** – to indicate a wrong answer;
- **Brief comments** – placed in 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.
- **F/T** – means followed through. If the candidate made a mistake in the earlier part of an answer, mark the answer using the correct method on their answer from the earlier part.

### *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 subphrase
- **//** - means alternative answer

1. a)



5

*A transaction/error log without file*

b) system flow chart;

1

6

2.

Device	use	why
<u>RF</u> Remote control	User can switch appliances/lights on (and off from a distance) // open/close doors/curtains;	does not have to be in line of view; (as with an infra-red device)
Movement detector	Lights could switch on as user is approaching a new area // Doors could open on approach;	would be difficult for a wheelchair bound person to reach the doors/lightswitch;
Voice recognition system	To open/close doors/curtains // activate lights;	User could speak commands rather than pressing buttons // Don't have to reach button;
CCTV	See who is outside/rang the doorbell;	Without going to the door;
Fingerprint door locks	To control who gets through the front door // to lock/unlock front door;	without needing a key;
Climate control system	to get fresh air // control temperature in house automatically;	No need to open windows // no need to adjust air con/heating manually;
Motors to operate doors/curtain rails	Can control opening/closing of garagedoor/door/curtains;	would be difficult for a wheelchair bound person to reach the doors/curtains; without the use of manpower; <b>A</b> for client to move around more easily;
Switching Unit	To switch on motors for curtain rail when it gets dark/ at certain times of day // to program the switching on of lights/heating/multimedia system/ according to times of day/week ;	Automates daily/regular activities so less to do manually;

C/F or C/B between 'Use' and 'Why'

Note: 'would be difficult for a wheelchair bound person' on its own NE. Needs context of use.

2 marks max for each explanation

6 6

3. a) i) *beta testing*: a test prior to commercial release

// testing that involves sending the product to beta test sites outside the company

for real-world exposure;

*must convey external testing*

**A** the last stage of testing;

1

ii)

<i>Type of information (1 mark per type, 4 marks max)</i>	<i>How it would help (must match type of information, 1 mark for each explanation, 4 marks max)</i>
Program listing; <b>A</b> source code;	Get an overview of the code;
Test data/results // test plan // known bugs;	What tests have been done and their results;
Data dictionary // list of variables;	What variables exist and where they are used;
List of naming conventions;	For example prefixes denote object types;
Procedure list	What the procedures exist and where they are called from;
Record/File/database structure;	How to access records/files // how they relate to each other;
Algorithms/pseudocode/formulae;	Understand how a step was solved;
Structure charts // object/class diagrams // hierarchy charts // system overview // system flow chart; <b>R</b> Data Flow Diagram	See how modules are connected;
Revision log; <b>A</b> maintenance log;	Track changes // enable roll-back; See if it is relevant to the current problem; Recent changes could have caused the problem
List of error codes; <b>R</b> error message	To diagnose errors during testing;

**R** error messages

8

b) *factors to help maintenance: 1 mark per factor (with some relevant explanation) to max 3*

structured program code // no GOTO statements // using iteration/selection constructs

appropriately;

local variables; procedures/functions; with interfaces/parameters;

modules/units;

layout/indentation/white space;

meaningful identifier names; self-documenting code // comments/annotation;

object oriented programming // use of classes;

use of pre-tested routines/library routines; error logs;

3

c) *types of testing. Any 2 of:*

system/integration testing;

functional / black box testing;

structural / white box testing;

acceptance testing;

unit/module/subsystem testing;

Alpha testing;

**A** Dry running / walk-through/inspection testing;

2 14

**R** bottom-up / top-down testing

4. a) i) *dialup*: A temporary, as opposed to dedicated, connection over a telephone line;

slow rates of data transfer; **A** slow;

baseband // can only be used by one device at a time;

converting signal from digital to analog (and vice versa);

ii) *cable modem*: A cable modem can transfer data at much higher rates compared with dial-up modems; **A** faster than dial-up;

**R** references to DA conversion

connection is via cable television cables/fibreoptic cable; **R** wire

dedicated connection//always on;

Speed depends on concurrent sharing;

broadband // line can be used by several devices at the same time;

iii) *ADSL*: allows more data to be sent over a telephone line per unit time

// supports higher data rates when receiving data than when sending data

// greater downstream rate than upstream rate; **A** faster than dial-up;

speed/availability is dependent on distance from telephone exchange;

broadband // line can be used by several devices at the same time;

dedicated connection // always on // computer connects almost instantaneously;

6

**I** cost/payment



b) i) router/gateway connects to modem/Internet/telephone line;

each computer links to the router;

any computer can link to Internet without access to another computer;

Laptop can access the desktop computer's files (via the router);

OR

desktop computer('s modem) connects to Internet;

laptop computers link to desktop;

desktop must be switched on for laptops to be able to access the Internet;

laptop can access the desktop computer's files;

max 3

ii) desktop acts as server // buy a dedicated server (to store the shared files);

server/desktop's modem connects to Internet;

laptops act as clients (to desktop/server);

laptops request files from [desktop] server;

max 3

c) i) 192.168;      A 192.168.0.0;    R 192.168.x.y

1

ii) *range for desktop*: 192.168.0.2; to 192.168.255.254;

192.168.0.1; to 192.168.255.254; A 192.168.255.255 as top end of range

2

iii) *subnet mask*: 255.255.0.0 // 255.255.224.0 // 255.255.192.0 // 255.255.128.0;

1

d) i) *virus attack*: run/use/install virus checking/ anti-virus software

// regularly update the virus checking software (database);

1

ii) *unauthorised access*: use/install firewall; using non-routeable addresses in LAN;

make folders/directories/files non-shareable/invisible/password-protected // encrypt data;

**P1** for buy    password-protect computer/data NE

max 1

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e) i) *cable required*: Ethernet cable // 10BASE-T // 100Base-T // 1000Base-T

// twisted pair // Cat3 // Cat5 // mains cable // internal tel cable // fibre optics; 1

ii) *hardware required*: wireless access point/hub/router;

wireless network card/adaptor; 2

iii) *advantage*: do not need cables trailing through house

// can work anywhere within range of access point

// other members of family/visitors can easily join network; 1

iv) *disadvantage*: less secure // neighbours may try to use bandwidth;

prone to interference;

signal may be poor (depending on house construction);

likely to be slower than any cabled connection;

Health & Safety issues; max 1 23

- 
5. a) i) Recipe table; A Figure 2; 1
- ii) *Why*: contains multiple values in Ingredients field/attribute/column  
 // data in Ingredients column not atomic // repeating groups; 1
- b) i) *fully normalised*:  
 every attribute is dependent on the key, the whole key and nothing but the key;;  
 OR (tables contain no repeating groups of attributes,) no partial dependencies;  
 no non-key dependencies; A rely on instead of depend on  
 OR if (and only if) every determinant in the relation is a candidate key;; 2
- ii) *Why*: to aid consistency of data // to avoid potential data inconsistency problems  
 // to eliminate data inconsistency // to minimise data duplication  
 // to eliminate data redundancy; A reduce instead of eliminate  
 R saving space 1
- c) i) Recipe (RecipeID, Dish, PrepTime, CookTime, NoOfServings, CookInstructions); 1
- ii) FoodItem (FoodItemID, FoodItemName, PackSize, Price); 1
- iii) RecipeIngredient(FoodItemID, RecipeID, Quantity) 4
- 1 mark for each correct field, 1 mark for correct primary key*  
*(take off 1 mark for every extra field included)*

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d) SELECT FoodItemName, Quantity, PackSize, Price	1 mark		
FROM FoodItem, RecipeIngredient, Recipe	1 mark		
WHERE (Recipe.RecipeId = RecipeIngredient.RecipeId)	1 mark		
AND (RecipeIngredient.FoodItemId = FoodItem.FoodItemId)	1 mark		
AND ( Recipe.Dish = “Feta Salad”)	1 mark		
ORDER BY FoodItemName ASC	1 mark	max 5	16
<i>field names F/T</i>	<b>P1</b> for <i>fieldname.tablename</i>	<b>P1</b> tbl prefix	
<b>A</b> ORDER BY FoodItemName			
<b>A</b> Dish instead of Recipe.Dish			
<b>A</b> ‘feta salad’ instead of “Feta Salad”	<b>A</b> #feta salad# instead of “Feta Salad”		