Version 1.0: 0605

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Computing 5511/6511

CPT5 Advanced System Development

Mark Scheme

2005 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 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; This symbol is also used** 
- **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. Desktop Publishing Package//DTP//Word Processor;
   A. Desktop Publisher;
   R. Graphics Package R. Brand names R. Publishing/Publisher

Total 1

2. Any two @ one mark each
   Top down (testing);
   Bottom up (testing);
   White-box (testing);
   Integration/Integrated (testing);
   Interface/Stub (testing);
   Acceptance (testing);
   Alpha (testing);
   Beta (testing);
   Walkthrough/Dry Run/Tracing/Desk checking:
   Compatibility (testing):
   Performance (testing):
   System (testing);
   Unit/Module (testing);
   R. Functional (testing)
   R. Structural (testing)
   R. Test cases and examples of test cases max 2

Total 2

3. Any two @ one mark each

   Interview;
   Observation; } Accept synonyms

   Survey/Questionnaire;
   Examination of paperwork;

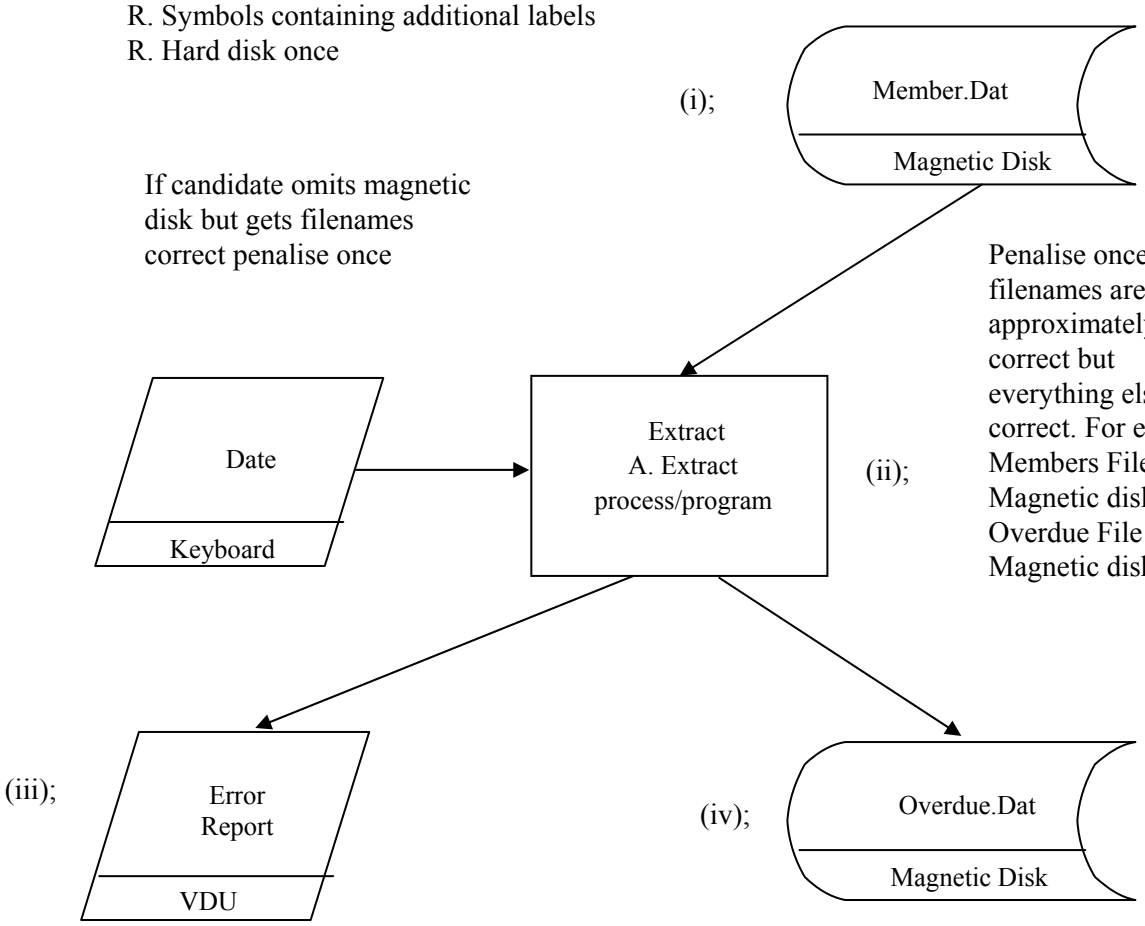
   Accept synonyms, e.g. Examination of problem logs

Total 2

4.

(a) System flowchart; A. System flow diagram. R. System diagram/chart.
R. Flow diagram 1

(b) One mark each of (i) to (iv)
R. Symbols containing additional labels
R. Hard disk once



If candidate omits magnetic disk but gets filenames correct penalise once

Penalise once where filenames are only approximately correct but everything else is correct. For example, Members File Magnetic disk, Overdue File Magnetic disk

4

Total 5

A. Credit R. Value
A. Balance
A. Money

5.

(a)

(i) To read(or synonym) amount of electronic cash(or synonym) stored on card//to alter(or synonym, e.g. store/topup) the amount of cash(or synonym) stored on card
A. To read debit/credit card to top up the wallet(must have both points R. to read card); 1

Focus is canteen

(ii) To identify a pupil//to check smart card belongs to pupil//to identify staff//for staff to login; A. Converse R. For security reasons 1

(iii) To **print** a menu/price list (R. produce menu/price list R. print summaries/stock lists) 1

(iv) To **print** receipts (R. produce receipts R print invoice)
A. To **print** end of day summaries; 1

Required by specification

(v) For canteen staff to enter transaction into computer system or equivalent(R. when using cash machine).
A. For pupils to look up menu/prices//staff to create menu/change prices 1

(b) Either

Marks awarded for (i) The technique (ii) Position detection (iii) Action
Region immediately in front of screen monitored//Beams of infra-red light projected across screen//other methods, e.g. capacitive membrane;
Position of e.g. finger determined(detected)//beam broken at a certain position;
Position matched to an action performed by computer;
R. Heat sensitive technique max 2

Or

A. A screen which allows users to make choices by touching areas of screen; max 1

Total 7

6.

(a)

(i) Old system and new system operate alongside each other/in parallel until new system proved(time-limited trial) or Old system and new system operate alongside each other/in parallel to check everything works;
R. Both systems run at same time 1

Be careful that you are not giving mark for a pilot

(ii) Parts of old system gradually replaced in stages by new system;
R. Anything that is not applied to live system, e.g. if reference applies to development stage 1

(b) Any two @ one each
Information/Data/Files may have to be converted/copied/reformatted/modified (so that compatible with new system);
Users/operators will have to be trained (so that they can use the new system)//Staff needed/hired (to maintain new system)//user/operator manuals will need to be written;
Old data archived;
Make full backup before changing to new system;
Hardware replaced/upgraded//A. changes to infrastructure, e.g. cabling, office layout;
(Operating) System software replaced/upgraded (this includes device drivers);
Integration with/Interaction with other software;
Perfective maintenance/performance tuning;
Updating operating procedures;
R. Installing software
R. New licences 2

(c) Any two @ one each

NB Emphasis is on changes not performance

Is it possible/How easy is it/How long will it take to:

- correct an error in software;
- change parameters in system, e.g. VAT rate;
- change system to cope with more users;
- change system to cope with more terminals/workstations;
- change system to cater for more software licences;
- change system to work with different hardware;
- update/upgrade system;

How extensive is support documentation;

What is skill level of support staff;

What is availability of support staff;

Reference is to developer's support staff

Can operators/users configure system/change settings;

How long will support be available for;

Is source code available;

A. One reference to documentation;

R. How easy is it to add new features/expand system (too general);

R. What is standing of developers;

R. What programming language is used

R. How much staff training is required

R. How modular is system;

R. Does it use OOP

2

Total 6

7. Any two @ one each

Project not specified sufficiently well so developer doesn't produce a system that meets users' needs;
Hardware is not powerful enough;
Potential problems not foreseen because existing system not properly analysed;
New sub-systems don't interface correctly/incompatible with existing system, e.g. wrong dll versions;
New system cannot read data in old system because old system uses a different file system – e.g. Unix file system cannot be read by Windows;
Existing application software only runs on one particular operating system, new system uses a different operating system, e.g. Physics department software cannot run on Linux;
New system uses different networking protocols from existing system
Poorly managed project;
Recruitment/retention problem of personnel with necessary skills;
Time taken to transfer/enter data into new system underestimated;
Data volumes greater than anticipated;
Staff not trained properly//staff training inadequate;
A. Staff resistant to change;
R. Hardware failure
R. Virus
R. Does not meet specification
R. Fails to meet users' expectations

Total 2

8.

(a) External/User/Local (schema);
Conceptual/Logical/The schema;
R. Internal/Storage (schema)
R. System Schema

2

(b) Any one @ one mark each
Create Table;
Create View;
Create Index
Create Unique Index;
Create Domain;
Create Database;
Create Trigger;
Alter Table;

max 1

(c)

(i) Collection of tables/relations (A. anything that suggests multiple tables);
R. Entities
R. Files 1

(ii) Collection of Objects;
A. Collection of properties/attributes/fields + methods;
A. Collection of instances of a class/classes
R. Collection of classes 1

Total 5

9.

(a) I. Case.

I. Indentation

NB Heading must be larger font than "Your surname" and "Send name"

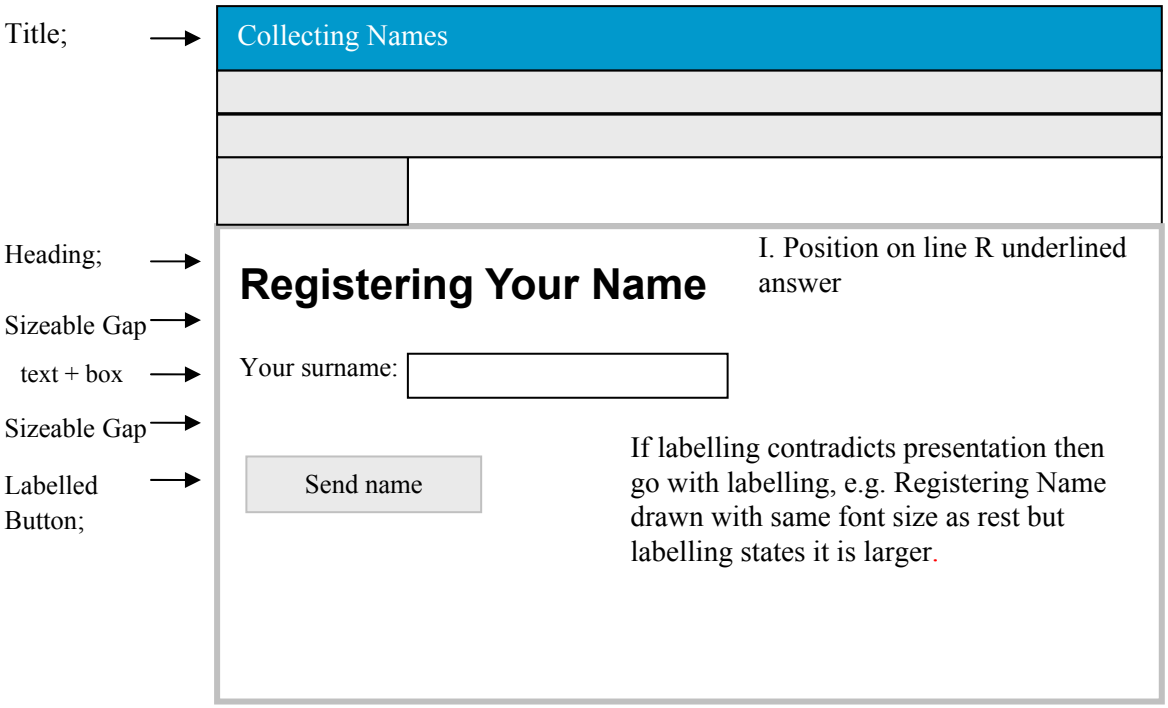
Title doesn't have to be in a rectangle, just needs to be at top.

The two sizeable gaps do not have to be the same size.

A. Text inside text box if text is the label "text box"

R. Box which is a TextArea or Memo box in size.

R. Any box which has scroll bars



I. Position on line R underlined answer

If labelling contradicts presentation then go with labelling, e.g. Registering Name drawn with same font size as rest but labelling states it is larger.

Total 5

10.

(a)

Contains a repeating group;
Or
Cells for one or more of SubjectID, SubjectName, ExamBoardSubjectOfficerName, NumberOfCandidatesEntered contain multiple values;
R. Repeating attributes, etc

1

(b) Attribute names must not be redefined (exception: allow Center). One mark for attributes(lose this mark if extra attributes), one mark for correct primary key

Penalise misspelling once

I. Spaces in attribute names

I. Capitalisation

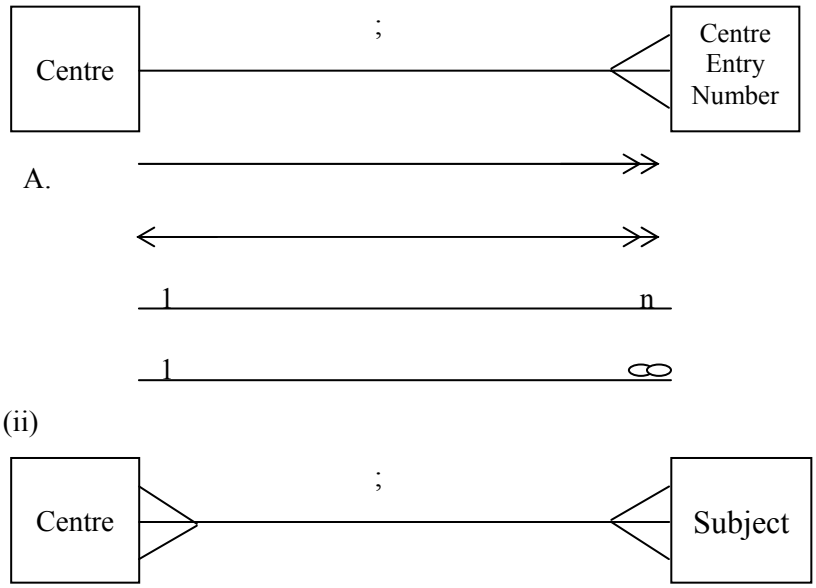
(i) Centre(CentreNo, CentreName, CentreAddress) 2

(ii) CentreEntryNumber(CentreNo, SubjectID, NumberOfCandidatesEntered) 2

(iii) Subject(SubjectID, SubjectName, ExamBoardSubjectOfficerName) 2

(c)

(i)



1

(ii)

1

(d) I. Inner join, Join
A. Without commas
R. Brackets in Select and anywhere else except:
A. Brackets around (DateReported < 1/3/2005) and (ExaminationOofficer.CentreNo=Problem.CentreNo) as shown
Asc is optional but if present it must be at end of **Order By** line (A. Ascending)

Penalise brackets once

Penalise **And** in this line

A. Date in any representation

A. IsLessThan or LessThan for <

Penalise incorrect use of relation name once e.g. CentreNo.Problem

Asc is optional

A. If candidate uses relation name in front of attributes, e.g. Select ExaminationOfficer.ExamOfficerSurname

```
Select ExamOfficerSurname, CentreNo, ProblemDescription
From ExaminationOfficer, Problem
Where DateReported < 1/3/2005
And ExaminationOfficer.CentreNo = Problem.CentreNo
Order By CentreNo Asc
```

R. If And used unless penalised above

I. Quotes/hashes/Absence of separators

Or

```
Select ExamOfficerSurname, CentreNo, ProblemDescription
From ExaminationOfficer, Problem
Where  ExaminationOfficer.CentreNo = Problem.CentreNo
And DateReported < 1/3/2005
Order By CentreNo Asc
```

Or

```
Select ExamOfficerSurname, CentreNo, ProblemDescription
From ExaminationOfficer Inner Join Problem
On (ExaminationOfficer.CentreNo  = Problem.CentreNo)
Where DateReported < 1/3/2005
Order By CentreNo Asc
```

Asc is optional

Max 5

(e) R. Brand names
word processor//word processor with e-mail support; 1

Total 15

11.

(a)

(i) Wide area network is a set of links that connect together geographically remote computers;
R. Definition that doesn't reference "connects computers.....and geographically remote" 1

A. Hosts/Nodes/Devices for computers
A. Far apart/Large distance/large geographical area
R. > some measurement, e.g. 2km

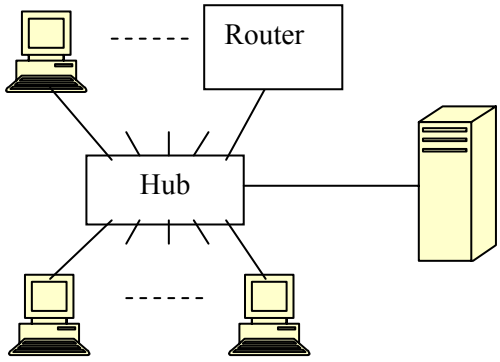
(ii) Networking based on virtual circuits established across a wide area packet switched network;
Networking which specifies the nodes or pathway through a packet-switched network before transmission begins so that no routing decisions need to be taken for each packet at each node during transmission;
A. Network that guarantees packets will arrive in the order that they are sent;
R. Network that uses cells
R. Quality of Service

max 1

(iii)
The data-carrying capacity of the medium is divided into (fixed size) time-slots, with a time-slot assigned to each data stream;
A. Clearly labelled diagram

max 1

(b) One mark for central hub and one mark for computers connected to hub as shown
NB If hub incorrect answer scores zero
If hub correct but computers incorrect answer scores one mark
Router can be replaced by a computer labelled with router's IP address



Don't have to label computers with their IP addresses.
A. IP addresses in place of computers + router

Don't have to label server if drawn as shown

2

(c) So that these are reachable from anywhere on the Internet//so that can be seen/reached from the world outside;
A. So that they can be uniquely identified.
R. So can be reached by another branch of company 1

(d) Document(Web page) split into smaller chunks; A. segments/packets/frames
Destination IP address doesn't match this segment's IP address so document chunks sent to nearest router/default router/gateway;
Using nearest router's network card address/MAC address;
Router sends chunks to router connected to web server segment using its routing tables;
And using network card address of router connected to web server;
This router sends chunks to Web Server;
Web server rebuilds document;
End to end connection established//port/socket connections made; max 5

(e) To block access to/from the internal private network from/to the Internet/world outside;
To stop/limit/block/restrict certain kinds of access to the Web server, e.g. telnet;
To close ports to prevent users from connecting to them;
To block connections on unwanted ports;
To prevent unauthorised access to the private computers;
A. Filtering
R To stop hackers (must state more than this = one of the above answers)
max 1

(f) A network in which resource security/user authentication/ administration/resource allocation;
managed/controlled by/carried out by servers;
OR
A network in which servers provide specialist services (A. specific servers e.g. web servers) ;
for client computers;
OR
Shared information stored on servers;
rather than individual PCs/client computers; 2

(g) A database server is software/computer that processes SQL requests from client computers returning results to the clients across a network or using network protocols (the data resides on the same machine as the database server);
Client requests data from server, server responds with data (require request, data and response); max 1

Database server listens on a particular port for client requests. TCP/IP protocol used.

Total 15