GCE

Mark Schemes for the Units

June 2006

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Advanced GCE Computing (7820)

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MARK SCHEMES FOR THE UNITS

Mark Scheme 2506
June 2006

1   **a)**   **(i)**   The physical parts of a computer system (accept 'peripherals')   (1)

          (ii)   The instructions that make the computer work. ('accept programs')   (1)

     b)   **(i)**   Software that controls the operation of the computer/lets the computer operate/runs the computer   (1)
Provides HCI/handles peripherals/provides utility programs/provides translators/handles security/interrupts/manages memory/schedules jobs through processor/provides a platform on which to run software

          (ii)   -   A number of pieces of software…
               -    that allow the user to do something useful/useful things   (1)
               -    that can communicate with each other/exchange data
          (1 per -, max 2)   (2)

2   **(i)**   -   User is given a set of alternatives
               -    user chooses one
               -    which leads to an output or a new set of alternatives
               -    suitable because it restricts choice and
               -    helps the user in navigating system/helps non-IT literate users
               -    allows use of touch screen
          (1 per -, max 3)   (3)

          (ii)   -   Choices represented by icons
               -    chosen by using pointing device
               -    different windows available for different tasks
          (Mention of WIMP worth 1 if none of first three mark points awarded)
               -    suitable because users are fairly experienced and know what to expect
               -    still reduces options only allowing a limited number of choices
          (1 per -, max 3)   (3)

          (iii)   -   Commands are typed (accept 'written') in (at keyboard)
               -    commands need to be learned
               -    and typed in accurately
               -    suitable because it allows the user unrestricted access to system
               -    and technician will be skilled in the meaning of commands
          (1 per -, max 3)   (3)

3   **a)**   **(i)**   Any character on the keyboard/an ASCII character (accept 'letters')
(Any character, or set of characters, in the) address/description/…

          (ii)   A whole number
Number of bedrooms/price/…

          (iii)   A piece of data which can only have two outcomes
Whether sold?/is there a garden?/…   (6)

     b)   **(i)**   -   A collection of pieces of information that refer to a single entity/all records must contain the same types of information/a row of information in a table
               -    e.g. A record is the information stored about a single house   (2)

          (ii)   -   A field/attribute is a single item of information/ which will appear in all the records/headed column in a table
               -    e.g. A field is the address/number of bedrooms/price/…   (2)

4   Translator diagnostics
- provide information about mainly syntax errors
- shows where error occurred and gives an indication of what error has been made

Desk checking
- checker works through the code noting changes to the variable values
- no computer is involved

White box testing
- testing the paths through a set of code

Black box testing
- testing the results of running the code are as expected

Alpha testing
- testing by people who are involved or have knowledge of the code

Beta testing
- testing by people who have no knowledge of the code

Variable dump
- studying the values of the variables in a piece of code at a particular place in the run

Break points
- to stop the run of a piece of software temporarily to check that it is operating properly to that point.

Watch and trace
- Outputs variable values as the code is processed

(max 2 per type, max 3 types, max 6)   (6)

5   **a)**   **(i)**
- RAM is volatile/ROM is not/RAM is emptied when power is switched off/ROM is not
- RAM is usually larger than ROM (in a PC)
- Data can be changed in RAM/in ROM it cannot.

(1 per -, max 2)   (2)

            (ii)
- User files/software/OS currently in use
- User needs to be able to alter them/processor needs to be able to use them   (2)

            (iii)
- Start up programs/bootstrap/O.S.
- because it needs to be in the memory when power is switched on   (2)

   b)
- ALU
- Carries out arithmetic/makes logical decisions/handles input and output
- Control Unit
- Controls the execution of instructions/synchronises the operations of the processor by use of a clock
- Registers
- Locations used for a specific purpose

(2 per pair, max 2 pairs, max 4)   (4)

6   **a)**   **(i)**   One bit is sent at a time/down a single wire   (1)

            (ii)   More than one bit is sent at a time/down a number of wires   (1)

            (iii)   Data can only be sent n one direction   (1)

            (iv)   Data can be sent in both directions (simultaneously)   (1)

   b)
- The speed at which data
- is transmitted from one location to another
- …down a communication channel
- Suitable example of time sensitive data e.g. video transmitted
- to a number of machines for immediate viewing/video conferencing
- baud/bits per second

(1 per -, max 2 for explanation, max 3)   (3)

   c)   **(i)**
- Router/hub
- Network card
- Cable/some other sensible medium for communication/wireless access transmitter

(1 per -, max 2)   (2)

            (ii)
- Network card
- Telephone line
- Modem
- Router

Note: Accept ISDN line/satellite/microwave/radio/optic fibre, but not Server/Gateway/ISP

(1 per -, max 2)   (2)

7   **(i)**   Account details on cheques/passport details on passports
Read by magnetic sensitive reader/Characters are printed in magnetic ink/magnetic ink character reader
Allows fast accurate computer reading while still being human readable/cannot be forged easily   (3)

       (ii)   e.g. Reading contents of typed documents/reader for blind people
Characters read from documents by comparing shapes of characters with those held in memory/scanned in as shapes rather than images/optical character reader
Allows documents that have not been designed for computer reading to be input directly into a computer system without any preparation./human readable and machine readable   (3)

       (iii)   e.g. Used for simple data capture forms/multi choice exam papers/national lottery
(Marks read from a document). Meaning is according to position of mark on the document/scanned in/optical mark reader
Easy for human to produce/does not need any data preparation/ automatic validation   (3)

8   **a)**   -   A standard set of characters (available to computer engineers/software designers)

            -      The set of characters that a computer can recognize

            -      characters on a QWERTY keyboard

            -      stored as a set of 8/7 bits

            -      allowing 128 characters to be represented/256 characters

            (1 per -, max 2)   (2)

    b)   **(i)**   01001011   (1 per nibble)   (2)

          (ii)   01110101   (1 per nibble)allow one mark for 111 101 or any other answer which makes it clear that the digits are treated separately   (2)

         (iii)   4B   (1 per digit)   (2)

    c)   -   First 4 bits from right give the units digit when turned into decimal

            -      Next four give sixteens digit

            -      and so on for length of number

            -      1011 gives 11 = B

            -      0100 gives 4

            -      (1 per -, max 2)   (2)

9   **a)**   -   For (next) loop

            -      Used when the number of loops is known before the loop is entered

            -      While (endwhile)

            -      Used when it is possible that the loop may not be executed at all/condition at start

            -      Repeat (until)

            -      Used when the loop must be carried out at least once/condition at end   (6)

    b)   **(i)**   8 2

                 4   (1 for cao)   (2)

          (ii)   6 0

                 6   (1 for cao)   (2)

10   **a)**   Parity/echoing back/checksum/(the means by which) the presence of corrupted bytes are identified.   (1)

    b)   -   Baud rate

                -      the speed/rate of data transmission

            -      Type of data transmission

                -      whether the transmission is serial/parallel/simplex/…

            -      Type of character set

                -      ASCII/EBCDIC/other

            -      Compression used

                -      need to be able to decompress files at other end.

            -      Type of transfer

                -      e.g. packet sizes

            -      Handshaking

                -      establishing contact/readiness to communicate

            (2 per pair of points, max 4)   (4)

Mark Scheme 2508
June 2006

1 **(a)** **Observation**
  Advantage:
  - Allows the analyst to see a current process at first hand
  - Analyst can get a "feel" of user competence and abilities in doing a task
  - Analyst can get a better idea of time required to do a task, constraints and strengthens of current system
  - Employees feel that their work is taken note of (feel wanted)

  [2]

  Disadvantage:
  - Users may respond differently if they are being observed
  - Lack of interaction between analyst and user
  - Time consuming
  - There is no control over what you see

  [2]

  Interviews
  Advantage:
  - User can express their opinions in a detailed way
  - More facts may come to light as the user answers questions
  - User may feel valued by the personal nature of interview
  - The questions can be changed according to the responses

  [2]

  Disadvantage:
  - Time consuming for analyst to gather facts
  - Users may not tell the trust if they feel intimated
  - Suggest answers the analyst may want!
  - Only a limited number of employees can be interviewed

  [2]

  (b) **(i)** **Questionnaires**
  (ii) **Advantage:**
  - Efficient in terms of time
  - Useful when a little information is required

  Disadvantage:
  - Difficult to design
  - Inflexible opportunities to respond
  - Low return rate from staff

  Record/document inspection
  Advantage:
  - Analyst can get an idea of the volume of data stored
  - See how data is collected and stored
  - Can inspect how data is verified/validated

  Disadvantage:
  - Volume of material collected is too big

Group meetings
Advantage:
- Quicker than interviews, as you can get group opinions
- True picture of what's actually happening, which may not be the same as how management are thinking

Disadvantage:
- Big groups, not all employees can give their views
- May have to shut down organisation for a period of time

[3]

For one method, 1 mark for name of method, 1 mark for advantage, 1 mark for disadvantage

(c)
- Designing data collection forms/data capture technique
- To cope with volume of data/considering the type of data to be collected

- Design of validation techniques/verification of data
- To assist in avoiding/handling input errors/to ensure data is correctly entered or processed

- Design of input/output formats
- Including screen layouts/report layouts/data collection
- Including user interfaces and screen layouts

- Design of a test plan/test strategy
- To test the parts/all of the system/meeting the objectives of the new system

- Choosing a software/hardware solution
- With reasons for selection

- Conversion/implementation plan
- To changeover the old system to the new system/to convert existing data to new system

- Method of processing to be used
- Justifying the method

- Data structures/data file/relationships
- Need to carry out file sizing…
- …to ensure that the hardware and communication
- strategies can cope with the volume of data

[8]

Any 4 tasks x 2 valid points to a max of 8 marks

d) **Corrective maintenance**
- Correcting errors in mail order system
- Software is not performing tasks
- Errors/bugs need to be removed from the software
- Debugging

Adaptive maintenance
- Changing needs of the mail order system
- Identifying other user requirements
- Changes in legal requirements/government policy
- Changes in business practice

[2]

Perfective maintenance
- Software is performing task specified
- But the system may be too slow in response times
- Due to increase in volume of data
- Improving performance

[2]

2 marks for each of the above, max of 6

2   **(a)**
- Direct changeover/Big Bang
- Old system stops
- And the new system begins immediately
- No overlap between systems
- If new system fails
- Old system cannot be used
- New system is implemented at a quiet period

[3]

Any three of the above x 1 mark

   (b)
- Pilot changeover
- New system could be used
- In a few supermarkets initially
- The results could be compared
- Against the other supermarkets that use old system
- Roll out the new system
- If successful (abandon the old system)

[3]

Any three of the above x 1 mark

3
- Desktop publishing/word processing/publishing/graphics
- Formatting text – styles, font types, sizes etc
- Integrating graphics from different sources such as clipart
- To use a pre-defined advertisement template

[2]

- Spreadsheet software
- To perform automatic calculations
- Ability to use what… IF scenarios
- Use graphs to analyse results and make predictions

[2]

- E-mail/Web authoring/instant messaging/video conferencing
- To send e-mails to other schools
- To create an interactive website of school
- To maintain web pages

[2]

- Database software/Spreadsheet software
- To create a suitable record structure
- Query/add/delete/amend book details

[2]

1 for software type and 1 mark for suitable reasons for each.

4   (a)
- **User Friendly/ease of use**
- Meaningful icons
- Well organised/uncluttered screen
- Common features with other packages
- Intuitive feel
- Colour contrast
- Type of font size
- **Help available for novices/inexperienced users**
- Tutorials/demos
- Wizards
- Tips
- Concise, easy to read error messages
- Context sensitive help

- **Facilities for experienced users**
- Providing 'short cuts' users
- Customising menus
- Customising toolbars
- Function keys

- **Making use of human memory**
- Making use of human long-term/short term memory
- Such as functions keys (f1 help)
- Recognisable icons

- **The type of user**
- May require voice recognition
- May require a touch screen
- May require certain large fonts/colours
- How the system helps overcome peoples fear
- Caters for disabled

Any 3 features x2 marks each, max of 6

(b)
- Designed to do exactly what the user needs
- Fits user requirements exactly
- Programs can be written to run on existing hardware/software/system
- User support can be geared to meet user needs
- No excess functionality
- Sell copies to other similar users to recoup development costs
- Program maintenance may be easier

Any 4 of the above x1 mark   **[8]**

5 **(a)** **Data Verification**

- Process of checking data done manually (by humans)
- It normally involves checking the data that appears on the screen with the data on the source document
- Visual verification
- A method of double-entry can be used
- Whereby two people enter the same data (double entry)
- Results are cross-referenced to see if there are mistakes

[2]

1 mark for each valid point, max of 2

(b) **Data Validation**

- This involves checking data, done by the computer automatically at the input stage
- Its purpose is to reject data that does not conform to certain rules
- Reasonable and sensible
- Example of type of validation check

[2]

1 mark for each valid point, max of 2

(c)
- Weights are added to each digit
- Sum of the products is calculated
- Modulus (11) arithmetic is used
- 11 –R will give check digit
- Exceptions to rule, if R=1 or R=0

If used something other than Modulus 11, marks will be accepted

[4]

Any 4 valid points, 1 mark each, max of 4

(d)
- It involves using a pre-printed form
- Including boxes in predefined areas
- That can be shaded in by humans
- And read/recognised by an OMR reader

[2]

Any 2 points, 1 mark for each, max of 2

6 **(a)**
- Piece of software which manipulates large quantities of data
- To produce information
- Which is useful for managers
- Which helps in decision making

[2]

Max of 2

(b)
- Combines the knowledge of experts on a given subject
- Using rules it has been given
- Can make inferences/diagnosis

[2]

Max of 2

(c)
- Ability to diagnose a fault in the equipment
  - Suggest a recommended solution
- Can combine the knowledge of many human experts
  - Ability to retain the information
- Much faster than a human
  - at completing a task
- Low error rate
- Advice and recommendations are consistent
- Provides probabilities of faults/ranks faults
- Ability to explain each part of the system

                                                                [4]

1 mark for each valid point, max of 4

(d) Difficult to capture all knowledge about components
- From a wide range of human experts
- Over reliance
  - Reduced dependence on the human expert
- Do not learn from mistakes/new knowledge to be entered
  - Misinformed expert system can lead to errors   **[4]**

1 mark for each limitation, max of 4

(e)
- They can operate faster than humans
- The quality of work is always consistent/high
- Accurate and precise manufacturing
- They can work in hazardous environment
- Running costs are low compared to human wages
- Continuous process by robots
- Can work 24/7

1 mark for each valid point, max of 4

7   **(a)**
- ATM's
- Telephone banking
- Chip/PIN
- Internet Banking…
- …eg, Transferring funds between accounts
- Viewing bank statements on-line
- EFT

1 mark for each valid point, max of 3

(b)
- Repetitive strain injury (RSI)
- Employee needs to take regular breaks
- Ergonomic keyboards/wrist rests

- Radiation from VDU
- Anti-glare screen/filters
- Flat panel screens

- Posture problems
- Adjustable furniture for users

- Eye problems
- Employer pays for eye tests
- Anti-glare screens
- Change of focal length

- Epilepsy
- Use of interlaced screens
- Maintenance of VDUs to protect from flickering

1 mark for health risk,
1 mark for method of reducing the risk, max of 6

                                                       Total [86 + 4] = 90

Mark Scheme 2509
June 2006

Each bullet point is worth one mark, up to the maximum for that section, unless stated otherwise.

1   **a)**   **i)**
- use of backing store as if it were main memory
- paging / fixed size units
- swap pages between memory & backing store….
- ….to make space for pages needed
- allows programs to run that need more memory than is available

[max 4]

         ii)
- occurs when moving pages between memory & disk
- disk is relatively slow
- high rate of disk access
- more time spent transferring pages than on processing

[max 3]

   b)
- allocate memory to allow separate processes to run at the same time
- deal with allocation when paging
- reallocate memory when necessary
- protect processes/data from each other
- protect the operating system/provide security
- enable memory to be shared

[max 3]

   c)
- each user is unaware of other users
- users are unaware of the hardware actions
- users are unaware of the software actions
- users do not need to understand the network operating system tasks

[max 2]

   d)
- to allow it to be processed (in a reasonable time)
- otherwise if higher priority jobs occur…
- …it would have to wait indefinitely

[max 2]

2   **a)**
- syntax analysis
- code generation

[max 2]

   b)
- source program is used as input
- tokens are created …
- … for the reserved words/keywords
- a token is a string of binary digits
- …of fixed length
- variable names are put into a look up table/symbol table
- redundant characters (e.g. spaces) are removed
- comments are removed
- error diagnostics are given

[max 3]

   c)   **i)**
- a complete program…
- ..that the computer can run…
- …without further translation/has been compiled
- machine code / low level language

[max 2]

      ii)
- software…
- …that translates & executes a program…
- … one instruction at a time/line by line
- …each time the program is run / without generating an executable program
- stops at first error found

[max 2]

    d)   **i)**
- when the compiler is used
- because the source code is not available to the interpreter/intermediate code cannot be changed

[max 2]

      ii)
- the user needs an interpreter / the program runs more slowly
- because the program has to be translated each time it is run

[max 2]

3   **a)**
- acts as a buffer…/temporary store
- …for data…
- …or instruction…
- …when being passed between processor and memory…
- …during the fetch execute cycle.

[max 3]

    b)   **i)**
- a signal…
- …that causes a break in the execution of the current routine/requests processing time
- the current routine can be resumed after the interrupt

[max 2]

      ii)
- more than one interrupt can occur at a time
- deal with the more urgent interrupt first…
- …because a more urgent interrupt has a higher priority
- …to avoid loss of data
- e.g. store data when system failure is imminent – high priority
- e.g. printer needs paper/data – low priority

[max 3]

    c)
- PC holds the address of the next instruction
- so next instruction is at 38
- current instruction is a jump instruction/end of a loop

[max 2]

    d)
- single control unit/processor manages program control
- one instruction at a time…
- …in linear sequence
- fetch-decode-execute
- programs & data stored in same format

[max 3]

4   **a)**   **i)**
- queue is FIFO
- stack is LIFO
- queue has 2 pointers
- stack has 1 pointer

[max 4]

      ii)
- queue: printer queue / job queue
- stack: return addresses when using subroutines / store data when interrupt occurs

[max 2]

b) e.g.
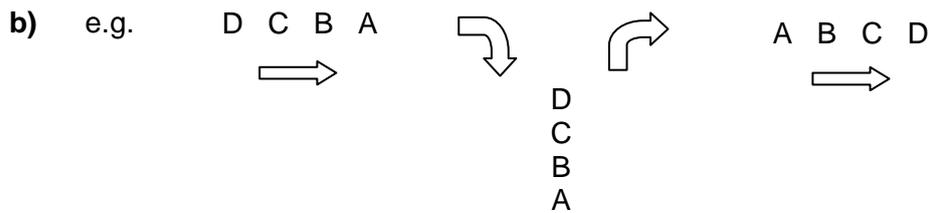
marks for
- indicate order of items in queue…
- …go into stack in same order…
- order of items removed from stack…
- …into another queue
 (some explanation/labelling expected)

[max 3]

5 **a)**
- close to design of computer/lack of portability
- machine-oriented language
- assembly language
- used for tasks connected with running the computer
- uses mnemonics for instructions
- uses variable names for addresses
- uses labels
- 1-1 correspondence between low-level language and machine code

[max 3]

b) **i)**
- immediate addressing

[1]

ii)
- direct addressing

[1]

iii)
- temporary storage (in the ALU)
- holds data being processed/result of calculation
- deals with the input and output in the processor

[max 1]

c) **Procedural**
- 3rd generation
- step by step instructions to solve a problem
- to explain how to solve the problem
[max 2]

Declarative
- 4th generation
- state what to achieve…
- …without giving detailed steps
- uses facts and rules
[max 2]

[max 4]

d) **i)**
- digit, %, letter, digit – so valid

[1]

ii)
- digit, (%, letter) % , (%, letter), (%, letter), digit – so not valid

[1]

iii)
- digit, (%, letter), %, digit – so not valid

[1]

6   **a)**   **i)**   •   traverse left subtree
                       •   visit root
                       •   traverse right subtree

                                                         [max 3]

            ii)   a procedure…
                 …that calls itself

                                                           [max 2]

b)   **i)**
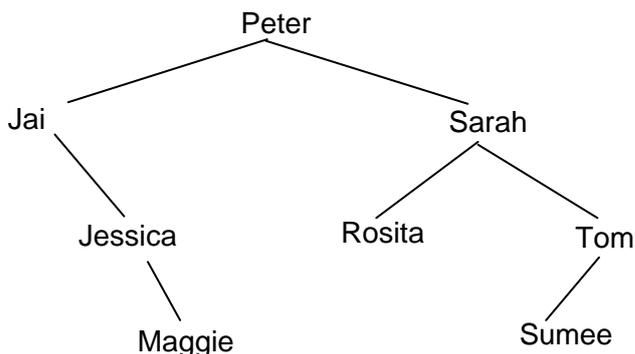
[1 mark for each name added in correct place, max 2]

ii)
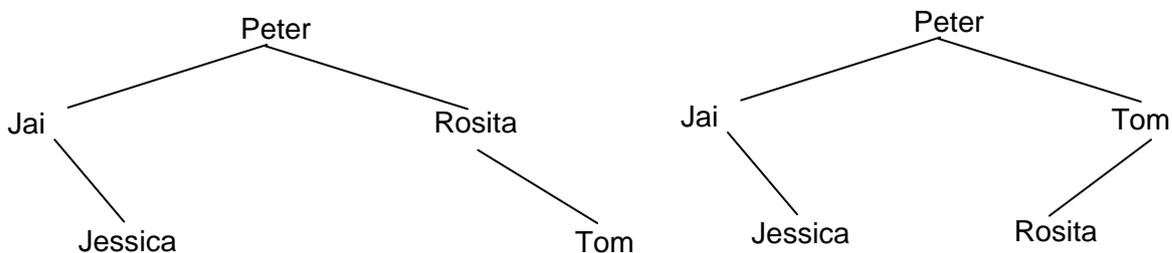
- either diagram

[1]

c)
- traverse tree until item is found..
- …and remove elements below item…
- …store them
- delete item **(accept only if in correct place)**
- transfer stored items back onto tree

[max 2]

7   **a)**   **i)**
- one-many / 1:n

[1]

     ii)
- GuestCode in Reservation / RoomNo in Reservation

[1]

     iii)
- primary key from Guest / Room…
- …used as an attribute in Reservation…
- …to represent the relationship
- connects the tables…
- …Guest / Room to Reservation

[max 2]

b)   **i)**
- each cleaner cleans a number of rooms
- each room can be cleaned by many cleaners

[max 2]

ii)

Cleaner	RoomCleaner	Room
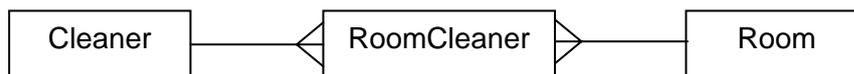
Marks for
- extra entity, sensibly named
- correct relationship Cleaner to link
- correct relationship link to Room

[max 3]

c) **i)** • access data needed for their job / check which rooms need cleaning

[1]

ii) • no authority to change or make new reservations/avoid damaging data

[1]

d) • 1st user given read/write access…
- …2nd user is given read-only access…/locked out
- …until the 1st user finishes with data
- …system gives the 1st user a limited time
- …after which access rights are changed
- message on screen to 2nd user

[max 3]

Mark Scheme 2511
June 2006

1   **(a)**   **(i)**   Interview/group meeting   **[1]**

        (ii)   Give 1 mark per point to a maximum of 2

- Only two people to interview
- No existing system to examine/look at
- No documents to examine
- Questionnaire not suitable for only two people
- Can vary questions according to answers/Ask questions not otherwise asked
- Can expand questions   **[2]**

   (b)   Give 1 mark per point to a maximum of 2

- There are no packages available/not including all facilities
- Special purpose software is needed
- Multimedia software is needed
- Each task is very individual
- Infringe copyright to buy off-the-shelf
- Needs to link into textbooks
- Exam board specific
- Software written to exact specification   **[2]**

2   **(a)**   Give max 2 marks per stage, 1 for each point to overall max of 6

- (Systems) analysis
- … researching similar systems
- … identify requirements
- … describe the system using diagrams
- … develop a data model
- … specify hardware/software requirements
- … data flow diagrams
- … UML diagrams

- (Systems) design
- … overall design using a systems diagram/data flow diagrams/UML
- … user interface/validation & verification of inputs
- … design reports/output
- … design storage/organisation of data
- … provide detailed specifications
- … provide a test plan
- … data dictionary
- … design algorithms

- Implementation/Development
- … specify modules (to be used)
- … specify main data structures
- … specify main algorithms
- … produce the program

- (Systems) testing
- … test individual parts of the system
- … test interfaces between modules
- … test whole system
- … testing against requirements

- Installation
- … parallel running
- … pilot running
- … direct change-over/big-bang
- … phased

- Maintenance
- … addressing problems not previously identified
- … modifying software due to change in circumstances (e.g. legal)
- … replacing hardware
- … adding new facilities

- Documentation
- … technical documentation
- … systems documentation
- … program documentation
- … user documentation
- … installation documentation   **[6]**

(b) Give 1 mark per point to a max of 2

- Only a small project
- Few people involved
- Does not need to be divided up between many personnel
- SSADM is for large projects
- Expensive
- Time consuming   **[2]**

(c) Give 1 per point to a max of 2

- Breaking a problem into modules
- … and these into further modules
- … until it is possible to solve the modules   **[2]**

Give 1 mark per advantage to a maximum of 2

- Easier to test
- … and find
- … and correct errors
- Can use many programmers
- … using individual skills
- Speeds up production/can time manage tasks better
- Reuse existing modules
- Easier to solve the problem   **[2]**

3 **(a)** **(i)** Give marks as follows

- All 5 correct 4 marks
- 3 correct 3 marks
- 2 correct 2 marks
- 1 correct 1 mark   **[4]**
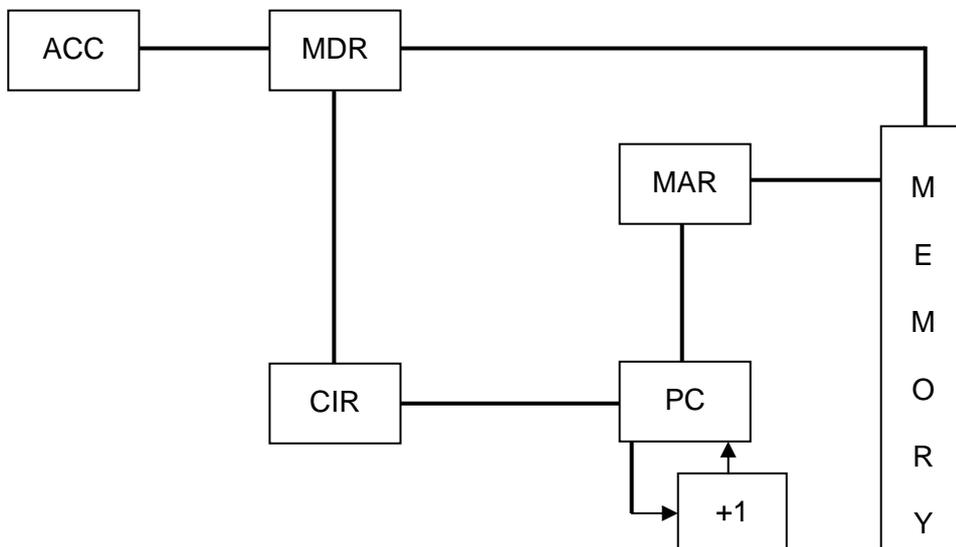

(ii) Give 1 mark for each correct definition

- CIR – holds the instruction being executed
- MAR – holds the address of the instruction/data to be fetched
- MDR – holds the instruction/data when passing between memory and processor/acts as a buffer
- PC – holds the address of the next instruction   **[4]**

(b) **(i)** Give marks as follows, max 4

- correct insertion of names
- pointer from Daniel to first cell in free list
- pointer from this cell to Hanif
- pointer from head of free list to 2nd cell in list
- other pointers not being changed   **[4]**
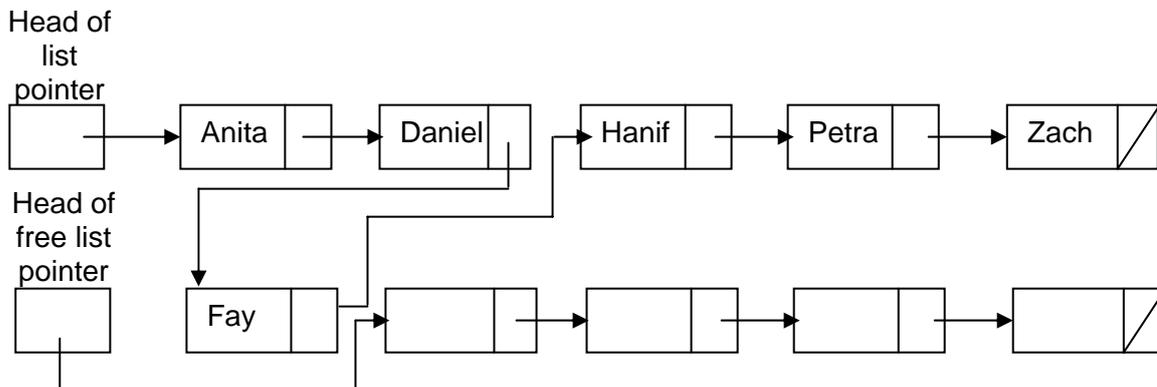
(ii)   Give marks as follows, max 4

- ptr from head of free list to Daniel
- ptr from Daniel to first cell in free list
- ptr from Anita to Hanif
- all other ptrs being correct   **[4]**
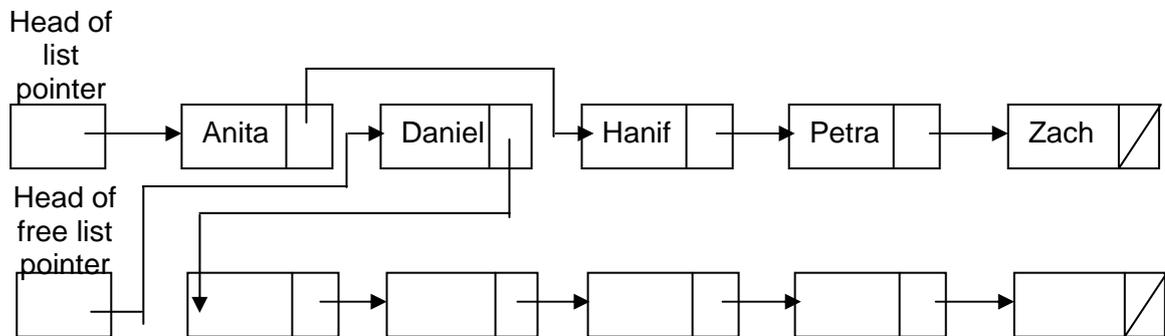
(c)   Give 1 per mark point to a max of 3 for up-to-date documentation

- Information that includes all that has been done to date
- including program listings
- flowcharts/algorithms
- dataflow diagrams
- interface design
- i/o methods
- documents should be dated/time stamped
- data structures
- documented regularly

Give 1 per mark point to a max of 3 for quality control

- Identification of
- key processes
- responsibilities
- communication mechanisms
- process improvement opportunities
- evidence required such as
- minutes
- action planning and follow-up
- debriefs
- statistical evidence
- software operates with acceptable limits
- test against specification
- maintaining standards

Give a total max mark of 4   **[4]**

(d) Give up to 2 marks per method to a max of 6

- Comments/remarks
- Describes what a section of code is doing
- using non-technical language
- should be possible to write the program from comments
- provides the algorithm

OR

- user documentation
- on screen help
- good interfaces
- error messages
- technical documentation

- Meaningful variable/object names
- that are understandable
- Individual words making up name capitalised/use of underscore

- Indentation
- to indicate loops
- and decision blocks

- Description of functions/procedures/subroutines
- placed at start of process
- Indication of pre
- and post conditions   **[6]**

(e) Give up to 2 marks per characteristic for 3 characteristics

- Naturalness
- … method should be appropriate
- … natural to the user/user friendliness
- … structured to the task
- … self explanatory/meaningful icons/GUI
- … no jargon

- Consistency
- … consistent method for input
- … language used in prompts should always be the same
- … language used in messages should always be the same
- … output formats should always be the same
- … consistent format for menus
- … same standard between tutorials
- … same standard between programs

- Relevance
- … should not ask for redundant material
- … minimum user input
- … minimum system output
- … minimum keystroke effort
- … emphasis on the user's needs
- … only relevant material shown

- Supportiveness/Help
- … provide adequate information to the user to operate the system
- … answer questions like where am I
- … how did I get there
- … what is happening
- … where can I go next
- … how do I get there
- … what can I do?
- … wizards
- … error messages
- … pop up help

- Flexibility
- … accommodate different users' requirements
- … preferences
- … level of performance/experience/disabilities etc/computer literacy
- … provide a variety of support levels
- … geared to a range of user needs **[6]**

4 **(a)** Give 1 mark for each part of the answer to a maximum of 3 in each case

    (i) Direct
Everything changes over at once
Cannot move same item twice

    Or

    Phased
Part of warehouse uses new system
Can iron out errors

    (ii) Direct
Everything changes over at once
Cannot afford time to enter data twice/All items are bar coded so no point in
phased implementation

    (iii) Parallel
Run old and new system side by side
Can check results against known system/Cannot afford errors

    Or

    Pilot/Phased
Run new system for some employees
Only few employees affected if error **[9]**

(b) Hardware – give 1 mark per row to max of 4

Autopilot	Billing system
Small/compact/in aeroplane	Very large
Rapid response/Fast processor essential/powerful	Medium speed processor OK
Little backing store	Large backing store
Little RAM	Large RAM
Many sensors	No sensors/OCR
Accept data from many sources	Few sources of data
Many output devices/lights/alarms etc	Few output devices/printer
Must be reliable	

Software – give 1 mark per row to max of 4

Autopilot	Billing system
Very efficient code	Code need not be efficient
Very reliable, crash can be fatal	Crash can be nuisance, but not fatal
Needs little data handling	Large amounts of data to be handled
Needs to handle many sources of data	Needs to get data from only a few places
Needs to be able to send signals to many destinations	Only needs to send data to a few destinations
Needs priority system	No priorities needed
Works in real time	Batch processing
Real time operating system/code	Needs back-up

Maximum 7 marks **[7]**

5 **(a)** Give up to 2 marks per advantage and max 6 marks

- Overheads reduced
- … no need for retail premises
- Can attract new customers/advertising benefits
- … who may not have heard of the business/wide range of people
- Number of employees less
- … reduces costs
- Customers have access to information
- … 24/7
- Can hold less stock
- … CD-ROMs can be produced as required
- Can collect information about customers
- … that would not be able to normally
- No money to handle
- … done through EFT
- Eliminates intermediary
- … no need to employ sales people
- Can put samples of text on web site
- … so that potential customers can see what they are going to get
- sales are automatically recorded
- … allows data mining

Give up to 2 marks for one disadvantage

- May need to run conventional business
- … alongside Internet operation
- Web site may be hacked
- … money could be stolen/data deleted
- … to cause embarrassment
- Customers need PC
- … some have not got one
- Need web designer
- … high initial costs **[8]**

(b) Give up to 2 marks for the advantage and up to 2 marks for the disadvantage

Advantage:
- Prices may be reduced
- … because business has lower overheads
- Customers can place orders when convenient
- … 24/7
- Customer can view sample texts
- … including whole chapters
- Receive goods digitally
- … save delivery costs
- Convenient
- … do not have to leave home
- No travelling
- … reduction in costs

Disadvantage:
- Many people wish to discuss products
- … with a person/personalised service
- Customer accounts dept
- … may not wish to pay on-line
- Customer fears
- … may be wary of fraud
- Less secure
- … goods may not arrive
- Not everyone has internet access
- … reduced customers
- May not have bank account or credit card
- Faulty products
- … hard to return **[4]**

6 CPA diagram
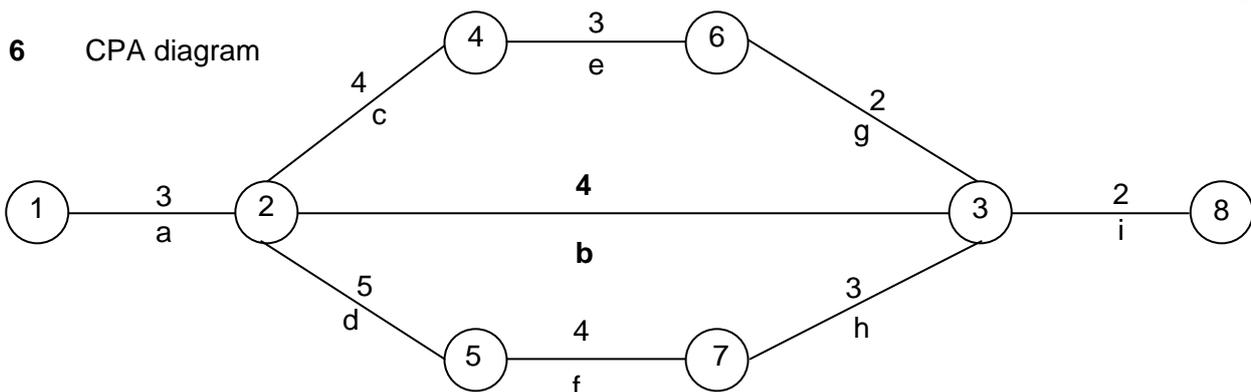
Note: The numbering of the nodes is not significant

Give 1 mark per point max 4

All activities are labelled with the activity
All activities are labelled with the duration
Activities c, e and g are serial and consecutive
Activities d, f and h are serial and consecutive
Activities a, b and i are serial
Activity i connected to g, b and h **[4]**

Critical path length = 17 **[1]**

Use ft marking for the last mark

7
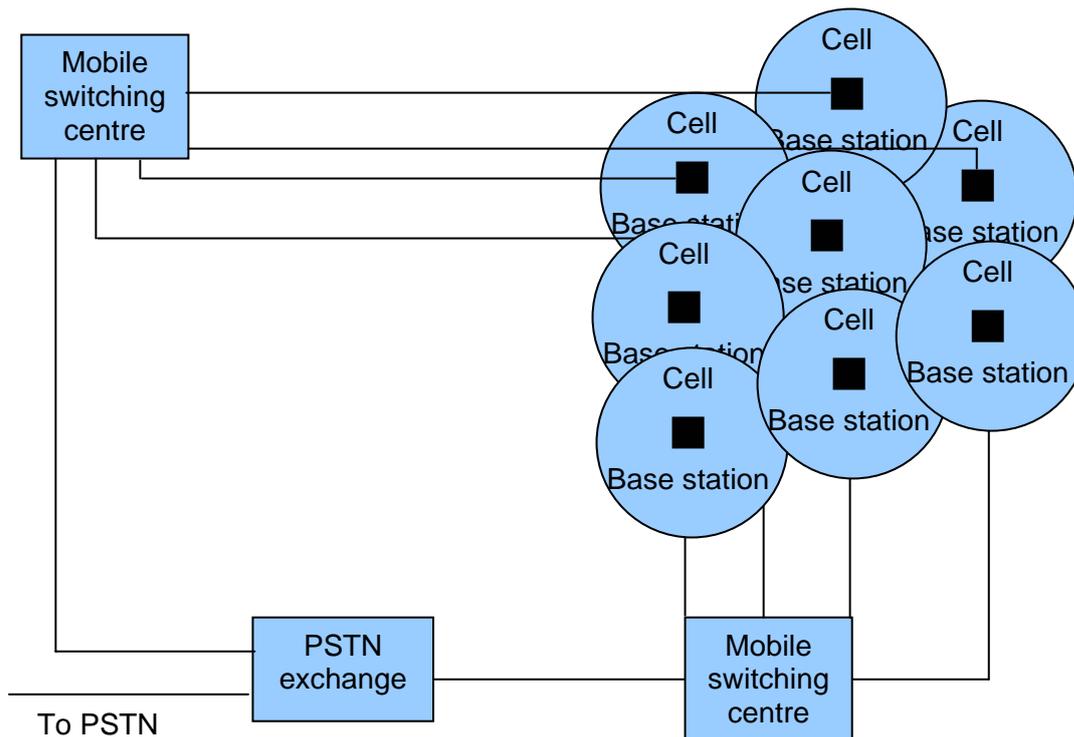
Diagram: Give 1 mark for each of the following to a max of 3

- Mobile switching centre
- PSTN
- A base station
- A mobile connected to base station
- A connection between a base station and a mobile switching centre
- A connection between a mobile switching centre and a PSTN

Explanation: Give 1 mark per point to a max of 3

- Mobile accesses a base station
- … with the best signal
- Usually the nearest
- This base station contacts the base station of the receiver
- … possibly via a mobile switching centre
- If call is to an ordinary phone
- … call goes to a mobile switching centre
- … which passes it on to a PSTN **[4]**

Total 86 (+ 4) = 90 marks

Advanced GCE Computing (3870/7820)
June 2006 Assessment Series

Unit Threshold Marks

Unit		Maximum Mark	a	b	c	d	e	u
2506	Raw	90	71	62	53	44	36	0
	UMS	90	72	62	54	45	36	0
2507	Raw	120	95	82	69	57	45	0
	UMS	120	96	84	72	60	48	0
2508	Raw	90	58	51	44	37	31	0
	UMS	90	72	62	54	45	36	0
2509	Raw	90	58	51	44	37	31	0
	UMS	90	72	62	54	45	36	0
2510	Raw	120	98	87	76	65	54	0
	UMS	120	96	84	72	60	48	0
2511	Raw	90	53	47	41	36	31	0
	UMS	90	72	62	54	45	36	0

Specification Aggregation Results

Overall threshold marks in UMS (i.e. after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
3820	300	240	210	180	150	120	0
7820	600	480	420	360	300	240	0

The cumulative percentage of candidates awarded each grade was as follows:

	A	B	C	D	E	U	Total Number of Candidates
3820	9.9	26.5	48.4	68.6	87.6	100.0	904
7820	11.3	32.8	58.9	81.7	94.9	100.0	767

For a description of how UMS marks are calculated see;
www.ocr.org.uk/OCR/WebSite/docroot/understand/ums.jsp

Statistics are correct at the time of publication