CAMBRIDGE
INTERNATIONAL EXAMINATIONS

November 2003

CAMBRIDGE INTERNATIONAL DIPLOMA

MARK SCHEME

MAXIMUM MARK: 90

SYLLABUS/COMPONENT: 5216

COMPUTING
Written Paper 1

1 (a) (i) A number of different pieces of **software**/**programs** that can **share** data

(ii) Contains documentation with the software that allows the user to produce something useful

(iii) Generic software can be used in different situations to accomplish different things/general purpose software

(3)

(b) (i) - Batch processing is the **collecting** together of data **before** being **processed**
- Real time is a process where the output is produced quickly enough to affect the next input.

(ii) Batch processing, e.g. payroll
- not time sensitive
Real time, e.g. computer game
- the player must be able to affect the game

(6)

2 In each case, the suitable use stated is an example.

(i) - Prompts operator for inputs/Specified areas for the data/Data entered in order/in format
- Operator taking information over phone
- Does not allow information to be missed out/simple to use

(ii) - Icons used to stand for options/when selected, command code is run/normally accessed by use of mouse or other pointing device/WIMP
- Non-experienced user/child in school
- Restricts access to certain parts of the system

(iii) - Set of commands recognised by the OS/typed in at prompt/need to be learned by user
- Technician
- Allows access to whole system/does not use large amount of memory
(1 per -, max 3 per dotty, max 9)

(9)

3 13, 18, 19, 21, 2
1 per value with follow through marking from one error and –1 (misread) if more than 5 values given

(5)

4 - Comments typed in as part of code
  - using special reserved word making clear it is a comment/explains clearly the purpose of code

- Meaningful data names
  - so that reference to a complex list is not necessary/less chance of error

- Indentation of program lines
  - to make it obvious which lines of code go together

- Modularity
  - splitting code into smaller parts so that the solution is easier to follow.

(1 per -, max 2 per method, max 3 methods, max 6)   (6)

5 (a)   - A member of a **standard** character set/set of codes the computer understands
- Represented in a single byte/7 or 8 bits used per character
- Standard nature allows for communication between systems.

(1 per -, max 2)

(2)

(b)   - Date/integer
- Integer
- Boolean/yes or no
- Currency/floating pt/real/integer

(4)

(c)   **(i)**   Storage space for one data item/one student's name

     (ii)   All the data about all the students in the college

     (iii)   All the data about a single student

(3)

6   - (Processor) fills buffer/data temporarily stored in buffer
  - then gets on with some other task

- Data emptied from buffer to secondary storage
  - without holding up processor

- When buffer empty
  - interrupt sent to processor
  - requesting refilling of buffer
  - from storage device
  - leading to register contents from current job being stored

- Mention of double buffering
- Vectoring interrupts
  - mention of priorities

(1 per -, max 6)

(6)

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7 (a)   - Network card(s)
- Cable
- Server (of some sort)/hub
- Network operating system/communications software/network
  versions of applications packages
(1 per -, max 2 for hardware, max 3)

(3)

(b)   - Text based are relatively small files
  - because each character only takes one byte

- Graphics tend to be large files
  - because each character can take up to 3 bytes
(1 per -, max 1 for idea of size and one for explanation, max 2)   (2)

(c)   Advantages
- sharing of hardware
- sharing of software
- sharing of files
- communication
- students may use any machine to access their work
- installation of software is easy

Disadvantages
- difficulty of securing data
- fault in network can affect whole system
- complexity of the hardware
- need for technical administrator
- spread of viruses
(1 per -, max 2 for advantages, max 2 for disadvantages, max 4)

(4)

(d) (i)   - **Communications** need a set of **rules**
  - to govern the way that communication is controlled

(ii)   - Individual layers can be altered
  - without altering other layers
  - when hardware/software is changed
(1 per -,max 2 per dotty, max 4)

(4)

8   (i)   - Custom written is software written specifically for the
  purpose/designed for one customer
- Off the shelf is generic/covers many problem solutions/ready
  made/can be bought in a shop

- Custom written only sensible choice because...
- application is a one off

(2)

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9 (a)
- Passive system is one that supplies information without allowing it to be altered
- Interactive system supplies information and allows it to be altered
- Interactive system here...
  - otherwise operators cannot alter automatic process.

(4)

(b) (i)
- HCI is the means by which the human and the computer communicate

(1)

(ii)
- Prioritising of information
- Volume of information
- Information overload
- Colour used
- Colour blindness
- Sound (not too many)
- Different hardware, e.g. printer for very important information
- Placement of hardware
- Data input techniques
- Expertise of staff
- Tasks to be done
- Type of data representation (textual/graphical/…)
(1 per -, max 5)

(5)

10
- Direct or big bang
- Old system is turned off and new system is brought on line
- If it does not work then admin must shut down
- Training/Files must all be in place
- Dual running or parallel running

- Both systems run simultaneously
  - until sure that the new system works/Finds bugs in new system
  - very expensive/time consuming

- Allows training to be carried out while it is working
- Phasing/Pilot running

- Some sections are introduced while others run old system
  - not changed over until running properly
  - allows training to be carried out

- Key parts of new system run alongside old system
  - until fully tested

- Problem because full data not tested as in dual running
- Allows return to original system if new system does not work
(Note: Allow pilot and phased introductions if it is clear that they are clearly understood)
(1 per -, max 3 per method, max 9)

(9)

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11

- Barcode consists of (pairs of) dark lines
    - of (three) varying thicknesses
    - which combine to give a (character) code
    - used to identify worker

- OCR is a means of computer reading standard
  characters/Optical character recognition
- Light reflected off characters/determines shape of character
    - comparing the values with examples in memory
    - fewer characters the better
    - used for reading times
    - different days signified by different positions on the card
(1 per -, max 3 per type, max 6)

(6)

12

- Workers will need to do extra work for changeover...
    - e.g. preparing new data files

-Workers will need training in new systems

- New skills will be learned which will mean...
    - workers are better qualified (paid)
    - some workers may (not be able to learn new systems) lose
      jobs.
    - disruption to routine during changeover
    - jobs will become less paper based
    - adverse effects of things like RSI/sitting at desk all day
(1 per -, max 4)

(4)

November 2003

CAMBRIDGE INTERNATIONAL DIPLOMA

MARK SCHEME

MAXIMUM MARK: 60

SYLLABUS/COMPONENT: 5217

COMPUTING
Practical Tasks

Practical Tasks Assessment Form

Centre Number		Centre Name	
Candidate Number		Candidate Name	

The mark points indicated on the mark scheme are listed below. Indicate with a tick where each mark has been awarded.

Question 1 (a)		✓
Maximum 8 marks		
	Data capture form to include:	
	- name	
	- membership number	
	- age/date of birth	
	- gender (tick box or similar)	
	- type of membership (tick box or similar)	
	- travel distance (choice of answers)	
	- frequency of visits	
	Scale for:	
	- the quality of the sports facilities at the club	
	- the quality of the social facilities at the club	
	- the sports training classes that are offered	
	- value for money of the club	
	(radio buttons perfectly acceptable)	
	- suggestion box	
	Sub-Total 1 (a)	
Question 1 (b) (i)		
Maximum 5 marks		
	Data source includes:	
	- title, forename, surname fields	
	- 3 address fields	
	- membership number field	
	- membership type field	
	- membership renewal date field	
	- all 4 types of membership included	
	Sub-Total 1 (b) (i)	
Question 1 (b) (ii)		
Maximum 6 marks		
	Standard letter to include:	
	- club logo	
	- address of club	
	- date of letter	
	- member's address in correct position	
	- suitable font size (letter fits on single sheet of paper)	
	- personalised letter	
	- table of fees	
	- return slip	
	Sub-Total 1 (b) (ii)	

Question 1 (c)		
Maximum 6 marks		
	User guide to include instructions for:	
	- starting mail merge	
	- producing data source	
	- producing standard letter	
	- shutting down the system	
	User guide includes:	
	- troubleshooting guide	
	- example data source input screen	
	- example standard letter	
	- example output letter	
	Sub-Total 1 (c)	
Question 2 (a)		
Maximum 9 marks		
	Diagram to include:	
	- at least three levels	
	- sequence of actions which will work	
	- top layer has a title	
	- initialise	
	- input data	
	- total data	
	- calculate mean	
	- checks maximum	
	- checks minimum	
	- output mean, maximum, minimum	
	Sub-Total 2 (a)	
Question 2 (b)		
Maximum 9 marks		
	Algorithm to include:	
	- initialise the total (= 0 or first value)	
	- initialise the maximum (= very small or first value)	
	- initialise the minimum (= very large or first value)	
	For each value:	
	- add to total	
	- compare with maximum	
	- change maximum if necessary	
	- compare with minimum	
	- change minimum if necessary	
	- divide total by 9	
	- output results	
	Sub-Total 2 (b)	
Question 2 (c)		
Maximum 3 marks		
	Algorithm to include:	
	- rogue value in input list	
	- counter is initialised	
	- increment counter	
	- divide total by counter	
	Sub-Total 3 (a) (I)	

Question 3 (a) (i)			
Maximum 4 marks			
	Template:		
	- all cells are labelled, e.g. name, date, etc.		
	Function/Formulae:		
	- number of days hired		
	- cost per day		
	- total cost		
	- date		
		Sub-Total 3 (a) (ii)	
Question 3 (a) (ii)			
Maximum 1 mark			
	Printout		
		Sub-Total 3 (b)	
Question 3 (b)			
Maximum 9 marks			
	Screenshots of validation checks		
	For title:		
	- existence check		
	- suitable test data and error message		
	For invoice number:		
	- format check (not range check)		
	- suitable test data and error message		
	For type of car:		
	- existence check		
	- suitable test data and error message		
	For date of hire:		
	- valid date		
	- suitable test data and error message		
	For date of return:		
	- valid date		
	- suitable test data and error message		
	- date is after date of hire		
	- suitable test data and error message		
		Sub-Total 3 (c)	
		Total (max 60)	

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INTERNATIONAL EXAMINATIONS

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CAMBRIDGE INTERNATIONAL DIPLOMA

MARK SCHEME
MAXIMUM MARK: 90
SYLLABUS/COMPONENT: 5218 COMPUTING Written Paper 3

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1 (a)
- Employees can train in own time...
  - at own speed...
  - can skip parts they already are happy with
- (Testing of understanding) can use virtual systems
- Training may be done at home/not necessary to shut store
- Employee can train on additional areas in order to advance
- Training programs can be individually tailored
- Testing may be revisited as often as necessary/can revisit areas as required
- Training tailored, automatically, according to test results
- Results of tests reported to management through system
- Different teaching approaches possible
- Workers not intimidated by being in a group
(1 per -, max 6)

(6)

(b) (i)
- Not feasible
- Involves using both methods at each checkout
- Customers would not put up with delays

(ii)
- A few tills change
- Useful for training
- No danger of problems if don't work
- Store can remain open during changes

(iii)
- Implications for training staff
- All tills changed at once
- If system does not work, store must shut/problems arise
(1 per -, max 2 per dotty, max 6)

(6)

2
- Page or partition of software in memory rather than whole job
- Partitioning of memory
- Variable sizes to suit...
  - varying jobs
- Pages of memory...
  - of fixed size
  - jobs do not have to occupy contiguous pages
  - mention of virtual memory
  - mention of swapping
Note: Segmentation equivalent to partitioning
 (1 per -, max 5)

(5)

3 (a)
- Whole program not written...
    - so may not compile
- Testing needs to be done...
    - diagnostics will be more complete
    - individual segments can be run...
    - allowing errors to be isolated
    - running will be necessary after very minor changes...
    - continual compilation of whole code is wasteful/time consuming
(1 per -, max 5)

(5)

(b)
- Check on grammar of statements
- Error diagnostics are issued
- Jump destinations checked for existence
- Control constructs checked
- Check that variables have been declared
- Check for existence of library modules
(1 per -, max 3)

(3)

4 (a)
- When procedure is finished...
    - it is necessary to return to place that procedure was called from

(2)

(b) (i)
- Stack/linked list

(1)

(ii)
- Necessary to use return addresses in correct order
    - which is reverse of calling order
- Stack is LIFO/FILO
    - which reverses the order
(1 per -, max 3)

(3)

(iii)
- Parameters needed in execution of procedure
    - placed on stack to be read (by calling program to be read) by procedure
- Parameters returned by procedure placed on stack
    - after return address has been read.
(1 per -, max 2)

(2)

5
- Value in PC placed in MAR
- PC incremented (anywhere)
- Contents of address in MAR placed in MDR
- Contents of MDR placed in CIR
- Op code in CIR is decoded
- Address is copied from CIR to MAR
- Contents of address in MAR placed in MDR/sent to accumulator
- Contents of MDR sent to accumulator
- Registers reset ready for next instruction
 (1 per -, max 7)

(7)

6 (a) (i) 01010100 / 00000100
(ii) 10101100 / 00000100
(1 per byte)

(4)

(b) (i) 01111111 / 01111111
(ii) 10111111 / 10000000
(1 per byte)

(4)

7 (a) - Hits will be from qualified people
- Higher proportion of hits from interested parties
- Greater chance of finding interesting information because of smaller number of sites
- Less chance of misleading/hoax sites
- Chance to keep research results restricted
- More sensible discussion groups set up
- Faster access because of smaller amount of data
- May lose chance of sensible comment because person does not have access
- Access/membership can be controlled
(1 per -, max 6)

(6)

(b) - Impossible to do otherwise
  - because technology does not exist
  - e.g. train astronauts to land on Mars
- Dangerous to do otherwise
  - because the result may be hostile to humans
  - e.g. train reactor operators to deal with emergencies
- Too costly to do otherwise
  - because budget would not cover costs
  - e.g. test different suspension systems for new car.
(1 per -, max 2 examples)

(6)

8 (i) - Data can only be accessed by the methods provided by the class
- Name can only be accessed from the class Person

(ii) - Where one class is a subclass of another it can use its methods
- Pupil can use getname() from Person

(4)

9 (a) - Jobs sent to storage
       -When storage of job complete
       -reference to job stored in spool queue
       -along with location in storage.
(1 per -, max 3)

(3)

(b) - Processor can only process one job at a time
- Two types of job, I/O bound and processor bound
- I/O must have priority in order to...
    - allow peripherals to operate while processor bound job is
      processed
(1 per -, max 3)

(3)

10 (a) (i) - Error check, Q full
- Insert data at ARRAY(Head pointer)
- Increment Head pointer

(ii) - Error check, Q empty
- Read data at ARRAY(Tail pointer)
- Increment Tail pointer
Note: Allow variation if consistent
(1 per -, max 2 per dotty, max 4)

(4)

(b) - Head pointer may leave ARRAY
- Loop to bottom of array (circular Q)
- Array may fill because Array is static and Q is dynamic
- Use linked list to hold Q instead of Array
(1 per -, max 2)

(2)

11 (a)
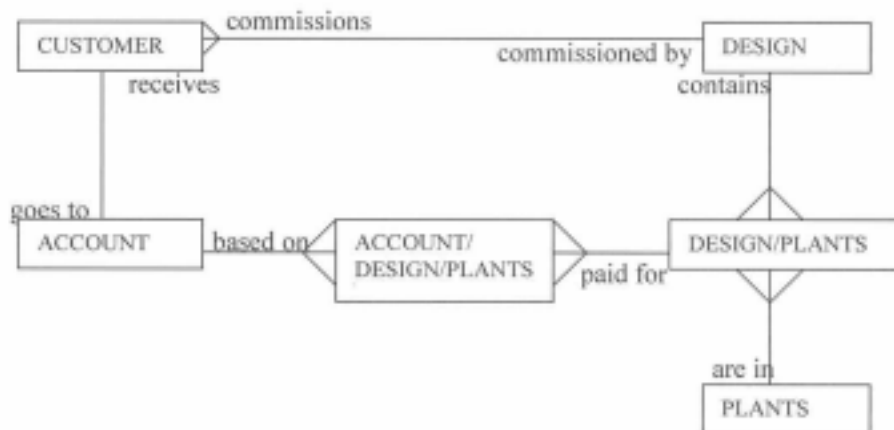
Mark points:
1 for each of original tables, max 3
1 for a link table
2 for an example of a two-way relationship shown
1 for each correct link, max 4

(10)

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(b)   - Eucalyptus AND...
               - Batch 12
                 - found in PLANTS table
               - Individual gardens found in Design/Plants table...
               - Customer for those gardens are found (via account in Accounts
                table)
             (1 per -, max 4)

                                                    (4)