UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

9691 COMPUTING

9691/01 Paper 1 (Written Paper 1), maximum raw mark 90

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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1 (a) (i) To allow the user to give the computer data/change data into computer understandable form

(ii) To allow the computer to give information/communicate with the computer/to change information from computer into human understandable form

(iii) To keep data while the computer is not using it
(1 per dotty) [3]

(b) -Black and white laser
-e.g. Use in office to produce letters
-Produces high quality/speedy so does not develop large queue on a LAN
-Colour laser
-e.g. To produce reports for a meeting
-High quality outputs/can produce large quantity quickly
-Dot Matrix
- e.g. Print receipts at checkout/tickets on railway
-Produces more than one copy at a time, one for customer + one for shop
-Inkjet
-e.g. Doing homework at home
-Relatively cheap and slowness does not matter
-Plotter
-e.g. Produce architect's plans
-Precision drawing tool
-Braille printer
-Producing documents/books for blind people
-Outputs physical/3D form of data
(3 per type, max 3 types, max 9) [9]

2 (a) (i) Name: Text/String/alpha/alphanumeric
Description: Text/String/alpha/alphanumeric
Cost: Currency/integer/real/float
Whether: Boolean
Number: Integer
(1 for first three, 1 for last 2) [2]

(ii)

Field Sizes:	10	– 50	
	50	– 250	
	4	– 8	
	1		
	1	– 4	
Total	66	– 313	bytes (1)

(1) for showing that the field sizes should be added up
Multiply Total by 1000 (1) = 66000 to 313000 bytes
Add extra (10%) for overheads (1) = 72600 to 344300 bytes
Convert to sensible unit (÷1024) (1) = 70.9Kb to 344.3Kb.
(5 possible mark points, max 4) [4]

(b) Advantage:
-Processed/Searched more easily/quickly/Estimate of file size is easier
-e.g. When a customer wants to know the availability of an item the record can be f quickly/makes selection of storage easier
Disadvantage:
-The size of fields must be determined before use so space is often wasted/not sufficient
-e.g. The "description" field may not be large enough for a particular item.
(1 per -, max 4) [4]

3 -Working from home
-Fewer journeys/more free time/less supervision…
-Different types of jobs/jobs lost/job opportunities arising
-Production line/manual jobs being lost/replaced by more technical jobs
-Work done can be more visible to managers
-All work/times working can be seen/leading to rewards where appropriate/sanctions when poor effort
-Safety of workers is improved
-Computers/robots do dangerous tasks/can be used to accurately monitor dangerous processes
-Work time can be less rigid
-Work can be fitted in round other commitments/leads to simpler ways of job sharing
-The 24 hour job/office/commitment/world workforce
-Workers may always be contactable/throughout the world/communications.
(Up to 2 per group, max 3 groups, max 6) [6]

4 (a)

Line	X	A	OUTPUT	CONDITION
1	1			
3	1	1		
4	1	1	1,1	
5	2	1		
6	2	1		FALSE
3	2	4		
4	2	4	2,4	
5	3	4		
6	3	4		TRUE
7	3	4		

(1 for values of X and matching line numbers; 1 for values of A corresponding to values of X; 1 for giving correct outputs; 1 for giving 2 conditions) [4]

(b) (i) Change X = 3 to X = 11 [1]

(ii) -A first line to allow user to input value (N)
-UNTIL X = (N + 1) [2]

(c) e.g.

```
X = 5
REPEAT
    A = X * X
    OUTPUT X, A
    X = X + 5
UNTIL X = 25
END
```

Mark points:
-Begins with 5 (as first output)
-Loop with working condition
-Counter correctly incremented [3]

5 **(a)** **(i)** -Options appear on screen from which to select
-Selection may lead to submenus
-Menus arranged in a tree structure (from single root to many branches)
Use: In a passive information system e.g. Tourist guide at a train station.
(1 for use, + 2 other -, max 3) [3]

(ii) -Follows a spoken language allowing user to input queries in normal vocabulary/syntax
-Computer understands keywords/positions in sentence to get idea of syntax
-Will then search database for keyword to provide output or responses.
Use: e.g. On an expert system or search engine.
(1 for use, + 2 other -, max 3) [3]

(b) -Provides utility programs to allow user to carry out maintenance tasks (any 3)
-Provides security measures like passwords and identifications.
-Controls the hardware and the operations they allow.
-Provides translators to convert software into a form useable by the computer.
-Manages interrupts.
-To provide a platform for the execution of software
(1 per -, max 3) [3]

6 **(a)** **(i)** Data is transmitted along a single wire/one bit at a time. [1]

(ii) Data is transmitted along a number of wires/one byte (or more) at a time. [1]

(iii) Data can only be transmitted in a single direction. [1]

(iv) Data can be transmitted in both directions but only one at a time. [1]

(b) **(i)** -Each byte contains an even number of 1's
-A special bit is set to 0 or 1 to ensure that total is even.
-Byte is checked for even number of 1's after transmission.
(1 per -, max 2) [2]

(ii) -When two bits are in error the errors cancel each other out/10101001. [1]

7 -Data collected on site/by drilling /observation/explosions
-Data collected remotely/by satellite/by electronic means
-Collected data input to system via HCI/automatically
-Data input is compared to library of data to find matches…
-by inference engine…
-Using rules found in rule base
-Decisions made about geologic structure reported through HCI.
(1 per -, max 4) [4]

8 **(a)** -Site map
-a diagram showing the way the different screens fit together
-shows the links between screens,
-Gantt chart/progress chart
-shows the different parts that need to be developed
-shows which parts of the development are independent and which are reliant on each other.
-Spider diagram
-to show interaction between the different elements of the solution
-and those parts which are independent of each other.
-Flow diagram
-to show the order of producing the parts of the solution
-or to show the flow through the proposed site.
(Up to 2 groups, up to 2 per group, max 4) [4]

(b) -Documentation for owner of site
-will be paper based
-will contain instructions for changing/maintaining site
-Documentation for viewer/visitor to site
-will be on-screen
-giving detailed help on searches/use of facilities/communication with site owner… [4]

9 -Sound
-Music to accompany the pictures/speech to explain the pictures….
-Video/animation
-Moving pictures to better describe the object on the site
-Automatic hard copy/saving
-Automatic downloading of data to printer/hard drive for future reference.
-Hyperlinks
-Allowing access to different sites/parts of site
(Up to 2 groups, up to 2 per group, max 4) [4]

10 Colour:
-Contrast
-Corporate schemes
-Aggressive/passive/soothing colour schemes
-Consistency over site to make site look cohesive
-Use colour to provide emphasis
-Accessability issues e.g. colour blindness

Layout:
-Consistent layout so user gets used to 'what is where'.
-Important things to top and left
-Data spread out across whole screen
-Tab order
-Group similar data together

Content:
-Limit to amount of content on a page
-Content on a page is cohesive
-Content matches the published intentions of the site
-Content is of sensible type and reading age for audience.
(1 per -, max 2 per group, max 6) [6]

11 -The bit rate is a measure of the rate that data can be sent across the communication medium
-Different communication media have different bit rates
-For simple text/still pictures…a low bit rate connection is adequate
-because volume of data per page is low and fixed
-For (live) video/sound…bit rate needs to be high
-because large volume of data which must be downloaded in real time because…
-information is time sensitive.
(1 per -, max 4) [4]

12 (a) (i) -Custom written software is especially written/according to the requirements of the customer
-Off the shelf is readily available/needs tailoring to the needs of the customer [2]

(ii) -no delay as it is ready immediately
-No shortage of experienced users/ready trained/No learning curve
-Software should be error free
-Help available through Internet/colleagues/courses
-Compatible with other users/software
(1 per -, max 2) [2]

(b) (i) -Check data input to ensure it matches source data
-Typed in twice…
-by different people/at different times
-inputs checked against each other for errors
-manual check by comparing…
-screen output of input with original document.
(1 for first -, + any 2 other -, max 3) [3]

(ii) -Check data input is sensible/follows set rules/are reasonable
-Data type/should be numeric
-Data format/should be in currency form/xxx.xx
-Length check/input should be < x characters
-Presence check/something has been input.
-Range check/value between 0 and some upper limit
(1 for first -, + any 2 other -, max 3) [3]