

**MARK SCHEME for the October/November 2009 question paper  
for the guidance of teachers**

**9691 COMPUTING**

**9691/31**

Paper 31 (Written), maximum raw mark 90

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1 (a) Any sensible organisation e.g. supermarket.

(b) e.g. for a supermarket:

- Customer names and addresses from deliveries
  - valuable to advertisers/gives a breakdown of who the typical shopper is from their neighborhood
- Amounts of goods sold in period of time
  - allows comparison between brands to ensure popular brand stocked/ to act as bargaining tool when setting costs of goods
- Bank account details/credit card details linked to addresses
  - Mail order companies to know who to send expensive offers to
- Goods bought by individual shoppers
  - to sell to mail order companies/aimed mailshots
- Sales over different parts of the store
  - to help with designing layout to maximise profits
- Individuals who respond to mailshots/offers
  - target offers at responsive customers.

(1 per -, max 3 pairs, max 6)

[6]

2 (a) -Intranet is a closed/private network rather than open/public network

- More secure because access controlled by bank...
- by use of IDs and passwords
- level of access
- cuts down on time wasted on junk mail/unsuitable material.
- All important because the information is very sensitive.

(1 per -, max 4)

[4]

(b) Problems:

- Hackers attack communications
- Hackers attack customer data
- Data being distributed leading to unsolicited communications

Measures:

- Encrypting data
- Digital signatures to guarantee reliability of source
- Passwords to enter user's area/database
- Use of firewall to block unwanted access
- Workers subject to D.P. legislation
- Portable storage devices not allowed.

(1 per -, max 2 for concerns, max 4 for solutions, max 5)

[5]

3 (a) Marks points:

- Address in instruction is decoded
- Contents of that memory location contain an address
- The address of the data to be used.

[3]

(b) -Some areas of memory cannot be addressed because size of memory address > space available in instruction

- Memory address will fit in a memory location

[2]

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- 4 (a) -Terminal (with small amount of processing power)  
 -Normal peripherals of mouse/key board/screen/printer  
 -Storage in form of hard drive (to store confidential documents)  
 -Storage in form of flash memory/cartridge... (to allow portability of data)  
 (1 per -, max 3) [3]
- (b) -Cable  
     -fixes position of machine  
     -secure  
 -Wireless  
     -can move machine and yet remain in contact  
     -insecure, subject to hacking/eavesdropping.  
 -coax cable  
     -cheap to install for school  
 -fibre-optic connection  
     -more secure/faster transmission of data  
 (1 for two methods; 1 each for comparisons; 1 for general point. Max 3) [3]
- (c) (i) -Individual who can be covered for time off/Whole group who could be trained en masse if school admin did not function  
 -Learning about system requirements/learning about the use of the software  
 -Comparison between technical and user requirements  
 (1 per -, max 2) [2]
- (ii) -Can be done in own time  
 -At own pace  
 -No personality clashes with tutor  
 -Can learn on actual software to be used  
 -Done without affecting running of school/no down time  
 -Electronic, so progress can be automatically monitored.  
 (1 per -, max 4) [4]
- (d) (i) Advantage: Searching is quicker because a binary search can be used.  
 Disadvantage: When index needs changing many of the contents must be moved. [2]
- (ii) -Insert details in file  
 -Insert index entry in one of free space list  
 -Start from head of list pointer  
 Repeat  
 -If points to value > new student  
     -Then alter pointers to insert new value here in list. End  
     -Else follow pointer to new value to compare  
 -Until no more values in list  
 -Insert new value and move null pointer. End  
 (1 per -, max 6) [6]

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- 5** -Address of instruction copied from PC to MAR  
 -PC incremented  
 -Instruction at address stored in MAR copied to MDR/MBR  
 -Instruction copied from MDR/MBR to CIR  
 -Instruction code in CIR is decoded  
 -Address in CIR copied to MAR  
 -Because Jump instruction, address in MAR copied to PC  
 (1 per -, max 6) [6]
- 6** Lexical:  
 -Instructions are tokenised  
 -Some of characters must be combined to create token for keyword  
 -If keyword does not exist in internal dictionary of keywords  
 -check for valid variable name  
 -against rules stated in BNF  
 -Error is reported  
 Syntax:  
 -Each keyword has an associated syntax  
 -Tokens are checked to ensure that they match the syntax for that keyword.  
 - e.g. Do left and right brackets match?/Does punctuation for Print keyword match rules?/...  
 -error is reported (only credit once)  
 (1 per -, max 5) [5]
- 7 (a) (i)** An application where the output is produced quickly enough to affect the next input. [1]  
**(ii)** -Any sensible example e.g. Check a PIN at an ATM machine  
 -must be done before offering a service on the card proffered. [2]
- (b)** -Touch sensor to ensure that window is not opened  
 -Pressure sensor/pad by door to sense someone stepping on it  
 -Infra-red sensor to pick up body heat of someone in room  
 -Sound sensor to hear broken glass if window broken  
 -Light sensor to detect when a light beam is broken  
 (2 per -, 1 for sensor + 1 for use. N.B. uses are examples, max 3 sensors) [6]
- 8 (a) (i)** -A table holding information about the database  
 -Used by managers of the database, not users  
 -Maps logical database to physical storage  
 -Allows existence check on data to be carried out.  
 (1 per -, max 2) [2]
- (ii)** -The language used to allow the manager to write the...  
 -description of the data items to be stored in the database  
 -defines the structure of the tables. [2]
- (iii)** -Language used allow user to access data...  
 -store data...  
 -change data in a database  
 -search for data in the database.  
 (1 per -, max 2) [2]

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(b) (i) -Most items of data only need to be stored once...  
 -because tables are linked allowing the contents of all tables to be used via access to one. [2]

(ii) -Access to areas of data can be easily controlled because...  
 -users each have their own view of data  
 -DBMS can control views using access rights.  
 -Regular back ups of the data can be made...  
 -automatically by the DBMS to alternative hardware.  
 (1 per -, max 2) [2]

(iii) -less chance of contradictions being caused  
 -as most information is only stored once.  
 -data protected from misguided or malicious processing/alteration  
 -leading user to trust in the correctness of the data  
 (1 per -, max 2) [2]

9 (a) (i) Only one user has access at a time. [1]

(ii) -Application Programming Interface  
 -provides platform to run software  
 -file management  
 -manipulation of files  
 -memory management  
 -paging/virtual memory/scheduling  
 -processor management  
 -interrupt handling/scheduling  
 -I/O management / handles data transfers  
 -between areas of processor/between primary memory and secondary storage.  
 -device drivers / handles data between processor and I/O peripherals  
 -using instructions in device drivers and control of buffers  
 - user interface  
 -a method of communicating with computer/suitable example  
 -Utility software  
 -offers series of software to carry out housekeeping/monitor and maintain and use the hardware.  
 -Security/privacy  
 -will protect data by copying to other media automatically/sets up passwords to restrict access to files.  
 (1 per -, max 2 components, max 4) [4]

(b) (i) -O.S. hides the complexities of the system from users.  
 -User believes that their computer is a stand-alone.  
 -User is unaware of sharing resources.  
 (1 per -, max 2) [2]

(ii) -Sets up files and directories for user.  
 -Allows group access to some files.  
 -Access to files dictated by user I.D.  
 (1 per -, max 2) [2]

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- 10**
- (i) -Information must be collected before anything else is done.  
 -Documentation is done alongside all other tasks  
 -Information must be analysed before solution attempted.  
 -Data files can be created alongside problem solution.  
 -Design must be completed before software can be written.  
 -Design and software can be done alongside data files.  
 -Testing must be documented.  
 -Project must be finished before implementation.  
 (1 per -, max 6) [6]
- (ii) -Critical Path: AGH or ABDFH. [1]
- (iii) -Least Time: 29 days. [1]