

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

A AND AS LEVEL

MARKING SCHEME

MAXIMUM MARK: 90

SYLLABUS/COMPONENT: 9691/01, 5216/01

COMPUTING
Written Paper 1



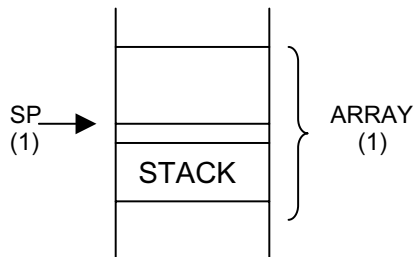
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- 1 (a)** - OS controls operation of system/hardware
- Applications software allows the system to do something useful (2)
- (b)** - File handling
- Copy/move/delete
- Anti virus software
- To protect files from attack by virus
- Defragmentation
- To keep files sensibly arranged on the hard drive
- Format
- To divide surface of drive into smaller areas to aid storage
(1 per -, max 6) (6)
- 2 (a) (i)** Jobs collected together for processing at a later time
(ii) Output produced quickly enough to affect the next input
(iii) User has direct contact with processor
(iv) User cannot communicate directly with processor (4)
- (b)** - Real time
- E.g. turning the wheel must turn the car immediately
- On line
- Otherwise system cannot be real time (4)
- (c)** - Sharing of software and data files
- Sharing of hardware, e.g. printers
- Communication
- Security of files more of a problem
(1 per -, max 3) (3)
- 3 (a) (i)** Incorrect use of language, e.g. PLINT instead of PRINT
(ii) A mistake in the structure of the solution, e.g. a jump goes to the wrong line
(iii) Inappropriate arithmetic is used, e.g. division by 0 is attempted (6)
- (b)** - Translator diagnostics
- Produced when wrong programming used
- Gives position and explanation of error
- Cross-referencing
- Used when program modularised
- To check use of variables
- Trace routines
- Follow value of variable
- To give clue as to where error occurs
- Variable dump
- Prints values of all variables
- At given point in program
(1 per -, max 2 per type, max 4) (4)

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- 4 (a)** - Data enters at one end (of a stack)
 - Leaves at the same end
 - Hence 'last in, first out'
 (1 per -, max 2) (2)

(b)



(2)

- 5 (a)** - Uses all 7 digits
 - Creates >2000 results
 - Highlight the danger of multiplying by zero (2)

(b) Any two 7 digit numbers that cause a clash (1)

- (c)** - Search serially from hash value
 - Until vacant location found
 - Mention of circular reference
 - If the memory locations become full, use a bucket
 - Use bucket to place duplicates in
 - In serial form
 - Pointer to bucket from hashed location
 - Use hashed location as start of linked list
 - Ensure end of list with null value of pointer
 (1 per -, max 2 methods, max 4) (4)

- 6 (a) (i)** To manage the execution of instructions
 By running a clock
 To decode instructions
- (ii)** To store OS
 To store those parts of applications programs currently running
 To store data currently in use
- (iii)** Part of processor where data is processed/manipulated
 All I/O must pass through here
 (1 per -, max 2, 2, 2, max 6) (6)

- (b)** - Main memory transitory, secondary storage is (semi-)permanent
 - Processor can only use data/instructions that are in main memory
 - Main memory in processor, secondary storage not
 (1 per - max 2) (2)

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- 7 (a)** - Serial is the transmission of data one bit at a time/through one wire
 - Parallel is the transmission of data more than one bit at a time/many wires
 - Simplex is the transmission of data in one direction only
 - Duplex is the transmission of data in both directions simultaneously (4)
- (b)** - Extra bit on each data-byte that
 - Does not transmit data
 - Makes number of ones in a byte be always even or always odd
 - Error in the transmission of a bit will make the even/odd wrong
 - Problem of two errors in one byte not being found
 - Parity block
 (1 per -, max 4) (4)
- 8** - College authorities are the experts in the problem
 - SA is the expert with computers
 - The two need to pool resources to come up with a clear definition
 - Agree the outcomes so that when the system is implemented there are a set of criteria to judge it by
 (1 per -, max 4) (4)
- 9 (a)** - Corporate colour scheme
 - Languages to be used
 - What information should be on
 - Should the site be two way/students allowed to enroll
 - Size of the site
 - What links should there be?
 (1 per -, max 4) (4)
- (b)** - Presentation software
 - Talks to large groups
 - DTP
 - Produce newsletter/advertising material
 - Word processor
 - Mail merged personal letters/junk mail
 - Database
 - To store lists of the recipients of the junk mail
 (1 per -, max 4) (4)
- 10** A description of:
 - Passwords
 - Hierarchy
 - Only allow some staff to access student files
 - Only some machines able to access
 - Physical location of these machines
 - Physical lock on machines
 - Encrypted data in files
 - Firewall if connected to the Internet
 (1 per -, max 5) (5)

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- 11** (i) Dual input of data
Two inputs are compared by the system
And any discrepancies reported (and not stored.)
Data input once, either printed out or checked on screen
Errors corrected
- (ii) Rules given to processor
Only accept A,B,C,D,E,F,G
Any other input rejected.
Drop-down list/radio buttons
Provides only valid inputs
So no other validation required
(1 per -, max 6) (6)
- 12** Enrolment:
- Data input on line
- Individual records validated
- Speed mismatch implications
- Indexes updated immediately
- Exam grades:
- Data input twice
- Off line
- Run as a batch
- At otherwise downtime
(1 per -, max 6) (6)
- 13** - Day to day information supplied to teachers
- About abilities of students
- Class lists
- Middle managers
- E.g. departmental exam results
- Strategic information
- Supplied to Principal
- E.g. overall exam results to compare performance of departments
- Comparison of grades year on year
(1 per -, max 5) (5)
- TOTAL 90**

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

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A AND AS LEVEL

MARKING SCHEME

MAXIMUM MARK: 60

SYLLABUS/COMPONENT: 9691/02, 5217/01

COMPUTING
Practical Tasks



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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 5 marks		
	Membership form to include:	
	- heading	
	- consistent use of formatting	
	- instructions for filling in	
	- logical order on form	
	- indication of maximum field lengths	
	- field names, including Forename, Surname, Address, Telephone number, Team	
	- splitting address into Address 1 and Address 2	
	Sub-Total 1 (a)	
Question 1 (b) (i)		
Maximum 5 marks		
	Existence of table:	
	- contains all the fields	
	- sensible data types	
	- existence of team ID in record	
	- identified as link field	
	- existence of player ID	
	Sub-Total 1 (b) (i)	
Question 1 (b) (ii)		
Maximum 3 marks		
	Existence of table (only given once):	
	- contains all the fields	
	- including team ID	
	- identified as key field	
	Sub-Total 1 (b) (ii)	
Question 1 (c)		
Maximum 9 marks		
	Input screen constructed:	
	- validation routine for team name input	
	- constructed correct query	
	- selection of required data	
	- output of required data	
	- to two screens	
	- one screen for details of team	
	- one screen containing all players	
	- means of moving between output screens	
	- output of tables	
	- correct team list	
	Sub-Total 1 (c)	

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Question 2 (a)		
Maximum 8 marks		
	1 mark per line:	
	5 2	
	6 4	
	7 2	
	8 4	
	9 3	
	10 4	
	11 2	
	12 6	
		Sub-Total 2 (a)
Question 2 (b)		
Maximum 8 marks		
	- setting up array	
	- two dimensional	
	- input values into array	
	- remainder of algorithm in correct position	
	- loop to increase value of S	
	- correct condition on the loop	
	- searching the array for stated value of S (use of inner loop)	
	- correct condition statement on inner loop	
	- condition statement based on value of S	
	- printing value of N when found	
		Sub-Total 2 (b)
Question 3 (a) (i)		
Maximum 5 marks		
	- suitable format of form	
	Data entry boxes for:	
	- event	
	- names of each competitor (6 rows or columns)	
	- 3 details of each competitor	
	- show some distinction for each type of event	
		Sub-Total 3 (a) (i)
Question 3 (a) (ii)		
Maximum 4 marks		
	- screen containing sample set of results	
	- evidence of file existence	
	- contents of screen transferred to file	
	- evidence that data has been automatically transferred	
		Sub-Total 3 (a) (ii)

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Question 3 (b)		
Maximum 7 marks		
	Within the data there must be:	
	- one case of an event with no competitor from a certain school	
	- one case of an event with more than one competitor from a school	
	- one case where each school has one competitor	
	- have at least one sensible time/distance/height	
	- one example of a time outside acceptable limits	
	- one example of a distance outside acceptable limits	
	- one example of a height outside acceptable limits	
	- one example of a dead heat	
	Sub-Total 3 (b)	
Question 3 (c)		
Maximum 6 marks		
	- design of screen	
	- deciding gold, silver, bronze in an event	
	- identifying the 3 schools in order	
	- increment the correct school totals	
	- formula $3 \times \text{gold} + 2 \times \text{silver} + \text{bronze}$ for total	
	- for each school	
	- method for calling up screen	
	Sub-Total 3 (c)	
	Total (max 60)	

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A AND AS LEVEL

MARKING SCHEME

MAXIMUM MARK: 90

SYLLABUS/COMPONENT: 9691/03, 5218/01

COMPUTING
Written Paper 3

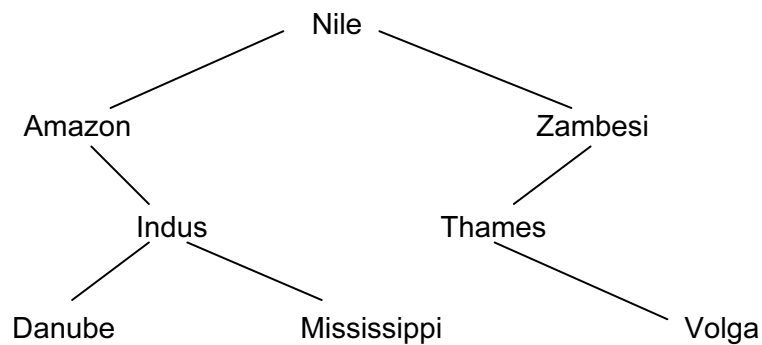


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- 1 (a) The sequence will have to be interpreted 2000 times/this will include all stages, such as checking
Compiled version needs no further translation (2)
- (b) Removes spaces/white space/tabs
Removes comments
Checked validity of reserved words
Tokenises reserved words
Tokenises operators
Checks validity of symbols/variable names
Creates the symbol table
(1 each, max 4) (4)

Total = 6 marks

2 (a)



(1 for the left sub-tree, 1 for the right sub-tree and 1 for the root) (3)

- (b) - compare with root
- if < go to left sub-tree
- else go to right sub-tree
- repeat until no sub-tree
- insert at node
Accept mirror image iff used in (a)
(max 4) (4)

Total = 7 marks

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- 3
- Passwords
 - Encryption
 - Firewall
 - Screen cables
 - Use fibre optics
 - Microwave links
 - Secure channels
 - Entry codes to rooms
 - Any physical check (palm, eye) – monitor personnel in building
 - Monitor system access
 - Hierarchy of passwords
 - Physical locks on computers
 - Duplicate processors/servers
 - Back ups
 - In a different place
 - RO files
 - Use of packet switching rather than circuit switching
 - Use of anti-virus software
 - Locking RW privilege to files
- (1 per point, max 9) (9)

Total = 9 marks

- 4
- Contents of PC copied into MAR/address of instruction in MAR
 - Contents copied from address into MDR/instruction held in MAR
 - Contents of MDR copied into CIR/instruction is put in CIR
 - Contents of CIR decoded
 - The number/25 from CIR copied into MDR
 - Contents of MDR copied into accumulator/25 is placed in accumulator
 - Incrementing PC at any stage
- max 6 (6)

Total = 6 marks

- 5 (a)
- Produces re-usable code
 - By creating a class library
 - Inheritance
 - To produce new objects
 - Encapsulation of data
 - To protect data integrity
 - Polymorphism
 - To use different versions of the same method (in different classes)
 - Structure of data and the code in a class may be altered
 - Without affecting programs that use the class
 - Without affecting other classes
 - Message passing between classes
- (max 6) (6)

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- (b) (i) A template for creating objects (that share a common behaviour and common structure) (1)
- (ii) A class that inherits the structure and methods of another class (1)
- (iii) A class that passes down its attributes and methods (1)

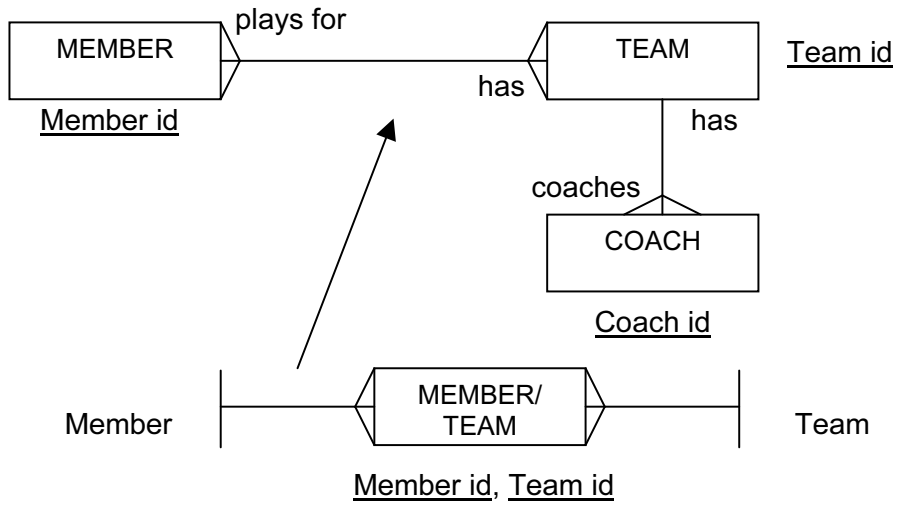
Total = 9 marks

- 6 (a) - Set of rules...
- To allow communication between devices/computers/machines (2)
- (b) - Standard file formats...
- To allow files produced on one machine to be understood on another
- ISDN/other communication standard
- Standard method of communication digital
- OSI/TCP (IP)
- Involves layering protocol
- To allow changes in layers
(1 per -, max 6) (6)
- (c) - Voice mail...
- (Using digital systems) to leave spoken messages
- Email
- Send and receive messages (irrespective of geographical location)
- Digital telephone system...
- To automate customer enquiries (and direct them)
- Video conferencing...
- To allow conferences between employees without the need for a physical presence
- Electronic data interchange
- Allows sharing of data across system while being protected
- Send and receive attachments
- Confirm receipt of message
(1 per-, max 8) (8)
- 7 - Safety
- Testing acceptable parameters in an industrial reaction
- The effects of a test which passed safety limits in real life may put lives in danger
- Impossibility
- Training astronauts to work on the surface of Mars...
- Such a task is not possible in real life because astronauts have not been to other planets
- Time
- Testing what will be the outcome of breeding a plant for 100 generations...
- In real life, 100 life cycles of a plant will take 100 years to test
- Isolation from external factors
- Growing crystals to study behaviour...
- Too easy for material to be contaminated in real life
(1 per -, max 9) (9)

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- 8
- (i) - Old and new systems both used on all data
- Example where it is essential that no errors arise in the new system, e.g. changing the software that produces student exam grades
- Errors can be found in new system before it starts to operate (3)
- (ii) - One part or module of old system is changed to new while remainder stays on old
- Complex system with easily identified modules, e.g. control of a chemical plant may involve one reaction being switched to the new system first so that it can be monitored separately
- Allows tight monitoring of new system with limited resources/training of personnel (3)
- (iii) - One complete system, representative of whole system is switched while remainder remains on old/prototyping
- Any system comprising a number of matching systems, e.g. a college record keeping system may alter one year group to ensure it works before changing the others
- Allows system to be tested with/while risking a limited volume of data (3)
- 9
- Current cycle is completed
- Priority of interrupt compared with current job
- If higher:
- Contents of special registers saved/job placed in blocked state/in ready Q
- Interrupt/program for execution of interrupt, is identified/vectored interrupt used
- Interrupt serviced by running program
- On completion values of special registers from original program area replaced/original job restored
- If lower:
- Interrupt allocated position in job queue...
- According to priorities
- Current job continues with next cycle
(1 per -, max 6) (6)

10



Mark points:

1 per correct entity	max 3
1 per relation	max 2
1 per statement	max 4

- 1 for attempt at link entity
- 1 for sensible name (mix of both)
- 2 for correct relationships
- 1 for id keys
- 1 for link key

(max 13)

(13)