

June 2003

A AND AS LEVEL

MARKING SCHEME

MAXIMUM MARK: 90

SYLLABUS/COMPONENT: 9691/01, 5216/01

COMPUTING Written Paper 1



Pa	age 1	Mark Scheme	Syllabus	Paper
		A AND AS LEVEL – JUNE 2003	9691	1
1 (a)	- OS	controls operation of system/hardware		
()	- Ap	plications software allows the system to do something us	eful	(2)
(b)	 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 			
	- For - To (1 pe	mat divide surface of drive into smaller areas to aid storage er -, max 6)		(6)
2 (a)	(i) (ii) (iii) (iv)	Jobs collected together for processing at a later time Output produced quickly enough to affect the next input User has direct contact with processor User cannot communicate directly with processor		(4)
(b)	- Rea - E.g - On - Oth	al time . turning the wheel must turn the car immediately line lerwise system cannot be real time		(4)
(c)	- Sha - Sha - Coi - Seo	aring of software and data files aring of hardware, e.g. printers mmunication curity of files more of a problem		
	(1 pe	er -, max 3)		(3)
3 (a)	(i) (ii)	Incorrect use of language, e.g. PLINT instead of PRINT A mistake in the structure of the solution, e.g. a jump go the wrong line	oes to	
	(111)	is attempted		(6)
(b)	is attempted) - 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 pe	er -, max 2 per type, max 4)		(4)

Page 2	Mark Scheme	Syllabus	Paper
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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)



(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)

Pa	age 3	Mark Scheme	Syllabus	Paper
		A AND AS LEVEL – JUNE 2003	9691	1
7 (a)	- Serial - Paral - Simpl	is the transmission of data one bit at a time/through or lel is the transmission of data more than one bit at a tim lex is the transmission of data in one direction only ax is the transmission of data in both directions simultar	ne wire ne/many wi	res
(b)	- Extra - Does - Make - Error - Proble - Parity (1 per -	bit on each data-byte that not transmit data s number of ones in a byte be always even or always of in the transmission of a bit will make the even/odd wro em of two errors in one byte not being found block -, max 4)	odd ng	(4)
8	- Collec - SA is - The to - Agree set of (1 per -	ge authorities are the experts in the problem the expert with computers wo need to pool resources to come up with a clear defi the outcomes so that when the system is implemented criteria to judge it by -, max 4)	nition d there are	a (4)
9 (a)	- Corpo - Langu - What - Shoul - Size o - What (1 per -	orate colour scheme Jages to be used information should be on Id the site be two way/students allowed to enroll of the site links should there be? -, max 4)		(4)
(b)	- Prese - Talks - DTP - Produ - Word - Mail r - Datab - To sto (1 per -	entation software to large groups uce newsletter/advertising material processor nerged personal letters/junk mail base ore lists of the recipients of the junk mail -, max 4)		(4)
10	A desc - Passy - Hiera - Only : - Only : - Physi - Physi - Encry - Firew (1 per -	ription of: words rchy allow some staff to access student files some machines able to access cal location of these machines cal lock on machines rpted data in files all if connected to the Internet -, max 5)		(5)

	Page 4	Mark Scheme	Syllabus	Paper
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11	(i) [Dual input of data		
	- - 	Fwo inputs are compared by the system And any discrepancies reported (and not stored.) Data input once, either printed out or checked on scree Errors corrected	ו	
	(ii) F (/ / F	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		
	(1 per	-, max 6)		(6)
12	Enroln - Data - Indivi - Spee - Inde»	nent: input on line idual records validated id mismatch implications kes updated immediately		
	Exam - Data - Off lii - Run - At otl (1 per	grades: input twice ne as a batch nerwise downtime -, max 6)		(6)
13	- Day 1 - Abou - Class - Midd - E.g. 0 - Strat - Supp - E.g. 0 - Com (1 per	to day information supplied to teachers it abilities of students is lists departmental exam results egic information lied to Principal overall exam results to compare performance of departs parison of grades year on year -, max 5)	ments	(5)
		т	OTAL	90

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CAMBRIDGE

June 2003

A AND AS LEVEL

MARKING SCHEME

MAXIMUM MARK: 60

SYLLABUS/COMPONENT: 9691/02, 5217/01

COMPUTING Practical Tasks



Page 1	Mark Scheme	Syllabus	Paper
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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-Lotal 1 (C)	1

Page 2	Mark Scheme	Syllabus	Paper
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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
	- snow some distinction for each type of event
Question 3 (a) (II)	
waximum 4 marks	acroon containing comple cat of requilte
	- screen containing sample set of results
	- evidence of necesaria tangfarrad to file
	- contents of screen transferred to the

Page 3	Mark Scheme	Syllabus	Paper
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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 x gold + 2 x silver + bronze for total 	
	- for each school	
	- method for calling up screen	
	Sub-Total 3 (c)	
	Total (max 60)	



June 2003

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MAXIMUM MARK: 90

SYLLABUS/COMPONENT: 9691/03, 5218/01

COMPUTING Written Paper 3



Page 1	Mark Scheme	Syllabus	Paper
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- (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)





(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

Page 2	Mark Scheme	Syllabus	Paper
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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)

5		Ognabus	
	A AND AS LEVEL – JUNE 2003	9691	3
(i) A cc	template for creating objects (that share a common be mmon structure)	ehaviour an	d (1)
(ii) A	class that inherits the structure and methods of anoth	ner class	(1)
(iii) /	A class that passes down its attributes and methods		(1)
		Total = 9 n	narks
- Set - To	t of rules allow communication between devices/computers/ma	chines	(2)
- Sta - To - ISE - Sta - OS - Inv - To (1 pe	Indard file formats allow files produced on one machine to be understood DN/other communication standard Indard method of communication digital I/TCP (IP) olves layering protocol allow changes in layers er -, max 6)	l on anothe	r (6)
- Voi - (Us - Em - Sei - Dig - To - Vid - To pre - Ele - Allo - Sei - Co (1 pe	ce mail sing digital systems) to leave spoken messages hail and and receive messages (irrespective of geographical ital telephone system automate customer enquiries (and direct them) eo conferencing allow conferences between employees without the ne sence actronic data interchange bows sharing of data across system while being protected and receive attachments nfirm receipt of message er-, max 8)	l location) ed for a phy ed	/sical (8)
- Sat - Tes - The dar - Imp - Tra - Suc to c - Tin - Tes - In r - Iso - Gro (1 pe	fety sting acceptable parameters in an industrial reaction e effects of a test which passed safety limits in real life nger possibility ining astronauts to work on the surface of Mars ch a task is not possible in real life because astronauts other planets ne sting what will be the outcome of breeding a plant for 1 real life, 100 life cycles of a plant will take 100 years to lation from external factors owing crystals to study behaviour o easy for material to be contaminated in real life er -, max 9)	may put liv s have not b 00 generat test	es in been ions
	(i) A (ii) A (iii) A (A AND AS LEVEL - JUNE 2003 (i) A template for creating objects (that share a common be common structure) (ii) A class that inherits the structure and methods of anoth (iii) A class that passes down its attributes and methods Set of rules To allow communication between devices/computers/mathematical standard file formats To allow tiles produced on one machine to be understood is Standard method of communication digital OSI/TCP (IP) Involves layering protocol To allow changes in layers (1 per -, max 6) Voice mail To allow conferences between employees without the ne presence Electronic data interchange Allows sharing of data across system while being protect Send and receive attachments Confirm receipt of message (1 per -, max 8) Safety Testing acceptable parameters in an industrial reaction The effects of a test which passed safety limits in real life danger Impossibility Training astronauts to work on the surface of Mars Such at task is not possible in real life because astronauts to other planets Time Testing what will be the outcome of breeding a plant for 1 In real life, 100 life cycles of a plant will take 100 years to Isolation from external factors Growing crystals to study behaviour To easy for material to be contaminated in real life (1 per -, max 9) 	A AND AS LEVEL - JUNE 2003 9691 (i) A template for creating objects (that share a common behaviour an common structure) (ii) A class that inherits the structure and methods of another class (iii) A class that passes down its attributes and methods Total = 9 n - Set of rules - To allow communication between devices/computers/machines - Standard file formats - To allow files produced on one machine to be understood on anothe ISDN/other communication standard - Standard method of communication digital - OSI/TCP (IP) - Involves layering protocol - To allow changes in layers - Noice mail - Voice mail - Voice mail - To audmate customer enquiries (and direct them) - Video conferencing - To automate customer enquiries (and direct them) - Video conferencing - To automate customer enquiries (and direct them) - Video conferencing - To allow sharing of data across system while being protected - Send and receive attachments - Confirm receipt of message - Safety - Resting acceptable parameters in an industrial reaction - The effects of a test which passed safety limits in real life may put liv danger - Training astronauts to work on the surface of Mars - Such a task is not pos

Page 4	Mark Scheme	Syllabus	Paper
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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
- (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)

(3)

- Current cycle is completed

- Priority of interrupt compared with current job

If higher:

9

- 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)

Page 5	Mark Scheme	Syllabus	Paper
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Mark po	ints:
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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)