MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

9691 COMPUTING

9691/32 Paper 32 (Written Paper), 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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UNIVERSITY of CAMBRIDGE International Examinations

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				GCE A LEVEL – May/June 2010	9691	32
1	(a)	-Inte -Inte -Cor -Cor (1 pe	erprei -Con -Con -Con -Con npile npile -bec er -, r	ter translates one command and runs it before translat npiler translates whole program before it is run ter maintains source code throughout run npiler creates the object code and drops the source co ter must be present in memory during program run npiler no longer needed once object code created/can d program will be longer than source code d program will tend to run more quickly ause no further translation is required max 6)	ing the next de be removed	[6]
	(b)	(i)	Lexio	cal analysis and Syntax analysis		[2]
		(ii)	-Cre -whio -The -Opt -to re -by ro (1 pe	ates a machine-code program/object code ch is equivalent to the high level language program code which is created will not be efficient imisation is used educe the number of commands in the object code emoving redundant code/substituting one command for s er -, max 3)	several (according	g to set rules) [3]
2	(a)	(i)	-ID r -Rea -Con -If a -If nc -If nc (1 pe	number input id next record from TF npared to ID number from record match found then record details are output of end of TF then repeat from second mark point of matches then report error or -, max 4)		[4]
		(ii)	-Flaç -set -no f (1 pe	g created/Boolean variable/condition statement in loop to 1 or true when match found urther comparisons carried out/search would end as se अ -, max 2)	oon as one mate	h was found [2]
		(iii)	-Con -If no -Rep -Nee (1 pe	npares centre record with input value o match, half of remaining file is removed leat until ID number is found ed to compare above and below found record because er -, max 3)	of multiple recor	rds [3]
	(b)	-Inse -Rea -Rep	ert fir ad ne beat i	st value/36721 ext value and insert in correct place in list/36721, 53967 until no more values/24378, 36721, 53967 24378, 36721, 47869, 53967 24378, 36721, 47691, 47869, 53	7 3967	
		(1 pe	er -,))		[3]

	Page 3		Mark Scheme: Teachers' version	Syllabus	Paper
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3	(a)	-Touch/ii -to c -Light se -to f -Weight -to c -Pressur -to s (1 per -,	nfra-red/ultra-sound/radar sensor letect obstacles insor ollow predetermined track on floor sensor/pressure sensor letermine when the car has had a component added to e sensor show that collision has occurred max 2 pairs, max 4)	• it	[4]
	(b)	-Paint sp -arm -in p -Carrying -Welders -to ff -These a -They er -Greater -They wo -Effect o (1 per -,	prayers n is programmed to follow a series of actions predetermined sequence g parts around factory s ix body panels to each other applications stop a human having to be in a hazardous asure a high/consistent standard of work precision in work ork continually without breaks n human workforce max 6)	environment	[6]
4	(a)	-A single -rather th -Flat files (1 per -,	e table han a set of related tables/linked tables s allow only a simple 2D structuring of data max 2)		[2]
	(b)	-Reduce -Mos -Beo -Improvin -Acc -Use -Vie -Improve -Reg -Dat -Improve -Les -Improve -Usi (1 per -,	d data duplication st data items stored once cause tables are linked contents of any table can be ac ng data privacy cess can be easily controlled ers have their own views of the data ws controlled using access rights ed data security gular/automatic backups of data made as part of DBMS a protected from misguided/malicious processing or al ed data integrity es chance of contradictory data ed/simpler search techniques ng facilities provided by DBMS max 2 per type, max 3 types, max 6)	cessed from one	•

	Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
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5	-Bus because -Ring because -Star because -Cables can l -Use of UTP/ -Low level of -Length of ca -Fibre optic is -Use of wirele -allowing phy (1 per -, max	e, e.g. of simplicity and speed not important se, e.g. simple but fewer collisions than bus e, e.g. of increase in performance/more reliable/greate be used because school is new and can be cabelled p Twisted pair/Fibre optic/Coaxial (minimum of two type traffic may point to UTP or twisted pair ble points away from coaxial s high speed ess media vsically unrestricted access across site. 6)	er security roperly s)	[6]
6	(a) -Pages a -Segmer (1 per -,	are fixed size/rely on physical divisions nts are variable size/are based on logical divisions max 2)		[2]
	(b) -Index of -If an ins -When p -by the n -which m -which al -Virtual n -Page m -used to -Pointer (1 per -,	F pages is maintained truction is to be executed it must be in main memory age is completed it can be over-written ext page to be accessed hay be stored in virtual memory llows faster access than simply from storage nemory is using backing store to act as memory anagement table keep track of where in memory the pages are stored to next page max 6)		[6]
7	(a) -Many lo -Many w -Will redu -Semi-sk -Skilled j -Non skil -New job -Workfor -May lea (1 per -,	se jobs ill need training for new tasks uce the dangers to people on production line tilled jobs will be done by robots/computerised/exampl obs enhanced/become checker/tester/example lled jobs unaffected/keeping factory clean/example os maintaining systems ce performance monitored by computer systems d to stress in workplace max 4)	e	[4]
	(b) -Quality -Quality -Cannot -May not (1 per -,	should improve because robots more precise should become consistent/easy to test production cope easily with one-offs spot faulty materials supplied. max 2)		[2]

			Syllabus	
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(i)	-The add -Can be -Can be (1per -)	ress in memory of the data/instruction to be accessed changed by contents of PC being copied into it changed by memory address being copied to it from C	IR	[3]
(ii)	-The data -Is chang -Stores c (1 per -)	a/instruction to be used jed every time an address in MAR is accessed lata from Accumulator on its way to being stored in me	mory.	[3]
(iii)	-Stores a -while it i -Content copied f	n instruction s being decoded/executed/carried out s change when an instruction from memory has been rom MDR to CIR.	placed in MDR	, and then it is
	(1 per -)			[3]
(a)	-System -as the c -System -the syste (1 per -,	I response time will be immediate/real time ustomer must wait until processing is done 2 will be batch processed/data is collected before proc em outputs are not time critical max 3)	essing	[3]
(b)	Hardward -Either no -System -System -System	e: eed storage device/hard disk 2 may copy final details to removable storage for back 1 needs bar code reader/keyboard for input 1 needs screen/printer/sound for output	up.	
	Software -System -Software -Software -System	: 1 requires file handling software/small amount of arithr e 2 requires file sorting/merging software e 2 requires stock control software 2 requires communications software for automatic orde	metic software ering	
	Data Stru -System -System -Transac -Databas (1 per -,	uctures: 1 must have direct/random access to file 1 has array/list of customer purchases in order to prod 2 must have sequential access to file tion file must be in serial form/sorted into sequential or se for products/stock max 8)	luce receipt der	[8]
	(i) (ii) (iii) (a) (b)	 (i) -The add -Can be (1per -) (ii) -The data -Is chang -Stores d (1 per -) (iii) -Stores a -while it i -Contents copied fi (1 per -) (a) -System -Contents copied fi (1 per -) (a) -System -System -the syste (1 per -, n (b) Hardward -Either nd -System -System -System -System Software -System System 	 (i) -The address in memory of the data/instruction to be accessed -Can be changed by contents of PC being copied into it -Can be changed by memory address being copied to it from C (1per -) (ii) -The data/instruction to be used -Is changed every time an address in MAR is accessed -Stores data from Accumulator on its way to being stored in me (1 per -) (iii) -Stores an instruction -while it is being decoded/executed/carried out -Contents change when an instruction from memory has been copied from MDR to CIR. (1 per -) (a) -System1 response time will be immediate/real time -as the customer must wait until processing is done -System 2 will be batch processed/data is collected before proc -the system outputs are not time critical (1 per -, max 3) (b) Hardware: -Either need storage device/hard disk -System 1 needs bar code reader/keyboard for input -System 1 needs bar code reader/keyboard for output Software: -System 1 requires file handling software/small amount of arithu -Software 2 requires file sorting/merging software -System 2 requires stock control software -System 1 must have direct/random access to file -System 1 must have sequential access to file -Transaction file must be in serial form/sorted into sequential or -Database for products/stock (1 per -, max 8) 	 (i) -The address in memory of the data/instruction to be accessed -Can be changed by contents of PC being copied into it -Can be changed by memory address being copied to it from CIR (1per -) (ii) -The data/instruction to be used -Is changed every time an address in MAR is accessed -Stores data from Accumulator on its way to being stored in memory. (1 per -) (iii) -Stores an instruction -while it is being decoded/executed/carried out -Contents change when an instruction from memory has been placed in MDR copied from MDR to CIR. (1 per -) (a) -System1 response time will be immediate/real time -as the customer must wait until processing is done -System 2 will be batch processed/data is collected before processing -the system outputs are not time critical (1 per -, max 3) (b) Hardware: -Either need storage device/hard disk -System 1 needs bar code reader/keyboard for input -System 1 needs bar code reader/keyboard for input -System 1 needs bar code reader/keyboard for output Software: -Software 2 requires file handling software/small amount of arithmetic software -Software 2 requires file sorting/merging software -Software 2 requires stock control software -Software 2 requires stock

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10	(a)	(i) . is r	not defined		[1]
		(ii) an ir	nteger must not begin with a zero		[1]
	(b)	<real> <first> <point: <zero></zero></point: </first></real>	::= <first><point><number> <first><point> >::=<integer> <zero> >::= . > ::= 0</zero></integer></point></first></number></point></first>		
		Mark poi -Definitic -Definitic -Correct (Note: N -Definitic	ints: on contains . (point)/Definition contains 0 on has integer OR 0 before the point AND number or no use of notation o marks for redefining meta variables given in question on of zero	othing after the)	point [3]
	(c) REA	\L,			GIT
		Mark Po Before p -Allows c -NZ Digit -NZ Digit After poi -Possibil -Unlimite (1 per	ints: oint: only 0 t alone t AND unlimited digits nt: lity of no digits ed digits max 4)		[4]