

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

MARK SCHEME for the June 2005 question paper

0420 COMPUTER STUDIES
0420/01 Paper 1, maximum raw mark 100

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

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Grade thresholds for Syllabus 0420 (Computer Studies) in the June 2005 examination

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 1	100	66	46	26	21

The threshold (minimum mark) for B is set halfway between those for Grades A and C.
The threshold (minimum mark) for D is set halfway between those for Grades C and E.
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.
Grade A* does not exist at the level of an individual component.

June 2005

IGCSE

MARK SCHEME

MAXIMUM MARK: 100

SYLLABUS/COMPONENT: 0420/01

COMPUTER STUDIES
Paper 1

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1 Generally, 1 mark for each valid point. Two examples gain 2 marks.

- (a) *buffer*
temporary
storage area/memory
to compensate for speed difference of device with CPU
for data being transferred between components of a computer system
allows other functions to take place while waiting
e.g. printer, keyboard, disk drive [2]
- (b) *gateway*
link between systems
that uses telecommunications/telephones
and converts data passing through
allows a computer in a LAN to communicate with a computer in a WAN
device/software translates - between a LAN and a WAN or another LAN [2]
- (c) *validation*
check
on data input
detect any data that is incomplete/unreasonable or mistyped
e.g. type, format, range, length, presence, control total, check digit [2]
- (d) *polling*
testing a station/terminal/device in a multi-access system
in a sequential order/in turn
to establish whether it is holding data for transmission/collection
to allow time sharing
e.g. checking source of interrupt [2]
- (e) *data-logging*
automatic capturing/sampling/gathering
and storing of data readings/to be processed later
from sensors
over a period of time
e.g. weather forecasting, temperature, rainfall, wind speed, wind direction,
pressure, CO₂ [2]

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- 2 Any **three** from for example:
- input control
 - output control
 - controls hardware and software
 - displays error messages
 - deals with errors
 - file management e.g. directories
 - memory management
 - handling interrupts
 - multitasking
 - communicating directly with the user/user interface
 - checking passwords/codes
 - handles security
 - run utility tasks
 - load/run/save/sort/rename/copy/list programs
 - user accounts
 - scheduling
 - handles JCL/batch processing [3]
- 3 Award 1 mark each:
- (a) legal right - right to view/check/change/correct data [1]
 - (b) software method - checking passwords/codes/fingerprints/
retina scans/biometric devices
encryption of data
firewalls
install dial back [1]
 - (c) hardware method - lock keyboard/computer/doors
use memory sticks/removable drive/external hard drive [1]

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4 (a) Award 1 mark each from:

input - light/infra red signal
PIR sensors/motion/movement
pressure/button pressed e.g. zoom/flash
battery level
distance

processing - e.g. calculate light level
adjust shutter speed/decide resolution
adjust aperture
operate flash
calculate focus point
name/save file
adjust white balance
add date/time

[3]

(b) Award 1 mark for each reason:

no processing/no darkroom/no posting/no expensive paper/no need to print
direct transfer to a computer/flash path/no scanning
extra copies anytime
can delete unwanted photographs immediately
no cost of film/no need to buy a film

[2]

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- 5 (a) 10 [1]
- (b) Two points from:
 fewer errors on input
 less storage space required/less memory
 easier/quicker to input
 quicker to find/search/easier to locate
 easier/faster validation [2]
- (c) number/numeric/decimal/1 d.p. [1]
- (d) One point from:
 faster process/easier to program
 updated/new records will occupy the same space as the old records
 allows accurate estimation of storage required [1]
- (e) L807, L808 or 807, 808
 1 mark each (minus 1 mark each error) [2]
- (f) (IN STOCK <16) AND (PRICE (\$) > 100)
 or
 (IN STOCK <= 15) AND (PRICE (\$) > 100)
 1 mark 1 mark 1 mark
- NOTE: ignore case
 16/15 and 100/101 award the mark with or without speech marks [3]
- (g) Award 1 mark for the correct field and 1 mark for the reason:
 field - STOCK NO
 reason - unique/primary key/key [2]

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- 6 (a) Award 1 mark for one correct cell (mark first answer only):
A1:F1 / A3 / A5:F5 / A7:A11 / A13 / E14 / B4:D4 [1]
- (b) Award 1 mark for one from (or equivalent formula):
 $B3 * E7 / B3 * E7 / E7 * 100$
 $SUM(B7 : D7) * 100 / SUM(B7 : D7) * B3$
 $(B7+C7+D7)*100 / (B7+C7+D7)*B3$ [1]
- (c) Award 1 mark for each stage:
highlight/click-on/right-click
copy and paste into C13, to D13 and E13
or a description of replication/fill right/drag and drop [2]
- (d) Two points from:
A5 and E5
(A7:A11)/(A5:A11)
(E7:E11)/(E5:E11) [2]
- (e)(i) Award 1 mark for each stage:
highlight/select (A7 : F11)/click on rows 7 to 11
select sort in the Data menu/ZtoA
select column F and descending [2]
- (ii) Palace, Oriental, Orchard, Grande, Beach (in this order)
minus 1 mark each error
Two adjacent errors lose 1 mark [2]
- 7 Any three ways of detection from:
police central computer holds details of all crimes committed
police central computer holds details of criminals
police national criminal intelligence system can interact with data supplied by Interpol,
tax offices, banks, customs
evidence from speed cameras as it happens
evidence from security cameras/CCTV
use of on-line burglar/alarm systems
recovery of evidence from hard drives e.g. hacking, illicit sites
DNA profiling
use of false website
fingerprinting systems
electronic tagging
number plate recognition
biometric tagging
facial comparisons [3]

8 (a) heater on and motor on/hot wash

(b)	8	7	6	5	4	3	2	1
	0	0	0	1	0	0	0	0

[1]

(c) Any **one** from:

- release door - via door switch
- releasing powder at set intervals/fabric conditioner
- drying/spinning
- give error messages/beeps
- stored programs for different washes e.g. cottons/woollens

[1]

9 (a) Any **three** from:

- biometric data e.g. retina scan, fingerprints
- PIN code/ID code
- bank details e.g. account number, sort code
- holders card limit
- record of transactions made within this limit

[3]

(b) Any **two** from:

- high cost of replacing the cards/advertising
- ATMs need converting to read smart cards
- POS terminal needs converting to read smart cards

[2]

(c) Any **two** from:

- electronic purse - put money on and spend up to that amount
- mobile phones - user can identify him/herself and their payments
- store medical information e.g. blood group, allergies, medication
- identification card/door locks/clocking in and out
- a debit card/get cash at till

[2]

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- 10 (a)** Award **1** mark each for two advantages and one disadvantage:
- advantage - huge amount of information/wider variety
information is continually updated
make finding information easier/quicker
 - disadvantage - could get virus and crash system
need to know how to perform searches/be trained
search could result in illicit data
information is not always reliable/too much **[3]**
- (b)** **Two** points from:
- faster download/access/exchange of info
 - ideal for watching/streaming video
 - always on - do not have to wait for system to dial up
 - not metered
 - can use phone while surfing - only one line needed **[2]**
- (c)** Award **1** mark for a benefit and **1** mark for a disadvantage:
- benefit - no/less cables
more people can use wireless network than wired one
person can sit anywhere in the library/move around
 - disadvantage - fewer wireless devices can be connected
slower transmission speed (than wired)
can have signal blocks e.g. metal cabinets
limited range (wired does not have a limited range) **[2]**
- (d)** DVD/Zip disk/CDR/CD/flash disk/memory stick/portable hard drive **[1]**
- (e)** **Two** from - award **1** mark for each precaution they should take:
- Screen - sunlight not reflecting on the screen
 - Monitor - with low resolution emission/screen filter/larger
 - Chairs - adjustable for support
 - Keyboards - ergonomically designed to stop RSI
 - Cables - should not trail the floor
 - Workstation and environment are checked for safety
 - Take rests/breaks
 - Block/Filtering sites/Nanny software **[2]**

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11 (a) Award 1 mark for the hardware and 1 mark for the way it helps:

Hardware - large tracker ball
touch pad/screen
concept keyboard
Braille keyboard
mouth pen
microphone
head switches
speaker

Way - appropriate for deaf/dumb/blind/limited – movement/
speech/hearing

[2]

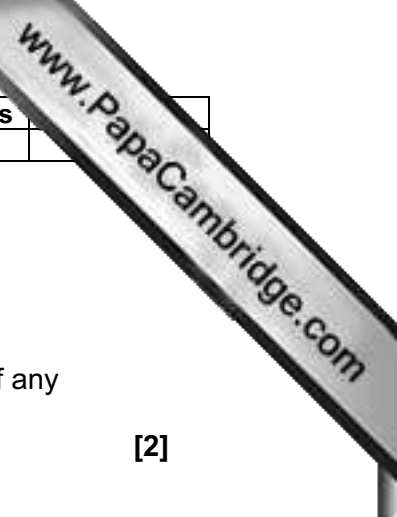
(b) Award 1 mark for the software and 1 mark for the way it helps:

Software - voice recognition/synthesis
special word processing program/predictive testing

Way - appropriate for deaf/dumb/blind/limited movement identified,
e.g. voice recognition - converts speech to text/commands
voice synthesis - gives on-screen feedback on loudness,
pitch and timing
word processing - completes words when first few letters
typed
- Braille output

[2]

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- 12 (a)** Any **two** items from:
- costs/running costs/development costs
 - benefits/improved management/better service
 - whether proposed system will meet its objectives/future updates if any redundancy/training needs
- [2]**
- (b)** Any **two** from:
- observation
 - questionnaires
 - interviews/talking to staff
 - reading documents/manuals
- [2]**
- (c)** Any **one** from:
- results from new system can be checked against known results
 - errors/problems can be sorted out since there is a duplicate system
 - less risk/have a fallback
- [1]**
- (d)** Award **1** mark each for a user and a technical documentation:
- user documentation
 - running the system/starting up
 - installing software
 - identifying and correcting errors
 - screen shots/sample screens
 - hardware required
 - technical documentation
 - program listing
 - list of variables
 - program flowchart/algorithms/pseudo code
 - systems flowchart
 - data flow diagrams
 - hierarchical charts
 - file structure
 - systems maintenance/upgrades
 - troubleshooting/correcting errors
- [2]**
- 13 (a)** Award **1** mark each for trace and reason:
- trace - 3,5,7,9,11.....
- reason - x is odd/loop does not terminate/goes on forever
- [2]**
- (b)** Award **1** mark for the following stages:
- initialise
 - loop
 - use of $x = x + 2$
 - output of x
- [3]**

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14 (a) Any **one** type of program:

- games
- operating systems
- utility programs
- compilers/assemblers/interpreters
- virus

[1]

(b) Any **one** reason:

- faster execution/run/conversion
- high level languages are too slow
- assembly language instructions are closely tied with the particular make/model of computer

[1]

15 Any **one** application and reason award **1** mark each:

- application e.g.
 - booking systems
 - stock control/stock market
 - on-board systems in planes that show height speed etc.
 - process control systems
 - interactive processing - inquiries, availability
 - transaction processing

reason – immediate update/processing

[2]

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- 16 (a) Any **one** from:
- manual had huge amounts of paper files/computerised less space
 - manual very slow searching for information/computerised faster
 - computerised system reduces errors
 - needed to reduce staff/costs
 - multi-access to data
- [1]
- (b) random/direct/online
- [1]
- (c) Any **one** insertion from:
- new patient
 - new baby born
- Any **one** amendment from:
- new/change of treatment or medicine
 - patient dies
 - change of name/details
 - error in data
- [2]
- (d) Any **two** from:
- use hot standby computer
 - use mirrored hard disk
 - use backups
 - re-run old master file with transaction file
 - use regular dumps of files/copy of files on CD/tape streamer/file generations
- [2]
- (e) Any **two** tasks from:
- monitoring patient conditions
 - room occupancy/usage
 - payroll/employee records
 - expert system to diagnose illnesses
 - staff training/virtual reality
 - stock control/drugs in pharmacy
 - air conditioning
- [2]
- 17 Award **1** mark for each correct step in the algorithm:
- Initialise
 - Loop
 - Input marks (x25)
 - Match mark to grade (If..Then..Else or Case) one correct
 - Increment grade total
 - Output the number of distinction, merit, pass and fail grades given
- [6]