

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

MARK SCHEME for the May/June 2008 question paper

<p style="text-align: center;">0420 COMPUTER STUDIES</p> <p>0420/01 Paper 1, maximum raw mark 100</p>
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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.

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.

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1 Generally, one mark per valid point. Two examples can gain two marks.

(a) batch processing

(processing) doesn't start until all data collected
any reference to JCL
no need for human interaction
uses computer during "quiet" time/overnight

examples

payroll system, billing, cheque processing

[2]

(b) interrupt

a signal generated by a device/program
causes a break in execution of the program

examples

e.g. printer out of paper, keypress

[2]

(c) top down design

break down problem/task/program
into sub-problem/smaller tasks/modules
stepwise refinement

examples/benefits

allows several programmers to work on same large task
each module can easily be tested/debugged separately

[2]

(d) laptop computer

portable computer system/can be used anywhere
has integrated keyboard/screen/pointing device
uses a battery/mains power not required

examples

can do internet/work/emails away from home/on train/on plane

[2]

(e) trackerball

pointing device
input device

examples

used to choose options from menus/screen icons
used in selecting objects on plant control/monitoring screens

[2]

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- 2** Any **two** from:
file management
input/output control
memory management
multitasking
multiprogramming
handling interrupts
error reporting/handling
security/checks passwords and id codes interfaces with user
loads/runs programs
scheduling
job control/JCL/batch processing
controls hardware/software [2]
- 3 (a)** Any **one** from:
have an alternative if staff go on strike in one country
can take advantage of lower wages in some countries
lower office rentals/building costs in many countries
can provide 24/7 cover [1]
- (b)** Any **one** from:
possible language problems
lack of local knowledge
time differences
backlash from customers in countries where jobs lost
customers often don't like call centres outside their own country [1]
- (c)** Any **one** from:
reduced travelling costs
reduced wastage of time travelling to venues
set up training sessions at short notice [1]
- (d)** Any **one** from:
cost of equipment to set up system initially
time lag if long way away
often sound/picture quality is poor
can be difficult to interact
possible language problems
different time zones [1]
- (e)** Any **one** from:
use of DVDs/multimedia
use of Computer Based Training (CBT)/CAL
use of internet [1]

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- 4 One mark for each type + 1 mark for each matching application
- | | | |
|----------------------------|--|-----|
| bar code readers | - used in stock taking/control
- used at POS terminals to access prices | |
| sensors | - any description of control/monitoring | |
| OMR/OCR | - reading documents automatically
- reading multi-choice questionnaires | |
| MICR | - automatic reading/clearing of cheques | |
| voice recognition | - text input | |
| other suitable type/device | - application | [4] |
- 5 (a) program/software/code which replicates itself/copies itself [1]
- (b) Any **one** from:
loss/damage to computer files/data
can cause computer to crash/run inefficiently/run abnormally
attach itself to other files [1]
- (c) Any **one** from:
use of (up to date) anti-virus software
don't use disks/CDs/DVDs/memory sticks from unknown sources
only read/open emails/attachments from known sources
use of firewalls
(NOTE: backups, passwords, encryption, don't connect to internet, do not protect against viruses) [1]
- (d) Any **one** from:
wouldn't stop actual computer being infected
back up files themselves may already have virus attachments
if computer infected, re-installed files would then also be infected [1]
- 6 (a) (i) direct/random access [1]
- (ii) disk/flash memory [1]
- (b) Any **two** examples from:
changes to personal details e.g. phone no, address
changes to academic record e.g. marks, form, subject
pupil leaves the school
pupil's history changes [2]

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- (c) Any **two** methods from:
 put password on the computer
 put password on the file
 access rights
 any physical method to stop access e.g. lock office door when not in use
 encrypt the data on the file [2]

- (d) Any **two** from:
 range check (0 to 100 only)
 character/type check (must be digits only)
 length check (must be 1–3 characters) [2]

- 7 (FORWARD) 40 }
 RIGHT 90 } 1 mark
 FORWARD 70 }
- REPEAT 2 OR RIGHT 90 }
 RIGHT 90 OR FORWARD 50 }
 FORWARD 50 OR RIGHT 90 } 1 mark
 ENDREPEAT OR FORWARD 50 }
- LEFT 90 OR LEFT 90 }
 REPEAT 2 OR FORWARD 20 } 1 mark
 FORWARD 20 OR RIGHT 90 }
- RIGHT 90 OR FORWARD 20 }
 ENDREPEAT OR RIGHT 90 } 1 mark
 FORWARD 20 FORWARD 20 }
- PENUP [4]

- 8 (a) For example:
 SOUTH AMERICAN COUNTRIES COFFEE EXPORTS 2007
 (Marks gained here for either appropriately refining the search or use of quotes to narrow down the field somewhat.) [1]

- (b) Any **one** from:
 much more information available
 can download text/diagrams/photos
 can have multimedia presentations
 can be interactive
 auto translation into foreign languages
 several people can access the same data at the same time
 usually up-to-date information available/continually changing
 much easier to X-reference information/can perform multiple query searches [1]

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- (c) Any **two** reasons from:
 information overload
 reliability of information
 viruses could be sent
 'cookies' can be downloaded
 risk of hackers gaining access to computer files
 access to some "dodgy" web sites/risk of pornographic material
 fears of future "junk mail" (once certain web sites accessed) [2]

- (d) Any **one** from:
 email the information [1]
 store the data/information on disks/CD/DVD/flash/website

- 9 (a) 2.5
 Error [3]
 3

- (b) Any **one** from:
 would be fully tested
 doesn't need to be re-written each time section of program needed [1]

- 10 (a) **One** mark for each use:

- DVD - applications programs/software
 - saving data for use on other computers
 - saving multimedia items
 - backup
- Hard disk - stores the operating system
 - stores software
 - stores data files
- RAM - stores data being used by user/work area
 - stores currently running programs [3]

- (b) **One** mark for example and **one** mark for advantage:

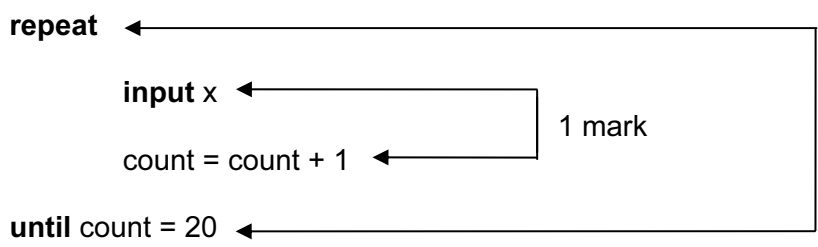
- floppy disk drive - suitable for small files
- flash memory stick/
 USB flash drive - non-volatile memory
 - is portable
 - more robust than hard drive
- CD-RW writer/reader - very common form of memory
 - large memory capacity [2]

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- 11 Any **three** features from:
- data must be up to date
 - data can only be read/used for the purpose for which it was collected
 - data must be accurate
 - data must be destroyed/deleted when no longer required/don't keep longer than necessary
 - data user must register what data is used/stored
 - data must be used/collected fairly and lawfully
 - data must be held securely
 - data must be protected from accidental damage
 - only authorised people can have access to data
 - fines imposed for data mis-use
 - data should not be passed on to a 3rd party without owner's permission
 - person can view data and have it changed/removed if incorrect
 - safe harbour

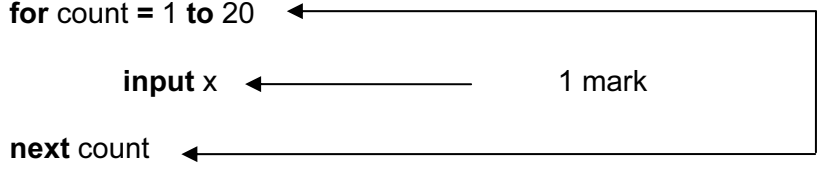
[4]

12 (a) (i) count = 0



1 mark

(ii) for count = 1 to 20



1 mark

[4]

(b) while...do

[1]

- 13 (a) Any **three** from:
- content e.g. prices, pictures of CDs, sale items, etc.
 - hyperlinks
 - secure payment method
 - shopping basket feature
 - help facility e.g. site map
 - ability to select artist/CD/DVD title from drop down boxes
 - ability to do artist/title searches
 - currency conversions
 - "customer who bought this album also bought..." facility
 - sale confirmation by email
 - saved customer details (for returning customers)
 - ability to track the status of orders
 - ability to listen to tracks/watch video clips
 - ability to pre-order albums/DVDs
 - returns policy

[3]

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- (b) Any **two** from:
 no time spent travelling to shop
 if disabled can shop from home
 less expensive since no travelling
 much wider choice of goods available
 can shop 24/7 [2]

- 14 (a) Any **two** from:
 less expensive to carry out than do real testing
 far safer than real thing in many cases
 easier to do repeat tests/vary the parameters
 cannot do certain tests in reality e.g. landing on Mars
 can get test results more quickly [2]

- (b) Any **two** from:
 data gloves
 data visor/goggles
 special suits fitted with sensors [2]

- 15 (a) **One** mark for each named method AND **one** mark for each correct advantage.

Parallel running	- information not lost/always copy in case of failure - allows staff to get used to new system/training	
Phased implementation	- still have most of system if fault develops - no expense of running both systems together - easier to train staff as each module introduced	
Pilot implementation	- still have other systems in place if fault occurs - no expense of running both systems together - can watch what happens/make decisions	
Direct changeover/ Big Bang	- time not lost/immediate use possible - no expense of running both systems together	[4]

- (b) normal - e.g. \$0 to \$800 input
 abnormal - e.g. < \$0, > \$800, letters input
 extreme - e.g. \$0 or \$800 input [3]

- 16 (a) **One** mark per point
 type of sensor e.g. motion sensor
 how sensor is used e.g. to detect movement in the washroom
 signals sent back to computer
 reference to need for ADC between sensors and computer
 continuous monitoring [2]

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(b) One mark per point

repeat

get signal from sensor

1 mark

if signal then set timer = 10

1 mark

else if timer = 0 then switch light off

1 mark

else countdown timer

1 mark

until system switched off

1 mark with repeat

[3]

(c) Any **one** from:

more efficient on energy

no need to pay somebody to go round switching off/switching on lights

safety, no need to touch light switch with wet hands

more hygienic

[1]

17 (a) Any **three** points from:

information from experts gathered.....

.....using questionnaires/interviews/text books

knowledge base is created

rules (base) created

inference engine created

interface with users is created

fully tested system with known compounds

[3]

(b) Any **one** from:

fully tested/perform own tests

output is given a % probability value for correctness

[1]

(c) Any **one** from:

don't need expensive expert to be present

can act as a second opinion

can be used anywhere

useful in areas/countries where the expertise doesn't exist

[1]

18 (a) (i) = C2 * D2

[1]

(ii) IF (E4 > 90000, "Profit", "Loss")

OR

IF (E4 > F4, "Profit", "Loss")

[2]

(iii) = SUM(F2:F8)

OR

= F2+F3+F4+F5+F6+F7

[1]

(b) E7, G7 (1 mark)

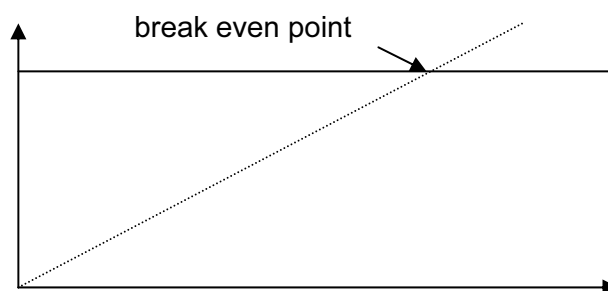
F9 (1 mark)

[2]

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(c) One mark per point

draw a graph



find break even point from the graph

use formulae in spreadsheet

.... to simulate what happens as number of seats sold changes (can use macro)

Select tools then Goal seek...

.... set values

[2]

19 Sample algorithm:

input amount

if amount > balance **then** x = 1 (2 marks)

else if amount > daily limit **then** x = 1 (1 mark)

else x = 0

while x = 0

if balance < 100 **then** charge = 0.02 * amount (1 mark)

else charge = 0 (1 mark)

endwhile

if x = 1 **then print** "Sorry, withdrawal refused"

print charge (1 mark)

Marking points

1 mark for checking if amount > balance

1 mark for checking if amount > daily limit

1 mark for some way of testing if withdrawal will be refused (value of x in above)

1 mark for checking if balance < \$100...

1 mark ...for calculating 2% charge

1 mark for no charge if balance >= \$100

2 marks for giving correct outputs

[5]