UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2008 question paper

0420 COMPUTER STUDIES

0420/01 Paper 1, maximum raw mark 100

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.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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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]

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]

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]

(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]

(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
store the data/information on disks/CD/DVD/flash/website [1]

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]

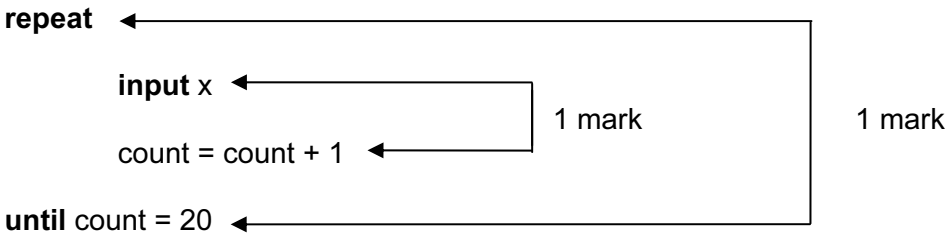
(b) **One** mark for example and **one** mark for advantage:

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

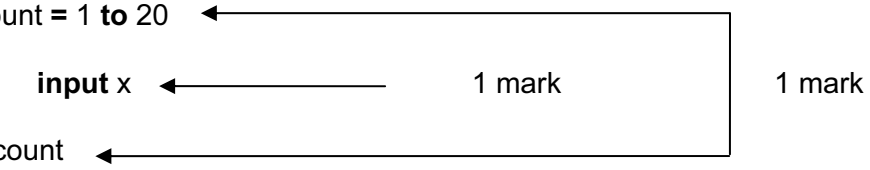
[2]

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



(ii) **for** count **=** 1 **to** 20



[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]

(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]

(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]

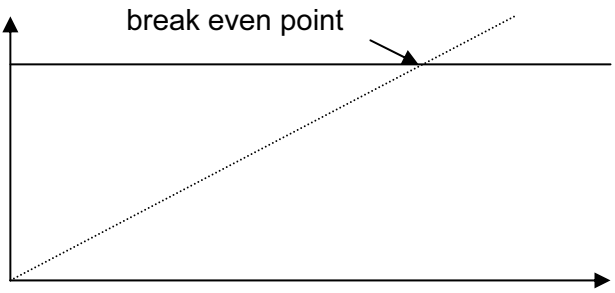
(ii) IF (E4 > **90000**, "Profit", **"Loss"**)
OR
IF (E4 > **F4**, "Profit", **"Loss"**) [2]

(iii) = SUM(F2:F8)
OR
= F2+F3+F4+F5+F6+F7 [1]

(b) E7, G7 (1 mark)
F9 (1 mark) [2]

(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]