

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the November 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*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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1 (a) **Expert System**

Any **one** from  
contains/programmed with the knowledge of human experts  
knowledge base  
inference engine  
uses rules/rule base  
man/machine interface  
ability to “add to its knowledge”/learn from previous experience  
**examples:** chess, medical diagnosis, mineral prospecting, car diagnostics,  
tax calculations, etc.

[2]

(b) **Electronic scabbing**

Any **one** from  
allows managers to switch ...  
word processing/computer processing duties ...  
from striking clerks in one country/location to non-striking clerks in another

[2]

(c) **Top down design**

Any **one** from  
breaking larger tasks  
into (successively) smaller tasks  
step-wise refinement  
**examples** allows use of modules, allows several programmers to work on task

[2]

(d) **Interrupt**

Any **one** from  
a signal/message  
generated by a device/operating system/hardware/software  
which causes a break in the execution of a program/stops running of program  
**examples:** overflow errors, disk full error, printer out of paper error etc.

[2]

(e) **Buffer**

Any **one** from  
temporary  
store/memory  
holds data being transferred between devices  
often used to compensate for different speeds of devices  
**examples** printer, disk, etc.

[2]

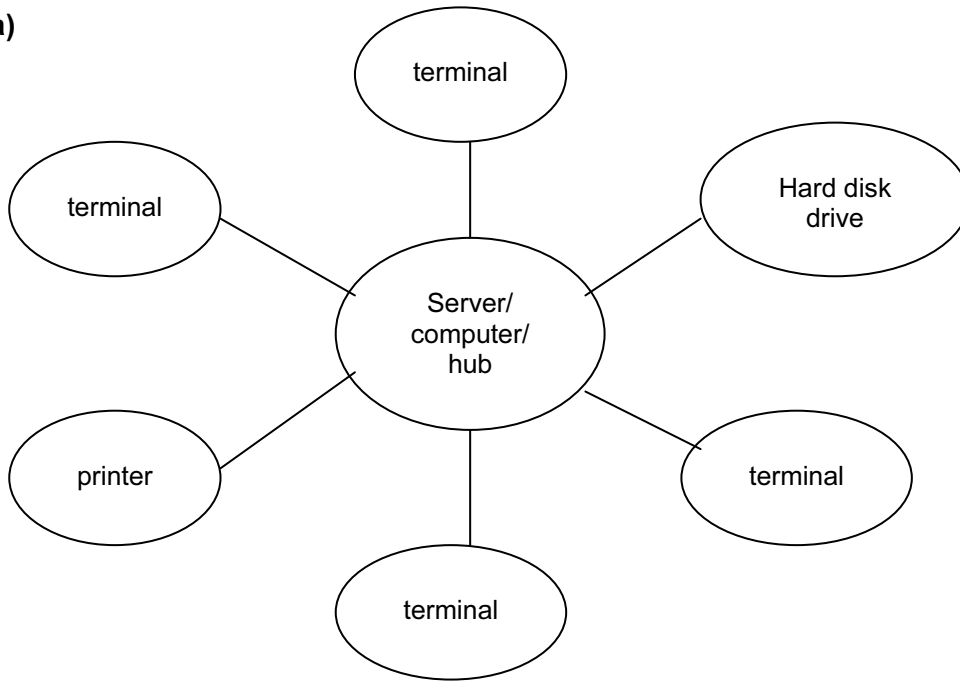
2 Any **three** from:

less expensive option (reference to costs needs to be justified)  
fully tested/more reliable/less errors  
links with existing software  
immediately available/quicker needs justification  
expertise/programmers not available ready trained workforce

[3]

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3 (a)



- 1 mark for printer
- 1 mark for terminals/workstation/computer/workbase
- 1 mark for showing correct connections
- 1 mark for hard disk drive
- 1 mark for server/computer/hub
- (max of 3 mks)
- (simple unlabelled diagram can only gain a max of 1 mark)

[3]

(b) Any **one** from:  
gateway/router/proxy server/modem

[1]

4 (a) 1 mark for each cause and 1 mark for correct prevention

<u>Causes</u>	<u>Prevention</u>
Loss of software/files	Ensure files are protected (e.g. locked, hidden, etc.)
Hardware failure	Use parallel systems
Hacking into system	Use of passwords/firewall
(Sending) viruses	Anti-virus software/not opening suspicious emails
Loss of power	UPS/generator
Spam	Use of a filter

[4]

(b) Any **two** from  
Use file generations/grandfather-father-son method  
Re-load software/files  
Re-enter lost data  
(Use) back-up files to transfer data  
New/alternative hardware

[2]

Page 3	Mark Scheme	Syllabus	Paper
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- 5 (a) Any **two** points from  
 processing takes place in one go/all at once/at a convenient time  
 when data has been collected  
 no human interaction required  
 reference to JCL  
 [2]
- (b) Any **one** point from  
 (real time transaction system is an) on-line system ...  
 in which transactions are processed as they occur  
 always up to date  
 [1]
- (c) (i) Any **one** from  
 payroll  
 updating stock levels at end of the day  
 printing out invoices  
 printing out orders  
 [1]
- (ii) Any **one** from  
 getting prices  
**automatic** stock levels  
 on line shopping  
 credit card transactions  
 calculating the bill  
 [1]
- 6 (a) Any **two** from  
 can print confirmation/boarding pass  
 can see seating plans  
 easier to locate special offers  
 encryption of data/https  
 telephone can be engaged/waiting in queuing system  
 [2]
- (b) direct/random access  
 Any **one** from  
 need to update files immediately  
 requirement for fast access  
 [2]

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(c) (i) Any **one** from  
 character/type check  
 length check  
 range check  
**allow sensible examples**

(ii) Any **one** from  
 format check  
 length check  
 range check  
 cross field check i.e. cannot be after date of return flight

(iii) Any **one** from  
 length check  
 check digit  
 character/type check

(three different validation checks are needed for all three marks) [3]

7 (a) Finance/Management [1]

(b) (NOTE: Accept FS AUSTRIA one box to the left)

K	S	C	H	R	O	D	E	R					F	S	A	U	S	T	R	I	A			0	8
---	---	---	---	---	---	---	---	---	--	--	--	--	---	---	---	---	---	---	---	---	---	--	--	---	---

<----- 1 mark -----><-----1 mark -----><1 mk>

[3]

(c) Any **two** advantages from  
 shorter, therefore less memory/storage used  
 shorter, therefore less typing required/faster input  
 less chance of errors being made  
 easier/faster to carry out searches/process data  
 easier/faster to do validation checks

[2]

(d) (i) Any **one** from  
 changes every year  
 files would need to be updated every year

[1]

(ii) date/year employee joined the company [1]

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- 8 (a) Any **three** from  
allows 3D imaging  
can carry out calculations e.g. costing, volume, area, stress  
test the design  
graphics features (arcs, in-fill, zoom, scale, etc.)  
access to previous designs/library of parts  
easy to modify drawings to suit customer requirements  
drawings are more accurate

(reference to CAM = 0)

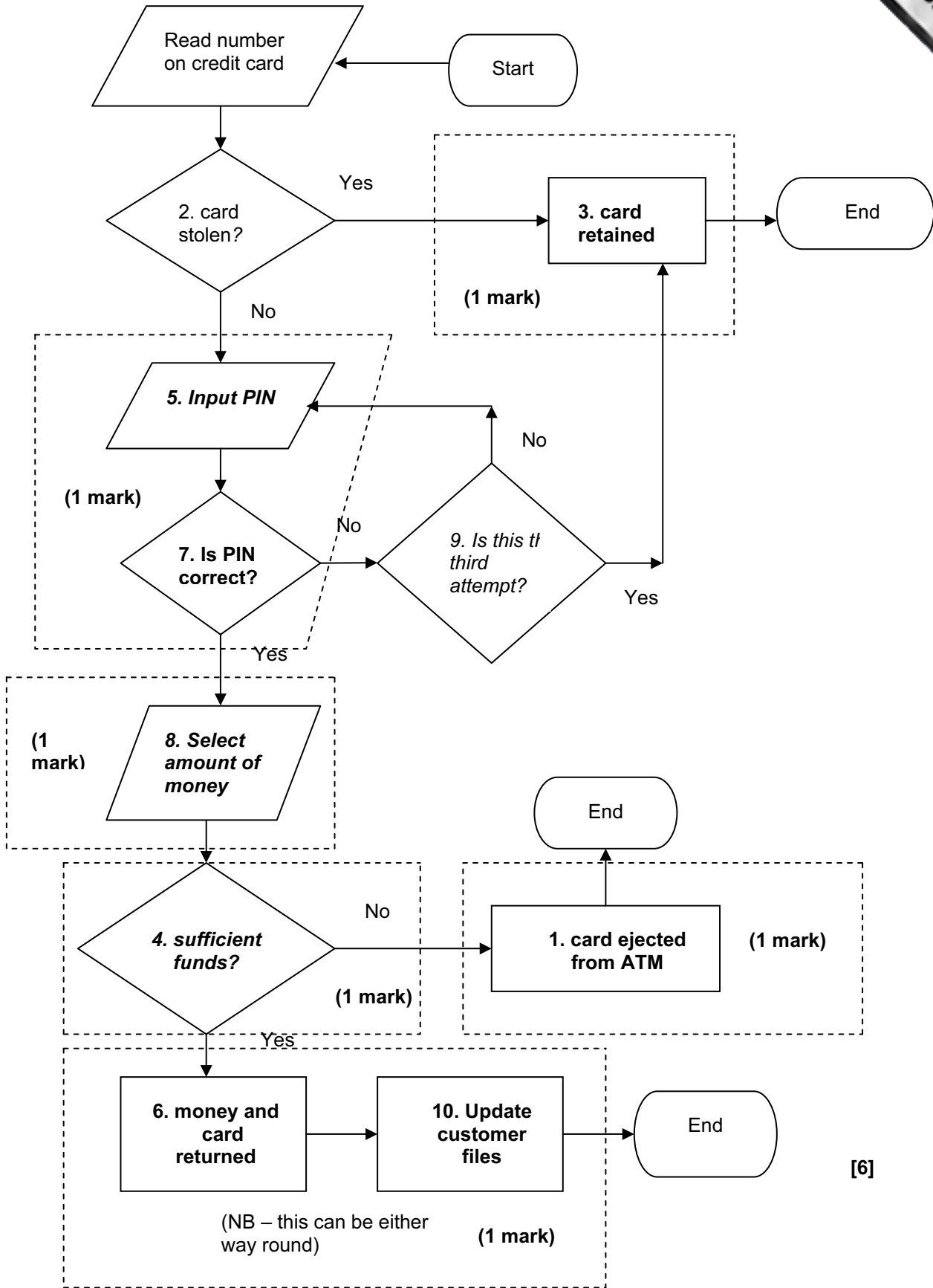
[3]

- (b) (i) high resolution monitor/projector

(ii) (graph) plotter/inject printer plus specification

[2]

9



[6]

Page 7	Mark Scheme	Syllabus	Paper
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10 (a) Any **one** from

*Digital displays:*

actual numbers

LED/LCD sections lighting up

[1]

Any **one** from

*Analogue displays:*

dial read out

continuous variation/wave representation (e.g. sound, temperature)

[1]

(b) Any **one** from

faster response

more robust (no mechanical bits to go wrong)

no user interpretation required/easier to read

[1]

(c) Any **one** from

more natural/humans used to the format

readings are steadier/less fluctuation

easier to repair if fault develops (no electronics)

more accurate

[1]

(d) (i) Any **one** named device from

e.g. television/radio/video/washing machine/camera/toaster

(ii) Any **one** description which must match up with choice in part (i)

e.g. stores channels/controls recording timings/controls chosen wash cycle/controls shutter speed/controls timing

[2]

11 1 mark per input device + 1 mark for correct reason

**input device**

**reason**

- tracker ball

- to control on-screen pointer

- if limited mobility in hands

- voice input/microphone }

- to control data input to the computer

speech recognition }

- if user unable to use the keyboard

- touch screen

- using a head wand/fingers

- to select options from a screen menu

- foot activated input devices

- when operator has no arm movement

- used instead of mouse or keyboard

- braille keyboard

- raised dots on keyboards to id keys

- to help blind people input data

1 mark per output device + 1 mark for correct reason

**output device**

**reason**

- audio output/speaker

- to help blind/partially sighted people

- who cannot see output on a screen/so

they can hear the output

- braille printer

- to help blind/partially sighted people

- to read output from the computer

[4]



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- 12 (a)** Any **two** analysis tasks from
- understanding the current system/modelling the current system/Data Flow Diagram
  - identification of the user's requirements
  - interpreting user requirements
  - defining user requirements for the new system
  - research using interviews, observation, questionnaires, looking at existing documentation
  - agreed objectives
  - collecting data from existing system

(cost benefits = 0)

[2]

- (b)** Any **two** design tasks from
- select/specify hardware
  - select/specify software
  - design input specification/screens
  - design output specification/screens
  - file design
  - break down of the task/top down design/modularisation
  - estimate the resources required
  - systems/process flowcharts/block/structure diagrams
  - process algorithms
  - design data capture forms
  - design reports
  - design forms
  - design test plan
  - produce implementation plan
  - validation techniques

[2]

- (c)** Any **two** implementation tasks from
- produce documentation
  - install hardware and software
  - testing of the software/system
  - training of staff to use system
  - transferring of files to new system
  - system changeover (i.e. direct, parallel, pilot or phased)
  - maintenance/fix any unexpected problems
  - creation of files

(test strategy = 0)

[2]

Page 9	Mark Scheme	Syllabus	Paper
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13 (a) either

B2/2 or B2\*0.5 and C2/2 or C2\*0.5

or

B2/2 or B2\*0.5 and B2/4 or B2\*0.25

[2]

- (b) Any **two** from  
 draw graph ...  
 read off values for years 2008 and 2010  
 add two extra columns in the spreadsheet ...  
 estimate values using new formulae

[2]

(c) either

SUM(B2:B6)      B8=SUM(B2:B6)  
 (NOT SUM(B2:B6)=B8)

or

(B2+B3+B4+B5+B6)      B8=(B2+B3+B4+B5+B6)  
 (NOT (B2+B3+B4+B5+B6)=B8)

[1]

- 14 (a) Any **three** from  
 increases productivity  
 saves on office space  
 increases staff motivation  
 makes trading hours more flexible  
 allows employment of staff irrespective of location  
 lowers absenteeism  
 increased staff retention  
 reduction in office requirements e.g. heating, lighting, ancillary staff, etc.  
 easier to employ disabled workers quota

[3]

- (b) Any **two** from  
 reduces travelling costs  
 reduces travelling time/less commuting time  
 reduces stress levels  
 allows greater flexibility/social life/family life  
 greater job satisfaction  
 disabled employees are not disadvantaged

[2]

- (c) Any **two** from  
 use of video conferencing/teleconferencing facilities  
 Internet access  
 electronic mail – can send attachments (e.g. video)  
 broadband – fast transmission of data allows real time interaction

[2]

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- 15 (a) 1 temperature sensor } 1 mark  
 2 ADC } 1 mark  
 3 computer } 1 mark  
 4 DAC } 1 mark

(maximum of 3 marks)

[3]

(b) Any **two** from

- control system where the output can affect the input to the system
- stored value compared with input
- current temperature is feedback value
- output from system changes (e.g. switch on chemicals pump) to try and equalise the two values
- process is repeating loop

[2]

(c) Any **two** from

- safer system (no need for manual intervention/automatic control)
- better/more accurate temperature control
- easier to modify process when under computer control
- possible to interrogate system (e.g. produce temperature graphs)
- more efficient (less energy wastage) due to more accurate control
- continuous(24/7) process
- quality of product is more consistent

(more accurate = 0)

[2]

- 16 (a) Any **three** from
- use of photographs/pictures/graphics
  - use of sound/audio/music
  - use of different fonts/text
  - reveal techniques
  - call up software/files.....allow examples
  - use of hyperlinks
  - connect to a web page
  - use of animation effects
  - embedded videos
  - timed transition between pages
  - presentation themes

[3]

(b) Any **two** from

- emails
- file attachments can be sent
- compressed file/zip
- reference to use of web site
- (reference to send by post = 0)

[2]

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### 17 Sample program

```

m1 = 100
m2 = 0
sum = 0
n = 1
while n < 151 do
  repeat
    read mark
  until (mark >= 0 and) mark <101
  if mark < m1 then m1 = mark
  if mark > m2 then m2 = mark
  sum = sum + mark
  n = n + 1
endwhile
average = sum/150
output average, m1, m2

```

}  
 } 1 mark  
 }  
 }  
 } 1 mark  
 } 1 mark  
 } 1 mark (validation check)  
 } 1 mark  
 } 1 mark  
 } 1 mark  
 } 1 mark  
 } 1 mark  
 } 1 mark

[6]

### General mark points

initialisation (must correctly set smallest (m1) and largest (m2) boundaries)  
 method for looping round for 150 students  
 reading in marks for all students  
 checking if mark inside 0 to 100 boundary and action taken  
 setting value of smallest (m1) after checking against input mark  
 setting value of largest (m2) after checking against input mark  
 totalling all marks together  
 calculating the average mark  
 output of average, smallest mark (m1), largest mark (m2)