

MARK SCHEME for the October/November 2006 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 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.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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- 1 (a) **Verification**
any **two** points from:
check on input for errors
on screen checking/checked by human
comparing input/use of second operator/by double entry
examples: password entry, email entry [2]
- (b) **Video conferencing**
any **two** from:
meeting between two or more participants (at different sites)
using computer network/WAN/Internet
to transmit/receive audio and video data
each participant has a video camera/webcam/microphone/speaker
images appear in real time (on a window on the participant's monitor) [2]
- (c) **Handshaking**
any **two** from:
exchange of signals/protocols
to establish communication/readiness (to send and receive)
between two devices/computers
examples: printer and computer, modem and computer [2]
- (d) **Simulation**
any **two** from:
studying the behaviour of a system
by using a model/represents real life/mathematical representation
results can be predicted
examples: flight simulator, hazardous applications, training [2]
- (e) **Batch processing**
any **two** points from:
processing does not start until all data collected
reference to JCL
no need for user interaction
output is not time sensitive
examples: payroll system, electricity/gas/water (etc.) billing, cheque processing [2]

- 2 (1 mark per device and 1 mark per application)
e.g.

<u>device</u>	<u>application</u>
use of bar code readers	stock control, libraries
use of mark sense readers/ OMR	marking multiple-choice papers, reading questionnaires
use of touch screens	choosing goods online
use of sensors	control applications (e.g. power stations, traffic lights, chemical reactions, counting people)
cameras	traffic control/speeding, security
MICR	cheques
microphones	games, telephone system, security
magnetic strip reader	reading credit/debit cards etc.

(need two different devices and applications)
(accept keyboards if application is appropriate)

[4]

- 3 (a) Any **two** from:

Illegal/unauthorised copying of software/data / software piracy
sending viruses
hacking into systems/access illegally
fraud/improper transfer of funds
(industrial) sabotage/malicious damage
altering information illegally

[2]

- (b) Any **two** from:

data encryption
use of passwords/ids/PIN/biometric software
physical locks
use of anti-virus software
log users/computer use/timed access
anti-hacking software
use call back facility for in-coming information
take/check references of potential staff
firewall

[2]

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4 Any **three** effects from:

- loss of jobs
- traditional shops/banks close
- city/town centres become deserted as shops/banks close
- gap between rich and poor grows (rich get access to savings by shopping online)
- less interaction between people
- increase in small businesses
- less pollution/less need to travel
- security fears
- people will need credit cards/bank accounts/computer systems

[3]

5 Any **two** from:

- animation
- editing e.g. changing colours on film
- tweening
- synchronising voice output with “cartoon” characters
- addition of text e.g. subtitles
- special effects e.g. morphing

[2]

6 Any **four** from:

- design data collection forms
- design input forms
- design system flowcharts/pseudocode
- design output forms/reports
- design/select validation rules
- design/select verification methods
- design testing strategy/plan
- specify/select hardware
- specify/select software
- design the algorithms/program flowcharts
- specify the data structure
- design files (structure)/tables

[4]

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

- answers questions asked by the system
- possible answers supplied as.....
-rule base is looked up
-knowledge base is searched
-by inference engine
- e.g. minerals/map of mineral deposits/% probability of finding mineral

[3]

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(b) Any **one** from e.g.

- chess
- medical diagnosis
- car/fault diagnostics
- criminology/forensic science
- careers
- tax/financial calculations
- weather forecasting

[1]

8 (a) Any **two** from:

- work can be done anywhere (at offices in different countries)
- quicker transfer of files to other offices
- employ fewer staff (**)
- less chance of paper/file loss
- less paperwork (therefore less storage requirement)
- can open up files from any computer terminal linked to system
- easier/quicker to search for/sort a given file
- easier/quicker to cross reference files
- easier/quicker to insert/reference sections of files into reports

[2]

(b) Any **two** from:

- training/need for new skills
- possible unemployment(**)
- possible working from home
- deskilling
- health effects

[2]

(**) only allow this answer in (a) OR (b) not both

(c) (i) Always have a fall-back system in case of failure/problems
 results from new system can be checked against known results
 errors corrected before final implementation

[1]

(ii) Control systems
 e.g. control of power station
 control of chemical plant
 traffic lights

[1]

- 9 (a) error 1: product = 0 on line 2
should use product = 1
- error 2: loop control, count <= 10 on line 3
should use count < 10 or alternatively alter count value on line 1 to count = 1
- error 3: print value of product inside loop on line 7
output should come after the endwhile statement
- [3]

- (b) Accept either of the following loop controls:

repeat	OR	for count = 1 to 10
until count = 10		next count
(accept repeat		
until count ≥ 11		

if line 1 changed to count = 1)

[1]

- 10 LEFT 6 }
DOWN 5 } 1 mark
CLOSE }
- UP 5 } 1 mark
RIGHT 4 }
- DOWN 4 } 1 mark
OPEN }

[3]

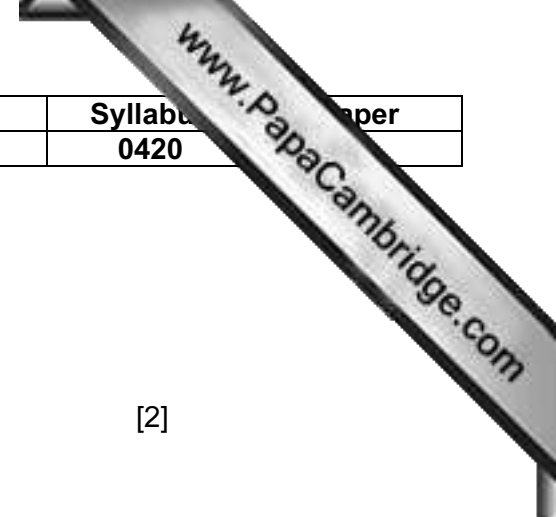
- 11 (a) (column) A
or Name

[1]

- (b) e.g. = AVERAGE(C2:F2) or =(C2+D2+E2+F2)/4 or =SUM(C2:F2)/4

[1]

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(c) Highlight all data (1) Choose column E to sort (1)

OR

Click on any cell in column E(1)
select sort descending/Z to A button(1)

[2]

(d) PASS

[1]

(e) Range check OR description

[1]

(f) Any **one** from:

graphs/charts

[1]

12 (a) Any **two** input devices from:

touch screens/light pens
roller/tracker ball/mouse/joystick
microphone
touch pads (containing options shown on keys)

[2]

(b) Any **two** examples from:

maps/directions
prices of goods/shop products
flight details
bank statements/bills
travel offers
news updates
emails/messages

[2]

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(c) Any **one** advantage from:

- airport can advertise services/products
- 24/7 service
- airport can get revenue from other advertisers
- airport can give security information/warnings
- less staff needed for information desks
- quicker response to customer enquiries

Any **one** disadvantage from:

- (cost of) maintenance
- central computer might crash/over-reliance
- hacking
- viruses

[2]

13 (a) Any **two** points from:

- 3D visual world
- created by a computer
- computer simulation
- uses special input/output devices to interact

[2]

(b) Any **two** examples from:

- (data) gloves
- (data) goggles/headsets
- special suits fitted with sensor
- hardware/motors to provide physical movement

[2]

(c) Any **two** advantages from:

- safer (e.g. view inside a nuclear reactor)
- can try out a dangerous task beforehand
- feeling of "being there"
- can perform "actual" tasks without any risk
- ability to store a whole plant on computer disks
- cheaper (if qualified)

[2]

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(d) Any **one** example from:

medical field
training/teaching
investigating problems in nuclear/chemical plants
3D/arcade games
simulators e.g. flight
walk throughs e.g. virtual tour of house

[1]

14 Any **three** benefits from:

split into small, more manageable tasks/modules
easier to debug/test
easier to modify/update
leads to a structured approach
many programmers can be used/different programmers per module

[3]

15 (a) Any **two** advantages from:

portable
can be used anywhere in school to link to wireless network
can be used as a standalone computer away from school

[2]

(b) Any **two** disadvantages from e.g.

usually more expensive to purchase/repair
difficult to use laptop keyboard/in-built mouse
laptops need re-charging from time to time
laptops more likely to be stolen/damaged

[2]

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16 (a) (i) Any **one** use from:

recording sales
keeping accounts
keeping registers
use as a mark book

(ii) Any **one** use from:

keeping client details
storing course details
keeping book lists

(iii) Any **one** use from:

designing/producing flyers
designing/producing leaflets
designing/producing presentations
designing/producing materials for websites
application forms

(iv) Any **one** use from:

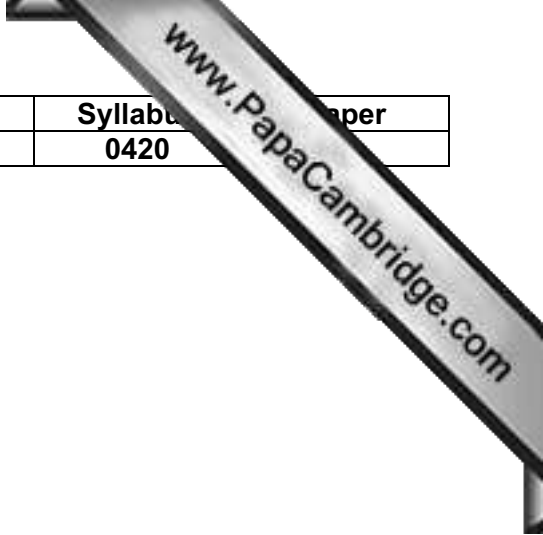
website design
multimedia material
training material
remedial lessons
interactive material
(creates hypertext/hypermedia documentation)

[4]

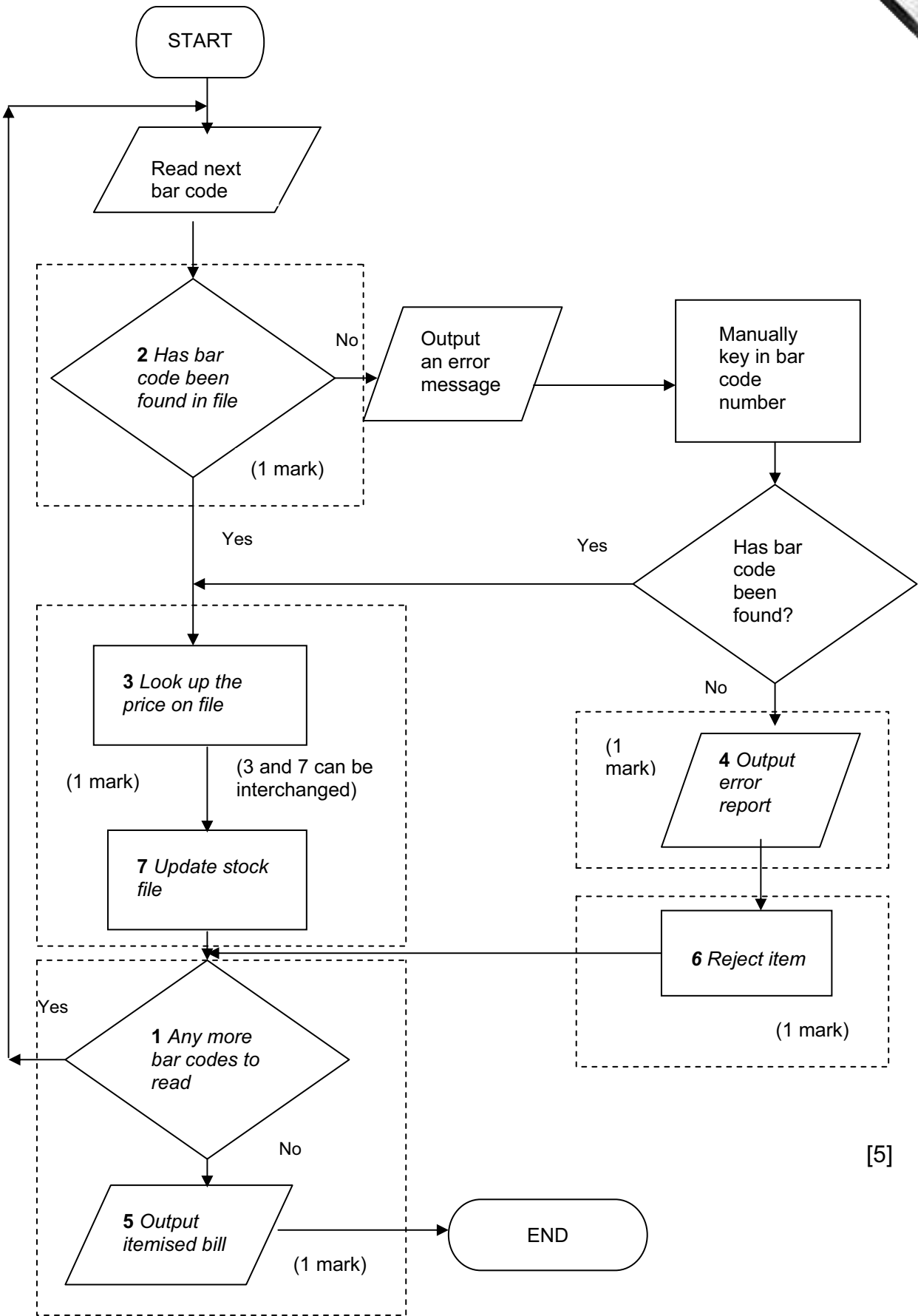
(b) Any **two** features from:

reduce font size
reduce side margins/top-bottom margins
use smaller font size/remove any bold text
reduce size of any pictures/graphs
reduce line spacing
use a larger page size / fit/scale to paper size
edit text

[2]



17 Award marks as shown



[5]

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- 18 (a) (i) Reg No
- (ii) unique identifier
used to search the database
used to link to other tables of data (foreign data) [2]
- (b) WS 46 ART
NK 55 ARM [2]
- (c) Either (Engine (cc) > 1400) OR (Doors < 5)
Or (Doors < 5) OR (Engine (cc) > 1400)
<---- 1 mark ----><----- 1 mark -----> [2]
- (d) Any **one** from:
customer code
customer ref no
(NOT customer name) [1]
- 19 (a) Any **one** from:
pressure
infrared [1]
- (b) Any **one** from:
sensor signal is analogue
computers can only understand digital [1]

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(c) Any **three** points from:

number of cars in both directions are totalled
 computer compares this total
 with values stored in memory/simulation results
 changes lights/takes action if necessary
 if no data received, default timing is used

[3]

(d) Any **one** point from:

all lights change to red/amber
 lights flash
 automatic timing sequence

[1]

20 Sample program:

```

count = 0
total1 = 0
total2 = 0
lowest = 1000
while count < 200 do
    input temp
    if temp < 10 then total1 = total1+1
    if temp > 20 then total2 = total2+1
    if temp < lowest then lowest = temp
count = count + 1
endwhile
output total1, total2, lowest
  
```

1 mark
1 mark
1 mark
1 mark
1 mark
1 mark
1 mark

(max of 5 marks)

Marking points:

Initialisation (but lowest must be set to a suitable value)
 Correct loop to read in 200 temperatures
 Correct input for temperatures
 Check if temperature is less than 10 and increment total1
 Check if temperature greater than 20 and increment total2
 Identifying the lowest temperature
 Output results (only give output mark if some data processing has been done, and outside loop)

[5]

