CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0420 COMPUTER STUDIES

0420/12 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, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

CAMBRIDGE
International Examinations

1 1 mark for health column and 1 mark for safety column; award 1 mark for a correct method of minimising risk

risk	health risk	safety risk	way of eliminating or minimising the risk
eye strain	✓		– use of sufficiently large screen – use LCD (non-flicker) monitors – take (regular) breaks – use anti-glare screen covers/filters
trip hazard		✓	– example of removal of trailing wires e.g. use cable ducts, use cable ties – use WiFi wherever possible
fire		✓	– example of cooling e.g. well ventilated, don't cover vents on equipment – don't overload wall sockets – no liquids near the computer – maintain equipment properly allow examples
RSI in the wrists	✓		– set seat to correct height/position – use wrist supports/wrists positioned correctly – ergonomic keyboards – take (regular) breaks

Total 2 marks — 1 mark for each named (**different**) method
–1 for each error — mark not dependent on correct identification of risk [6]

2 **(a)** Any **three** from:
– logs on/accesses the travel agency website
– enter/access personal details (accept two or more suitable examples of details)
– select/enter flight requirements (accept two or more suitable examples of requirements)
– view available flights
– make the booking
– confirmation sent [3]

(b) **batch processing**

Any **one** from:

– all data (collected together before) processed in one go
– no human interaction required once processing started
– system not time sensitive

real time transaction processing

Any **one** from:

– requires immediate/quick response
– updates as data input/received [2]

3 **(a)** 1 mark for naming software + 1 mark for a matching purpose

software: codec
purpose: – converts (and compresses) analogue data into digital data

software: (vide/audio) compression software
purpose: – reduces amount of (video/audio) data being transmitted

software echo cancellation software
purpose: – allows talking in real time
– prevents feedback/sound from speakers being picked up by microphone [4]

(b)

statement	advantage
it is possible to hold meetings at any time	
there is no problem with time zones	
reduces the "hidden cost" of employees being away from the office	✓

[1]

(c) 1 mark for reason why each statement is incorrect:

– microphone only pick up sound/input device
– loudspeakers needed to produce the sound/voices for delegates to hear

– webcams do not record any data/video
– webcams (only) capture data/video
– webcams do not transmit data/video [2]

(d) Any **two** from:

– expensive to set up
– poor quality of sound/video *or* need fast internet connection
– time zones can cause problems/differences in time zones [2]

4 **(a)** Any **one** from:

– search engine can pick up unrelated websites
– can result in too many "hits" [1]

(b) Any **one** from:

– narrow down the search criteria
– e.g. chemistry transition element
– use of "…" around key words [1]

(c) – pornographic/objectionable websites can be found
– unreliable/unnecessary information
– unwanted advertisements/pop-ups [1]

(d) Any **one** from:

– faster/easier to do a search rather than looking at, e.g., several book indexes
– information more up-to-date
– can cut and paste information directly into a document [1]

5 1 mark for identification of error and suggested correction (description or corrected pseudocode)

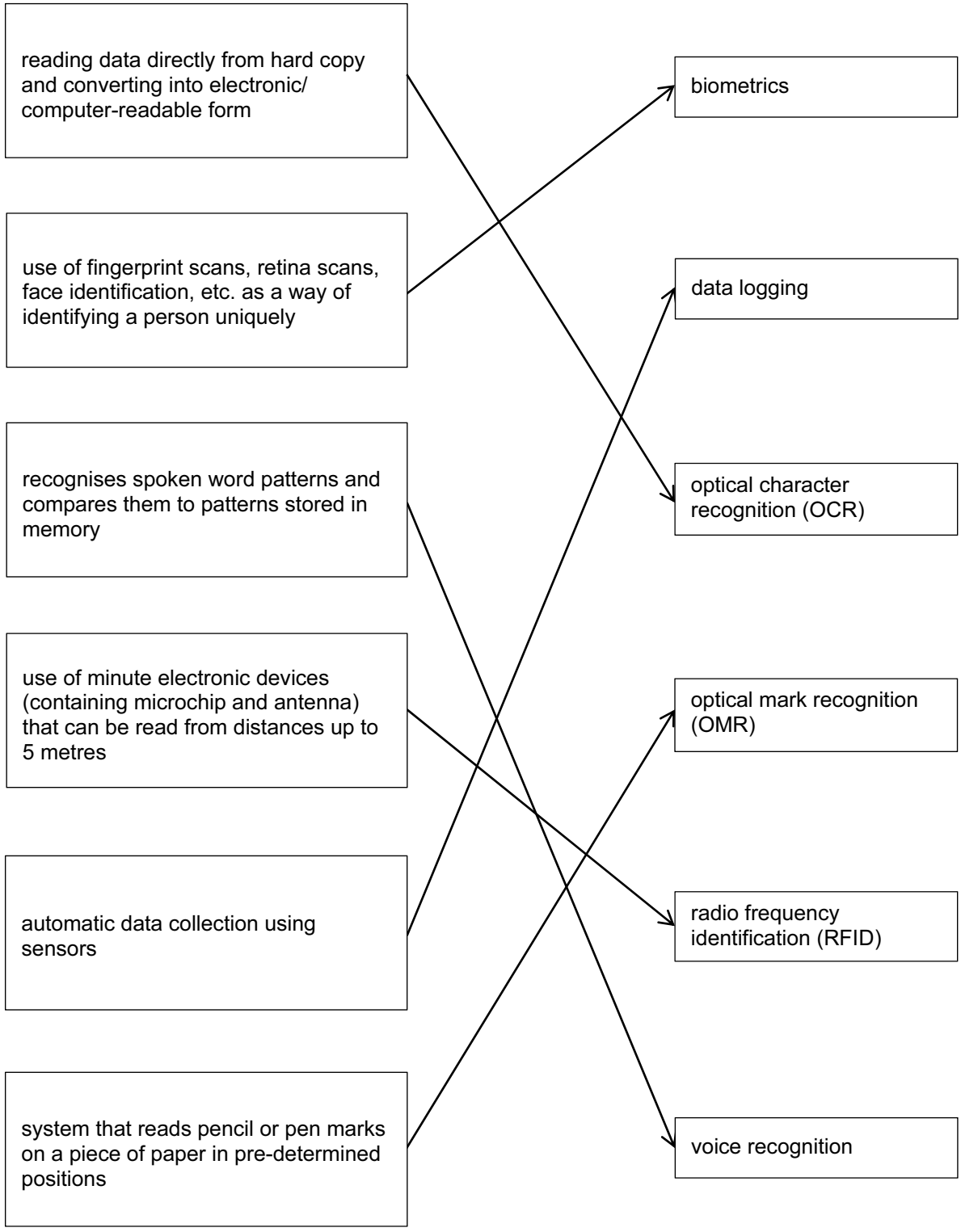
error: line 40: input x; using same input value as loop variable will cause problems or line 30: **for** x = 1 **to** 10
correction: change loop variable e.g. **for** count = 1 **to** 10 or change input variable e.g. **input** number

error: line 50: formula is reversed
correction: …. **then** largest = x (or largest = number)

error: line 60: output shouldn't be inside the loop
correction: 100 **output** average, largest

error: line 90: incorrect formula
correction: average = sum/10 [4]

6 1 mark for each correct link up to maximum of 5 marks



[5]

7 1 mark for each block of code between dotted lines. (e.g. use of REPEAT and BACKWARD functions). If an error occurs in the code, try to find a correct code sequence later on in the answer (in cases such as this, it is often easier to work backwards from last statement looking for correct blocks).

PENDOWN

REPEAT 2

3	FORWARD 50	FORWARD 25 ENDREPEAT
4	RIGHT 90	RIGHT 90 FORWARD 50
5	ENDREPEAT	RIGHT 90
- -		
6	FORWARD 10	
7	RIGHT 90	
8	FORWARD 20	
- - - - - - - - - - - - - - - -		
9	PENUP	(statements 9 and 10 are interchangeable)
10	LEFT 90	
11	FORWARD 10	
- - - - - - - - - - - - - - - -		
12	PENDOWN	
13	LEFT 90	(statements 12 and 13 are interchangeable)
14	FORWARD 20	
15	RIGHT 90	
- - - - - - - - - - - - - - - -		
16	FORWARD 10	
17	RIGHT 90	
18	FORWARD 40	
- - - - - - - - - - - - - - - -		
19	LEFT 90	
20	FORWARD 20	
(21	PENUP)	(line 21 is not essential)

[6]

8 **(a)** pharming [1]

(b) blog(s) [1]

(c) social networking (sites) [1]

(d) phishing [1]

(e) spyware/key logging (software) [1]

9 **1 mark** per point

(i) key frames

(ii) tweening

(iii) morphing

(iv) rendering

(v) avars [5]

10 (NOTES: Additional 0s in any column (UNLESS THEY ARE JUST THE REPEAT OF 0 VALUES) lose the mark for that column

If columns 1 to 7 are wrong there can be one mark for initialisation (0 0 0 0 0 1) and a mark for the correct output -3, 6).

negcount	poscount	neg	pos	zero	count	X	negavge	posavge
0	0	0	0	0	1			
				1	2	0		
	1		3		3	3		
	2		8		4	5		
	3		14		5	6		
1		–4			6	–4		
2		-5			7	–1		
				2	8	0		
				3	9	0		
3		–9			10	–4		
	4		24		11	10		
							–3	6

< - - - - - - 1 mark - - - - - > 1 mark 1 mark 1 mark <- - - -1 mark - - - -> < - - - - - 1 mark - - - - > [6]

11 1 mark for name + 1 mark for benefit + 1 mark for drawback

name	benefit	drawback
Parallel	– back up system if new system fails – able to gradually train the staff – staff can have time to adapt	– expensive with reason (e.g. need two sets of staff) – time consuming with reason (e.g. 2 sets of data have to be input) – not appropriate in applications where only one set of data can be used e.g. air traffic control
Pilot	– if system fails only 1 part of the company affected – can gradually train the staff – staff can have time to adapt	– time consuming with reason (e.g. system must be fully tested before rolled out to the whole company) – only works if the company is large and can use one division or office as "guinea pig"
phased	– if system fails, only 1 part of the system is affected – less expensive than parallel (no need for extra staff) – can ensure system works 100% before expanding to rest of system	– time consuming with reason (e.g. each phase/part needs to be fully tested before changing another part of the system) – doesn't work in certain scenarios where whole system needs to be implemented in one go for safety or security reasons e.g. air traffic control

[6]

12 (a) 1 mark for device + 1 mark for reason **all reasons must be different**

device	**reason**
digital camera	– to photograph the hotels/ hotel rooms/facilities – to video the hotels/hotel rooms/facilities
GPS system	– to find his way to hotel by car/on foot
Mobile/smart phone	– keep in contact with office/store important numbers – phone hotel to arrange a visit – use of internet if wifi not available – to photograph the hotels/ hotel rooms/facilities – to video the hotels/hotel rooms/facilities – to find his way to hotel by car/on foot
portable computer e.g. tablet, laptop	– to type his reports (about the hotels) – send emails/photos (back to the office) – allow VoIP/cam-to-cam communications – allow instant messaging – so he can access the Internet and find out details about the hotel he is visiting
PDA	– to store meeting details/details about hotels – to store contact details
Mobile internet dongle/	– to provide access to the internet router/broadband modem
Memory stick	– to save/backup reports

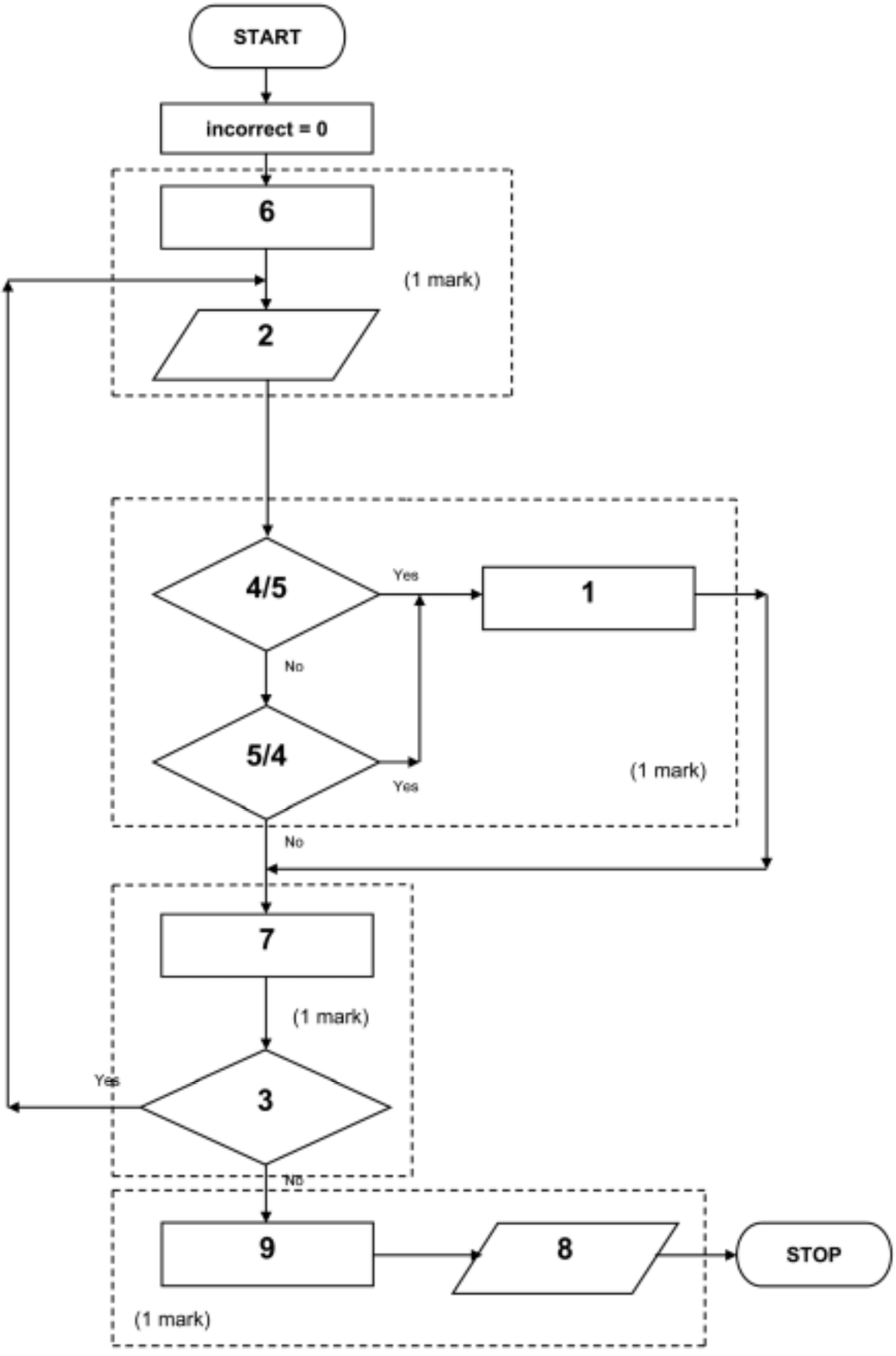
[6]

(b) Any **two** from:

– slower data transfer rate
– less secure network unless password protected e.g. increased risk of hacking
– signal often poor/drop out is common
– greater latency

[2]

13



[4]

14 1 mark for each working formula in cells C3, C4, and C5.

	A	B	C
1	input mass number	**56**	
2	input atomic number	**26**	
3	number of electrons =		**= B2**
4	number of protons =		**= B2 (or = C3)**
5	number of neutrons =		**= B1 – B2**

[3]

15 (a) 1 mark for each item:

- knowledge base
- rule(s) base
- inference engine
- (expert system) shell
- explanation system
- user interface/HCI

[4]

(b) Any **one** from:

- chess/strategy games
- prospecting for oil/minerals
- medical diagnosis
- engine diagnostics
- television/computer/electronic diagnostics
- financial/tax advice
- career advice

[1]

16 (a) (i) 1 mark for correct binary numbers

0	0	0	0	0	0	0	**1**	**0**	**1**	**1**	**1**

(ii) 1 mark for correct binary numbers

0	**1**	**0**	**1**	**1**	1	0	0	0	0	0	0

[2]

(b) one mark
– letter "Y" or 25th letter

One mark
– the binary number 0 0 0 0 1 1 0 0 1 0 0 0 has been shifted (to the left) 3 places
– so the binary number becomes 0 0 0 0 0 0 0 1 1 0 0 1
– 1+8+16 [2]

(c) (i) 1 1 1 1

(ii) 15 *(allow follow through from (i))*

(iii) – try to move 15 places to the left which is not possible
– only 12 bits in register to store letter; 15 is too large
– you would end up with 12 0s in the register [3]

17 (a)

A	B	C	X	
0	0	0	1	1 mark
0	0	1	1	
0	1	0	0	1 mark
0	1	1	1	
1	0	0	1	1 mark
1	0	1	1	
1	1	0	0	1 mark
1	1	1	0	

[4]

S

(b) (A = **NOT** 1) 1 mark

OR 1 mark

((A = 1 **OR** B = 1) **AND** C = 1) 1 mark

Accept: $\overline{A}$ + ((A + B). C) or $\bar{}A$ + (A + B). C

Accept: A' + ((A + B). C) or A' + (A + B). C

(1 mark) (1 mark) (1 mark)

Accept: (**NOT** A) **OR** ((A **OR** B).**AND** C)

(1 mark) (1 mark) (1 mark)

[3]

18 marking points:

- initialisation of all 5 totals
- loop to control input for all 1500 students
- input choice and name of student inside the loop
- check student choice …
- … increment the appropriate total
- output name of student who likes classical music
- find the 5 percentages (either using /15 or (*100/1500)) outside the loop
- output the 5 percentages outside the loop (must have some processing)
- error checking

sample algorithm (in pseudocode)

NOTE: many students may make use of the **case … of … endcase** construct here rather than five IF statements

```
rock = 0: soul = 0: pop = 0: jazz = 0: classical = 0                    1 mark

for student = 1 to 1500                                                 1 mark

    input choice, pupil_name                                            1 mark
        if choice = 1 then rock = rock + 1
        if choice = 2 then soul = soul + 1
        if choice = 3 then pop = pop + 1                                2 marks
        if choice = 4 then jazz = jazz + 1
        if choice = 5 then classical = classical + 1
        if choice = 5 then output pupil_name                            1 mark

next student
percent1 = rock/15
percent2 = soul/15
percent3 = pop/15                                                       1 mark
percent4 = jazz/15
percent5 = classical/15
output percent1, percent2, percent3, percent4, percent5                 1 mark


(sample pseudocode showing a possible case … of construct:
(alternative to rows 4 to 9 in above algorithm)
case of choice:
1: rock = rock + 1
2: soul = soul + 1
3: pop = pop + 1                                                        2 marks
4: jazz = jazz + 1
5: classical = classical + 1
output pupil_name                                                       1 mark
endcase)                                                                [5]
```