

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the October/November 2014 series**

### **0420 COMPUTER STUDIES**

**0420/13**

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.

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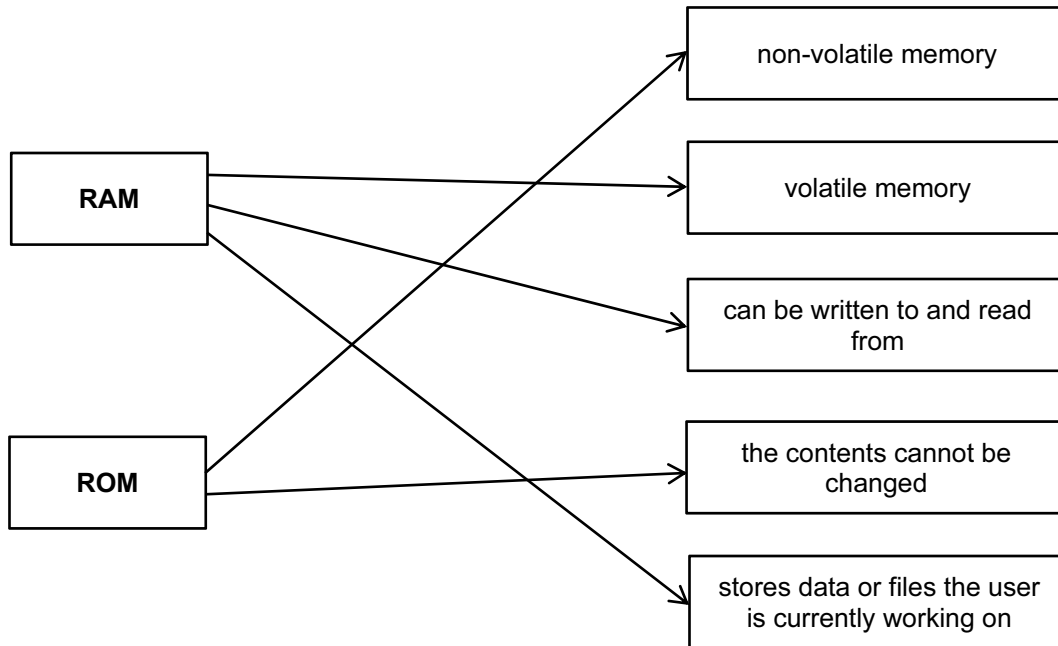
1 Any **three** from (need risk + reason):

Safety issues e.g.:

- electrocution from bare wires or spilling liquids on live equipment
- trip hazard due to trailing wires
- risk of heavy equipment falling from inadequate desks
- risk of fire if insufficient equipment ventilation or overloaded wall sockets

[3]

2



1 mark for each correct line (**max 5**)  
Deduct 1 mark for each additional incorrect line.

[5]

- 3 (a) **FALSE** – encryption only stops data being read / making sense (but does not prevent the act of hacking)
- FALSE** – data when backed up could still have the virus attached to it  
– when the backed up data is re-loaded at a later date, the virus could be loaded again into the system together with the stored data
- TRUE** – tapping into a Wi-Fi network is relatively easy (even when the network is protected by passwords)

1 mark for each correct TRUE / FALSE with correct corresponding reason

[3]

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(b) (i) drop down boxes help defeat spyware / key logging software [1]

(ii) – to ensure that it was in fact Felipe who logged on last time [1]  
– an additional authentication check

(iii) in case it is not Felipe who attempts to access the account [1]

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

- Expert System asks questions
- Rikki inputs the answers to the questions
- next question asked is based on previous response(s)
- search Knowledge Base .....
- ..... uses the Rules Base to draw conclusions
- use of Inference Engine
- probable faults / solutions output on a screen
- ... and the % probability of accuracy is also given

[3]

(b) Any **two** from:

- security purposes as these files are needed to access the Expert System
- licence agreement to only allow an authorised number of computers to access Expert System
- the extra files need to be accessed for the Expert System to work

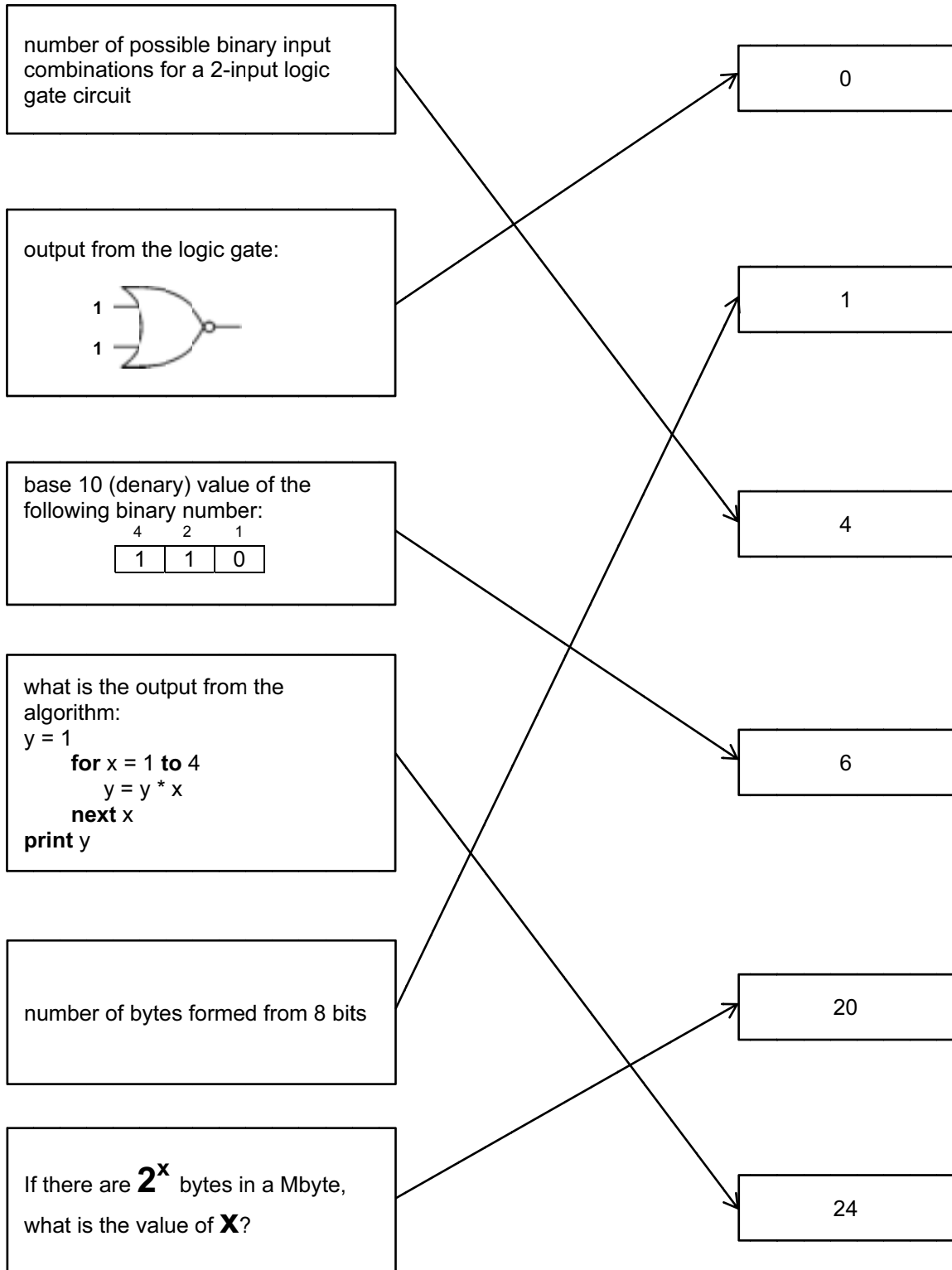
[2]

(c) Any **one** from:

- chess games
- oil / mineral prospecting
- tax calculations
- weather forecasting
- identify plants / animals/chemical compounds
- careers guidance
- car engine tuning

[1]

5



1 mark for each correct line (max 5)

[5]

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6 1 mark for each error located with corresponding correction (description or corrected pseudocode acceptable)

**error:** line 10: sum not initialised  
**correction:** sum = 0

**error:** line 40: incorrect formula for sum  
**correction:** sum = sum + n

**error:** line 50: incorrect IF statement  
**correction:** IF sum > 50 THEN .....

**error:** lines 50 and 60: value of count causes a problem e.g. loop never ending  
**correction:** **either** count = 19 on line 50  
**or** count = count + 1 between lines 30 and 40  
**or** any other correct solution

**error:** line 80: output of n is incorrect  
**correction** **output** sum or **print** sum

[5]

7 (a) wikis [1]

(b) social networking sites [1]

(c) podcasts [1]

(d) tagging [1]

(e) blogs [1]

8 (a)

d	u	u	l	a	f	x	n	a	c	c	x	e	o	y	u	o	v	.
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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

[2]

(b)

c	o	m	p	u	t	i	n	g	i	s	f	u	n	.
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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

[2]

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(c) Any **three** from:

- customers need a password / PIN
- use of card readers / use of Transaction Authentication Number (TAN)
- only certain characters from password / PIN requested...
- ...the requested characters change each time user logs on
- card security code requested
- use of drop down boxes
- use of a customer reference number
- inform customer when they last logged on to the website
- use of image verification code e.g. CAPTCHA
- make reference to something unique to the customer e.g. their mobile phone number
- use of secure protocol e.g. https, padlock symbol

[3]

9 (a) 1 mark for input device + 1 mark for its matching use

**input device:** touch screen  
**use:** select film / cinema seats / price

**input device:** keyboard / keypad  
**use:** input number of tickets / card PIN

**input device:** magnetic stripe reader / chip and PIN reader / card reader  
**use:** reading credit / debit card details

**input device:** scanner  
**use:** to read any promotional vouchers (etc.)

[4]

(b) 1 mark for each different output device + 1 mark for its matching use

**output device:** screen / monitor  
**use:** show films available / seating plan / prices of each seat / payment details

**output device:** printer  
**use:** print receipt / tickets

**output device:** loudspeaker / beeper  
**use:** to indicate error in input / confirmation of keys pressed

[4]

10 (a) 1 mark for each different sensor (**max 2**)

- pressure sensor
- example of sensor to detect if door closed / open e.g. magnetic field sensor, proximity sensor
- moisture / humidity sensor
- temperature / infrared sensor

[2]

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**(b)** 1 mark for each item of data (**max 2**):

- is the food frozen / uncooked / cooked?
- cooking time
- start / end time
- power
- weight
- type of food
- additional cooking feature e.g. browning

1 mark for each corresponding input method (**max 2**):

- turn dial to select option
- touch screen / buttons / concept keyboard / keypad to select options
- use of barcode readers (to read barcodes on food packaging which stores an automatic cooking programme)

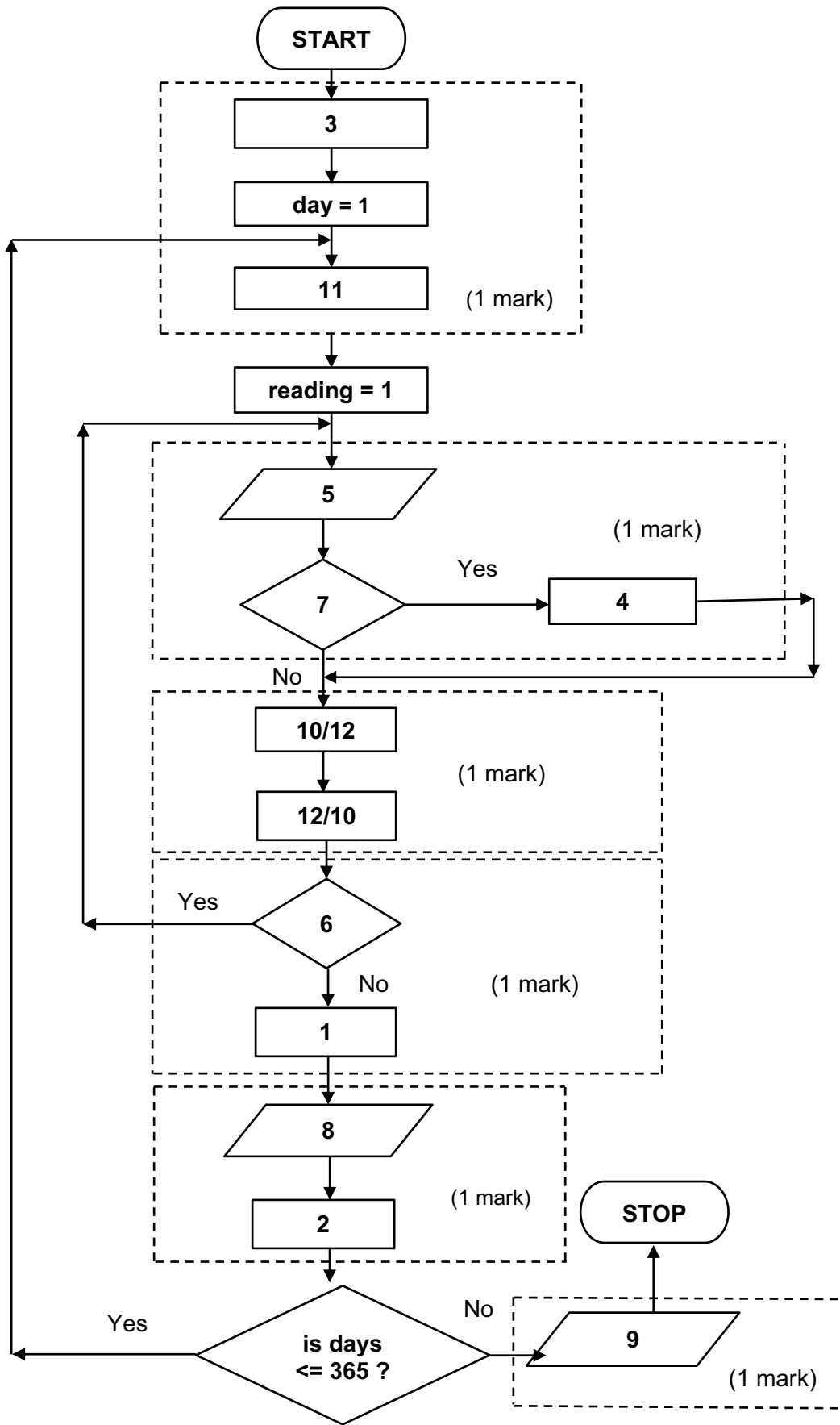
**[4]**

**(c)** Any **four** from:

- (microprocessor) checks / receives readings / data / signals from sensors....
- .....continuously
- if door open, (microprocessor) sends signal to sound alarm / stop process
- (microprocessor) compares weight of food against stored values...
- ...and automatically sets cooking time / power
- cooking time controlled by (microprocessor) comparing with stored values
- (microprocessor) sends signal to beeper / notify when cooking program complete

**[4]**

11



[6]



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12 (a) (i) B3 / B2 (1 mark)

(ii)  $(B5 / C4) * 2$  or  $= ((B5 * B2) / B3) * 2$  (1 mark)

[2]

(b) = IF(C6>D1, "above", "equal or below")

↔ ↔

1 mark 1 mark

OR

= IF(D1<C6, "above", "equal or below")

↔ ↔

1 mark 1 mark

Alternative word(s) for "above" are acceptable.

[2]

(c) C4, C6, D6

[1]

13 (a)

T1	T2	T3	A	B	C	OUTPUT
0	0	0				
			3	2	1	
1						
	1		4	8	7	
2			6	0	3	
		1	5	6	9	
	2		4	11	3	
			0	0	0	
						2, 2, 1

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

If no marks are awarded for the columns then 1 mark can be given for correct initialisation of T1, T2 & T3 as shown in the first row above.

[5]

- (b) – any data set (except 0, 0, 0) where 2/3 of the numbers are the same e.g. 2, 8, 8  
 – flowchart does not allow for numbers which have the same value

[2]

**14 (a)** Row number:      1      2      3      4      5      6      7

Reg 1:	0	1	1	0	0	0	0
Reg 2:	1	0	0	1	0	0	1
Reg 3:	1	0	0	1	0	1	0
Reg 4:	1	0	0	1	1	0	0
Reg 5:	0	1	1	0	0	0	0

Reg 1 + Reg 5 = 1 mark  
 Reg 2 = 1 mark  
 Reg 3 = 1 mark  
 Reg 4 = 1 mark

[4]

**(b)**

	8
Reg 1:	0
Reg 2:	0
Reg 3:	1
Reg 4:	1
Reg 5:	0

Reg 2 + Reg 5 = 1 mark  
 Reg 3 = 1 mark  
 Reg 4 = 1 mark

[3]

15 (a)

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

1 mark

1 mark

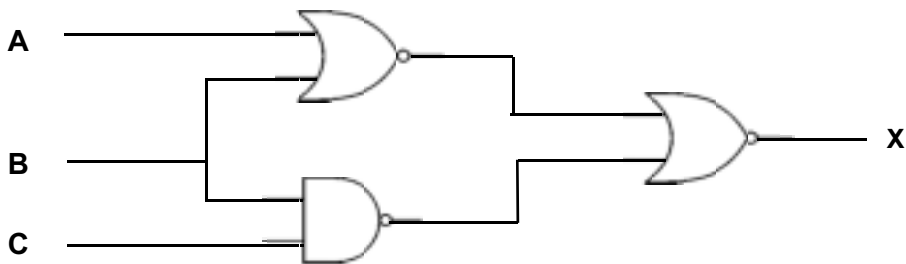
1 mark

1 mark

[4]

[4]

(b) 1 mark for correct NOR gate and 1 mark for correct NAND gate in correct positions on left hand side of diagram.



[2]

(c) [ A = NOT 1 OR B = NOT 1 ]      1 mark  
**AND**                                      1 mark  
 [ B = 1 AND C = NOT 1 ]            1 mark

Other notations which are acceptable:

(NOT A OR NOT B) AND (B AND NOT C)

$(\bar{A} + \bar{B}) \cdot (B \cdot \bar{C})$

$(A' + B') \cdot (B \cdot C')$

[3]

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## 16 Marking points:

- initialise largest and two totals
- control loop for 1000 items
- check if price 1 > price 2 and increment total 1 (inside loop)
- check if price 2 > price 1 and increment total 2 (inside loop)
- calculate price difference (inside loop)
- method of dealing with negative difference
- check if calculated difference > largest difference and action taken if it is
- three outputs OUTSIDE a loop (calculation must have been attempted)

### Sample program in pseudocode:

```

largest = 0
smarket1 = 0: smarket2 = 0           1 mark
for item = 1 to 1000               1 mark
    input price1, price2
    if price1 > price2 then smarket1 = smarket1 + 1   1 mark
    if price2 > price1 then smarket2 = smarket2 + 1   1 mark
    difference = price1 – price2           1 mark
    if difference < 0 then difference = - difference  1 mark
    if difference > largest then largest = difference  1 mark
next item
output smarket1, smarket2, largest       1 mark

```

(max 6)

[6]