

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

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MARK SCHEME for the October/November 2014 series

0420 COMPUTER STUDIES

0420/13

Paper 1, maximum raw mark 100

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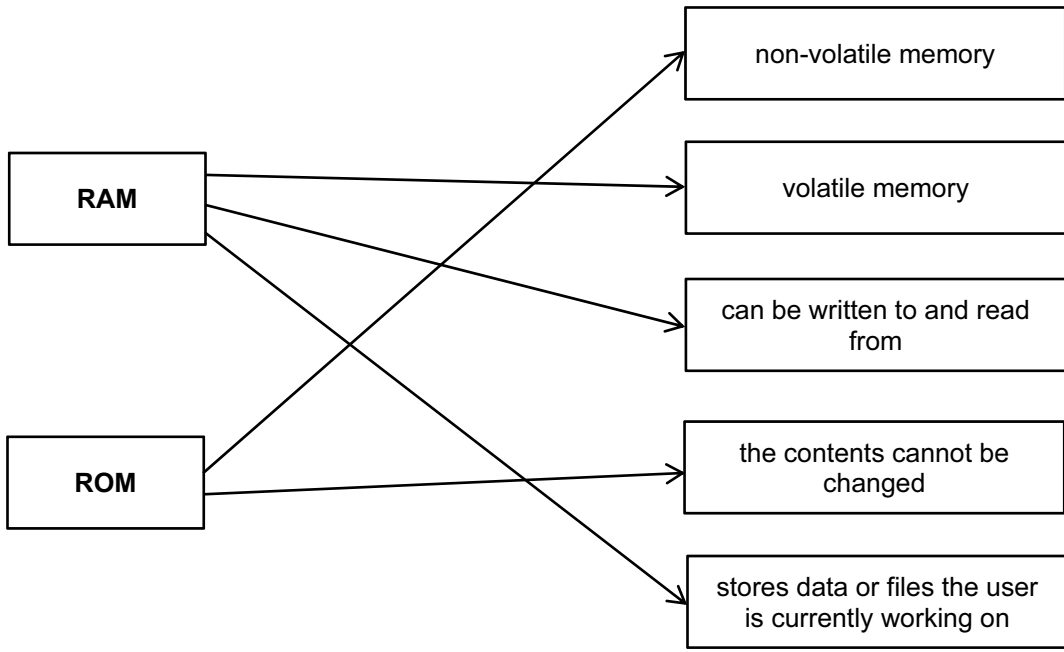
1 Any **three** from (need risk + reason):

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
- (ii) – to ensure that it was in fact Felipe who logged on last time
– 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:

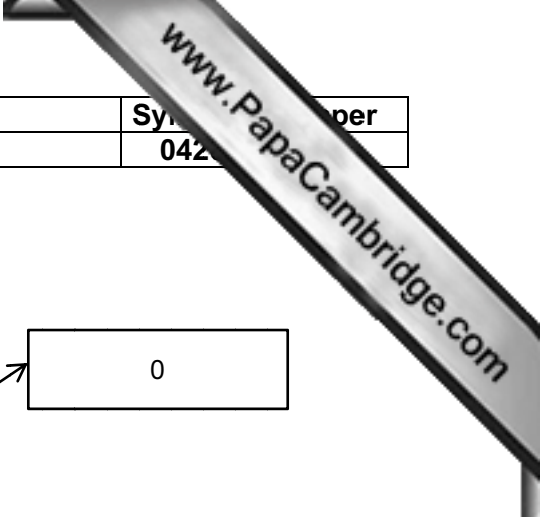
- security purposes as these files are needed to access the Expert System
- licence agreement to only allow an authorised number of computers to access Expert System
- the extra files need to be accessed for the Expert System to work

[2]

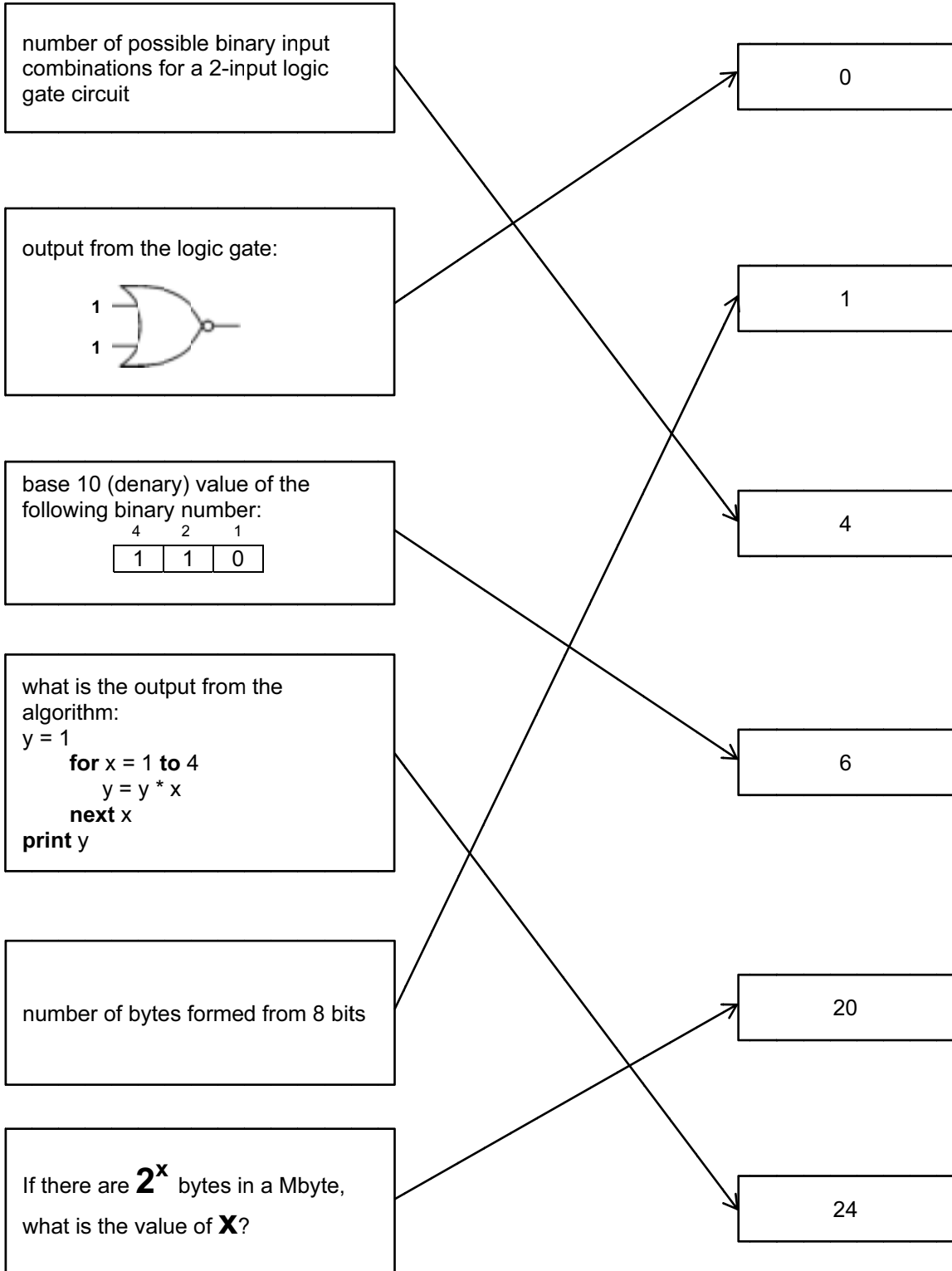
(c) Any **one** from:

- 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 ps 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)

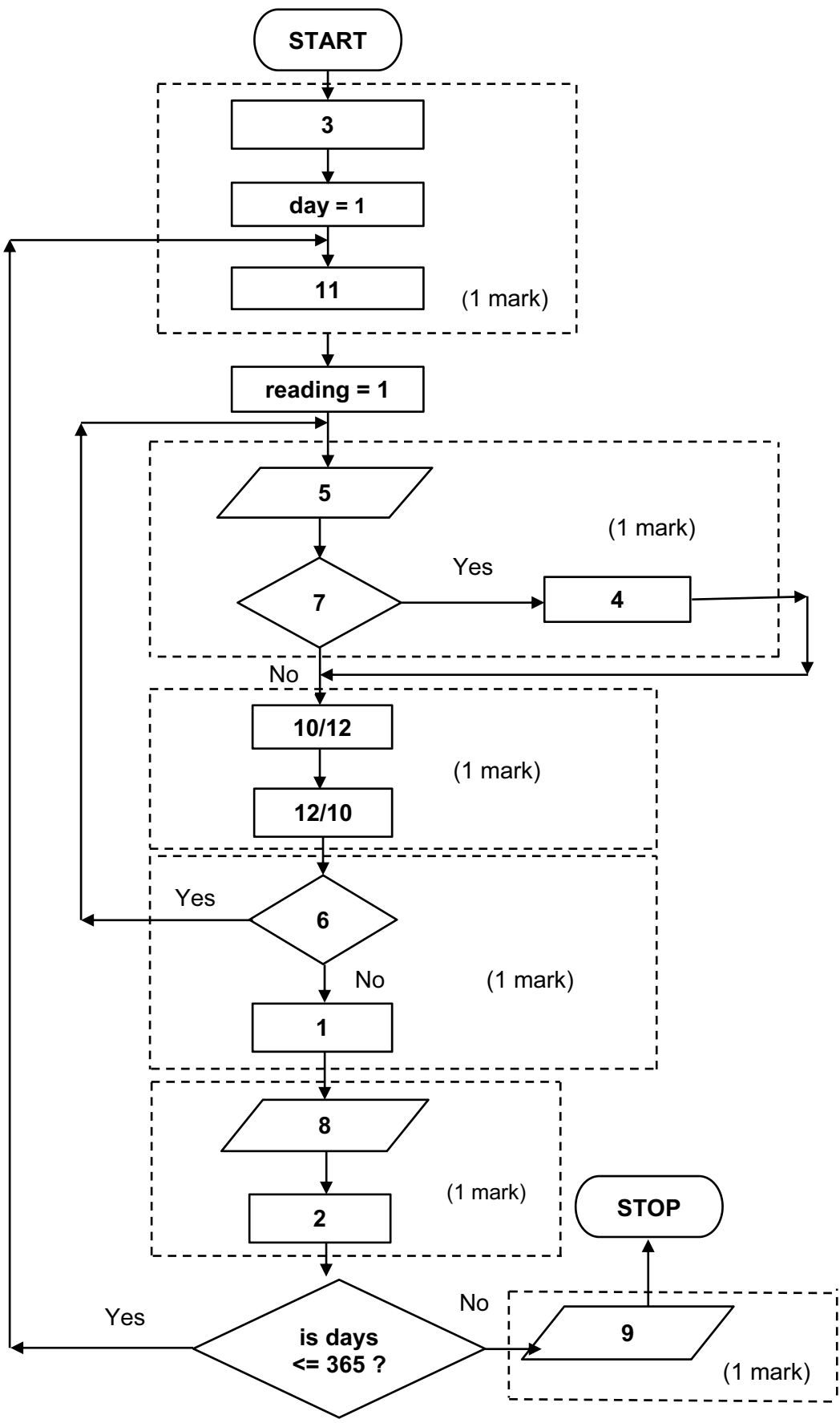
[4]

(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



1

1

[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

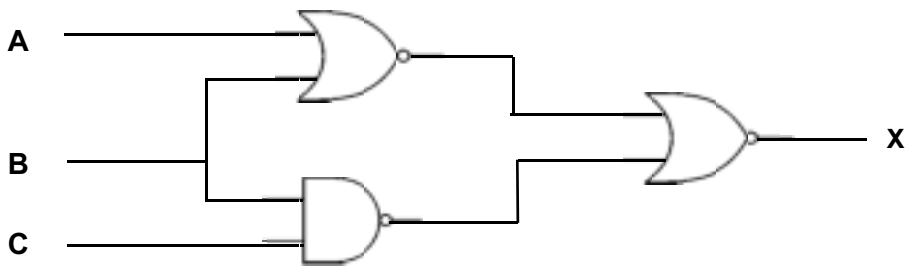
1 mark

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)
```