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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

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 must be read in conjunction with the question papers and the report on the examination.

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1 **(a)** Any **two** from:
- share resources (hardware and software)
- easier communications are possible
- possible to work from any work station and access files/data
- central data source
- easier to control/monitor what users are doing
- easier to 'globally' protect against unauthorised access [2]

(b) Any **one** advantage and any **one** disadvantage from:

Advantages
- no trailing wires (therefore safer, less expensive since no cables)
- allows users to work anywhere (portability)
- can set up network in places where cable runs are not possible (e.g. outside, historic buildings etc.)

Disadvantages
- limited range
- certain items (like filing cabinets) can block the signals
- possible to 'tap' into WiFi if it isn't secure
- often slower data transfer rate than a wired system
- needs additional hardware
- number of access points need to match computers [2]

2 1 mark per point (max of 2 marks per application)

Application	Output device	Reason for choice of device
A disabled person using a word processor	– speakers – Braille printers	– allows blind people to hear output from word processors – blind people can read printed output
Using CAD to design a new engine	– plotter – large monitor – 3D printer	– accurate print out of large drawings – allows easy editing of drawings – produce working prototypes in resin
Monitoring a house for burglars	– buzzer – light – alarm	– to warn of intruder's presence in the building

[6]

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3 (a) 1 mark for each description + 1 mark for each example of h/ware

CLI description
- user communicates by typing in commands (in response to a prompt)
- several commands are entered to carry out a task (such as loading software)

CLI h/ware
- keyboard
- keypad

GUI description
- user interacts with a computer using pictures and symbols (icons)/drop-down menu
- tasks are initiated by selecting the icon
- usually part of a windows/wimp environment

GUI h/ware
- pointing device (e.g. mouse)
- touch screen [4]

(b) (i) – saving/collecting data with no actual need for human interaction

(ii) 1 mark for named device + 1 mark for ***matching*** application: if device is wrong then no application mark

Device	Application
– barcode reader	used in automatic stock control
– document scanner	transferring printed documents into an electronic form for storage on computer
– mag stripe reader	electronic funds transfer/entry through 'locks'
– microphone	part of voice recognition – automatically picking up sounds in burglar detection
– OCR/OMR/MICR	transferring documents to computer, reading multiple choice answers in a survey, reading cheques
– RFID	tracking animals/people/items/vehicles
– retina scan/finger prints	security systems
– video camera	security surveillance
– correct sensor	control applications
– data logger	used to monitor a parameter in an experiment [3]

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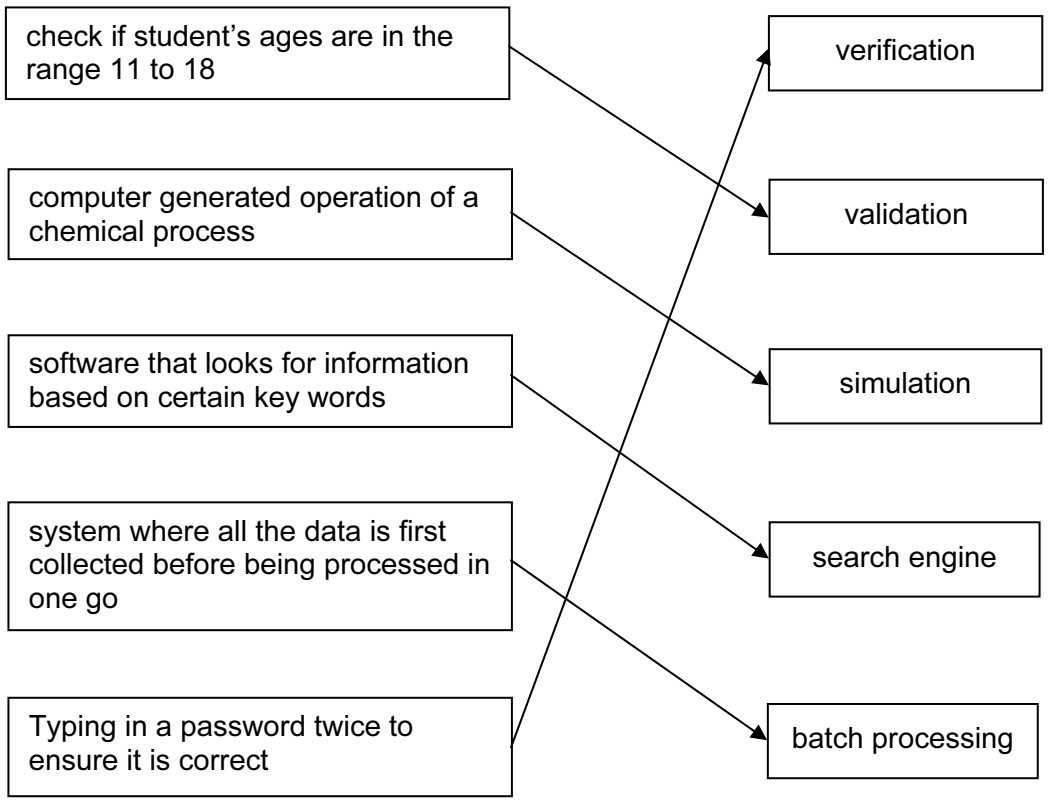
4 1 mark per correct match



[5]

5 **(a)** user documentation:
- helps users learn how to use/operate the software

technical documentation
- designed to help programmers to make improvements to the system
- helps programmers to repair/maintain the system [2]

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(b) 1 mark for 3 correct answers, 2 marks for 4 to 6 correct answers and 3 marks if all 7 answers correct.

Item	User documentation only	Technical documentation only	Both user and technical documentation
how to save a file	√		
program listing/coding		√	
hardware and software requirements			√
file structures		√	
list of variables		√	
how to load the software	√		
meaning of errors/error messages			√

[3]

6 **(a)** – program/software that allows a user to display web pages, web sites, etc.
NOT access the Internet [1]

(b) **(i)** webpage (part of)

(ii) radio button

(iii) hyperlink NOT link [3]

(c) reference to cookies or description of cookie [1]

(d) Any **two** from:
– phishing
– pharming
– viruses
– key logging } or malware
– spyware [2]

Rationale: fishing and farming not acceptable

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7

engine	count	number	size	average	OUTPUT
0	0	0	1.8		
1.8	1	1	2.0		
3.8	2	2	1.0		
4.8		3	1.3		
6.1		4	1.0		
7.1	3	5	2.5		
9.6		6	2.0		
11.6	4	7	1.3		
12.9	5	8	1.8		
14.7		9	1.3		
16.0		10	(–1)		
				1.6	
					1.6, 5
(1mk)	(1 mk)	(1 mk)	(1 mk)	(1 mk)	(1 mk)

[6]

8 **(a)** Any **three** from:
- unemployment
- need to re-train
- cleaner/less noisy environment
- safer environment
- possible de-skilling
- less heavy lifting
- reskilling with description
- redeployment (could lead to new employment e.g. maintaining robots) [3]

(b) Any **two** from:
- less lighting/heating/air con costs since few people now in factory
- no need to pay wages/salary
- greater productivity (therefore lower unit cost)
- can work non-stop/24-7 (no breaks/holiday) [2]

(c) Any **two** from:
- more consistent product
- can work non-stop (no breaks, holidays, etc.)/24-7
- don't go on strike
- can be used in a dangerous environment
- greater productivity [2]

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9 **(a)** = D2/C2 [1]

(b) = AVERAGE(E2:E6) OR
= SUM(E2:E6)/5 OR
= (E2 + E3 + E4 + E5 + E6)/5 [1]

(c) **(i)** 1 mark for formula in F2 and 1 mark for all other formulas correct

	F
1	**Flight costs ($)**
2	= B2 * C2/10
3	= B3 * C3/10
4	= B4 * C4/10
5	= B5 * C5/10
6	= B6 * C6/10

[2]

(ii) Loss [1]

(iii) = IF (F5 > D5, "Loss", "Profit") [1]

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

(i) monitoring
- decide if the temperature/pressure are out of range
- give a warning if out of range/doesn't change the process parameters [1]

(ii) control
- send signal to open/close valve, switch on/off a heater etc.
- output affects the input [1]

(b) Any **three** from:
- data from temperature/pressure sensor…
- …changed into digital by ADC
- data is sent to computer
- data/input is compared to values in memory
- if temperature too low, signal sent to heater…
- if pressure too low, signal sent to valve…
- and heater turned on/valve opened
- use of DAC
- use of actuators
- monitoring/control system continues to loop indefinitely [3]

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(c) 1 mark for <u>each</u> sensor + 1 mark for <u>each related</u> application

<u>sensor</u>	<u>application</u>
– light	greenhouse environment
	open/close automatic doors
– sound	burglar alarm
	listening for sounds in pipes etc.
– infra red	burglar alarm
	detecting people (e.g. entering a building)
– moisture	greenhouse environment
	check if clothes dry in a drier
– gas	detection of gas leaks
– pH	soil acidity in greenhouse
– smoke	in buildings for fire detection
– motion sensor/accelerometer	vibrations in machinery
– proximity	parking cars

[4]

11 (a) 1 6 : 4 9
1 mk 1 mk [2]

(b)

0 0 0 1	1st digit
0 1 1 1	2nd digit
0 0 1 0	3rd digit
1 0 0 1	4th digit

[4]

(c) Any **two** from:
– microprocessor compares present time with stored time
– if the values are the same
– sends signal to sound alarm [2]

12 (a) 7 [1]

(b) CH, IN, TI, SA [2]

(c) (**Area (millions sq km)** < 3) **AND** (**Coastline** = "Yes")
< - - - - - - - 1 mark - - - - - - -><- - - - - - 1 mark - - - - - - >

OR

(**Coastline** = "Yes") **AND** (**Area (millions sq km)** < 3)
< - - - 1 mark - - - - >< - - - - - - - - 1 mark - - - - - - - - - > [2]

(d) CH, IN, BR, PO, SA, RO, ZA, BO, TI [2]

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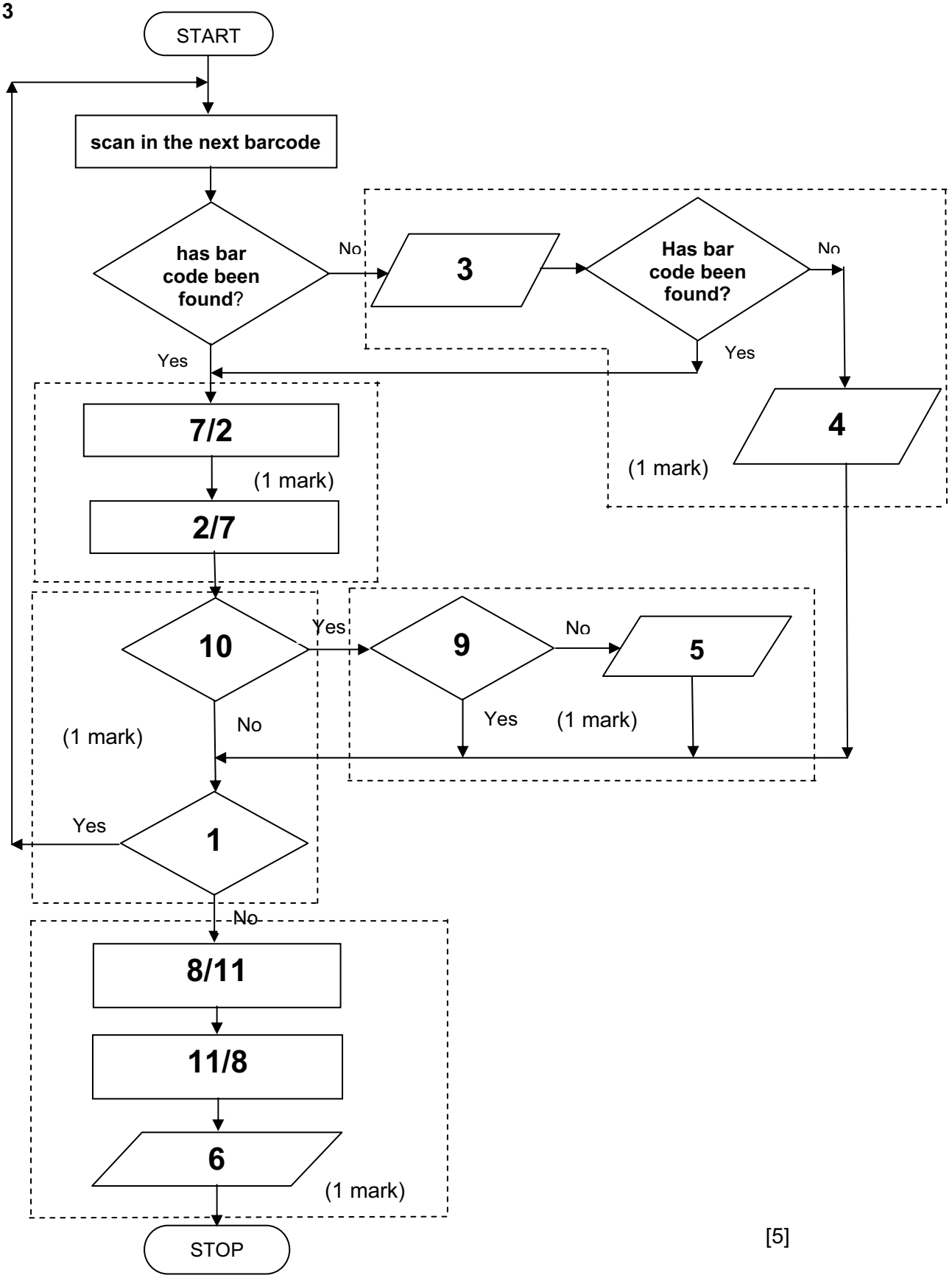
13



[5]

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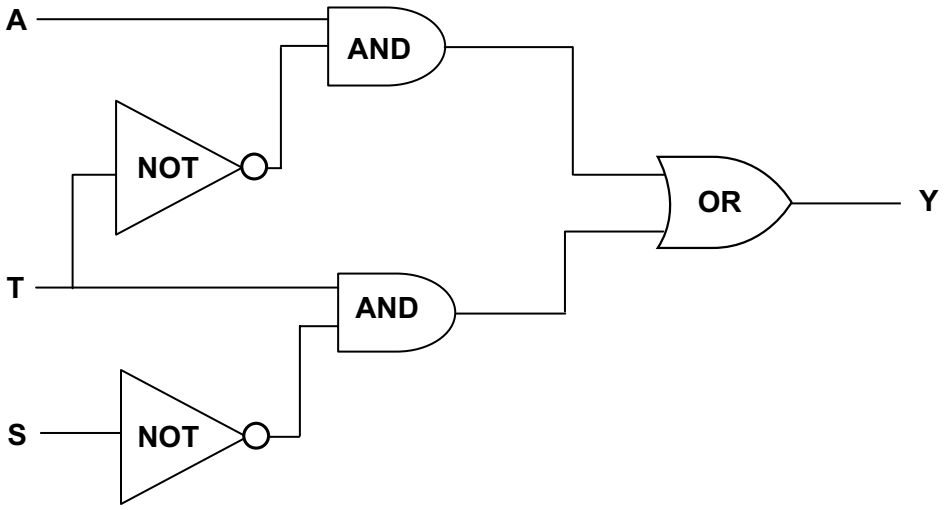
14 (a) **1 mark** for each logic gate:



[5]

(b)

A	T	S	Y	
0	*0*	*0*	0	1 mk
0	*0*	*1*	0	
0	*1*	*0*	1	1 mk
0	*1*	*1*	0	
1	*0*	*0*	1	1 mk
1	*0*	*1*	1	
1	*1*	*0*	1	1 mk
1	*1*	*1*	0	

[4]

15 **(i)** interrupt

(ii) handshaking

(iii) buffer [3]

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16 Marking points

initialise variables	1 mark
correct loop control	1 mark
input (in correct place)	1 mark
correct check on type of weather (if, case, etc.)	1 mark
adding number of days of each type of weather	1 mark
check for the highest temperature	1 mark
check for the lowest temperature	1 mark
output (all items in the correct place)	1 mark

Sample algorithm

```
c = 0: r = 0: s = 0: f = 0
high = 0 (or a negative number)
low = 1000                                                    (1 mark)
for x = 1 to 365                                              (1 mark)
    input weather, temp                                       (1 mark)
    if weather = "CLOUDY" then c = c + 1
        else if weather = "RAINING" then r = r + 1            (2 marks)
            else if weather = "SUNNY" then  s = s + 1
                else if weather = "FOGGY" then f = f + 1
    endif
    if temp > high then high = temp                           (1 mark)
    if temp < low then low = temp                             (1 mark)
next x
print c, r, s, f, high, low                                   (1 mark)   [6]
```

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