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0420/01

October/November 2007

2 hours 30 minutes

No Additional Materials are required.

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO NOT WRITE IN ANY BARCODES.

No marks will be awarded for using brand names of software packages or hardware.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use

IB07 11_0420_01/5RP
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UNIVERSITY of CAMBRIDGE
International Examinations

[Turn over

1 Explain, with examples, the following **five** computer terms:

(a) byte

.....
.....
..... [2]

(b) CD-ROM

.....
.....
..... [2]

(c) interrupt

.....
.....
..... [2]

(d) buffer

.....
.....
..... [2]

(e) virtual reality

.....
.....
..... [2]

2 Give **two** differences between high level languages and low level languages.

1

.....

.....

2

.....

..... [2]

3 (a) Give **three** of the elements that make up an Expert System.

1

.....

2

.....

3

..... [3]

(b) Give an example of the use of an Expert System.

.....

..... [1]

4 Online banking using the Internet is now increasing.

(a) Give **one** advantage to the customer of using online banking.

.....
..... [1]

(b) Give **one** advantage to the bank of providing online banking.

.....
..... [1]

(c) Online banking has an impact on society as a whole.

(i) Give **one** positive effect.

.....
.....
.....

(ii) Give **one** negative effect.

.....
.....
..... [2]

(d) Describe **two** concerns people might have regarding online banking.

1
.....
2
..... [2]

- 5 (a) (i) Name **one** method used to protect data against unauthorised access.

..... [1]

- (ii) Name **one** method used to protect data in a file from being understood when an unauthorised person has gained access to the file.

..... [1]

- (b) State **three** items that could be included as part of a Data Protection Act.

1

.....

2

.....

3

..... [3]

- 6 Thular is doing his IGCSE coursework on the school's local network. He would like to continue this work on his computer at home.

Name and describe **two** methods that he could use to do this.

Method 1

.....

Description

.....

.....

Method 2

.....

Description

.....

..... [4]

- 7 A company has decided to publish its Science books on the Internet rather than produce a series of paper-based books.

Give **three** reasons why a company might choose to do this.

1

.....

.....

2

.....

.....

3

.....

..... [3]

- 8 Give **three** tasks carried out by systems software.

1

.....

.....

2

.....

.....

3

.....

..... [3]

- 9 A multi-national company has decided to use video-conferencing facilities rather than the traditional approach of everyone meeting at one location.

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(a) What is meant by video-conferencing?

.....

.....

.....

..... [2]

(b) Give **three** advantages of using video-conferencing.

1

.....

2

.....

3

..... [3]

(c) Using emails is another method of communication. What advantage has this method compared with video-conferencing?

.....

.....

..... [1]

- 10** A systems analyst has been asked to replace an existing manual filing system with one which is computer-based.

- (a)** The paper-based files need to be converted into an electronic format.

Describe **two** ways this could be done.

1

.....

.....

2

.....

..... [2]

- (b)** When the system is implemented, the systems analyst will provide documentation. One type of documentation shows how the new system will work.

- (i)** Name this type of documentation.

.....

..... [1]

- (ii)** Give **two** items contained in this documentation.

1

.....

2

..... [2]

- (c) Another type of documentation is to allow future programmers to update or maintain the system.

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- (i) Name this type of documentation.

.....
..... [1]

- (ii) Give **two** items contained in this documentation.

1
.....
2
.....
..... [2]

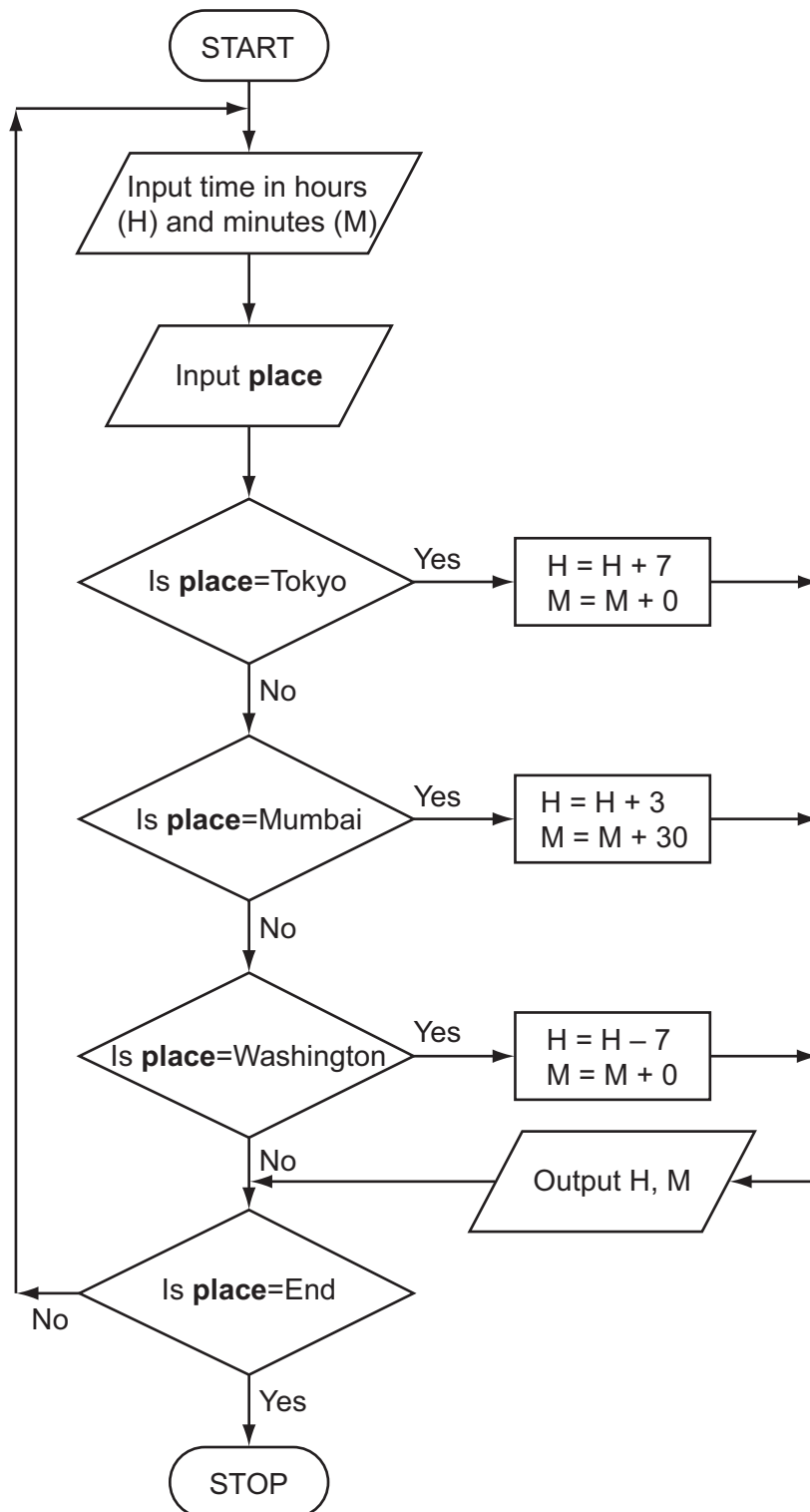
- (d) Name **two** methods of implementing the system.

For each method, give a reason for using it.

Method 1
Reason 1
.....
Method 2
Reason 2
..... [4]

- 11 Majid lives in Cairo but often travels to Tokyo, Mumbai and Washington. A flow chart has been written so he can work out the local time in these three places.

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(a) What output would be produced from the following input?

Input			Output	
place	hours (H)	minutes (M)	H	M
Tokyo	11	15		
Mumbai	15	10		

[2]

(b) What problem would occur if **place** = Mumbai and H = 15 and M = 30?

.....

.....

..... [1]

(c) What problem would occur if **place** = Washington and H = 4 and M = 0?

.....

.....

..... [1]

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- 12** A company checks its electrical equipment every three years. To help make sure that every item is checked at the correct time, the company has decided to put barcodes on the equipment. The barcode contains:

- type of equipment (e.g. monitor)
- location (e.g. Room 507)

Every time equipment is checked, the barcode is scanned and the data stored on a file.

- (a)** Give **one** other piece of information that should be on the barcodes.

.....
..... [1]

- (b)** Give **one** example of other information that should be stored on the file itself.

.....
..... [1]

- (c)** Give **two** advantages of this system rather than using sticky labels on the equipment marked, for example, "Do not use after May 2007".

1
.....
2
..... [2]

- (d)** Describe another application where barcodes could be used.

.....
.....
..... [1]

13 A robot is used in a car factory to spray car bodies.

(a) How does the robot know which parts of the car body are to be sprayed?

.....
..... [1]

(b) How would the robot know that the car was in the correct position to be sprayed?

.....
..... [1]

(c) The robot needs to be able to detect a range of possible problems (such as the car not being in the correct position). Name **another** possible problem and explain how it could be overcome.

Problem

.....

Solution

..... [2]

(d) Give another application of robotics.

.....
..... [1]

(e) Give **one** advantage of using robots instead of manual labour.

.....
..... [1]

- 14 The following spreadsheet shows how the value of certain items of computer equipment changes over time. Cells B8 and C2:E8 contain formulae.

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	A	B	C	D	E
1	Equipment	Value (\$) Year 1	Value (\$) Year 2	Value (\$) Year 3	Value (\$) Year 4
2	PC System	1600	800	400	200
3	Laptop Computer	2000	1000	500	250
4	Laptop Case	80	40	20	10
5	PC Cover	16	8	4	2
6	Printer	320	160	80	40
7	Scanner	120	60	30	15
8	Total value (\$)	4136	2068	1034	517

- (a) State a cell that contains a data item.

..... [1]

- (b) Give a formula which could be in cell B8 to calculate the total value of the equipment in Year 1.

..... [1]

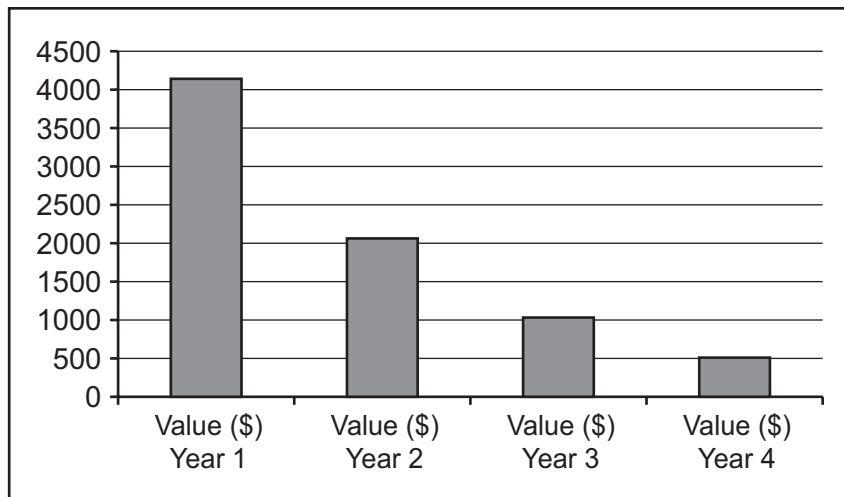
- (c) Each year the value of the equipment is halved. State a formula that could be in cell C2 to calculate value of a PC System in Year 2.

..... [1]

- (d) State **all** the cells where the values change automatically if the value in cell B4 is changed to 60.

..... [2]

(e) The following chart has been produced from the spreadsheet.



Which cells must have been selected to create and label the chart shown?

.....

..... [2]

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- 15 A school Science department is going to use a database to record details about its equipment.

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- (a) Give **two** advantages of using a computer system rather than a manual filing system.

1

.....

2

..... [2]

- (b) Part of the database is shown below:

Equipment	Code No	Quantity in Stock	Need to re-order?	Supplier Name	Price (\$)	Stock Value (\$)
Beaker	01043	25	Y	Labquip	1.04	26.00
Test tube	01051	200	N	Labquip	0.40	80.00
Clamp stand	01065	51	N	Anglera	3.25	165.75
Tongs	01151	23	Y	Anglera	0.55	12.65
Spatula	01222	62	N	Anglera	0.66	40.92
Flask	01341	15	Y	Labquip	1.70	27.50

- (i) As data is entered it needs to be verified. Describe **one** way this could be done.

.....

..... [1]

- (ii) Data also needs to be validated. Using fields from the database as examples, describe **two** different validation checks which could be performed on the data.

Name of field

Validation check

.....

Name of field

Validation check

..... [2]

16 (a) Fuel economy for a car is found using the formula:

$$\text{Fuel Economy} = \frac{\text{Distance Travelled (km)}}{\text{Fuel Used (litres)}}$$

What would be the Fuel Economy of a car travelling 40 km on 10 litres of fuel?

[1]

(b) The Fuel Economy for 1000 cars is to be calculated using the formula in Question **16(a)**.

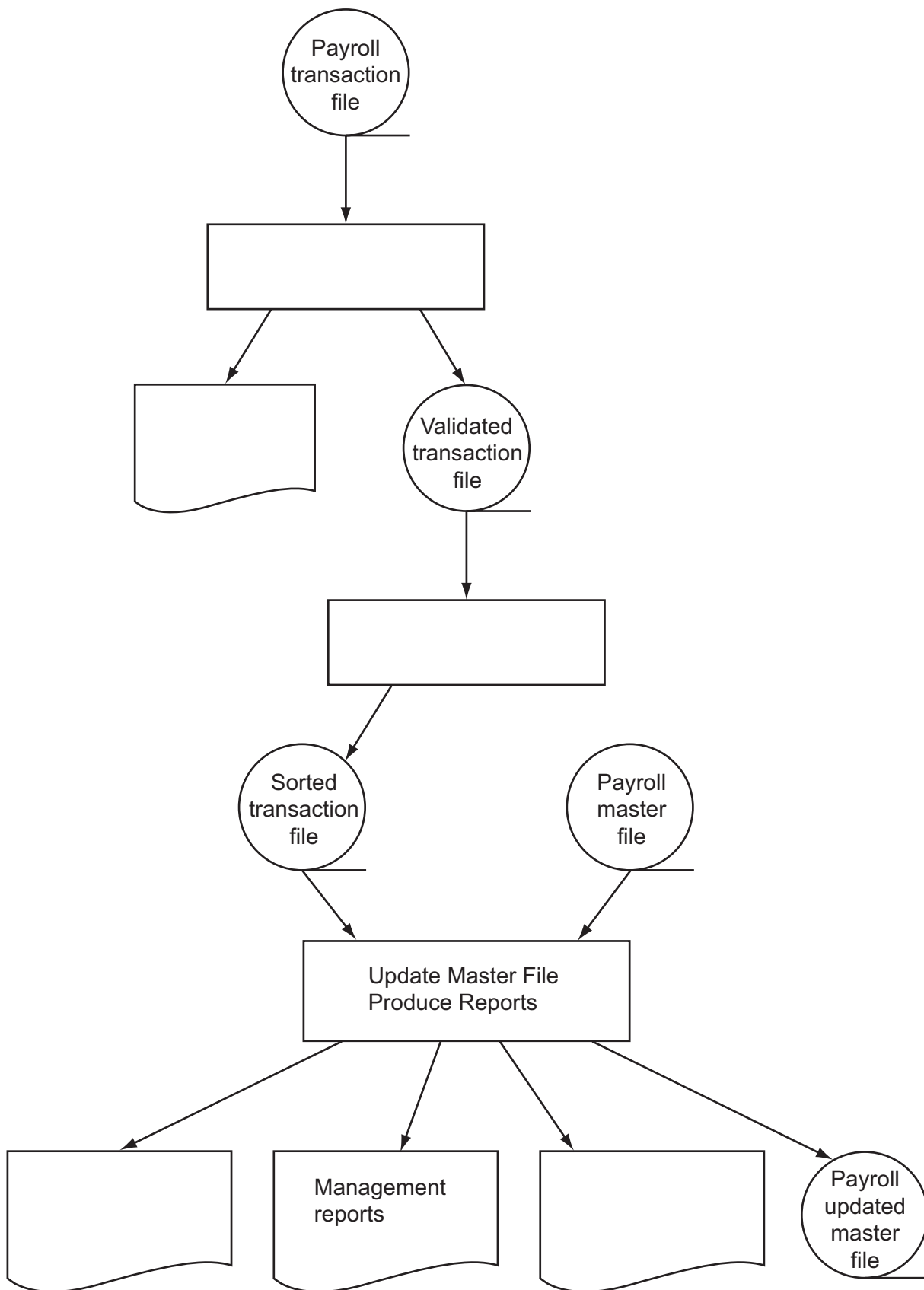
Write an algorithm, using pseudocode or otherwise, which inputs the Distance Travelled (km) and the Fuel Used (litres) for 1000 cars. The Fuel Economy for each car is then calculated and the following outputs produced:

- Fuel Economy for each car
- average (mean) Fuel Economy for all of the cars input
- the best Fuel Economy (i.e. highest value)
- the worst Fuel Economy (i.e. lowest value)

[6]

- 17 The following flowchart shows how a payroll transaction file is used to produce company pay slips.

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(a) Show on the diagram where SORTING is carried out and where VALIDATION is carried out. [1]

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(b) Show on the diagram **two** places where ERROR REPORTS are produced. [1]

(c) Show on the diagram where PAYSLIPS are produced. [1]

(d) The transaction file was created using batch processing. Why was it not appropriate to use real time processing?

.....
.....
..... [1]

(e) Name another application which uses batch processing.

.....
..... [1]

- 18** Monitoring of patients' vital signs (e.g. heartbeat) in a hospital is done automatically using sensors and computer hardware. Readings are shown on a screen both as a graph and as numbers.

(a) Why are readings shown in both graphical and numerical form?

.....

.....

..... [2]

(b) When the heartbeat is being monitored, how does the system decide if the doctor/nurse needs to be warned of an abnormal reading?

.....

.....

..... [1]

(c) Give **two** advantages of using this type of automatic monitoring.

1

.....

2

..... [2]

(d) How does this monitoring system differ from a control system?

.....

.....

..... [1]

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