

X216/11/01

NATIONAL THURSDAY, 3 MAY
QUALIFICATIONS 9.00 AM – 10.30 AM
2012

INFORMATION
SYSTEMS
INTERMEDIATE 2

Attempt Section I and Section II and **one** Part of Section III.

Section I – Attempt all questions.

Section II – Attempt all questions.

Section III – This section has three parts:

Part A – Applied Multimedia

Part B – Expert Systems

Part C – The Internet

Choose **one** part and answer **all** of the questions in that part.

Read each question carefully.

Write your answers in the answer book provided. **Do not** write on the question paper.

Write as neatly as possible.

Answer in sentences wherever possible.



SECTION I

Marks

Attempt ALL questions in this section.

1. State **two** reasons why manual database systems have been replaced by computerised database systems. 2

2. French schools use the following database to help pupils find pen pals in Britain.

ID	Name	Gender	Age	Country	French Speaker	Main Interest	School
123456	M Brady	M	15	Scotland	<input checked="" type="checkbox"/>	Walking	www.handytown.sch.uk
159875	A Gallacher	M	16	Scotland	<input type="checkbox"/>	Science	www.happyville.sch.uk
456732	T Madden	F	12	Wales	<input checked="" type="checkbox"/>	Skiing	www.valleyhigh.sch.uk
789132	G Smith	F	16	England	<input type="checkbox"/>	Reading	www.heartshigh.sch.uk
152345	M Brady	F	16	Wales	<input checked="" type="checkbox"/>	Swimming	www.cloverhigh.sch.uk

- (a) State the most appropriate field type for the **French Speaker** field. 1

- (b) State the most appropriate field type for the **School** field. 1

- (c) The **ID** field is a *primary key*. Explain the purpose of a primary key in a database. 1

3. A library database is shown below.

Book No.	Title	Author	Member ID	Member Name	Date Out	Date In	Fine
125	Exam Technique	B Test	155	L Cairns	15.5.2012	20.5.2012	£0·00
			236	A Porter	22.5.2012	31.5.2012	£1·20
			189	H McGhee	06.2.2012	06.4.2012	£6·50
999	Cookery Skills	A Potts	666	A Jamil	18.5.2012	20.5.2012	£0·00
			569	C Hoy	25.5.2012	30.5.2012	£0·00

- (a) Identify **one** *multi-valued attribute* from the database above. 1

- (b) The **Fine** field is an example of a *real* data type. Explain what is meant by a “real” data type. 1

4. Describe the difference between *data* and *information*. 2
5. State **one** offence made illegal by the Computer Misuse Act (1990). 1
6. (a) State the most appropriate type of application software to create the invoice shown below. 1

The screenshot shows an 'Invoicing System (demo version) - [Invoice/File]' window. It has a menu bar (Activities, Invoice, Lists, Reports, Tools, Windows, Help) and a toolbar with icons for Tree, View, Add customer, Add manager, Add file, Delete, Properties, Refresh, Create invoice, and Invoices. The left pane shows a tree view of customer contacts under 'Files by customer contacts'. The main area is divided into 'Non-professional activities' and 'Professional activities'. Each section has a table with columns: Date, Invoice, CM, Billing code, Rate, Hours, and Hourly. The 'Non-professional activities' table shows four rows of data. The 'Professional activities' table shows four rows of data. Below the tables, there are 'Total' and 'Invoiced total' values for each section. At the bottom, a 'Summary' section shows the overall 'Total' and 'Invoiced total'.

Date	Invoice	CM	Billing code	Rate	Hours	Hourly
1/11/2002	2	DB	117-Travel by car	\$75.00	1	\$75.00
11/11/2002		DB	117-Travel by car	\$75.00	255	19,125.00
11/20/2002	1	DB	117-Travel by car	\$75.00	1	\$75.00
11/20/2002	1	DB	116-Travel - other trans	\$75.00	2	\$150.00

Total: \$19,521.92, Invoiced total: \$396.92

Date	Invoice	CM	Billing code	Rate	Hours	Hourly
11/22/2002	1	DB	110-Telephonic contact	\$75.00	2	\$150.00
11/25/2002	1	DB	101-Telephonic contact	\$75.00	1	\$75.00
12/2/2002	2	DB	055-Meeting With Attorn	\$75.00	0.8	\$60.00
12/25/2002		DB	002-Arrange Transportat	\$75.00	1.9	\$142.50

Total: \$428.50, Invoiced total: \$286.00

Summary
Total: \$19,950.42, Invoiced total: \$682.92

- (b) Describe a **personal** use of *Reference* software. 1
7. Customers and retailers are both involved with online shopping.
- (a) Describe **one advantage** to a **customer** of online shopping. 1
- (b) Describe **one disadvantage** to a **retailer** of online shopping. 1
8. Describe the role of a *knowledge worker* in an organisation. 1

Total for Section I (15)

[END OF SECTION I]

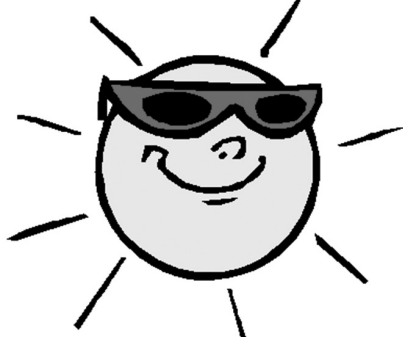
[Turn over for SECTION II on Page four]

SECTION II

Marks

Attempt ALL questions in this section.

9. SunnyDays is a travel agency with branches throughout the UK. They offer 3, 7 or 14 night holidays to destinations all over the world. Below is an example of some information held by SunnyDays.



SunnyDays

Branch ID: 179LDN
Location: London
Address: 258 Oxford Street
Phone No: 0191 569 8745

Holiday No	Customer Name	Destination	Departure Date	Duration	Price
121	Mr McNeill	Barbados	20/09/2012	7	£4000
666	Mrs Grey	Rome	25/09/2013	3	£520
999	Mr Price	Australia	01/10/2013	14	£7980

- (a) Identify and remove the multi-valued fields from the above table and represent the data as two entities with suitable names. Clearly identify all primary and foreign keys.
- (b) Describe **one** validation check that would be appropriate for the above data. Your answer should include the field name and suitable validation check.

7

2

(9)

10. Naz runs a shop that sells mobile phones. He is considering introducing a computerised *information system*.

- (a) Explain what is meant by the term “information system”. 1
- (b) Naz wishes to store the personal details of his customers.
- (i) State the legislation that aims to prevent companies misusing **personal** information. 1
- (ii) Describe what this legislation requires Naz to do before storing any personal information. 1
- (c) Naz has been advised that he should have a *backup strategy* for his information system.
- (i) Explain why it is important to have a backup strategy. 1
- (ii) State **one** other information management strategy that Naz should consider implementing. 1
- (d) Having implemented his information system, he produces the following table.

	A	B	C	D	E
1	Sales				
2	Product	Stock Level	Sold	Price	Income
3	Galaxy	250	12	£80.00	=C3*D3
4	Curve	380	3	£120.00	
5	J-Phone	500	123	£200.00	
6	NN8	100	55	£60.00	
7	Cookie	300	165	£39.99	

- (i) A formula was entered into cell E3. State the *operation* that could efficiently enter a similar formula into cells E4 to E7. 1
- (ii) Identify **two** *formatting functions* that have been used in the above table. 2
- (e) After *gathering* the sales figures, the total sales are then calculated, *stored* and *output*.
- Name the function of the organisational information system that is being used when the total sales are calculated. 1
- (f) Two implications of introducing the new information system are *increased productivity* and *increased profitability*.
- (i) Explain what is meant by increased productivity. 1
- (ii) Explain what is meant by increased profitability. 1

11. Amy works in the graphics department of WebEasy and has been given the task of creating a company logo.

- (a) Before starting, Amy must choose a graphics package to create the logo. She has the choice of Easylogo or Simply Draw.

State **two** features Amy could use to evaluate which package was more appropriate for creating the logo.

2

- (b) At the bottom of the logo, Amy puts “© WebEasy 2012”. This indicates that WebEasy owns the copyright to the logo.

Explain why WebEasy have shown they own the copyright.

1

- (c) While creating the logo, Amy finds the following information screen useful.

Paint tools

Easylogo is a program you can use to create drawings on a blank canvas or on top of other pictures. The program features a toolbar on the left hand side of the window. The following tables describe how to use each of the tools on this toolbar.

Tool	Description
	Use Free-Form Select to select any irregularly shaped part of the picture. Click Free-Form Select , and then, in the options box just below the toolbar, click a background style. Drag the pointer to select the part of the picture you want to work with.
	Use Select to select any square or rectangular part of the picture. Click Select , and then, in the options box just below the toolbar, click a background style. Drag the pointer to select the part of the picture you want to work with.
	Use the Eraser to erase areas of your picture. Click Eraser , click an eraser size below the toolbox, and then drag the Eraser over the area of the picture that you want to erase. Any areas that you erase will be replaced by the background color.
	Use Fill With Color to fill the entire picture or an enclosed shape with color. Click Fill With Color , click a color in the Color box, and then click inside the area you want to fill. To remove the color and replace it with the background color, right-click the area where you want to remove the color.

Ask someone or expand your search

State the name given to this type of information screen.

1

(4)

12. The University of Perthshire offers revision courses to help pupils prepare for exams. The data is held in two tables as follows.

COURSE(Course ID, Title, Room, Lecturer)

PUPIL(Pupil ID, First Name, Surname, School, Contact Number, Course ID*)

- (a) Explain why the field **Course ID** is included in the **PUPIL** table. 1
- (b) State the *one-to-many* relationship that exists in the tables above. 1
- (c) The University produces a *report* that shows all the pupils studying Course 101.

Course 101 Report				
Course ID	First Name	Surname	Contact Number	School
101	Hamza	Ali	01738 945632	Strathallen
101	Amna	Ishaq	01738 869795	Strathallen
101	Conor	Johnston	01738 963258	Strathallen
101	Pulvisha	Ahmed	0141 589 1973	Smithycroft
101	James	Borland	0141 589 4789	Smithycroft
101	Elaine	Coyle	0141 589 6321	Smithycroft
101	Kieran	Henaghan	0141 589 6578	Smithycroft
101	Daniel	McFadden	0141 589 9632	Smithycroft
101	Quassim	Mohammed	0141 589 6739	Smithycroft
101	Louis	Ruddy	0141 589 6791	Smithycroft
101	Haider	Ahmad	01699 745632	Kilgraston
101	Thomas	MacKay	01699 461325	Kilgraston
101	Cain	Thomson	01699 879658	Kilgraston
101	Patrick	Waddle	01699 846310	Kilgraston

- (i) Describe what is meant by a “report”. 1
- (ii) Describe how the **PUPIL** table was searched and sorted to provide the information for the above report. 3
- (6)

Total for Section II (30)

[END OF SECTION II]

SECTION III

Attempt ONE part of Section III.

Part A	Applied Multimedia	Page 9	Questions 13 to 15
Part B	Expert Systems	Page 16	Questions 16 to 19
Part C	The Internet	Page 20	Questions 20 to 22

Choose **one** part and answer **all** of the questions in that part.

SECTION III

PART A—Applied Multimedia

Marks

Attempt ALL questions in this section.

13. A business uses a multimedia presentation to introduce a new range of smartphone products to sales staff.

- (a) State **one other** use of multimedia in business. 1
- (b) The presentation contains basic information about Smartphones. Two versions of the information have been created.

Version 1

Smartphone Basics

A smartphone is a handheld device that can provide wireless voice communications along with support for other applications. Data applications include messaging (both text and multimedia), e-mail, audio players, and web surfing via a Graphical User Interface (GUI)-based browser.

Another feature of a smartphone is a built-in camera for taking snapshots, with some smartphones able to capture video clips. Another important feature is docking with a PC for uploading and downloading data.

An important function of office applications is the capability of synchronizing data.

Version 2

Smartphone Basics

Main Uses

A handheld device providing wireless voice communications and other applications such as:

- text messaging
- multimedia messaging
- audio player
- e-mail
- web surfing.

Other features

A number of other features are often available such as:

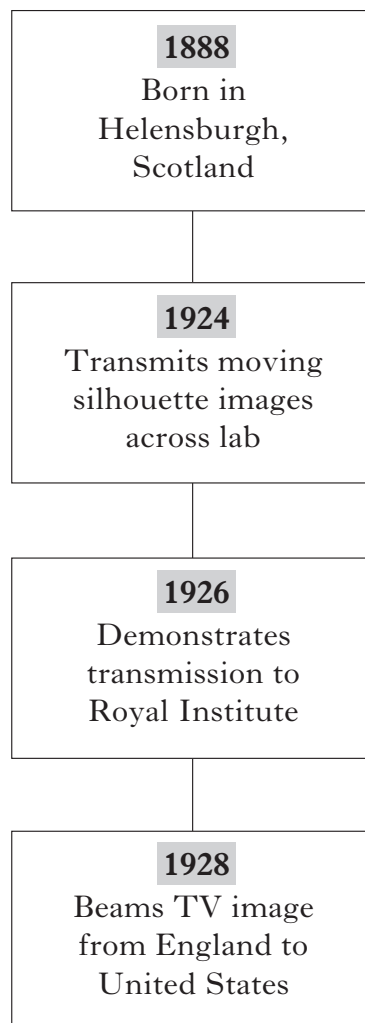
- built-in camera for snapshots
- ability to capture video clips
- docking with a PC for uploading and downloading data
- capability of synchronizing data.

- (i) Identify **two** general principles of text design that have been applied in Version 2. 2
- (ii) Name the data object used to hold the information in this presentation. 1

14. A museum wishes to introduce interactive multimedia information points about Scottish inventors.

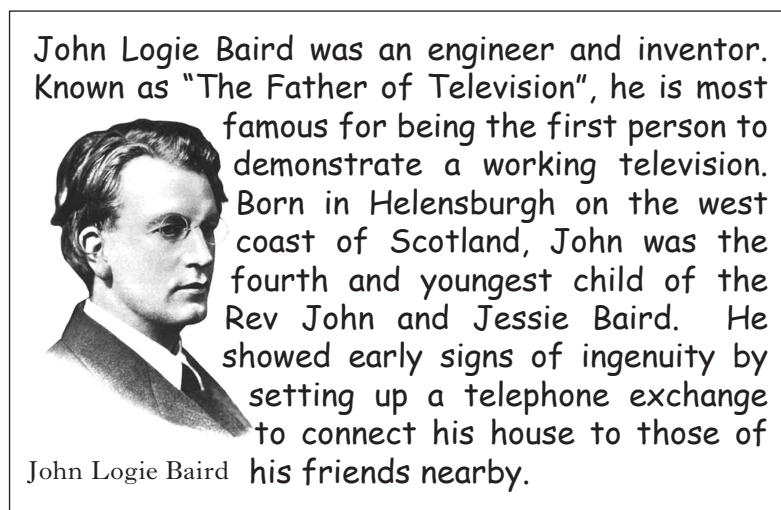
The museum commissions ScoMM, a multimedia development company, to create the information points.

- (a) ScoMM appoint a project manager for the museum project. Describe **one** task carried out by a project manager. 1
- (b) A project specification is prepared which includes details of the *delivery media*, *purpose* and *content* of the information points.
- (i) Name **one other** aspect that should be included in the project specification. 1
- (ii) State the most appropriate delivery media for these information points. 1
- (c) One of the inventors to be included in the exhibition is John Logie Baird. Here is part of a timeline for his life:



- (i) State the type of navigation structure most suitable to show the events in his life from beginning to end. 1
- (ii) Justify your answer to part (i). 1

- (d) Another screen will contain old scanned photographs, like the one shown below about John Logie Baird.

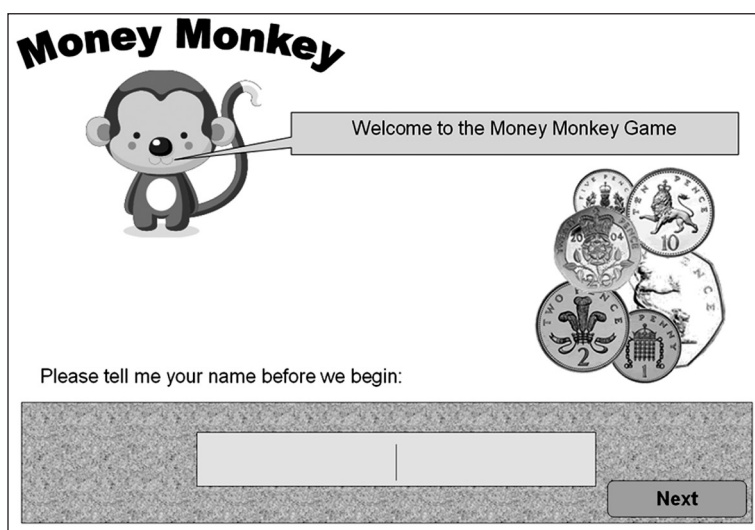


- (i) Identify **two** graphic design principles that have been incorporated in this screen. 2
- (ii) Explain how the resolution of the scanned image will affect the file size and clarity of the graphic. 2
- (iii) The image of John Logie Baird is an *anchor*. 1
 Explain what is meant by the term "anchor" in this situation.
- (e) Before the information point is introduced into the museum, an evaluation is carried out to ensure it is *fit for purpose*. 1
 Describe **one** technique the museum could use to evaluate the new system. 1
- (11)**

[Turn over

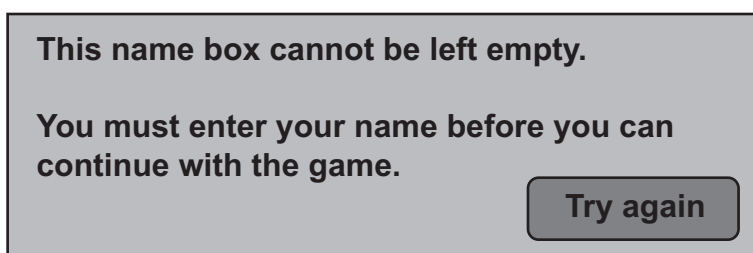
15. Money Monkey is an interactive game which helps young children learn about money.

Before playing the game, the user is asked to enter their name.



The screenshot shows the title screen for the 'Money Monkey' game. At the top left, the title 'Money Monkey' is written in a bold, black, sans-serif font. Below the title is a cartoon monkey character with a speech bubble that says 'Welcome to the Money Monkey Game'. To the right of the monkey are several British coins, including a 10p coin and a 2p coin. Below the coins, the text 'Please tell me your name before we begin:' is displayed. At the bottom, there is a large, empty rectangular text input box. To the right of the input box is a button labeled 'Next'.

If they do not type a name, the following screen is displayed.

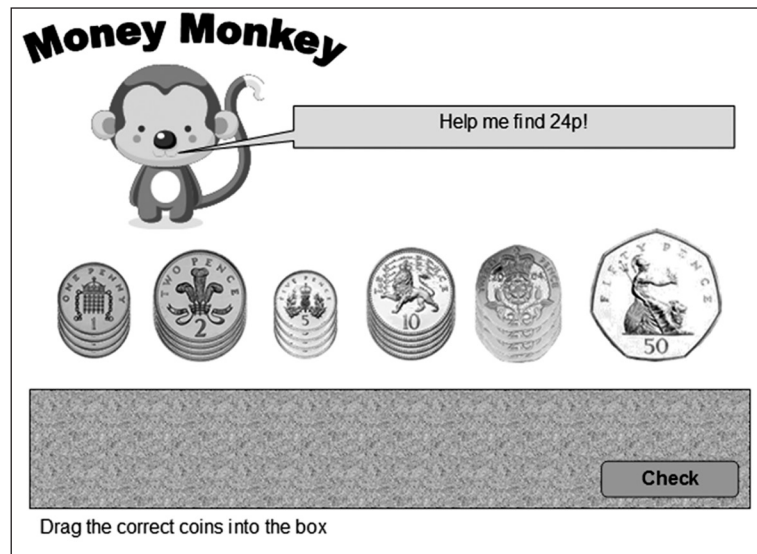


The screenshot shows an error message screen. The background is a solid grey color. At the top, the text 'This name box cannot be left empty.' is displayed in a bold, black, sans-serif font. Below this, the text 'You must enter your name before you can continue with the game.' is displayed in a bold, black, sans-serif font. At the bottom right, there is a button labeled 'Try again'.

- (a) Name the feature used in the program that meant this message was displayed.

1

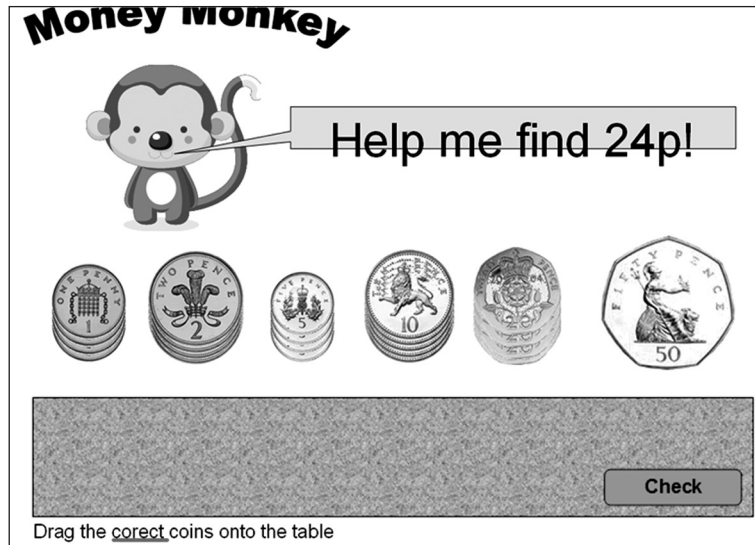
When playing the game, the user sees the following screen.



- (b) (i) State the type of user interface being used above. 1
- (ii) Explain why this type of user interface is suitable for this application. 1
- (c) Background music is played during the game.
Suggest **one other** use of audio in this game. 1
- (d) (i) State the most appropriate type of software for creating the Money Monkey game. 1
- (ii) Give a reason for your answer to part (i). 1

[Turn over

- (e) During the development of the game, *screen testing* is carried out.



Describe **three** problems on the screen shown above that would be identified during screen testing.

2

- (f) The Money Monkey game is distributed with *User Instructions*.

Describe **two** items that should be contained in the User Instructions.

2

(10)

Total for Section III Part A (25)

[END OF SECTION III—PART A—APPLIED MULTIMEDIA]

[Turn over for Questions 16, 17 and 18 on *Page sixteen*

SECTION III

Marks

PART B—Expert Systems

Attempt ALL questions in this section.

16. Expert systems deal with knowledge.

(a) Explain the difference between *information* and *knowledge*.

2

(b) An expert system is often created using an *expert system shell*.

Describe **two** features of an expert system shell.

2

(4)

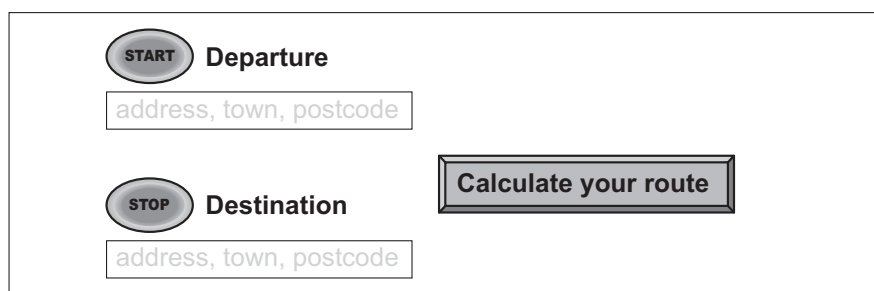
17. A router manufacturer wishes to develop an expert system to determine the nature of problems with Internet connections. Here is some of the knowledge to be included in the system.

“Each router has a DSL light and an Internet light. If the DSL light and the Internet light are both on green, then the ADSL filter needs to be checked. If the DSL light is green and the Internet light is flashing, then check the router settings. However if the DSL light is green, and the Internet light is off, then check the username and password are entered correctly. If the DSL light is flashing and the Internet light is off, then the service has not yet been activated.”

Represent the knowledge about the Internet connection problems as a factor table.

(4)

18. Scott uses an expert system to find the route to drive from Inverness to Edinburgh.



(a) Name the component of the expert system responsible for displaying the screen above.

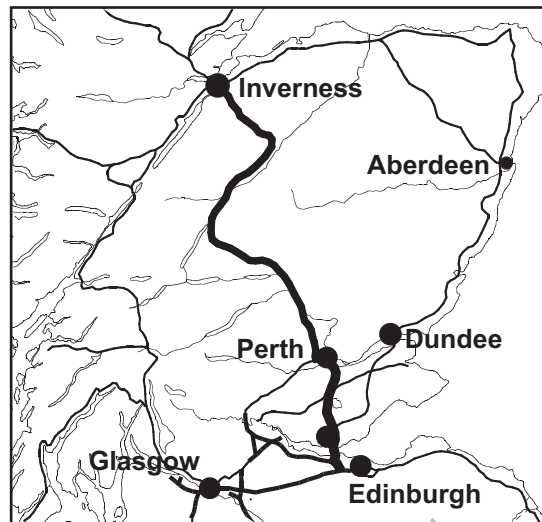
1

(b) State the category of this expert system.

1

- (c) During the development of the expert system, two methods of displaying the route were included.

Method 1: Route Map



Method 2: Route Instructions

START

Depart: Leave Inverness centre

- Continue along A82
- At the roundabout, take 3rd exit and continue along A9
- Near Perth, at the roundabout, take 2nd exit and continue along M80
- Take A90

STOP

Destination: Arrive Edinburgh

State **one** reason for including a variety of methods to present the conclusion in this expert system.

1
(3)

[Turn over

19. Ski resorts use a rating system to indicate the difficulty of ski runs. There are four ratings used—Green(easy), Blue(beginner), Red(intermediate) and Black(expert).

An expert system is being developed to help skiers decide which ski runs to try during their holiday.

The factor table below shows some of the knowledge in the expert system.

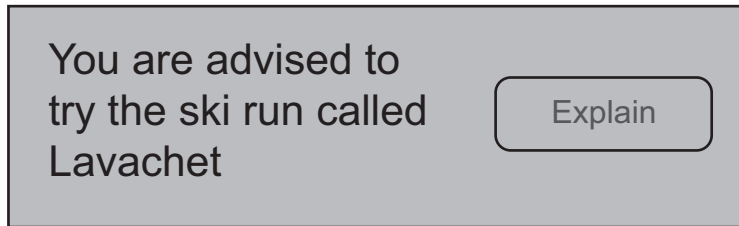
Rating	Length	Mountain Area	Name of Ski Run
Green	Short	Les Brevieres	Davie
Green	Medium	Tignes	Lavachet
Blue	Very long	Les Boisses	Mélèzes
Blue	Long	Val Claret	Piste H
Blue	Short	Tignes	Petit Col
Red	Short	Tignes	Saxifrage
Red	Long	Tignes	Bleuets
Red	Long	Val Claret	Double M
Red	Short	Tignes	Crocus
Black	Very long	Les Brevieres	Sache
Black	Medium	Grand Motte	Descente

- (a) Identify the stage of the expert system development when a factor table is created. 1
- (b) Production rules are written for the ski run expert system.
- (i) Identify the method of inferencing that should be used to write the production rules for this system. 1
- (ii) Give a reason for your answer in part (i). 1
- (iii) Using your chosen method of inferencing, write the rule that will recommend they try the ski run called Descente. 4
- (c) Explain how the domain expert is involved during the testing of this system. 1

19. (continued)

Marks

(d) After a test consultation the following screen is displayed.



Describe the purpose of the Explain button on this screen.

1

(e) When the system is completed, a skier uses it to find a short red run in Tignes.

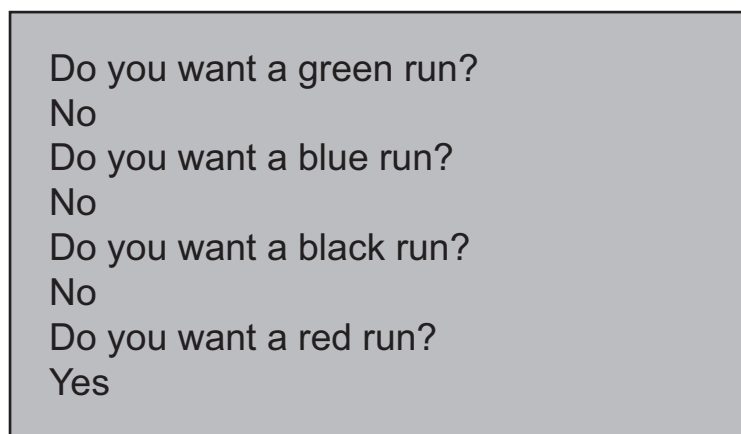
(i) State all the advice the completed system will give the skier.

2

(ii) If the system was implemented in a database instead of an expert system, which feature would be used to find a short red run in Tignes?

1

(iii) During the consultation the following screen is displayed.



Design a structured question that would be a more efficient method of getting the same information. You may use a diagram in your answer if you wish.

2

(14)

Total for Section III Part B (25)

[END OF SECTION III—PART B—EXPERT SYSTEMS]

[Turn over

SECTION III

Marks

PART C—The Internet

Attempt ALL questions in this section.

20. Faith uses the MySearches search engine to find information about martial arts clubs.

- (a) She wishes to find a martial arts club in the Angus area that does not meet on a Thursday.

State a Boolean search that would find this information.

3

- (b) Faith would like to watch some martial arts video clips.

Identify the advanced search feature from MySearches, shown above, which is most suitable for this search.

1

- (c) Identify the feature from MySearches, shown above, that would most likely have been created using the scripting tool.

1

- (d) Faith downloads a martial arts video. Soon afterwards, Faith thinks that her computer may have a virus. The anti-virus software she has installed has not given her any warnings.

- (i) Describe **one** symptom of virus infection that may make Faith think that her computer has a virus.

1

- (ii) Suggest **one** reason why the anti-virus software may not have notified Faith that her computer has a virus.

1

(7)

[Turn over for Question 21 on *Page twenty-two*

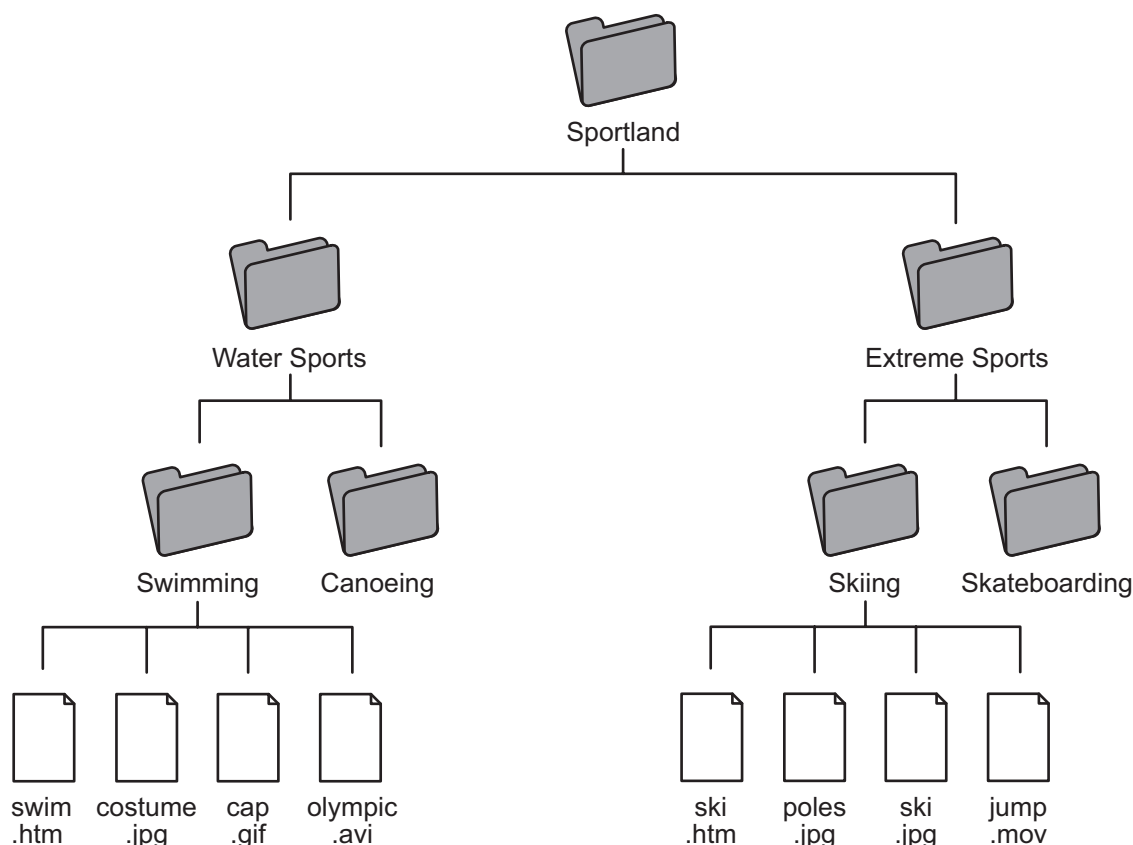
21. Sportland is a sports store which is found in many shopping centres.

(a) Sportland has decided to expand its business through the use of *e-commerce*.

(i) Explain what is meant by the term “e-commerce”. 1

(ii) Describe a **social implication** which has risen from the increased use of e-commerce. 1

(b) Daniel designs Sportland’s website file structure as shown below.



(i) State the type of application software that would be most appropriate for Daniel to create the website. 1

(ii) State the type of page addressing that Daniel should use to include the file **costume.jpg** on the **swim.htm** page. 1

(iii) Daniel creates a link between **swim.htm** and **ski.htm**.
State the feature of the software package he would use to create the link. 1

(c) Sportland decide to add extra functionality to their website.

(i) They wish to give their customers the opportunity to speak to a sales advisor in real-time.

State an Internet service that would allow them to do this. 1

(ii) Suggest a suitable **business** use that Sportland could have for e-mail. 1

21. (continued)

Marks

(d) Some customers are concerned about the security of their bank details when using the Sportland website.

(i) State a development in security software which has made using the website more secure for Sportland's customers.

1

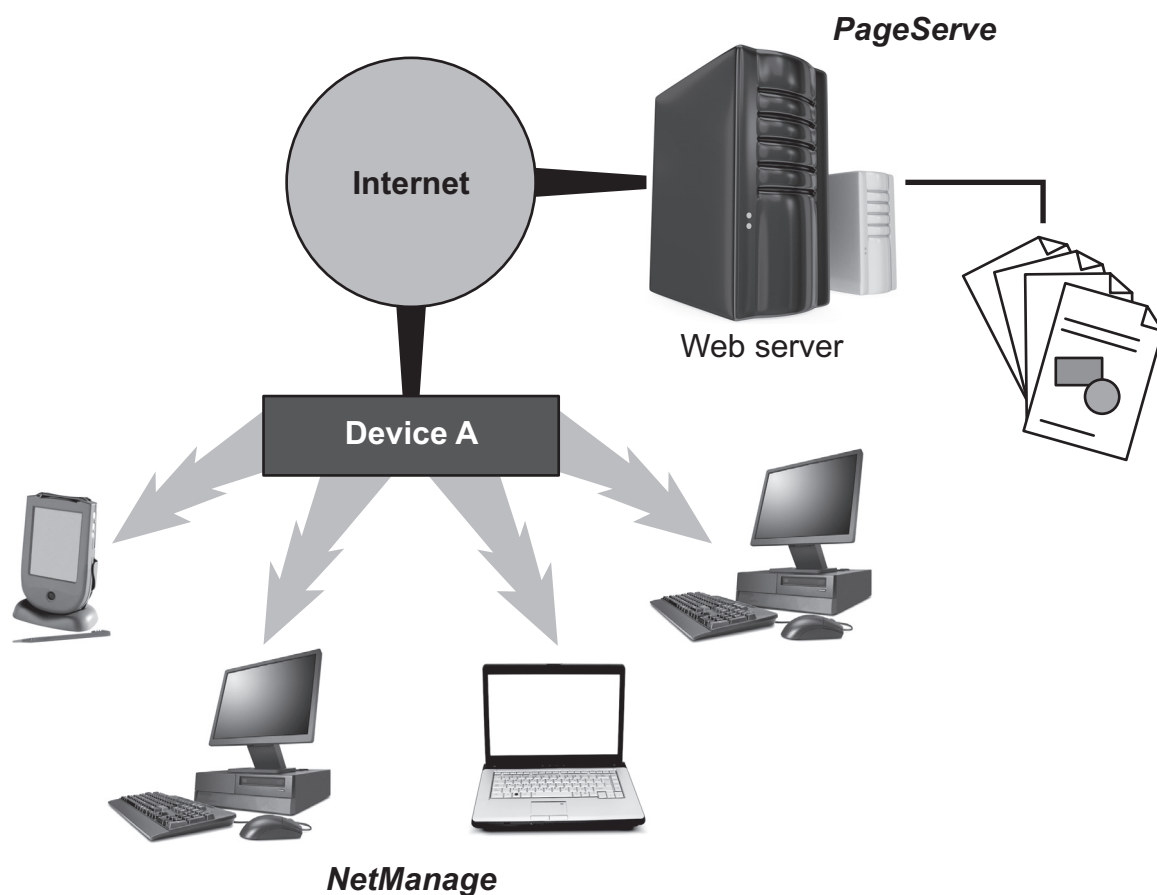
(ii) Describe how the development you suggested in part (i) has led to increased security.

1

(9)

[Turn over

22. PageServe is an Internet Service Provider (ISP) which provides Internet services to a company called NetManage. A diagram of the connection between PageServe and NetManage is shown below.



- (a) Identify the name of Device A from the diagram above. 1
- (b) PageServe is responsible for NetManage's *Internet hosting service*.
- (i) Explain what is meant by the term "Internet hosting". 1
- (ii) State the Internet service which should be used to upload data files onto the web server. 1
- (c) PageServe store high resolution graphics for use on their customers' webpages. Explain why this will be a problem for computers using a low bandwidth Internet connection. 2

22. (continued)

Marks

- (d) Data sent over a network is divided into packets.

A diagram of a packet is shown below.

Data	X	Destination Address
-------------	----------	----------------------------

Two of the parts that make up a packet are the data and the destination address.

Name the part of a packet shown in the diagram as “X”.

1

- (e) *Communication protocols* are used to send data between PageServe and NetManage.

(i) Describe what is meant by a communication protocol.

2

(ii) State the protocol which is used for downloading web pages.

1

(9)

Total for Section III Part C (25)

[END OF SECTION III—PART C—THE INTERNET]

[END OF QUESTION PAPER]

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