VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education 2017

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER | | | | | | | | | Letter |

COMPUTING: INFORMATICS

Written examination

Monday 13 November 2017

Reading time: 11.45 am to 12.00 noon (15 minutes)
Writing time: 12.00 noon to 2.00 pm (2 hours)

QUESTION AND ANSWER BOOK

Structure of book

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	20	20	20
B	7	7	30
C	13	13	50
			Total 100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.
- No calculator is allowed in this examination.

Materials supplied
- Question and answer book of 26 pages
- Detachable insert containing a case study for Section C in the centrefold
- Answer sheet for multiple-choice questions

Instructions
- Detach the insert from the centre of this book during reading time.
- Write your **student number** in the space provided above on this page.
- Check that your **name** and **student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space provided to verify this.
- All written responses must be in English.

At the end of the examination
- Place the answer sheet for multiple-choice questions inside the front cover of this book.
- You may keep the detached insert.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

SECTION A – Multiple-choice questions

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** or that **best answers** the question.

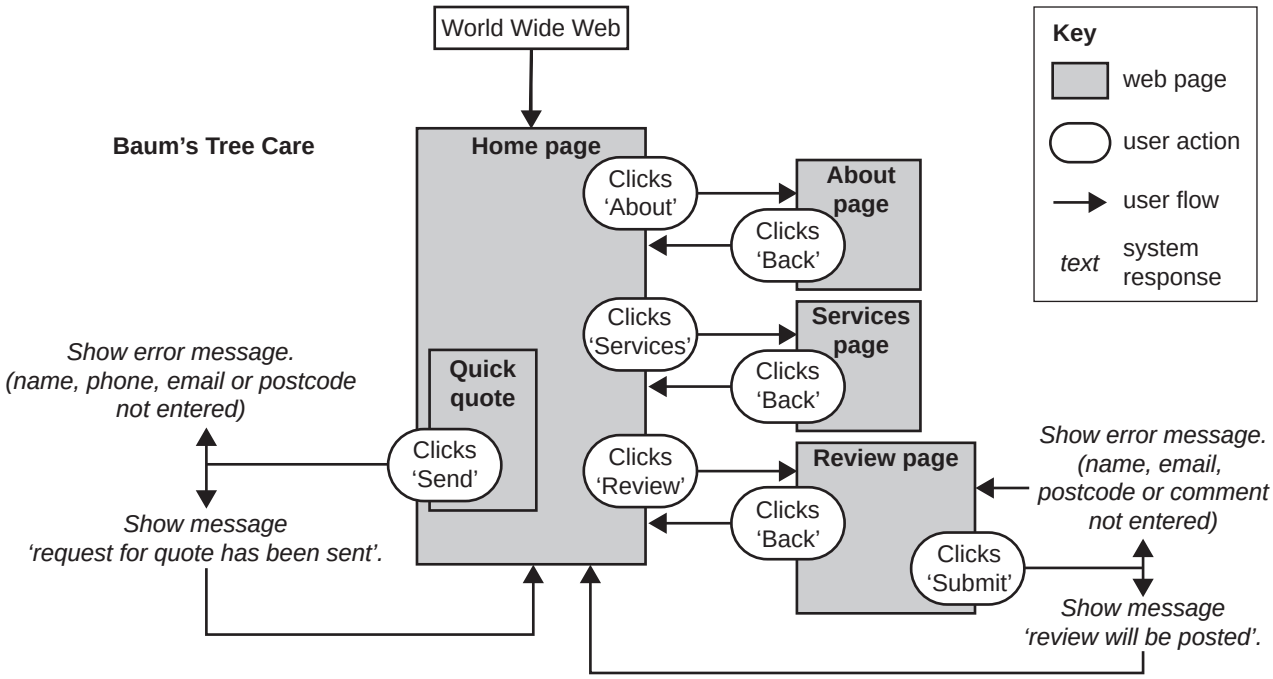
A correct answer scores 1; an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Use the following information to answer Questions 1–5.

Baum's Tree Care (BTC) offers tree pruning and removal services throughout Victoria. The diagram below shows a user flow diagram for BTC's website. Visitors to the site can obtain a quote by filling in a form on the home page.



Question 1

When on the home page, to successfully post a review on BTC's website, a visitor to the site must

A. click 'Submit'.

B. click 'Review', enter their name, email and postcode, and click 'Submit'.

C. enter their name, email and postcode, write their review comments and click 'Submit'.

D. click 'Review', enter their name, email and postcode, write their review comments and click 'Submit'.

Question 2

To protect the privacy of the data that visitors enter into BTC's website, the website must at least

A. encrypt the data on the home page and review page.

B. force visitors to change their passwords regularly.

C. encrypt the data entered into the 'Quick quote' form.

D. include a link to BTC's privacy policy on the home page.

Question 3

The user flow diagram clearly shows that the functionality of BTC's website has been influenced by the design principles of

A. space and balance.

B. alignment and navigation.

C. ease of use and robustness.

D. error tolerance and navigation.

Question 4

The data entered by the visitor into the 'Quick quote' form will be stored in a database table.

The most suitable data type for the

A. Phone_Number field is numeric because it is a number.

B. Email_Address field is text because any character is allowed.

C. Postcode field is Boolean because it is either entered or not entered.

D. Visitors_Name field is text because only letters of the alphabet are allowed.

Question 5

The error messages shown in the user flow diagram are generated by a validation technique that checks for a blank entry. Another validation technique that could be used is a 'length check', where the data entered is checked to make sure it has the correct number of characters.

For which fields would a length check be most appropriate?

A. Postcode and Phone_Number

B. Email_Address and Visitors_Name

C. Phone_Number and Email_Address

D. Email_Address, Postcode and Phone_Number

Question 6

Primary data sources include

A. interviews, observations and surveys.

B. interviews, observations and statistics.

C. interviews, statistics and news websites.

D. interviews, observations and news websites.

Question 7

Which one of the following statements is a reasonable hypothesis?

A. Computing: Informatics is the most popular VCE subject.

B. If I brush my teeth every day, I will not develop cavities.

C. I study Computing: Informatics because it is the most popular VCE subject.

D. To prevent cavities from developing, eat healthy food.

Question 8

Intellectual property rights are protected through the use of

A. logins, trademarks and copyright.

B. trademarks, copyright and patents.

C. patents, security protocols and logins.

D. copyright, patents and security protocols.

Question 9

Which one of the following criteria can be used to check the authenticity of data?

A. Is the data useful?

B. Is the data error free?

C. Is the data up to date?

D. Is the data from a reliable source?

Question 10

Which of the following do Gantt charts show most clearly?

A. multiple tasks and timelines

B. the constraints on a project

C. the consequences if a project is delayed

D. all the people involved in a project and their requirements

Question 11

Digital system components that are used to input data include a

A. keyboard, mouse and printer.

B. keyboard, mouse and scanner.

C. keyboard, printer and hard disk drive.

D. keyboard, touch screen and hard disk drive.

Question 12

Which one of the following is a technique that can be used to code qualitative data?

A. Sort the data into numerical order.

B. List all the nouns and verbs in the data.

C. Organise the data into categories or themes.

D. Search the data for the largest or lowest values.

Question 13

One method that could be used to evaluate the effectiveness of a multimodal online solution in communicating a conclusion is to

A. make sure that graphs and charts display properly.

B. ask someone to check that the conclusion is correct.

C. show the solution to a group of people and interview them afterwards.

D. calculate the number of bytes required to communicate the conclusion.

Question 14

Which one of the following evaluation criteria is suitable for evaluating a design idea?

A. Is the information presented accurate?

B. Does the solution confirm or refute the hypothesis?

C. Can end users perform tasks within the expected timeframes?

D. Are the relationships between various components of the solution clear?

Question 15

A website is under construction. The purpose of the website is to provide educational material to a worldwide audience. One of its web pages will include a video clip. The video file will be hosted on the same server as the website, not on an external video-hosting site.

The first test of the video page's functionality should be to check that the

A. download time is reasonable.

B. video plays on all major web browsers.

C. video plays when its control is clicked on.

D. video plays on all desktop computers, tablet computers and mobile phones.

Question 16

The *Privacy and Data Protection Act 2014* governs how

A. the Victorian public sector deals with individuals' health information.

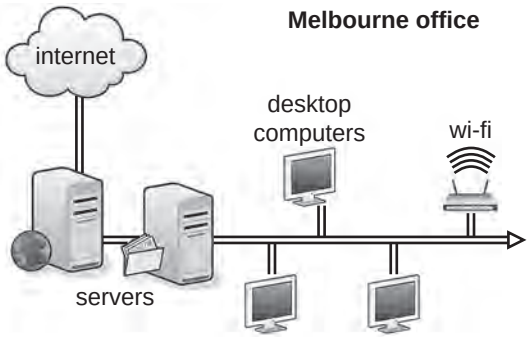
B. private companies in Victoria deal with individuals' health information.

C. the Victorian public sector deals with individuals' personal information.

D. private companies in Victoria deal with individuals' personal information.

Use the following information to answer Questions 17 and 18.

BAC Architects is a large architectural company in competition with several other organisations to win contracts for major building projects. It has offices in Melbourne, Sydney and Perth. Each office has an information system consisting of a number of desktop computers in a wired network with a fileserver and a webserver. There is also a wi-fi connection for staff devices. An example of their set-up is shown in the diagram below.



BAC Architects' information management strategy has five main goals:

1. to maximise the ease of sharing data
2. to minimise the risk of attack from malware
3. to maximise the ease of version control of files
4. to minimise the opportunities for employees to steal data
5. to minimise the loss of valuable company data in the event of a disaster

Question 17

BAC Architects' information management strategy includes the policy statement: 'Staff must store company data on the fileserver, not on desktop computer hard drives, removable storage devices (for example, mobile phones, USB memory devices, laptops) or in email accounts.'

Which set of goals does this rule most directly apply to?

A. 1, 2, 3

B. 1, 3, 5

C. 2, 4, 5

D. 3, 4, 5

Question 18

To better meet the goals of its information management strategy, BAC Architects is considering replacing the local fileserver in each office with a single cloud storage facility for the whole company.

For BAC Architects, cloud storage will

A. decrease the opportunity for employees to steal data.

B. improve sharing within the company and always be available.

C. simplify backup procedures and give BAC Architects more control over its data.

D. simplify backup procedures and provide quick access to data after a disaster.

Question 19

The main reason for having a disaster recovery plan for an information system is to

A. prevent a disaster from occurring.

B. minimise system downtime and data loss in the event of a disaster.

C. make sure everyone knows what to do in the event of a disaster.

D. guarantee that backups are carried out every day and stored off site.

Question 20

An organisation is developing criteria for evaluating its new information management strategy for the storage and disposal of data.

What is the most important factor for the organisation to take into consideration when developing these criteria?

A. the organisation's legal requirements

B. the needs of the organisation's stakeholders

C. the goals of the organisation's information system

D. the cost of the organisation's disaster recovery plan

END OF SECTION A
TURN OVER

SECTION B – Short-answer questions

Instructions for Section B

Answer **all** questions in the spaces provided.

Question 1 (2 marks)

Explain how qualitative data can be used to support quantitative data. Provide an example to illustrate your answer.

Question 2 (4 marks)

a. Explain how legal issues can be a constraint on the acquisition and use of secondary data. 2 marks

b. Outline a process that could allow for the use and publication of secondary data. 2 marks

Question 3 (3 marks)

A science project is being set up to determine what kinds of lizards there are in Australia and how many live in towns and cities. People who take part in the project will be asked to enter sightings into a web page. More than one sighting can be entered at a time.

a. The following table shows an example of the data that could be collected from a form on the web page.

date	**postcode**	**state**	**commonName**	**speciesName**
04-Apr	3850	Vic	Blue tongue Garden skink Bougainville's skink	Tiliqua scincoides scincoides Lampropholis guichenoti Lerista bougainvillii

State why this data is not in first normal form. 1 mark

b. The database designer has brought the data into second normal form, as shown in the following table structures.

Species Table: primary key: speciesName

speciesName	commonName

Sightings Table: primary key: sightingID

sightingID	date	postcode	state	speciesName

Explain why the Sightings Table is not in third normal form. 2 marks

Question 4 (4 marks)

Foodie's Restaurant has been open for two months and is proving to be a popular and successful eating establishment. Richard, the owner, has captured the online reviews of his restaurant. He would like to know whether the day of the week makes a difference to his customers' experience, particularly in relation to food, service or atmosphere.

Here is a sample of the online reviews:

- 29 Sep 2017 – Great food and ambience. The combination of flavours and textures was fantastic and the wines were very good. Service was extremely professional and friendly.
- 2 Oct 2017 – Worth every cent. The food and service are amazing; can't fault a thing. We will be back.
- 2 Oct 2017 – It's a little small, but cosy. One of my favourites as the food is absolutely delicious!
- 19 Oct 2017 – Went here with the family and was not disappointed. Food and service were outstanding. Will be back.

Explain how Richard could manipulate the review data to find patterns that might answer his question. Use examples to support your explanation.

Question 5 (2 marks)

Rocks'R'Us is a geological mapping company that uses satellite imagery to highlight areas of Far North Queensland that may have valuable minerals in the ground.

Explain why having timely data would be less important to Rocks'R'Us than having accurate data.

Question 6 (4 marks)

Jimbo's Real Estate Company is a large agency with an annual turnover that exceeds $7 million. Currently the company stores all of its corporate information on a reputable cloud server based in Germany. The following information is stored:

- A – all staff details, including salaries and earnings from sales
- B – all sales-related items
- C – all purchaser details
- D – all seller details

The cloud storage company says that it keeps all details secure. All of Jimbo's staff members have equal access to all files stored in the cloud.

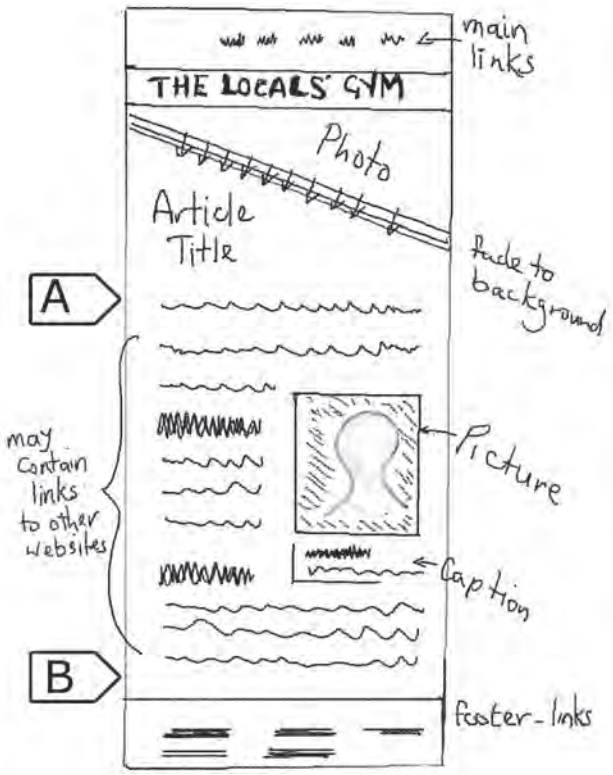
a. Outline a possible ethical dilemma related to point A above. 1 mark

b. Outline a possible solution to the ethical dilemma outlined in **part a.** 1 mark

c. When Jimbo's switched over to cloud storage, its manager thought a disaster recovery plan would no longer be needed.

Outline **two** important aspects of a disaster recovery plan that the manager still needs to consider even if Jimbo's has cloud storage. 2 marks

Question 7 (11 marks)



The Locals' Gym is adding a new section to its website. Each month, the gym will publish on a new web page an article providing advice about physical wellbeing and fitness.

At the end of each month, the web page will be linked to an index page so that visitors to the site can still find the article if they wish.

The layout of each monthly web page will be the same. A sketch of the layout has been created and is shown above.

a. With regard to the text that appears between A and B on the web page, identify two conventions that should be followed and suggest how each should be applied. 4 marks

1. _____

_____

_____

2. _____

_____

_____

b. Apart from gender inclusiveness, explain two characteristics that the information on the new web page should have if it is to educate worldwide audiences. 4 marks

1. _____

_____

_____

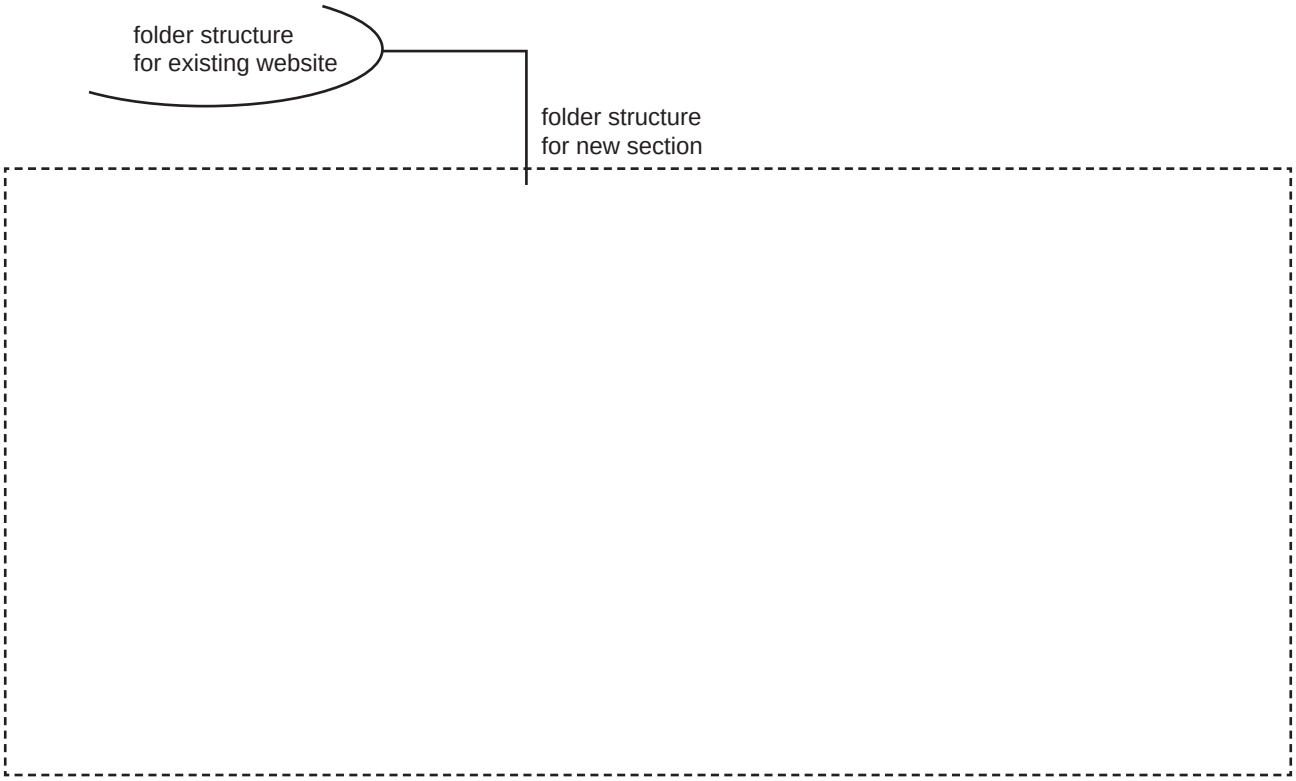
2. _____

_____

_____

c. The new section will require a suitable folder structure and file-naming convention so that different files can be found quickly.

i. In the space provided below, draw a suitable folder structure for storing the files associated with the new section of the website. Clearly label your diagram. 1 mark



ii. Describe a file-naming convention and use an example to show how the convention would be helpful in finding files quickly. 2 marks

_____

_____

_____

END OF SECTION B
TURN OVER

SECTION C – Case study

Instructions for Section C

Please remove the insert from the centre of this book during reading time.

Use the case study provided in the insert to answer the questions in this section. Answers must apply to the case study.

Answer **all** questions in the spaces provided.

Question 1 (4 marks)

In a meeting with his university lecturer, Anthony was told that his lecturer had studied the decline of pinball machine usage in the 1980s. The lecturer offered Anthony the use of the data that was collected.

Anthony is not sure whether he should accept or decline the offer. He is concerned about the integrity of the data and is aware of criteria that can be used to check its integrity.

a. Identify one criterion that could be used to support **accepting** the offer and explain how the criterion does this. 2 marks

Criterion _____

Explanation _____

_____

_____

b. Identify a **different** criterion that could be used to support **declining** the offer and explain how the criterion does this. 2 marks

Criterion _____

Explanation _____

_____

_____

Question 2 (3 marks)

During the meeting, Anthony's lecturer also mentioned a survey recently completed by the university's sports and activities coordinator. Anthony has a friend who works in the Sports Department. This friend said he could access the data for Anthony.

Discuss the legal implications of using this data for Anthony and his friend.

Question 3 (2 marks)

Since starting his project, Anthony has been interviewing players after they finish a game, asking them questions about the idea of playing competitively. Anthony has been recording all the answers on his mobile phone. For example, one of his questions was, 'How keen are you to have a super league and play competitively?', to which players gave answers such as, 'Yeah, heaps', 'A little bit, maybe' and 'Just to prove I'm the best anyway'.

Anthony has more than 100 voice recordings. He now wants to analyse this data to discover if there are any themes that might help him understand the effect that competition might have on attendance.

Describe **one** way in which Anthony could easily enter the data into a spreadsheet so that he can manipulate it.

Question 4 (3 marks)

Anthony has completed his analysis of the data and formed a conclusion about his hypothesis. He now has to create his online report for the university.

a. Describe **one** technique that Anthony could use to generate design ideas for his multimodal online report. 1 mark

b. Suggest one criterion that Anthony could use to evaluate which of his design ideas he should choose. Justify your answer. 2 marks

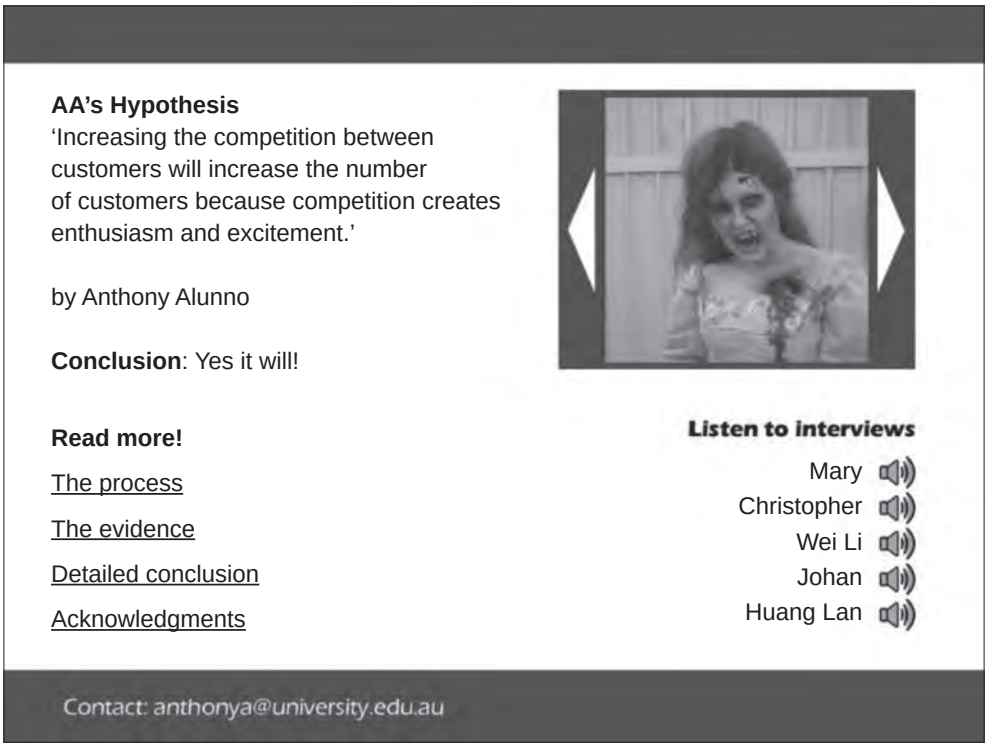
Criterion

Justification

CONTINUES OVER PAGE

Use the following information to answer Questions 5 and 6.

Anthony has constructed the first page of his online report. It is shown in the following screenshot.



Question 5 (4 marks)

Based on the screenshot, identify two design principles related to appearance that Anthony has used in the creation of this web page. Provide evidence of each.

Design principle 1 _____

Evidence _____

_____

_____

Design principle 2 _____

Evidence _____

_____

_____

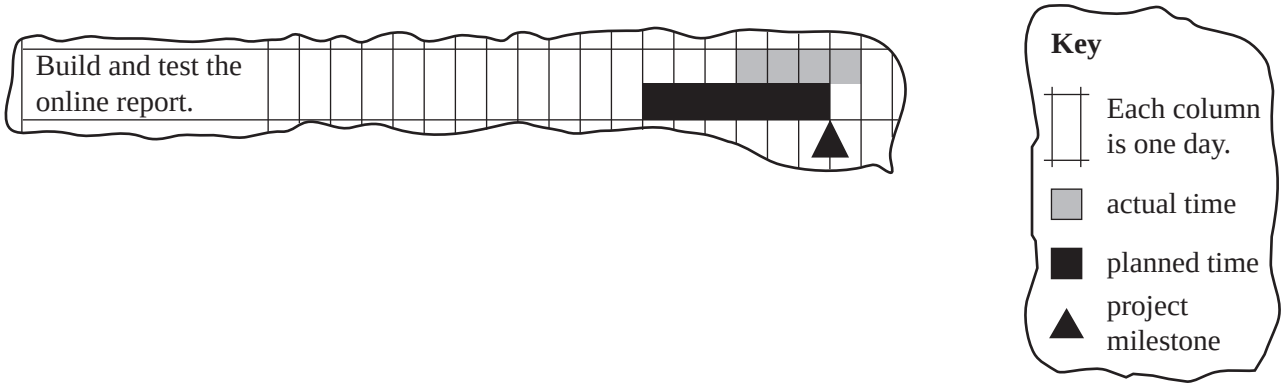
Question 6 (3 marks)

The arrows on either side of the image in the screenshot are buttons that will allow a visitor to Anthony's web page to click back and forth through a gallery of about 20 photographs.

Outline a set of tests that Anthony should perform to check that the arrow buttons operate as intended.

Question 7 (4 marks)

During the project, Anthony monitored his progress by recording actual starting and ending times for each task on the Gantt chart he had prepared at the beginning. The project is now complete and Anthony is reviewing his plan. One portion of the Gantt chart and its key are shown below.



Explain what this portion of the Gantt chart shows about Anthony's progress at the time.

Question 8 (5 marks)

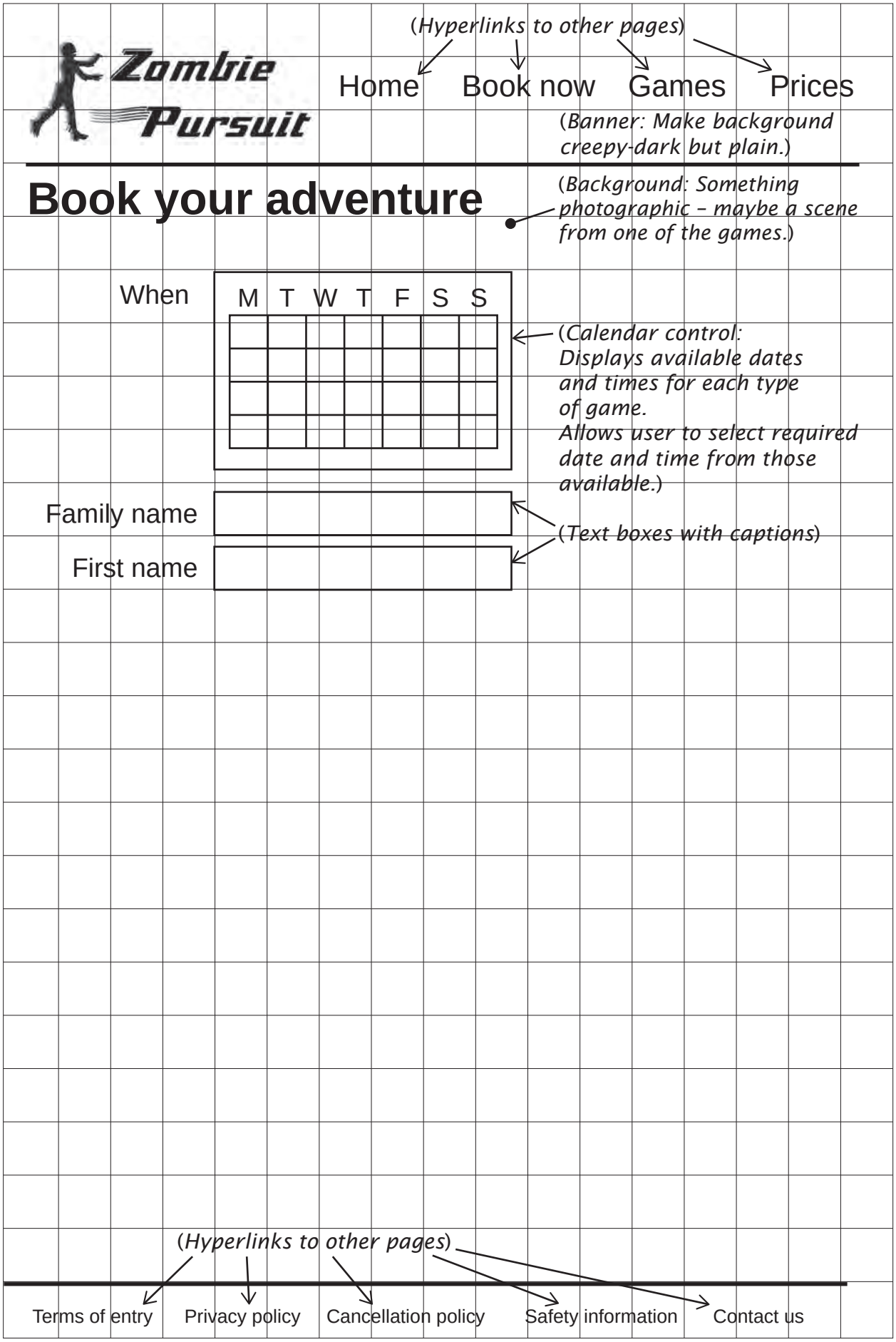
Elena has started creating a mock-up of a new web page using a simple drawing program. The purpose of the web page is to allow customers to make a booking online. She has printed her mock-up and written annotations in brackets on it. This is shown on page 21. She still has to add controls that meet the following three requirements:

1. Obtain the number of people (minimum one, maximum 10).
2. Obtain a contact number (must be entered) and email address (optional).
3. Allow a customer to proceed to payment if all of the required data has been entered.

a. Complete Elena's mock-up on page 21 so that it shows the controls needed to meet the three requirements listed above. When drawing the controls:

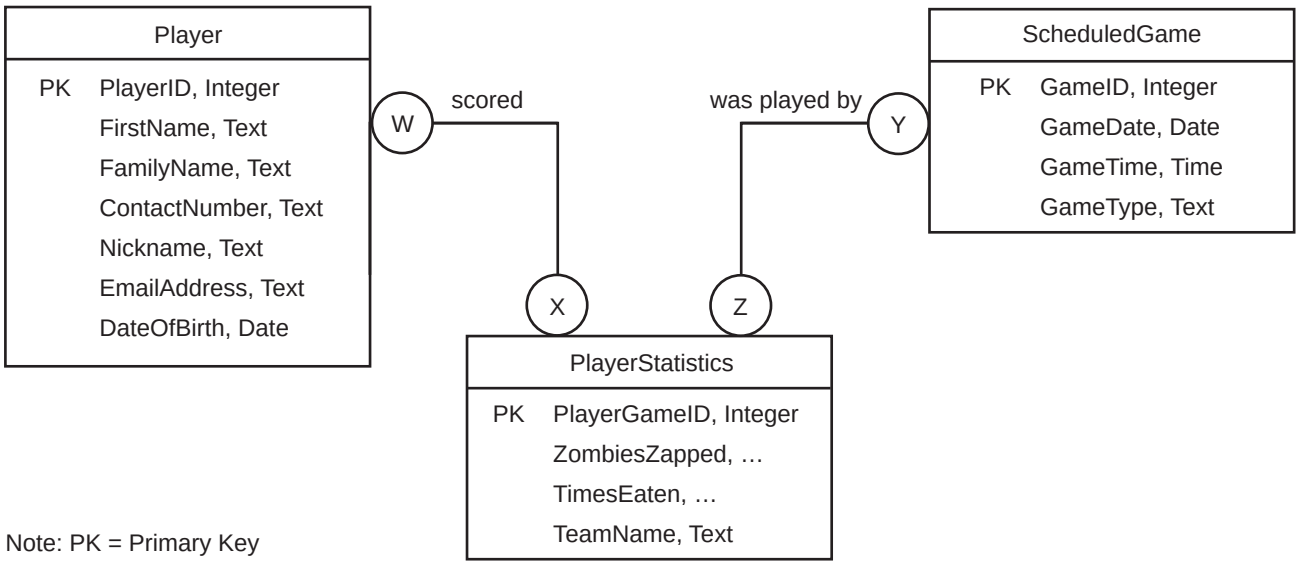
- clearly indicate the type of control with an annotation
- make sure the purpose of the control is clear
- take into account the web page's appearance. 3 marks

b. By referring to appropriate design principles related to functionality, justify the type of control used to meet requirement 1. 2 marks


(Hyperlinks to other pages)
Zombie Pursuit
Home
Book now
Games
Prices
(Banner: Make background creepy-dark but plain.)
Book your adventure
(Background: Something photographic – maybe a scene from one of the games.)
When
M T W T F S S
(Calendar control: Displays available dates and times for each type of game. Allows user to select required date and time from those available.)
Family name
First name
(Text boxes with captions)
(Hyperlinks to other pages)
Terms of entry
Privacy policy
Cancellation policy
Safety information
Contact us
(Footer: Plain colour, good contrast with text)

Question 9 (7 marks)

Flynn has agreed to Anthony's idea about creating a competition between players. Together they have drawn an entity-relationship (ER) diagram for the part of the database that keeps statistics about every game a player has played in.



Note: PK = Primary Key

a. The ContactNumber attribute will contain a phone number.

State why Flynn and Anthony chose to make its data type 'Text'. 1 mark

b. What data type should Flynn and Anthony choose for ZombiesZapped and TimesEaten – text, numeric or Boolean? Give a reason for your answer. 1 mark

c. Write a word to indicate the cardinality that should be shown at X and at Y. 2 marks

At X _____ At Y _____

d. The ER diagram shows that when Flynn sets up the entity PlayerStatistics as a table in a relational database, he must add two more fields to act as foreign keys.

State the two fields that should be added as foreign keys and explain their purpose. 3 marks

Field 1 _____ Field 2 _____

Purpose _____

_____

_____

_____

Question 10 (4 marks)

Flynn and Anthony have constructed the database tables needed to run the player competition. Anthony is constructing a number of queries that will extract the required information. He represents the design of the queries using input-process-output (IPO) charts.

a. Anthony would like one of the competitions to be only for players who are under 18 years of age on 1 January of the current year. The IPO chart below shows a query that he will use to filter out any player who is too old. 2 marks

Input	CurrentYear Process	Output
PlayerID DateOfBirth	Calculate field: Age = ThisYear – YearOfBirth Filter with criterion: Age < 18	PlayerID for all eligible players

Anthony has written the first line of a testing table for the query.

Complete the table below so that two other important conditions are tested. Assume CurrentYear is 2017.

Condition being tested	Data input	Expected result of query
player too old	PlayerID 12345 YearOfBirth 1998	PlayerID not included in output

b. To create a 'super team', Anthony needs a query that returns each player's score for a game. In each game, players get five points for every zombie they zap, but lose 10 points every time they are 'eaten'.

Complete the process column in the IPO chart below by showing what the query needs to do to obtain the required output. 2 marks

Input	Process	Output
PlayerID ZombiesZapped TimesEaten		PlayerID PlayerScoreForGame

Question 11 (3 marks)

The case study outlines the security controls used by Zombie Pursuit.

a. Identify **one** physical security control used to protect Zombie Pursuit's information system. 1 mark

b. Identify **one** weakness in the physical security provided for Zombie Pursuit's information system. Explain the threat it presents. 2 marks

Question 12 (4 marks)

Elena's friend Isha is the owner of a store selling costumes. She runs a single desktop computer system connected to a cash register. At the end of each day, accounting software is used to keep the accounts up to date. All of the shop's data is stored on the hard disk of the desktop computer. At the end of each week, Isha copies all the data to cloud storage.

a. Identify **one** strength of Zombie Pursuit's backup procedure compared with Isha's. Explain why it is a strength. 2 marks

b. Identify **one** strength of Isha's backup procedure compared with Zombie Pursuit's. Explain why it is a strength. 2 marks

Question 13 (4 marks)

Isha's store has been in operation for a number of years. In that time, she has had many customers, suppliers and product lines. To prevent her records from becoming cluttered with out-of-date data, in July each year Isha deletes any records of customers, suppliers or product lines that have not been accessed for five years.

Isha's computer is kept in an office at the back of the store and is rarely turned off. It is connected to the internet by a simple broadband modem. Isha runs a complete virus scan on her computer every week.

For each of the areas of information management shown below, decide who (Zombie Pursuit or Isha) has the more effective procedures and justify your answer.

- Disposal of data

- Protection from malware

END OF QUESTION AND ANSWER BOOK

Insert for Section C – Case study

Please remove from the centre of this book during reading time.

Zombie Pursuit

Zombie Pursuit is a small entertainment facility on the outskirts of Melbourne. Its owners, Flynn and Elena, have converted a warehouse into a multistorey, escape-room-style facility where customers pay to fight zombies. Customers can choose to play in groups of up to 10 and can arm themselves with laser weapons. Although only one game can be played at a time, three different types of games are offered during the week.

Prior to entering the playing area, customers are required to register their details on the Zombie Pursuit website and choose a unique nickname. This ensures their details are saved to the Zombie Pursuit database. They are then issued with their weapon and told the basic rules of the game:

- If you zap a zombie, it is out of the game and you get points.
- If a zombie splats green gloop on you, you get 'eaten', which means your weapon is inactive for 60 seconds and you lose points.
- Physical violence against the zombies is strictly prohibited.

Zombie Pursuit currently has 30 employees consisting of 25 actors who play the zombies, two cleaners, one party host and two food and beverage attendants.

Issue

At present, Zombie Pursuit's website just provides visitors with information about Zombie Pursuit. Currently all bookings are done via the telephone.

Elena would like to modify the company's website so that customers can see available time slots, make a booking and pay in advance.

One of the actors, Anthony, is currently completing a Master of Business degree at university and is required to complete a research project as part of his course. Anthony has a hypothesis: 'Increasing the competition between customers will increase the number of customers because competition creates enthusiasm and excitement.'

Anthony thinks that one way to increase competition between Zombie Pursuit's customers would be to create a monthly contest where the players with the five best scores from that month are invited back to create a 'super team' and take on the zombies. The highest scorer from that team then wins a prize.

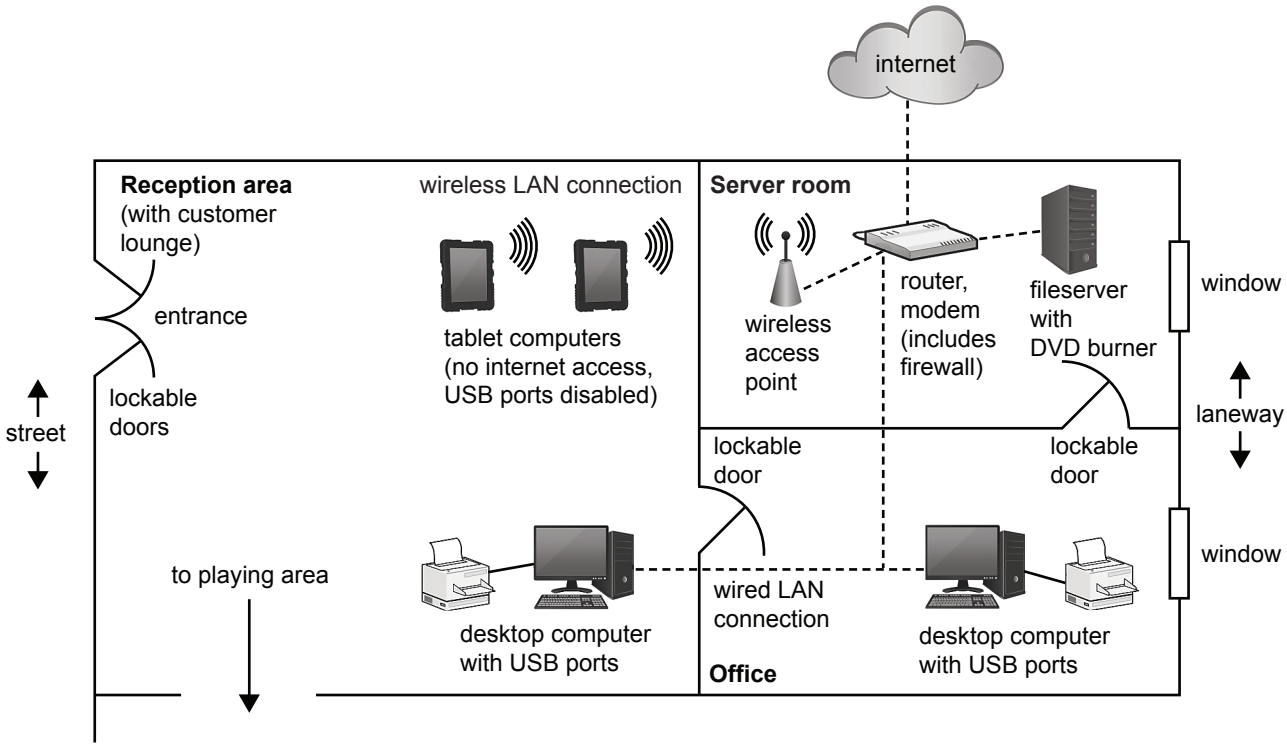
Flynn gives Anthony permission to use the company as part of his research project. For the first part of the project, the university requires Anthony to submit his hypothesis and evidence that supports or refutes it in a multimodal online report. The report is due in June and, if it does not provide a clear, well-argued and evidenced-based conclusion, Anthony will not be able to proceed with the rest of his project.

Zombie Pursuit's information system

The information system is built around a local area network (LAN) connecting:

- a fileserver, which holds the company's database and all other important records, and has a DVD burner attached to it
- two desktop computers, with attached printers, that are used for all administrative tasks
- two tablet computers that are used by customers to register themselves and choose a nickname.

The physical layout of the LAN and other components and features is shown in the diagram below.



Zombie Pursuit's current information management practices

- Backup procedure

The fileserver is never shut down. It automatically runs a backup every night at midnight. This is achieved by copying all the important files onto a DVD. Each evening, before leaving for home, Elena replaces the previous night's backup DVD with a blank. She stores the backup DVD in a locked cupboard in the office and then goes home.

- Disposal procedure

To save on cupboard space, Elena only keeps the 10 most recent backup DVDs. When she places the latest backup DVD in the cupboard, she removes the oldest one and puts it into the office's rubbish bin.

- Software security controls

The fileserver runs an antivirus program. The program scans any file when the file is opened and is also scheduled to run a full virus scan at 2 am every morning. Before running the scan, the antivirus program automatically checks for updates to the virus definitions.

The two desktop computers have no virus detection software installed.

END OF INSERT