VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education 2016

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

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

COMPUTING: INFORMATICS

Written examination

Friday 11 November 2016

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 29 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.

Question 1

A design principle that relates to the appearance of a website is

A. useability.
B. repetition.
C. robustness.
D. accessibility.

Question 2

Secure Sockets Layer technologies protect data by

A. encrypting data when it is stored in a web-based database.
B. placing a lock symbol in the address bar of a web browser.
C. separating layers of private data from sensitive information.
D. encrypting data while it is being transmitted to and from a website.

Question 3

The efficiency of an online transaction processing system could be evaluated by

A. measuring the time it takes to enter a valid transaction.
B. counting the number of incorrect transactions rejected by the system.
C. measuring the speed of processing an entry compared to previous methods.
D. counting the number of correctly validated entries compared to previous methods.

Question 4

Quantitative data includes data that is

A. numeric only.
B. character only.
C. character and numeric.
D. character and Boolean.

Question 5

Criteria that can be used to check the integrity of data include

A. timeliness, authenticity, relevance and accuracy.
B. timeliness, accountability, relevance and accuracy.
C. timeliness, authenticity, relevance and acceptance.
D. timeliness, accountability, referencing and acceptance.

Question 6

'High temperatures affect plant growth.'

What must be added to the statement above to make it a reasonable hypothesis?

A. a subject

B. a variable

C. a prediction

D. a conclusion

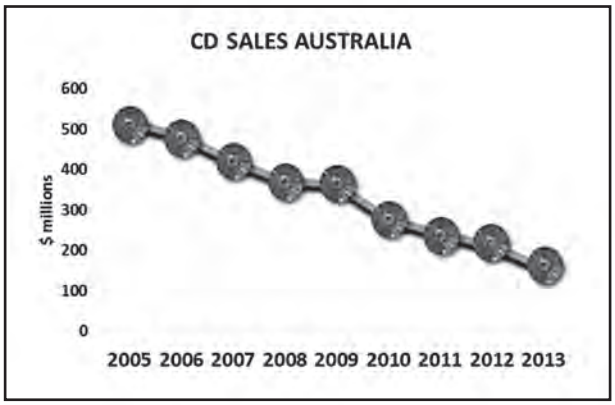
Question 7

Janet has been investigating the decline in sales of music CDs. She would like to create a chart for her blog that clearly shows the decline.

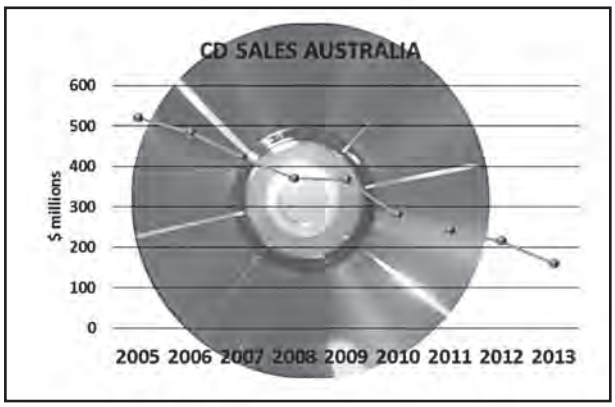
Which one of the following is the best chart to use?

A.

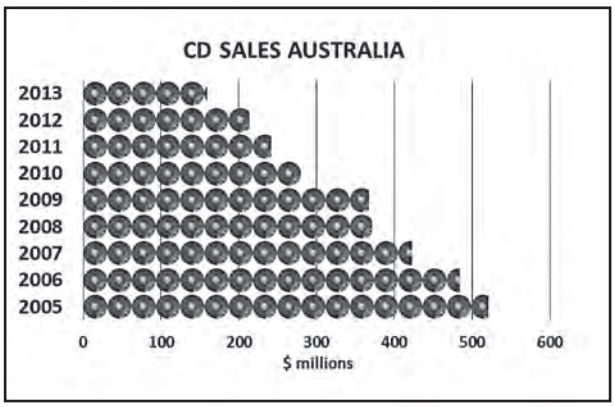
B.



C.



D.



Question 8

One of the provisions of the federal *Privacy Act (1988)* and its amendment is to

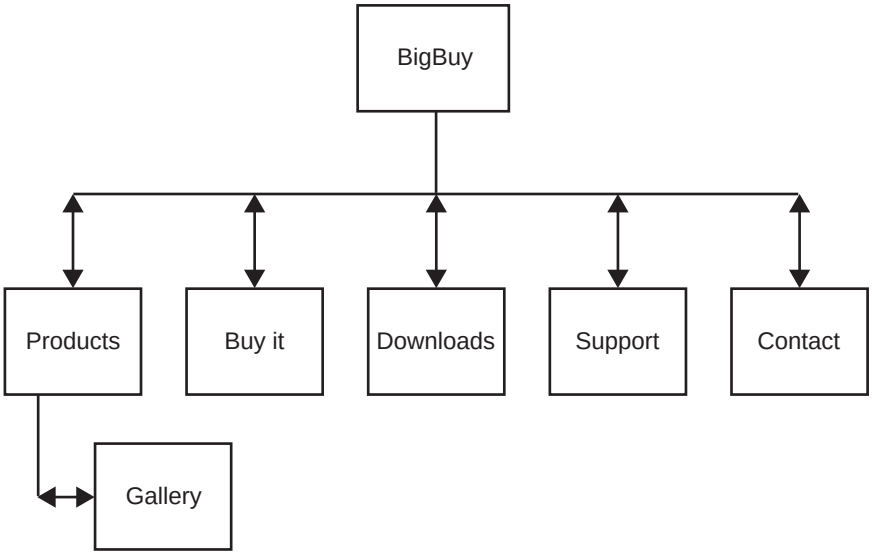
A. permit access to the personal details of specific people.

B. prevent state and territory governments from misusing personal data.

C. permit someone to print their own tax file number, provided that it is for personal use.

D. protect personal information collected and stored by federal government departments.

Question 9



The diagram above most likely represents

A. a site map.

B. a mock-up.

C. a storyboard.

D. an entity-relationship diagram.

Question 10

Bentwood Softball Club needs to ensure that all of its umpires are registered to umpire games in Victoria. To do this, the club needs to record detailed personal information regarding each umpire's level of skill. Recently, the club undertook an online survey of all of its 35 umpires.

The safest way for Bentwood Softball Club to store the data from the survey is on

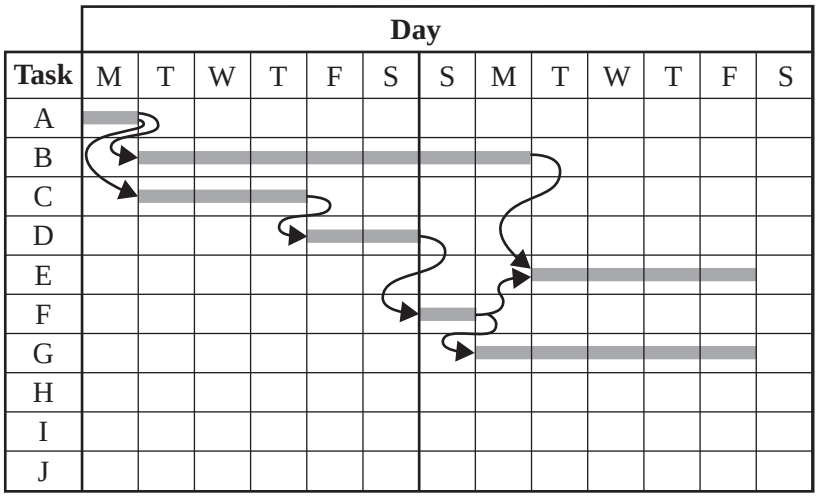
A. the club's 'members only' social media page.

B. an unsecured web page on the club's website.

C. a DVD kept on an open shelf in the clubrooms.

D. a secure laptop with restricted access kept in the clubrooms.

Question 11



For the Gantt chart shown above, a delay in the completion of Task D by one day will

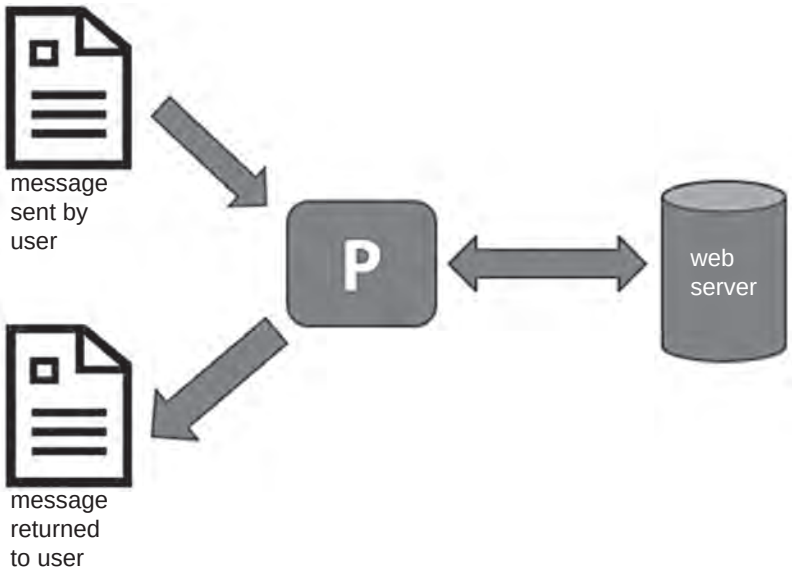
A. have no effect on Task E.

B. delay only Task E by one day.

C. delay only Task F by one day.

D. delay both tasks E and F by one day.

Question 12



In the diagram shown above, what security control is at P to ensure that the data is provided by a valid source?

A. a switch

B. a firewall

C. a biometric reader

D. antivirus software

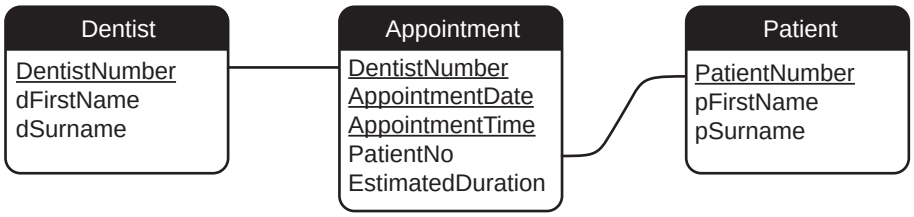
Question 13

A dental clinic has the following table storing appointment information. The business would like to store the data in a relational database.

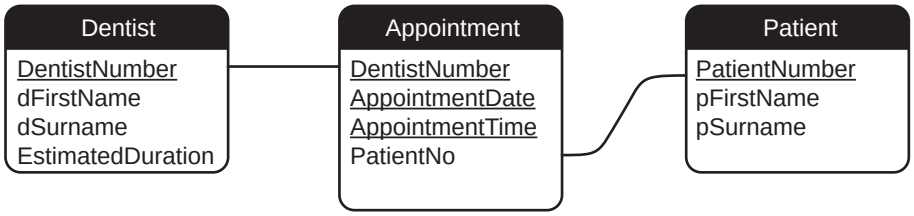
Dentist number	Dentist name	Patient number	Patient name	Appointment date and time	Estimated duration
S0001	John Smith	P0001	Lyle Richards	14/01/2016 9:30	20 mins
S0001	John Smith	P0002	Betsy Taylor	20/01/2016 10:15	20 mins
S0002	Mary Tanner	P0003	Delia Torres	27/01/2016 11:30	0.5 hour
S0002	Mary Tanner	P0104	Elsie Ferguson	28/01/2016 11:30	1.5 hours
S0002	Mary Tanner	P0104	Elsie Ferguson	11/02/2016 12:30	2.0 hours
S0001	John Smith	P0005	Kristen Haynes	1/03/2016 14:00	20 mins

Which of the following diagrams shows the data in third normal form?

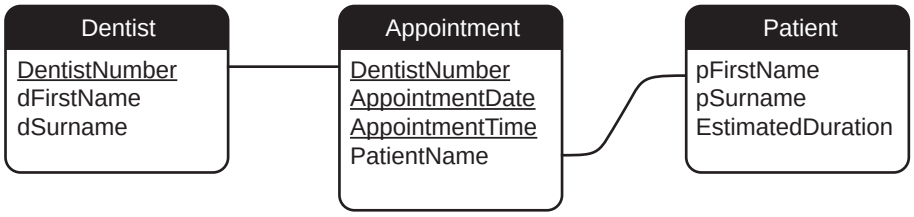
A.



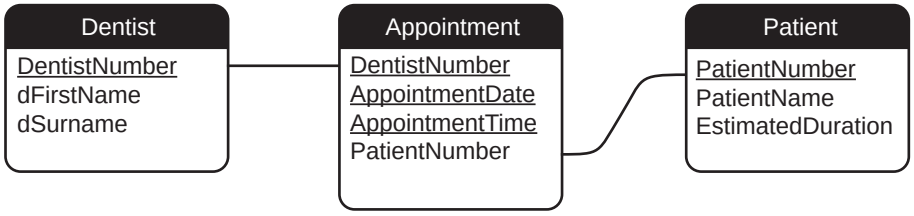
B.



C.



D.



Question 14

Information created for educating a worldwide audience about career options should be

A. age appropriate and gender inclusive.

B. appropriate for all ages and gender inclusive.

C. suitable for adults only and culturally exclusive.

D. suitable for young people only and culturally inclusive.

Question 15

Greenwood Council is developing a disaster recovery plan.

What is the best management strategy to enable the restoration of data quickly with the least loss of data?

A. Implement weekly full backups.

B. Implement only daily incremental backups.

C. Implement daily incremental and weekly full backups.

D. Implement daily incremental and weekly incremental backups.

Question 16

A school's administration is reviewing its information management strategy based on the following criteria: security, cost, speed of data retrieval and currency of data.

Taking into account all of the criteria, which of the following is the best information management strategy to enable the urgent restoration of data?

	Security	Cost	Speed of data retrieval	Currency of data
A.	excellent	expensive	quick to store and retrieve data	current at times during the day
B.	excellent	cheap	slow to store and retrieve data	current at all times
C.	excellent	cheap	very quick to store and retrieve data	only current at end of week
D.	excellent	very cheap	quick to store and retrieve data	current at times during the day

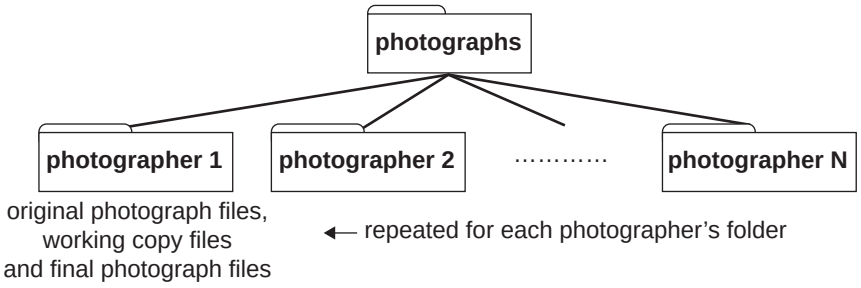
Question 17

The photograph editor for a magazine publisher is setting up a folder structure for a new project based on the following conditions:

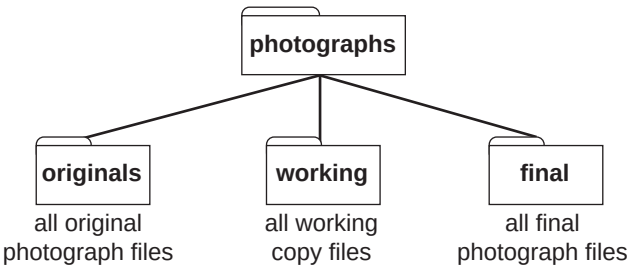
- Several photographers will be sending original photographs to the editor during the next three months. At the end of the project, each photographer's full set of original photographs will have to be easily identified. The originals will never be manipulated but will need to be archived at the end of the project.
- When a photograph is to be manipulated, the editor will make a copy of the original. The copy will be manipulated as needed. There may be many different versions saved. These will require daily backup.
- The final photographs that are accepted for publication will need to be sent as a batch to the publishing team. They will also need to be archived at the end of the project.

Which of the following folder structures will most efficiently meet these storage, backup and archival needs?

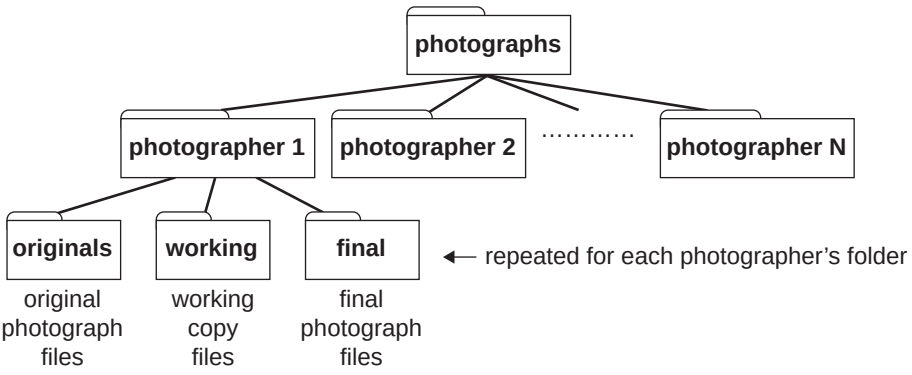
A.



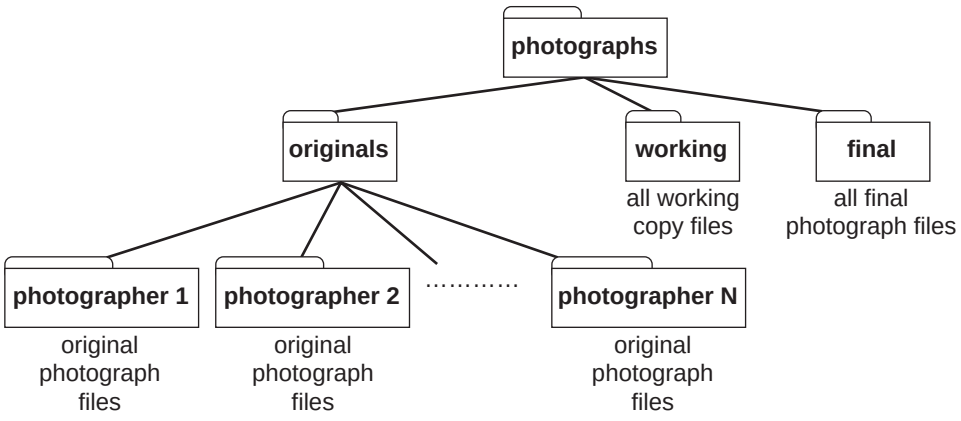
B.



C.



D.



Use the following information to answer Questions 18–20.

Two organisations, Painfree Medical Centre (PMC) and Bushwalks for Over 60s (BOS), are reviewing their information management strategies. In particular, they need to update their equipment and procedures for backing up, managing and disposing of client and membership data.

Currently, PMC backs up its database records to a set of five 4 GB flash drives that is stored in the office. The office is open to all staff.

BOS backs up its files to an 8 GB flash drive.

Question 18

PMC needs a storage capacity of 20 GB per day for its client data, while BOS needs 5 MB per day for its membership data.

Which pair of options will provide the best backup plan for both organisations?

	Painfree Medical Centre (PMC)	Bushwalks for Over 60s (BOS)
A.	external hard disk drive stored off site every Friday night	a second internal hard disk drive located inside the computer
B.	DVD stored on site	read-only DVD stored off site
C.	on-site tape backup at the end of every day tape taken off site nightly	automatic backup to cloud storage 1 Mbps internet connection
D.	250 GB external SSD flash drive stored in office, open to all staff	32 GB flash drive stored off site every Friday night

Question 19

Both organisations are aware of the need for privacy when storing data.

Which pair of options will provide the best rule for each organisation?

	Painfree Medical Centre (PMC)	Bushwalks for Over 60s (BOS)
A.	Require staff to log in to access medical records.	Allow open access to all members' records.
B.	Allow restricted access based on a staff member's role.	Allow any member to print a list of all members' records.
C.	Allow open access to all records as stated in their website policy.	Require members to log in to access members' details.
D.	Allow restricted access based on a staff member's role.	Allow only the secretary and the treasurer to be able to log in to members' records.

Question 20

PMC has decided to replace its current backup strategy with cloud storage. It is aware of the need to dispose of data when clients' records are no longer required. PMC has a number of options:

1. Crush the old flash drives and place them in the garbage.
2. Delete backup files from the old flash drives before re-using them.
3. Delete data from cloud storage that is no longer needed.
4. Ensure that the contract with the cloud company requires it to dispose of the data PMC no longer needs.

Which pair of options should PMC choose to ensure old data is disposed of properly?

A. 1 and 3

B. 2 and 4

C. 1 and 4

D. 2 and 3

END OF SECTION A

SECTION B – Short-answer questions

Instructions for Section B

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

Question 1 (4 marks)

Marco is the owner of a recently opened shoe store. He has been storing sales records in a flat file database. Each record contains the following fields: customer ID, customer name, address, contact number, purchase price, date sold and the unique item code for each pair of shoes.

Customers sometimes buy more than one pair of shoes. Marco has to enter a new record for each pair of shoes purchased.

Marco is investigating the idea of moving his sales data into a relational database.

a. State two advantages of moving the sales data to a relational database. 2 marks

1. _____

_____

2. _____

_____

b. Marco has started to create the entity-relationship diagram below for his data.

Complete the diagram by showing the relationship between the two entities and the cardinality of the relationship. 2 marks

Question 2 (3 marks)

A large number of paper survey forms have been completed and now the data must be entered into a database. It is important that the data is entered accurately.

a. State **one** manual technique that could be used to ensure data entry is as accurate as possible. 1 mark

_____

_____

b. Describe an electronic validation check that could be used to identify possible errors as data is entered. 2 marks

_____

_____

_____

Question 3 (5 marks)

Janice wants to create a web page to inform the public about her amateur theatre group's new play. The play is going to be performed each weekday during the school holidays. There will be a special price for families of at least one adult and two or more children. Janice is thinking about how the page should look.

a. Outline two techniques Janice could use to generate alternative design ideas for her web page. 2 marks

1. _____

_____

_____

2. _____

_____

_____

b. Suggest a criterion Janice could use to evaluate which of her design ideas she should choose. Justify your answer. 3 marks

_____

_____

_____

_____

_____

_____

Question 4 (2 marks)

A student has found an online report containing data he wishes to use for a school project. He viewed and downloaded the report on 14 June 2016 from <http://www.endangered.vic.gov.au/report>.

The report was written by M van Olst and entitled 'The plight of the pygmy possum'. It was first published in 2014.

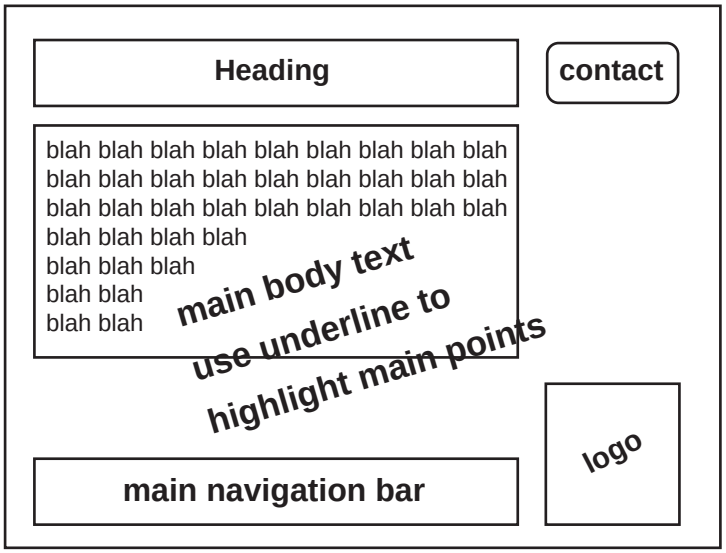
Using your preferred method of referencing and the information provided, write the reference the student would put in his reference list.

Referencing method _____

Reference _____

_____

Question 5 (7 marks)



The design for the home page of a website is shown above.

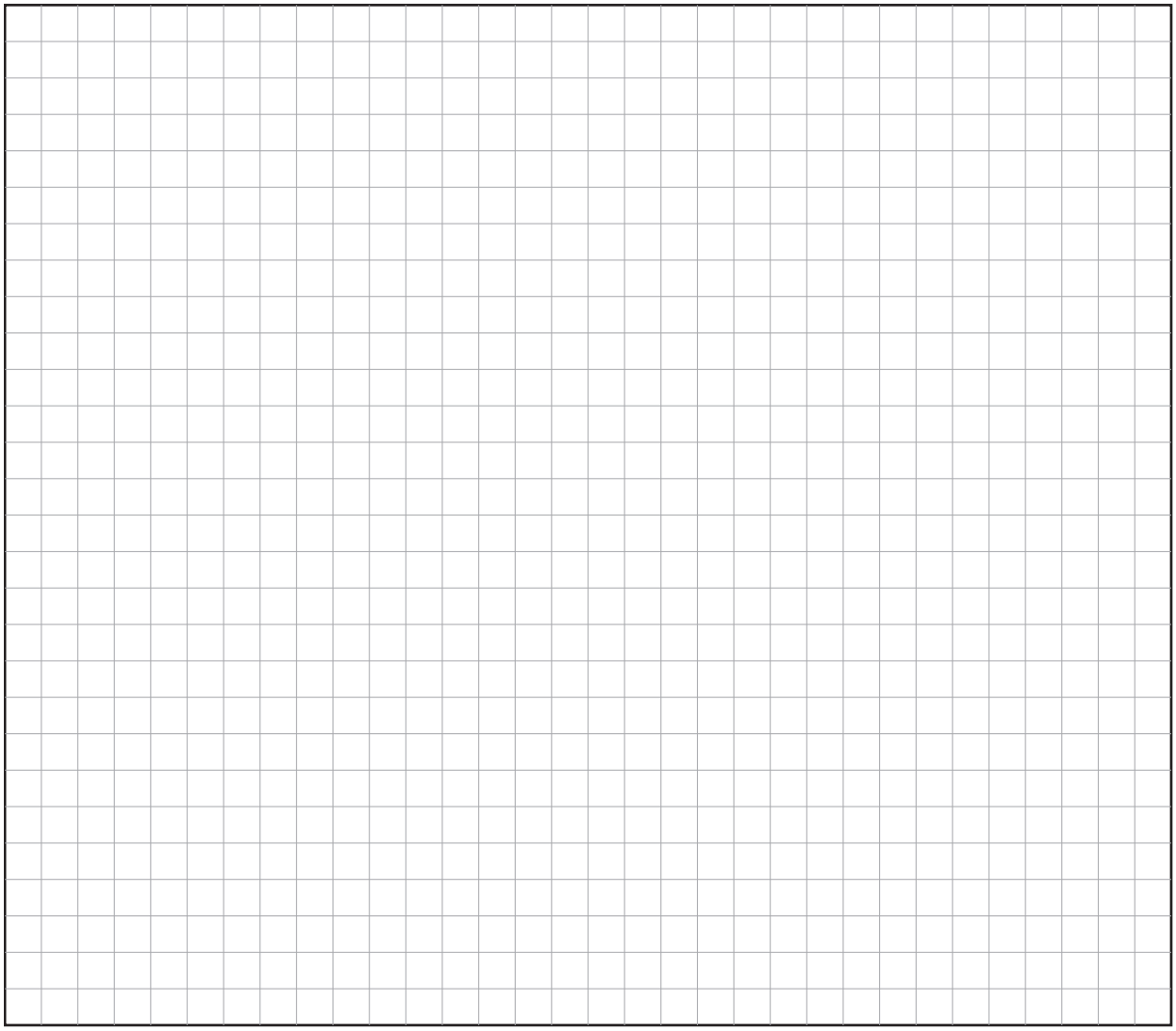
a. Identify three features of this design that do not follow appropriate conventions. 3 marks

1. _____

2. _____

3. _____

b. Use the grid below to redesign the home page and apply appropriate conventions. 4 marks



Question 6 (5 marks)

An organisation stores its client data on a fileserver that is kept in a back office. Each night, a backup tape is made. Recently, a staff member became aware that, instead of being taken off site, the backup tape was simply left on a cabinet in the back office where the fileserver is. The staff member reports this to the head of the organisation.

a. Outline two possible consequences for the organisation if the head of the organisation does not take any action. 2 marks

1. _____

_____

_____

2. _____

_____

_____

b. Recommend an action that the head of the organisation should take to remedy the situation. 1 mark

_____

_____

c. Having been alerted to the careless information management practices within the organisation, the head of the organisation decides to investigate further. She discovers that the organisation has no disaster recovery plan.

Explain why she should be concerned about this. 2 marks

_____

_____

_____

_____

Question 7 (4 marks)

The internet provides access to many hours of video footage on almost any subject. It is easy to download a video and then include it in a website or other online solution.

Discuss the key legal requirements related to this type of activity, including an outline of the circumstances in which the requirements apply and do not apply.

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 (6 marks)

There is a lot to be done to prepare his report and Bill has a deadline to meet. He decides to prepare a plan to help him manage this project. He works out the main tasks and estimates how long each will take:

A. Prepare an online survey for the telemarketers. (one day)

B. Telemarketers respond to the online survey. (seven days)

C. Organise and manipulate the survey data. (three days)

D. Search online sources for relevant research data. (two days)

E. Manipulate and interpret all the data for the report. (three days)

F. Create the report. (two days)

Using the task list above, construct a Gantt chart for Bill on the grid below. Show the durations and the dependencies, and take into account the following:

- Bill does not work on weekends.
- Bill wants to start the project on 5 December and finish the project as soon as possible.
- Bill can carry out Task D while Task B is happening.

	December																				
	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Task	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
A																					
B																					
C																					
D																					
E																					
F																					

Question 2 (2 marks)

Data is collected during tasks B and D.

Identify which data is from a primary source and explain why.

Question 3 (4 marks)

While Bill is preparing his survey questions for Task A, he has an idea. He should interview some of his telemarketers face-to-face, rather than have them complete the online survey. He could digitally record the interviews and use the recordings to create a multimodal online report, rather than preparing just a text- and image-based report.

Bill thinks it will take a day to digitally record the interviews and he will have to add a day to the time it takes to prepare the multimodal online report. Bill would like his idea to have as little impact as possible on his project's timeline.

a. From your Gantt chart on page 18, suggest the best date for Bill to conduct the face-to-face interviews in relation to the other tasks. Explain how your suggestion minimises the impact of the interviews on the overall project timeline. 3 marks

Suggested date _____

Explanation _____

_____

_____

b. Taking into account your suggested date in **part a.** and the extra time needed to prepare the multimodal online report, describe the overall impact of Bill's idea on the project timeline. 1 mark

_____

_____

Question 4 (5 marks)

In the online survey, Bill wants to ask his telemarketers why working from home appeals to them. He prepares three questions:

- How important is saving on travel expenses?
- How important is not wasting time on travelling to work?
- How important is being at home to care for a sick family member?

a. Describe a way Bill could arrange for the responses to these questions to be coded to support manipulation once the survey is closed. 2 marks

b. Using the coding method described in **part a.**

i. describe **one** technique Bill could use to identify any patterns in the responses to the survey questions 2 marks

ii. identify the type of pattern Bill could expect to find. 1 mark

Question 5 (6 marks)

While completing his online search for Task D, Bill has found a report prepared by Deloitte Access Economics. Data sets 1 and 2 in the insert show two tables from that report that Bill would like to use in his report to support his hypothesis.

a. State two variables in Bill's hypothesis regarding the telemarketers. 2 marks

1. _____

2. _____

b. Identify one item from each data set that supports Bill's hypothesis and explain how it does this. 4 marks

Item from Data set 1 _____

Explanation _____

_____

_____

Item from Data set 2 _____

Explanation _____

_____

_____

Question 6 (3 marks)

Bill is concerned that a table of figures might not communicate his message to the Board of Directors.

Describe another way for Bill to present **Data set 1** in his multimodal online report. As part of your description, indicate how he might take advantage of the digital recordings and/or online presentations to highlight an item relating to his hypothesis in his multimodal online report.

Question 7 (2 marks)

Mary, the marketing manager, has come up with an idea to help cut costs. She has proposed that her online marketing department use email to contact InformUs' participants rather than the telemarketing department calling participants individually.

Under Mary's plan, participants would complete a survey online and the results would be saved to the cloud rather than on the database on InformUs' fileserver.

Explain **one** benefit of minimising risk for the InformUs information management strategy that Mary's proposal would have.

CONTINUES OVER PAGE

Bill has completed his multimodal online report for the Board of Directors. The Board has agreed to Bill's original proposal for the telemarketers to work from home and call survey participants individually.

Since Bill's proposal will go ahead, he has hired Minh, a web applications developer, to create the web-based user interface that the telemarketers will use and a database to store the survey responses they enter.

Question 8 (6 marks)

Minh's first task is to construct a user flow diagram. She has drawn the user flow diagram shown on page 25 but has not included any data protection requirements.

In the spaces provided on page 25, identify where two different types of security control should be provided for data protection. For each security control:

- describe where the security control should be placed and draw a line to it
- state the type of control required
- briefly explain why it is needed.

Security control 1

Where _____

_____

Type of control _____

_____

_____

_____

Explanation _____

_____

_____

_____

_____

Security control 2

Where _____

_____

Type of control _____

_____

_____

_____

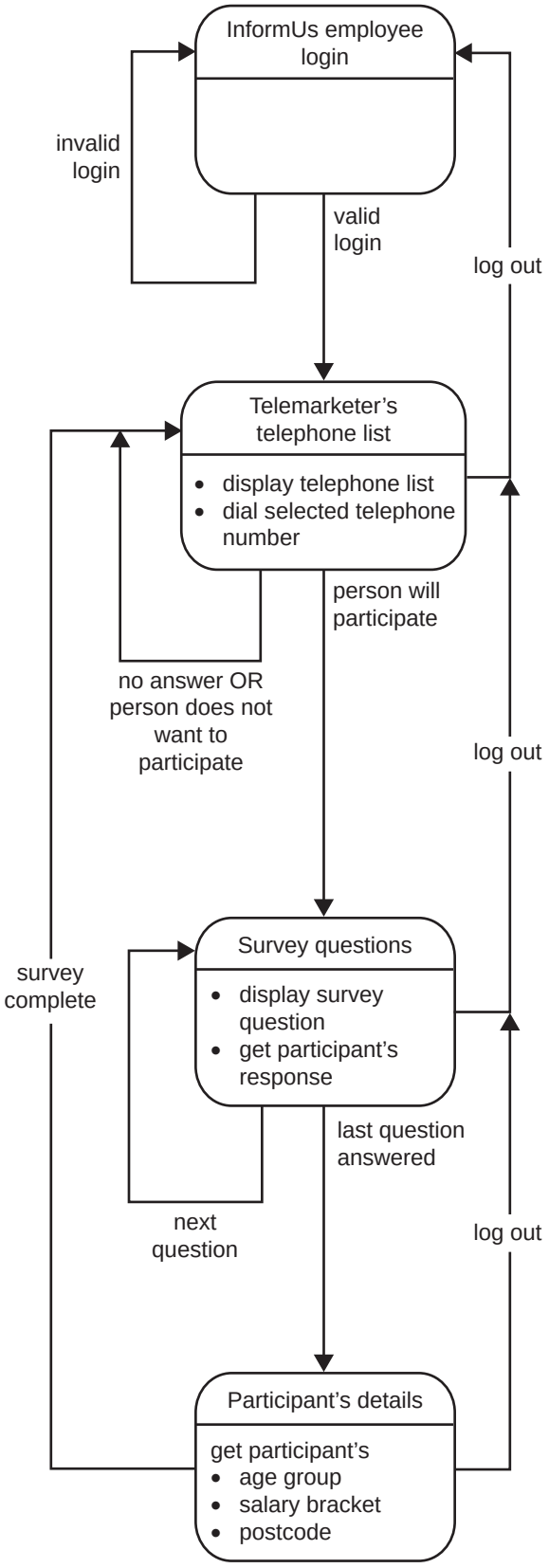
Explanation _____

_____

_____

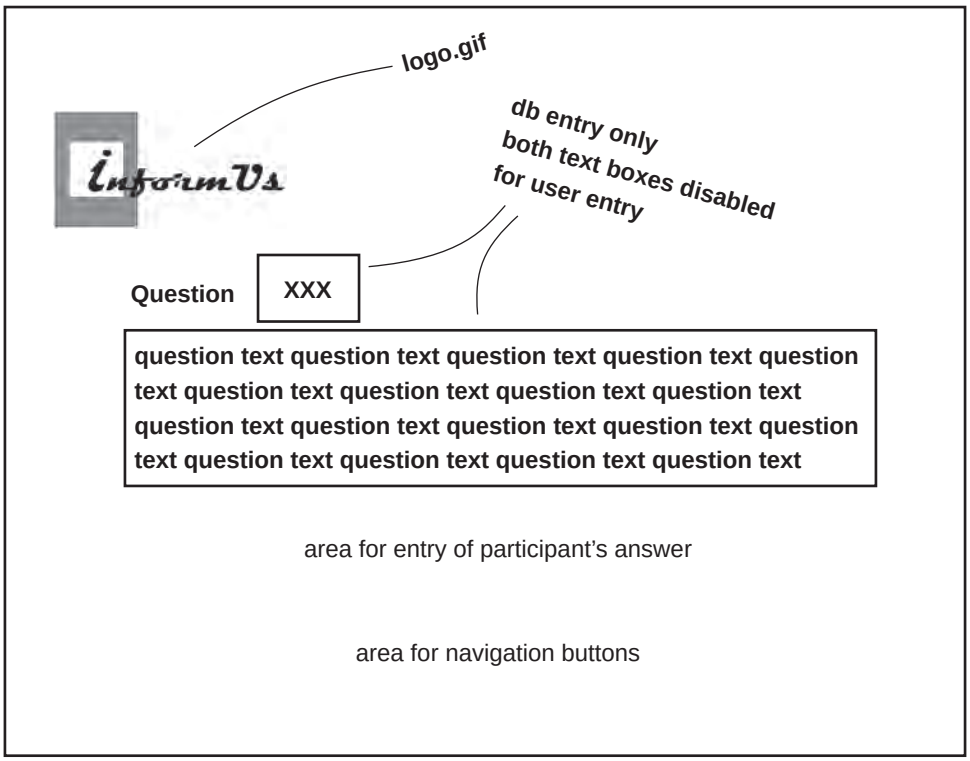
_____

_____



Question 9 (4 marks)

Minh starts designing the web pages that form the user interface. She has started with the survey questions' page. One question at a time will be displayed and the telemarketer will enter the participant's response.



a. When answering a survey question, participants will be given a range of options to choose from. Minh is unsure about which of the following data entry methods to use:

- text box
- drop-down menu
- radio buttons

She has been told that the telemarketers must be able to enter responses as quickly as possible.

Which one of the three data entry methods should Minh choose? Justify your choice. 3 marks

Data entry method _____

Justification _____

_____

_____

_____

b. Minh's design also shows an area to be used for navigation buttons.

Based on the user flow diagram shown on page 25, identify **one** button that should be placed in this area and briefly state its purpose. 1 mark

Question 10 (2 marks)

Australian postcodes are made up of four digits and there are currently over 3000 postcodes in use. On the participant details' page, the telemarketer has to enter the participant's postcode.

Describe a validation technique Minh could use to ensure a valid postcode is entered by the telemarketer.

Question 11 (2 marks)

For each telephone number that is dialled, the database will first receive a block of data in the following format.

Telemarketer ID	Selected telephone number	Participated

for example

T0001234	0413409607	Yes

When setting up the database that will store the survey data, what data type should Minh use for

- Telemarketer ID

- Participated?

Question 12 (2 marks)

After the telemarketer has entered the participant's response, a second block of data will be received.

Selected telephone number	Date	Start time	End time	Question 1: Answer Question 2: Answer Question 3: Answer Question 4: Answer Question 5: Answer " " " Question *N*: Answer	Age group	Salary bracket	Postcode

Minh is creating a relational database to store this data.

Explain why the data in this format is not in first normal form.

Question 13 (6 marks)

Shane has just started work with InformUs as a receptionist. He has discovered that the telephone numbers that the telemarketers use can be downloaded by anyone logged in to the InformUs network.

Shane is part of a fundraising group for a local homeless shelter. The shelter is trying to build a new hostel for homeless people. He decides to download the company's list of telephone numbers so that he can contact people when he is not working and ask them to donate money to the shelter.

a. Explain an ethical reason why Shane should not use the InformUs list of telephone numbers. 2 marks

b. Shane's manager at InformUs thinks it is a great idea for Shane to use the InformUs list of telephone numbers and, since InformUs does not have a privacy policy, he cannot see anything wrong with Shane doing this.

What two pieces of advice should be given to InformUs about its information management strategies with regard to the use of people's telephone numbers and personal details? Provide reasons to support the advice. 4 marks

1.

2.

END OF QUESTION AND ANSWER BOOK

Insert for Section C – Case study

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

InformUs

InformUs is a large marketing company in Melbourne. Bill is the manager of the telemarketing department and he is in charge of all the telemarketers in the company.

The telemarketers work between the hours of 5 pm and 8 pm, when more people are likely to be at home. They travel to the office in the late afternoon, log in to the system, download a list of telephone numbers and start making calls to participants to obtain their opinions on various products. Each participant's responses are written on a paper copy of the survey by the telemarketer.

Issue

Bill is finding it very difficult to attract and retain telemarketers for the company. He believes that this is because many potential telemarketers do not want to travel into the city each evening for only a few hours' work.

At a recent managers' meeting, Bill discussed the problem with Mary, the manager of the marketing department. She suggested that Bill look into allowing his staff to work from home via the internet as a way of making it more appealing and to attract and retain telemarketers.

Proposal

Bill has put together a proposal for setting up a new system that will allow his telemarketers to work from home.

Bill's proposed new system has four main parts:

- Telemarketers who choose to work from home will be given a laptop, a headset and a high-speed broadband connection of at least 12 Mbps for their home internet.
- At the start of each shift, the telemarketer will remotely log in to the company network as a virtual private network (VPN) client and access their list of telephone numbers to call.
- Telemarketers will make telephone calls using a voice over internet protocol (VoIP) system through the company network.
- The information collected by the telemarketers will be entered straight into a database via a web-based user interface. The database will be stored on the InformUs fileserver.

During his research for his proposal, Bill formed a hypothesis: 'If the telemarketers were allowed to work from home, they would have greater levels of satisfaction. This would lead to higher retention levels (fewer people leaving the company) and fewer sick days being taken. Overall, the telemarketing department would perform better and this would be good for the company.'

To get approval for his proposed new system, Bill must demonstrate to the Board of Directors that his hypothesis is well informed and correct. His supervisor has told him that he must have a report regarding his proposal ready for the Board by 23 December. The report will be placed on the company's VPN for the Board to access and will be password protected.

To test his hypothesis, Bill must collect data about whether the telemarketers would prefer to work from home. To do this, he decides to undertake an online survey of all the telemarketers.

Data set 1 – Perceived business advantages of working from home

Advantage	% of businesses rating as 'highly important'
higher productivity	54.8
increased adoption of communications technology	44.5
more flexible use of staff	44.1
better retention of experienced staff	23.0
more flexible use of infrastructure	22.4
improved employee morale	21.5
greater commitment to company goals	19.0
reduced cost of office accommodation	5.8

Data set 2 – Employee perceived benefits of working from home

Benefits	Limited extent (%)	Neutral (%)	Great extent (%)
less distraction	6.4	7.9	85.7
improved productivity	1.6	12.9	85.5
greater flexibility in work arrangement	6.4	9.5	84.1
increased job satisfaction	9.5	7.9	82.5
an improved work-life balance	14.5	9.7	75.8
a greater loyalty to the organisation	11.3	16.1	72.6
increased morale	6.4	22.2	71.4
decreased stress levels	14.5	22.6	62.9
reduced monthly expenses	23.8	25.4	50.8
increased time spent with family	17.5	36.5	46.0
decreased sick days	20.6	33.3	46.0
increased number of training opportunities	44.4	42.9	12.7

Source: Lafferty, 2000 (Data set 1) and Baard, 2010 (Data set 2) in 'Next Generation Telework: A Literature Review', report by Deloitte Access Economics for Department of Broadband, Communications and the Digital Economy, July 2011

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