

STUDENT NUMBER Letter

COMPUTING: INFORMATICS

Written examination

Friday 16 November 2018

Reading time: 3.00 pm to 3.15 pm (15 minutes)

Writing time: 3.15 pm to 5.15 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 28 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 validation technique that ensures that a field is not left empty on a web data entry form is

- A. a reasonableness check.
- B. an existence check.
- C. a blank check.
- D. a range check.

Question 2

Credit card applications can either be completed in person at a bank branch or by submitting data online.

What are two advantages to the user of submitting data online compared to submitting it in person at a bank branch?

- A. convenience and reduced cost
- B. security and convenience
- C. convenience and simplicity
- D. value and security

Question 3

A database table contains four fields.

Which one of the following represents the most appropriate naming convention for the fields?

- A. firstname, lastname, mobilenumber, lastlogin
- B. FirstName, LastName, MobileNumber, LastLogin
- C. First_Name, lastName, Mobileno, last_login
- D. fn, ln, mn, ll

Question 4

Many websites now use an online service to verify a street address; for example, 25 Apple Street. As a user types their address in the field, the system provides a list of options for the address and allows the user to select from **only** those options.

What is one advantage of this validation technique?

- A. It ensures that the address exists.
- B. It ensures that the address field is text.
- C. It ensures that all fields are completed.
- D. It verifies that the address entered is actually the user's address.

Question 5

The following is a table of postcodes and suburbs, with some adjacent suburbs sharing a postcode.

PostCodeID	Postcode	Suburb
1	3099	Arthurs Creek, Cottles Bridge, Hurstbridge, Nutfield, Strathewen
2	3912	Somerville, Pearcedale
3	3204	Ormond, Patterson, Bentleigh, McKinnon
4	3000, 3001, 3004, 8001	Melbourne

If the table were converted into third normal form (3NF), which one of the following table structure diagrams would best represent the new design?

A.

Table: Postcodes						
PostCodeID	Postcode	Suburb1	Suburb2	Suburb3	Suburb4	Suburb5

B.

Table: Postcodes		
PostCodeID	Postcode	SuburbID

Table: Suburbs	
SuburbID	SuburbName

C.

Table: Postcodes	
PostCodeID	Postcode

Table: Suburbs		
SuburbID	SuburbName	PostCodeID

D.

Table: Postcodes	
PostCodeID	Postcode

Table: Links	
PostCodeID	SuburbID

Table: Suburbs	
SuburbID	Suburb

Question 6

Peta found a series of original photographs on the walls of an information booth overlooking a popular tourist location. The photographs had been taken at five-year intervals. Peta is keen to use them to show the change in the number of native trees over time.

The photographs are an example of a

- A. digital, primary data source that will allow for quantitative analysis.
- B. digital, secondary data source that will allow for qualitative analysis.
- C. non-digital, primary data source that will allow for quantitative analysis.
- D. non-digital, secondary data source that will allow for qualitative analysis.

Question 7

In Victoria, one of the provisions of the *Charter of Human Rights and Responsibilities Act 2006* (Vic) is to allow

- A. people to say what they want to say when completing online surveys.
- B. biometric data to be shared between voice-operated apps on personal devices.
- C. health information provided to a gym to be shared by all other gyms in the franchise.
- D. personal data collected by a school to be provided to a university for a study on human rights.

Question 8

Tien has sourced an infographic from someone else's website. He would like to use it in his multimodal online solution (MMOS).

Under what condition can the infographic be legally reproduced in the published MMOS?

- A. The copyright symbol is removed.
- B. Tien provides a hyperlink to the original source location.
- C. Tien cannot find the copyright owner of the infographic.
- D. The copyright owner has said it is free to use or has given permission.

Question 9

Which one of the following statements is a reasonable social constraint for an MMOS project?

- A. The solution should be easy for all users to navigate.
- B. The solution must be finished by the end of October.
- C. All secondary data sources and third-party infographics used in the solution need to be referenced.
- D. The solution should allow users with varying expertise levels to find and access the information they require.

Question 10

Two quantitative data sets that have been acquired from online sources are to be analysed.

Which one of the following techniques would best highlight the difference between the two data sets?

- A. Sort the data sets in ascending order.
- B. Plot the first data set against the second data set.
- C. Calculate the mean and the median of each data set.
- D. Display the maximum and minimum values for each data set.

Question 11

Sanjay is creating an MMOS about pets. One of the web pages will be a 'Contents' page. It will show images of various animals. Users will be able to click on an image and go to a page that provides information about that animal.

Which one of the following is the best design tool for showing the relationship of the 'Contents' page to the other pages?

- A. site map
- B. mock-up
- C. layout diagram
- D. entity-relationship (ER) diagram

Use the following information to answer Questions 12 and 13.

A Physical Education (PE) teacher is creating a new web page for his Year 7 students. The text has been entered but not formatted, as shown in the extract below.

Exercises

Kinds of Exercise

Aerobic Exercises

Isometric Exercises

Isotonic Exercises

Flexibility Exercises

Aerobic Exercises

These place demands on the circulatory and respiratory systems. They include jogging, running, cycling and swimming.

Isometric Exercises

These are a kind of strength training where the muscle being exercised is not moved through a range. One body muscle is pushed against another or against a fixed point for a period of 8 to 12 seconds.

Isotonic Exercises

These are another kind of strength training, but the muscle being exercised is moved through a range against a constant force. The force is supplied by weights, such as dumbbells, or by the weight of the body itself, such

Question 12

To check that the web page is suitable for his audience, the PE teacher should

- A. validate the text by proofreading.
- B. make sure the text is age-appropriate.
- C. test the functionality of the web page.
- D. find out what other interests his students have.

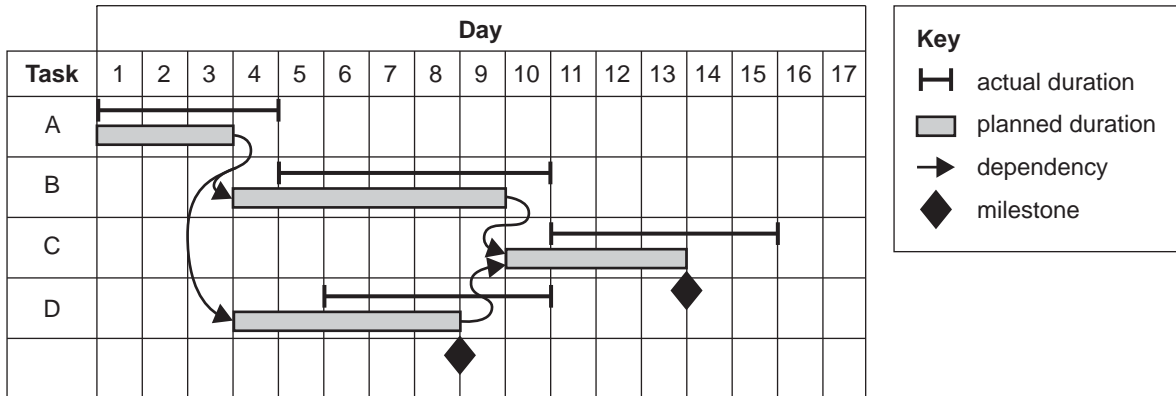
Question 13

Which convention should the PE teacher apply to the web page so that it is easier to find information when scrolling through the page?

- A. a heading hierarchy
- B. contrast and balance
- C. use of standard icons
- D. use of underlining for links

Question 14

Jeremy completed a project two days late. He is assessing his project plan to find out why. On his Gantt chart he has drawn the actual duration for each task of his project.



What are the main reasons for Jeremy’s project finishing two days late?

- A. Tasks B and D started late.
- B. Tasks A and B took longer than expected.
- C. Tasks A and C took longer than expected.
- D. The dates for the two project milestones were missed.

Question 15



For the text in the web page above, which area shows the best use of the design principles of alignment and contrast?

- A. the title area
- B. the photograph
- C. the ‘links’ section
- D. the ‘Contents’ section

Question 16

The new owner of Seeing Eye Optometrists, Eartha, has realised that the business does not have a disaster recovery plan and decides to develop one.

The scope of Eartha's disaster recovery plan needs to include

- A. cloud computing, backing up and restoration of data.
- B. evaluation, backing up, restoration of data and test plans.
- C. evacuation, backing up, restoration of data and test plans.
- D. evacuation, backing up, restoration of data and evaluation.

Question 17

A measure to evaluate the effectiveness of an information management strategy is

- A. cost.
- B. maintainability.
- C. ease of retrieval.
- D. communication of message.

Question 18

Liam is working on his Informatics project during his study period. He suddenly realises that he is late for his next class and quickly unplugs his USB, forgetting to save his work. That afternoon he discovers that he has lost his unsaved work.

This is an example of

- A. an event-based threat.
- B. an accidental threat.
- C. a deliberate threat.
- D. a technical threat.

Question 19

One of George's Joggers' organisational goals is to improve its advertising of special events to its VIP members in Australia and, in the future, around the world.

The most efficient way that George's Joggers could achieve this goal is to

- A. send an email to all members.
- B. sign up customers instore to receive emails about special events.
- C. produce a newsletter that is sent through the mail to all VIP members.
- D. develop a website that will allow special access to VIP members to view special events.

Question 20

The new Chief Security Officer (CSO) of IFM Analytics has reviewed IFM's data-handling procedures. He has found that staff often leave their workstations unattended when working with sensitive data.

One way that the new CSO can best minimise the risk of sensitive data being viewed by other people is to

- A. encrypt the data.
- B. install anti-malware software.
- C. continuously back up data onto servers.
- D. require staff to logout before leaving their computer.

SECTION B – Short-answer questions**Instructions for Section B**

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

Question 1 (4 marks)

A company's website allows users to compare health funds. It does not use transport layer security (TLS) or secure sockets layer (SSL) protocols. The website asks users to enter any medical procedures they have had in the past, in order to provide an accurate quote.

- a.** Explain the problem this website creates in regard to the information entered by its users. 2 marks

- b.** Identify **two** risks to the company or its clients if this website continues to be used. 2 marks

Question 2 (4 marks)

An organisation records the strength and location of earthquakes in a text file. The organisation is moving to a new database system to store and manage this data and perform calculations. Some records from the existing text file are shown below.

Date	Time	Magnitude	Location	Entered by
27 Dec 2017	04:57:02	1.1	65.165° N 16.425° W	JSB
27 Dec 2017	13:25:58	1.3	64.006° N 20.114° W	JSB
28 Dec 2017	23:42:01	2.1	63.483° N 23.489° W	SAL
29 Dec 2017	03:41:19	2.4	63.483° N 23.962° W	JSB

- a. Which data type would be best to store the Magnitude and Location fields? 2 marks

Magnitude _____

Location _____

- b. There are two options available to the organisation for the new database technology it will use. One option is to use a relational database management system (RDBMS) and the other option is to use a flat file database.

Identify and explain an advantage for the organisation of using a flat file database compared to an RDBMS. 2 marks

Question 3 (4 marks)

Natalie has collected data from her online survey form and is planning to manipulate the data in a spreadsheet. An extract from her data is shown below.

BirthDate	Gender	PostCode	Suburb
15/12/2002	F	3149	Mount Waverley
12/30/2001		3149	Mt Waverley
6/08/2002	M	3149	Mt. Waverly
5/03/2022	F	3150	Glen Waverley
06/03/2002		3149	Carn

Identify two concerns that affect the integrity of the data above. For each concern, suggest a technique that could have been applied to the form’s user interface to address the concern.

Concern 1 _____

Technique _____

Concern 2 _____

Technique _____

Question 4 (1 mark)

Grace is the office manager of a medical centre that sees over 1000 patients. She has been reviewing all the electronic files and has decided to archive the files of 150 patients.

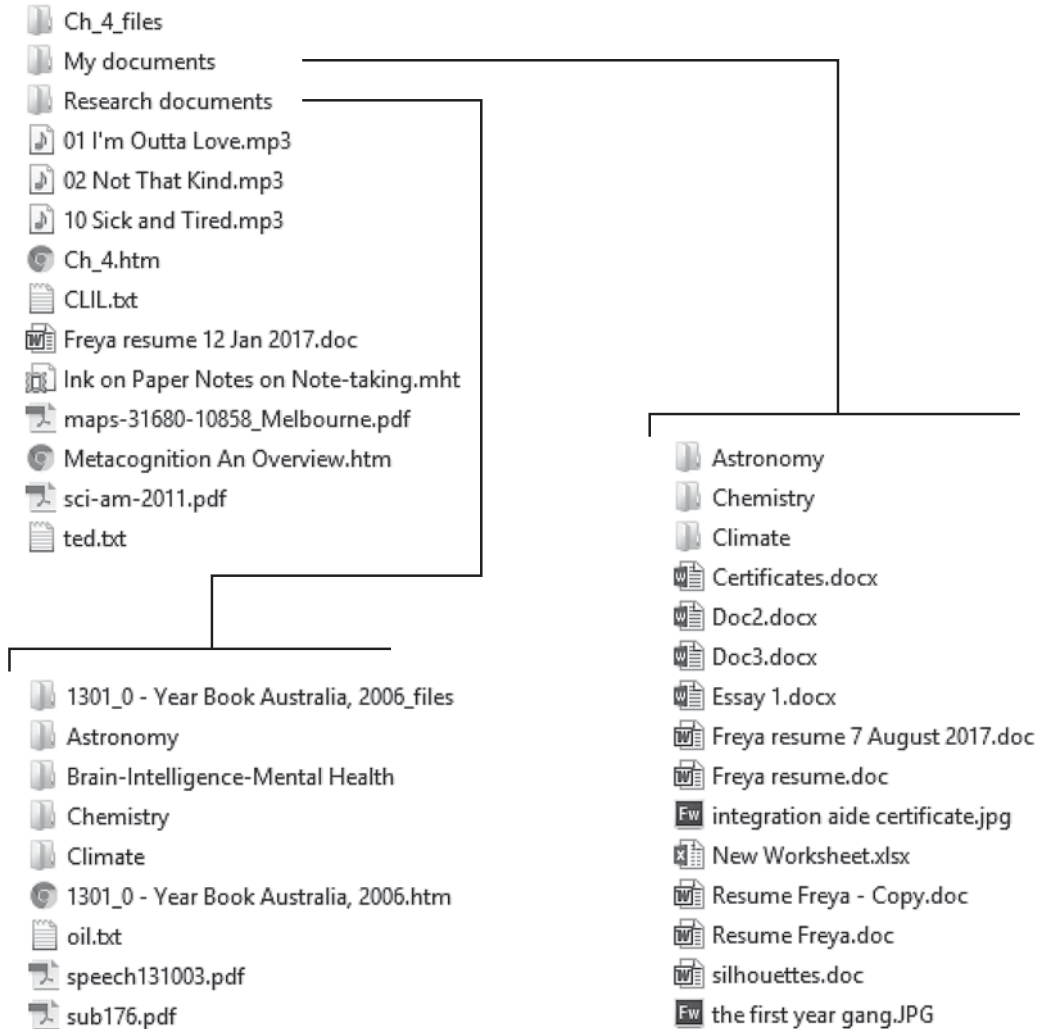
Identify **one** reason why these patient files would be selected for archiving.

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Question 5 (9 marks)

Freya is studying science at university and is also looking for a part-time job. The other day she complained to her mother that she had wasted an hour updating an old version of her résumé. When Freya’s mother heard this, she remembered other times when Freya had become annoyed at ‘not being able to find anything!’

Freya’s mother decided to look at how Freya organised the files on her laptop. The following diagram shows what she saw.



Identify three different concerns about Freya's file management practices. For each concern:

- suggest what Freya should do to correct it
- briefly describe how this suggestion will help Freya.

Concern 1 _____

Concern 2 _____

Concern 3 _____

Question 6 (4 marks)

BeautyOnTheLine is a website that sells different types of beauty products to customers in Australia. Customers who sign up to purchase items must fill out a form that includes details such as their email address, delivery address, favourite beauty products, frequency of purchasing beauty products and income.

Jessie oversees the database that stores customer details, images and pricing of the products, and the web pages that customers can use.

Jessie’s boss, Paul, has insisted that she filter customer data to identify high-income customers so that these customers can be charged 15% above the normal price for a product.

- a. What should Jessie be asking herself about the ethics of using customer data to identify high-income customers so that these customers can be charged more for the same product? 1 mark

- b. What should Paul be asking himself about the ethics of insisting that Jessie identify high-income customers so that these customers can be charged more for the same product? 1 mark

- c. Suggest **two** actions that BeautyOnTheLine could take to help staff avoid future ethical dilemmas. 2 marks

Question 7 (4 marks)

Dion has used primary and secondary sources in his research about sleep.

- a. Give two reasons why Dion should reference and acknowledge the sources of information used.

2 marks

Reason 1 _____

Reason 2 _____

- b. Dion downloaded a report on 2 June 2018 about sleep health from a website, as shown in the image below.



Source: Sleep Health Foundation, <www.sleephealthfoundation.org.au/>

Using your preferred method of referencing and the information provided in the image above, write the reference that Dion would put in his reference list.

2 marks

Referencing method _____

Reference _____

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 (2 marks)

State two variables identified in Jasmin and Joseph's hypothesis.

Variable 1 _____

Variable 2 _____

Question 2 (6 marks)

Knowing that they must be well organised, Jasmin and Joseph decide to create a project plan.

They have listed the key tasks, durations and dependencies associated with the project. These are listed on page 4 of the insert.

They have also identified some important restrictions that they must take into account. These are also listed on page 4 of the insert.




Jasmin and Joseph expect to start the project on 16 April and have started drawing a Gantt chart, as shown on page 17.

Complete the Gantt chart, taking into account the restrictions identified by Jasmin and Joseph. On the Gantt chart:

- show all task durations
- show all dependencies
- mark all milestones.

Task	April														May											
	M 16	T 17	W 18	T 19	F 20	S 21	S 22	M 23	T 24	W 25	T 26	F 27	S 28	S 29	M 30	T 1	W 2	T 3	F 4	S 5	S 6	M 7	T 8	W 9		
A	█																									
B		█	█																							
C					█	█																				
D																										
E																										
F																										
G																										
H																										
I																										
J																										
K																										

Key

-  task duration
-  dependency
-  milestone

Question 3 (4 marks)

Jasmin and Joseph are determining their project's solution specifications by identifying the scope and constraints.

Define the terms 'scope' and 'constraint', and provide an example of each that is related to the project.

Scope _____

Example _____

Constraint _____

Example _____

Question 4 (4 marks)

Jasmin and Joseph have found Data set 1, shown in the insert, which lists some actions that contribute to the engagement of parents/guardians.

They think that it might be useful to know if there is a link between the number of community activities and the performance of a school, and have gathered some data as shown in Data set 2.

Describe two techniques that Jasmin and Joseph could use to organise and manipulate the data in Data set 2. Identify the kind of pattern from each technique that could be used to help them develop a conclusion.

Technique 1 _____

Pattern _____

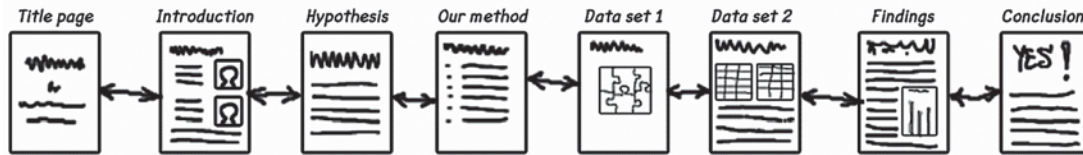
Technique 2 _____

Pattern _____

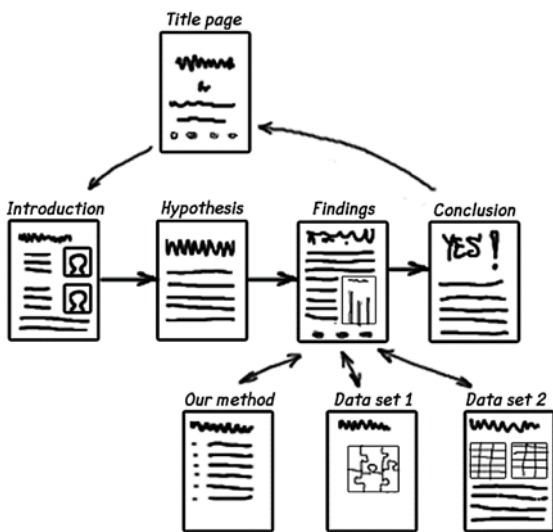
Question 5 (4 marks)

Jasmin and Joseph have begun working on their multimodal online solution (MMOS) for the College Council presentation. Joseph has generated some designs by quickly sketching some simple storyboards.

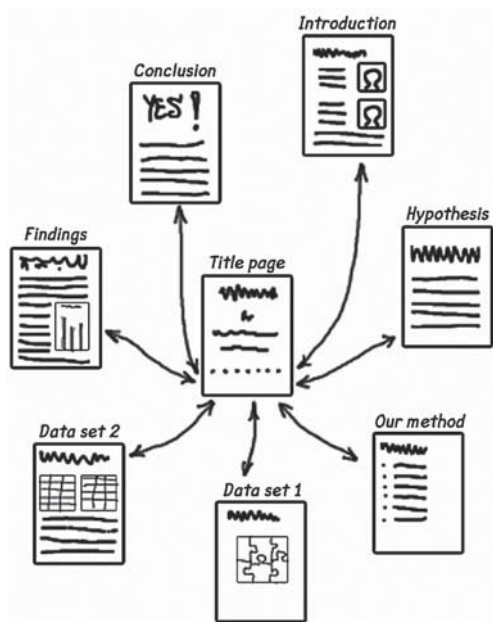
Design 1



Design 2



Design 3



- a. Suggest **one** criterion that Jasmin and Joseph could use to decide which design to choose. 1 mark

- b. Which design should Jasmin and Joseph choose? Justify your response by referring to the criterion suggested in **part a**. 3 marks

CONTINUES OVER PAGE

Question 6 (8 marks)

Jasmin and Joseph have started drawing detailed mock-ups of each page of the MMOS. The next page to be designed will display information about Data set 1.

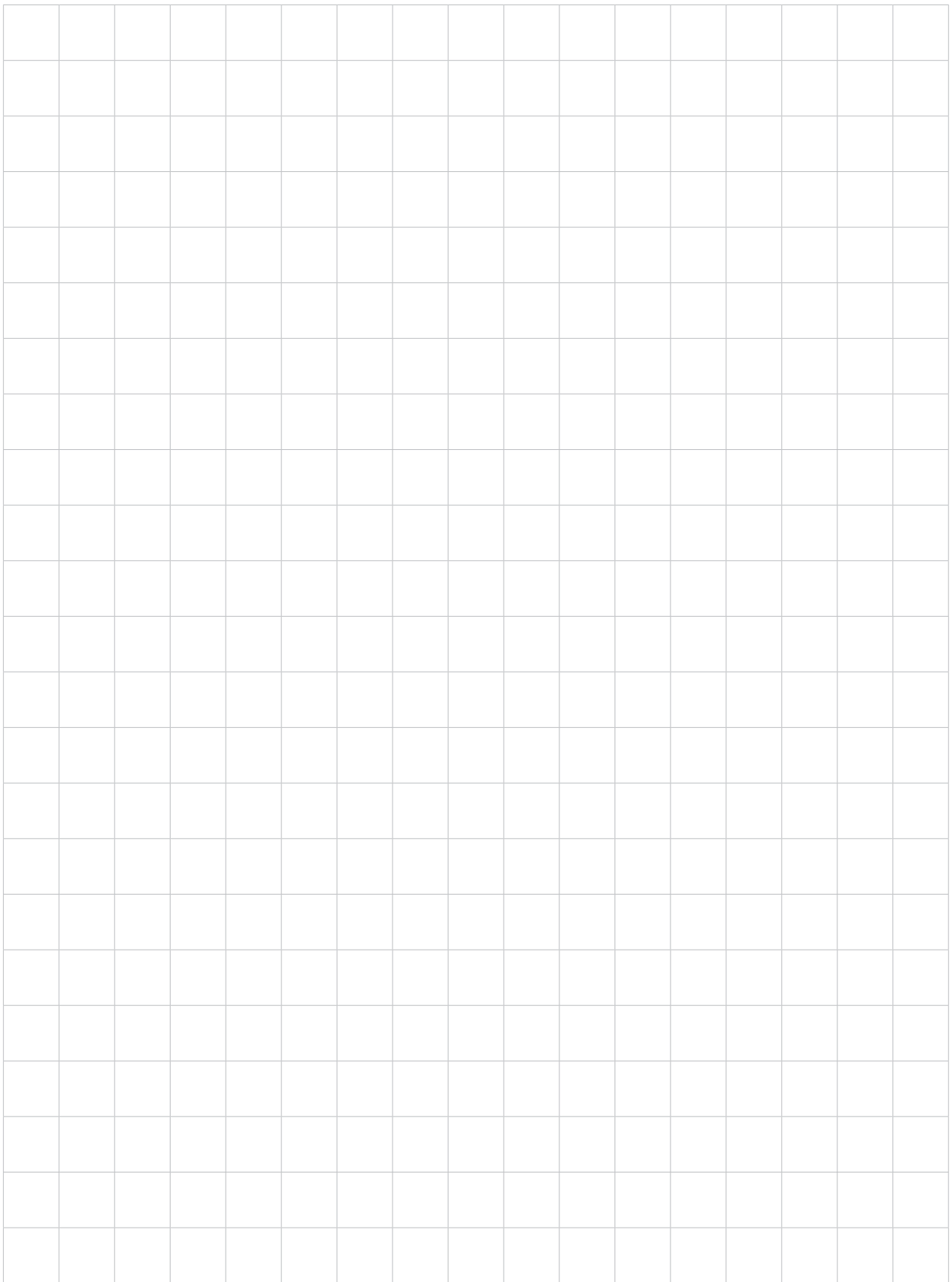
This page will include the following features:

- the title 'Data set 1'
- the infographic shown in Data set 1
- four sentences of text explaining the infographic and how it relates to the hypothesis
- a link to the previous page
- a link to the website the infographic came from
- an acknowledgment of the source of the infographic

For this page, Jasmin believes it is important that the design principles of space and balance are applied.

On the grid provided on page 23, draw a mock-up to show all six of the features listed above. When drawing the mock-up:

- label each feature so that it is clear which feature is being shown
- annotate features that perform an action to indicate what these features should do
- annotate the mock-up to show how the design principles of space and balance have been applied.



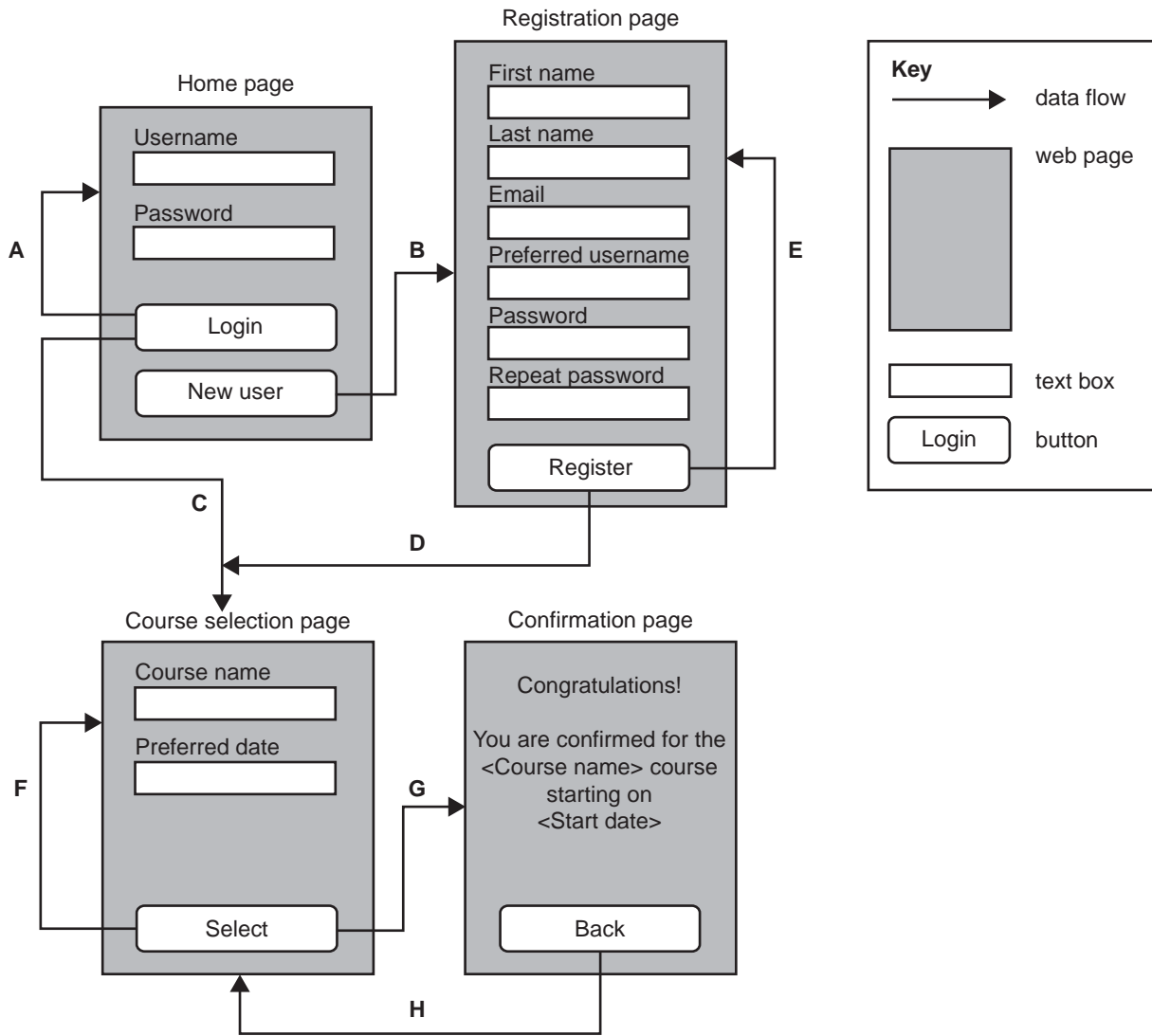
Use the following information to answer Questions 7–10.

The College Council congratulated Jasmin and Joseph on an excellent presentation. The council then decided that running evening courses at the school would be a good way to involve parents/guardians. It would give parents/guardians an opportunity to engage with the school environment in a meaningful way and also to learn new skills to help their children with their learning needs.

Tristan, the college’s IT team leader, was given the task of creating a website and database that would allow parents/guardians to enrol in the courses to be held at the school.

He was told that parents/guardians will be allowed to enrol in several courses.

As part of the design process for the new website, Tristan drew the following user flow diagram.



Tristan also created a flat file database so that he can test the ‘Course selection’ page when it is completed. The database contains records such as the following.

Course ID	Course name	Start date
HS1-1	Helping your child to develop a home study program	28 March
TA1	Teenagers and sleep	11 April
SW1	Balancing school work and fun	24 April
HS1-2	Helping your child to develop a home study program	2 May

Question 7 (3 marks)

Consider the user flow diagram shown on page 24.

- a. Which data flow path would be followed if the 'New user' button were clicked? 1 mark

- b. Path E will be followed if there is a validation error when the 'Register' button is clicked.

List two different kinds of errors a user could make when entering data on the 'Registration' page. 2 marks

Error 1 _____

Error 2 _____

Question 8 (5 marks)

The 'Course selection' page allows users to select a course by entering a course name. After constructing the 'Course selection' page, Tristan wanted to test it for usability. He linked the page to his flat file database.

Tristan then asked a group of people to use the page while he observed. He noticed that the users quickly became frustrated with the many validation error messages that appeared.

- a. Give **one** reason why using text boxes as a data entry method on the 'Course selection' page might produce so many validation errors. 1 mark

- b. Suggest and briefly describe a better data entry method for the 'Course name' field and explain how it will reduce the number of validation errors. 4 marks

Method _____

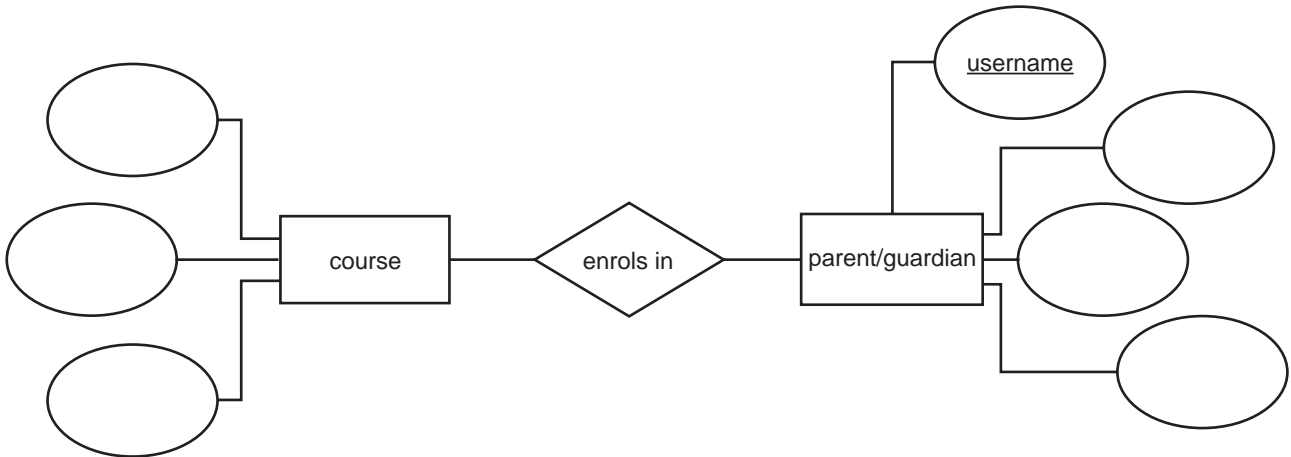
Explanation _____

Question 9 (4 marks)

The website is complete and now a new database must be created. Tristan has drawn the entity-relationship (ER) diagram for the database but has struggled with the relationships and with identifying all the required fields.

The diagram below shows what Tristan has drawn so far.

Complete the ER diagram to properly represent a database that will support the new website.



Question 10 (2 marks)

Tristan has developed the web pages shown in the user flow diagram on page 24 for the Datarook Secondary College community to sign up for the courses.

However, the Principal of the college has heard from some members of the community that people who do not have children enrolled at the college are signing up for the courses. At this stage the Principal would like to limit access to these courses to Datarook parents/guardians.

Outline **one** way that Tristan can ensure that only Datarook parents/guardians are able to enrol in courses.

Question 11 (3 marks)

The Department of Education has been quite impressed with the college's community education program and has decided to provide some extra funding for the college's information management system. The Principal is thrilled with receiving this money and consults Tristan about improvements that could be made to the system. Tristan advises that the college should use cloud computing to store all of its data.

Is Tristan correct? Justify your answer.

Question 12 (3 marks)

The Principal has decided to adopt cloud computing for data storage as part of the college's new information management strategy.

During the transfer of files to the new cloud system, Sandra, an IT team member, views a database file of parent/guardian emails. She considers taking a copy of this file and using the email addresses on it to send parents/guardians promotional material for the upcoming Country Town Fair that she is organising. The college does not have a privacy policy statement.

Discuss any key legislation that Sandra needs to be aware of when using the email addresses for promoting the Country Town Fair.

Question 13 (2 marks)

Six months have passed since Datarook transferred all of its files to the cloud.

State **one** evaluation criterion that the Principal could use to measure the effectiveness of the college's new information management strategy and describe how it applies to the college.

Insert for Section C – Case study

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

Datarook Secondary College

Datarook Secondary College is a government school of about 600 students in country Victoria. Even though the college is performing well, the Principal has asked different groups within the school to come up with ideas to make it perform even better.

Part 1 – The Student Representative Council

The Student Representative Council (SRC) is one of the groups that has been discussing how to further improve the college's performance. After many meetings, the students have agreed that one thing the college could do is increase its engagement with the school community. They form the following hypothesis:

If the parents/guardians were more strongly engaged with their children's school community, then student learning would improve because parents/guardians would have a greater understanding of their children's educational needs.

The SRC captains, Jasmin and Joseph, take their idea to the Principal. She is impressed with the SRC's hypothesis but wants to see evidence that it is true before taking the idea any further. The Principal tells the captains that the SRC should report its findings to the College Council at its June meeting. She also requires that the captains support their report with a multimodal online solution (MMOS) so that all students, staff and parents/guardians can view it.

As a part of their research, Jasmin and Joseph find the information shown in Data set 1 and Data set 2.

Part 2 – Community education programs

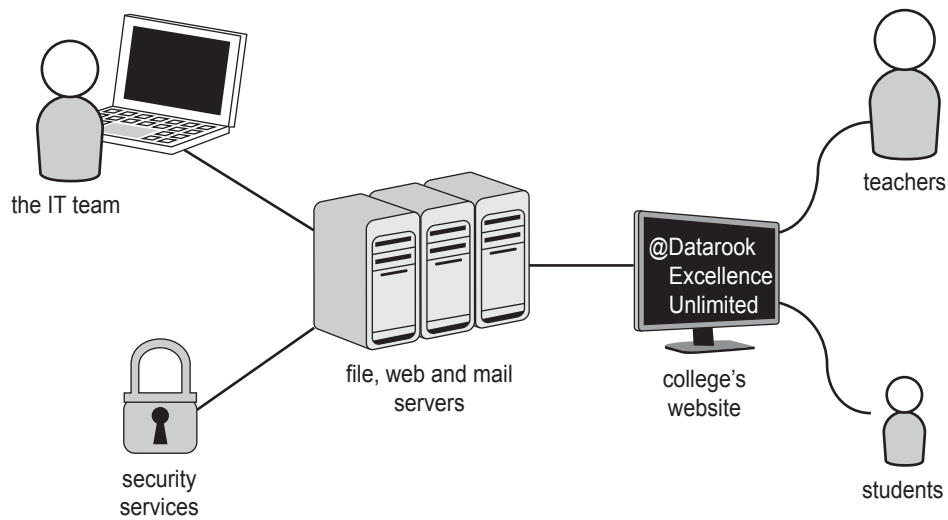
The SRC's presentation to the College Council has been successful. The council asks the Principal to do something to increase the college's engagement with the wider school community.

It is decided that the college will conduct a series of short courses for parents/guardians. Some of the courses will involve students and parents/guardians working together. Others will be just for parents/guardians, and designed to help them learn more about what the students are learning and how to assist their children in reaching their potential.

Interested parents/guardians will be able to enrol in a course through a new section on the college's website. New web pages and a database will have to be created for this.

Information management system

The following diagram shows the system used to support the college's website.

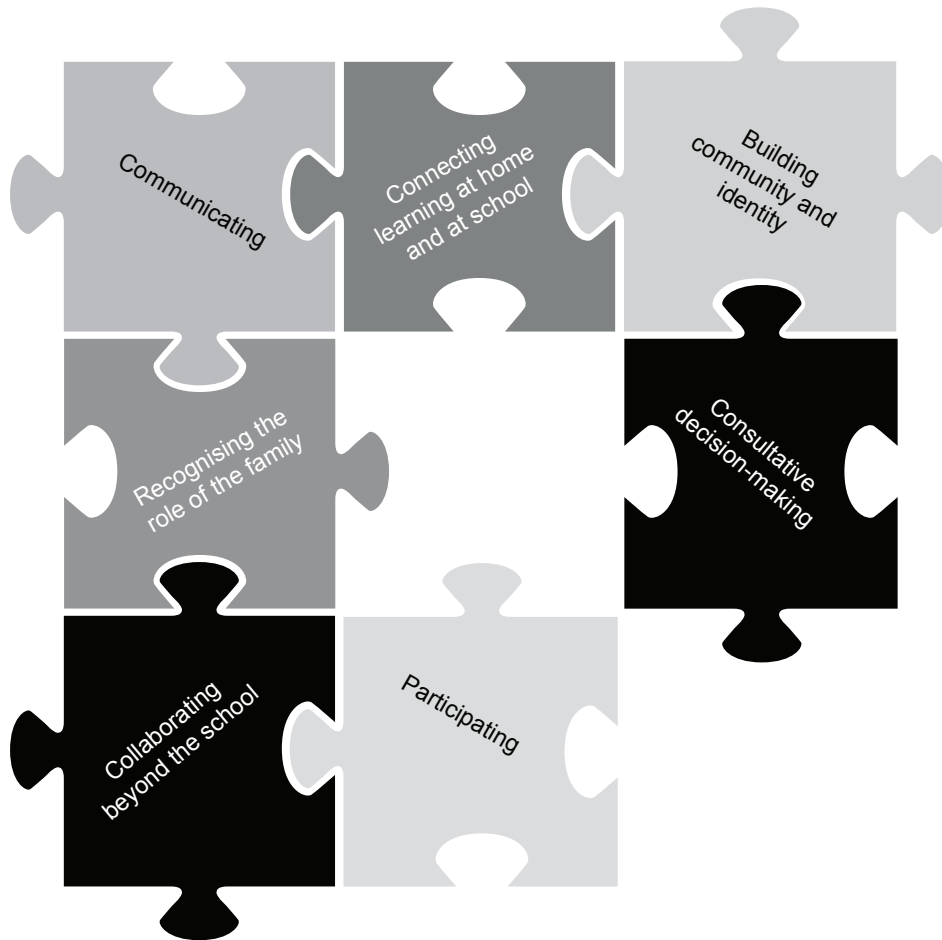


Components of the system include the following:

- the @Datarook website, which gives access to members of the school community, including students and teachers
- the IT team, consisting of Sandra and Tristan, who handle network administration and all other IT-related issues at the college
- the servers, including file, web and mail servers
- the security services that protect the servers, @Datarook and its users

Data set 1

Jasmin and Joseph found the following infographic showing the main actions a school can take to improve engagement with the school community.



Source: Parental Engagement Taskforce, 'Strengthening family and community engagement in student learning resource'; © 2011 Department of Education, Employment and Workplace Relations

Data set 2

Since there are more than 2000 schools in Victoria, Jasmin and Joseph decide to limit their research to six schools in country Victoria that are similar to Datarook Secondary College.

2013		
School	Median exam score (%)	No. of community activities
1	58	4
2	56	3
3	48	3
4	54	0
5	52	2
6	52	3

2017		
School	Median exam score (%)	No. of community activities
1	60	10
2	58	4
3	50	5
4	56	2
5	58	8
6	52	4

TURN OVER

Project planning**List of tasks created by Jasmin and Joseph**

	Task	Duration	Dependent on
A	Acquire data from online sources.	2 days	none
B	Acquire data from regional schools.	2 days	none
C	Organise Skype interviews.	1 day	none
D	Conduct Skype interviews.	2 days	C
E	Organise and manipulate data.	2 days	A, B, D
F	Develop visualisations.	1 day	E
G	Write report for College Council.	2 days	E
H	Generate design ideas.	0.5 days	G
I	Develop the MMOS.	2 days	H
J	Test the solution and fix errors.	0.5 days	I
K	Upload to school website.	0.5 days	J

The important restrictions identified by Jasmin and Joseph are as follows:

- There will be no school on ANZAC Day, 25 April, and there will be a student-free day on 26 April.
- The two captains will not be able to work on the project on Saturdays because of sporting commitments, but they will meet and work together on the project on Sundays.
- They will work together on each task.
- Two important dates in the project are when the report is finished and when the project is finished.