

# VCE Applied Computing: Data Analytics

## Sample Questions

### Written Examination – End of Year

These sample questions are intended to demonstrate how new aspects of Units 3 and 4 VCE Applied Computing: Data Analytics may be examined. They do **not** constitute a full examination paper.

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#### Question 1 (8 marks)

A financial institution stores sensitive customer data including personal identification information and transaction records. The institution needs to ensure that this data is protected both when stored on its servers (data at rest) and when transmitted over the internet (data in transit). It is considering the use of various cryptographic techniques to enhance its security measures.

Compare the use of symmetric and asymmetric keys in relation to data at rest and data in transit, with reference to the strengths and weaknesses of each method. In your response, provide a recommendation about which combination of techniques offers the best overall protection in the context of the scenario above.

SAMPLE

**Question 2** (9 marks)

A bookshop is experimenting with SQL queries with the aim of assisting customer queries in a more efficient manner. Below are two tables: one listing publishers, and the other listing books.

**Publisher Table: tblPub**

PubID	Name	Location	Founded
1	Dolphin House Publishing	New York	2013
2	SmithGilles	New York	1989
3	MacNeillie Publishers	London	1843
4	Robert & Hamilton	New York	1924
5	Dubois Leroy	Paris	1826

**Books Table: tblBooks**

BookID	Title	Genre	Author	PubID
100	Clues in the Dark	Mystery	Birt Taylor	1
101	Fires of the Moon	Fantasy	Erika Robins	5
102	Lives of Legends	Biography	Daniel Raulter	4
103	Famous Figures	Biography	Alice Clang	1
104	Kingdom of Fortune	Fantasy	Emily Bowson	4
105	The Unsolved Mystery	Mystery	Edward Laff	2
106	Explore the Cosmos	Academic	Dr Roger Puckey	3
107	Dragons of the South	Fantasy	Michelle Garrickson	3
108	Remarkable Journeys	Biography	James Singer	2
109	The Classified Story	Biography	Andrea Tangle	5

- a. Write an SQL query that sorts the book genres in ascending order. All fields are to be included. 2 marks

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- b. Write an SQL query to retrieve the book titles in the 'Academic' or 'Biography' genres. The query must include the book title and genre. 3 marks

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- c. Write an SQL query that joins the two tables based on the relationship between the primary key and the foreign key. Records must list the publisher's name and the book title. 4 marks

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**Question 3** (13 marks)

Break\*fast Bar is a Victorian business specialising in healthy breakfast bars that are nutritionally balanced for a great start to the day. In its first year of trading, its Victorian and New South Wales stores have been successful, and the business is now planning to open a new store in Queensland.

To help the business decide which products it should sell in its new store, it requires a way to quickly identify its bestselling items. To achieve this, Break\*fast Bar's management wants to summarise the information from its sales database, shown in the table below, as an interactive dashboard.

Year	State	Flavour	Number sold
2023	VIC	Fruitless	2547
2023	VIC	Banana	2301
2023	VIC	Cherry	2709
2023	NSW	Fruitless	3216
2023	NSW	Banana	2464
2023	NSW	Cherry	2890

a. On the grid on page 5, generate a mock-up for the dashboard that includes the following features:

- company name and logo
- title of data displayed
- filters/slicers to select flavour(s) and state(s)
- one chart displaying the result of the filter(s).

5 marks

b. Annotate the mock-up generated in **part a** to identify and describe **four** design principles that have been incorporated into the dashboard's design.

8 marks

SAMPLE

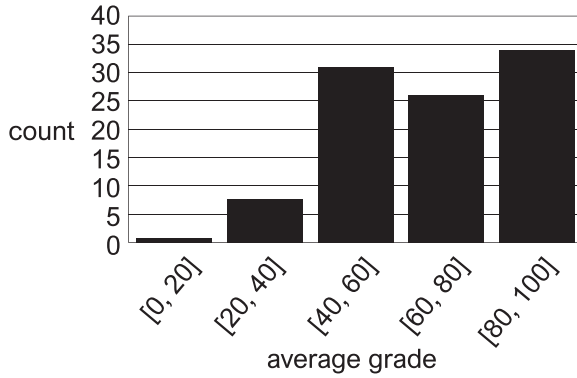


**Question 4** (12 marks)

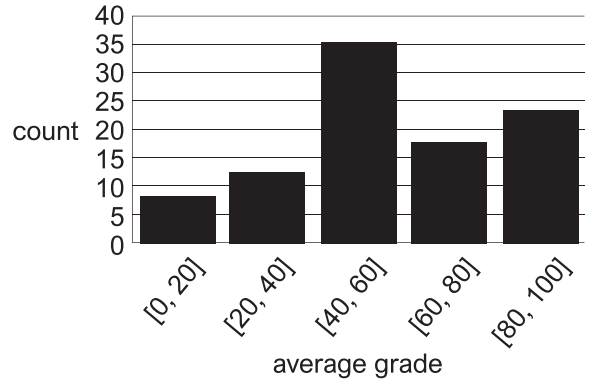
A local school wants to understand whether the amount of time students spend studying each week affects their grades in Year 8 and Year 10. To investigate this, the school collected each year level's average grades from last semester using the school's learning management system (LMS), and asked students to complete a survey to determine how much time they spent studying each week.

The data from the LMS and the student survey are shown in the charts below.

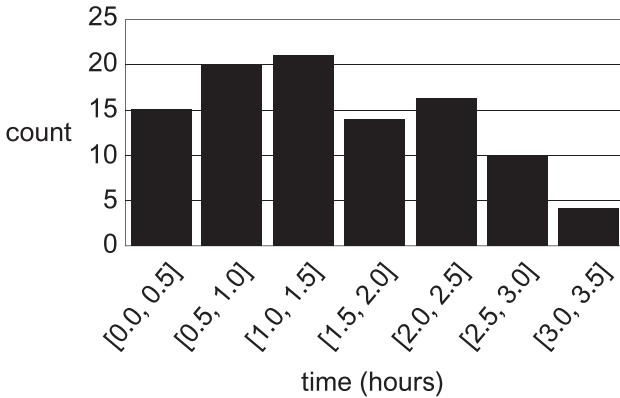
**Chart 1 – Average grades (Year 8)**



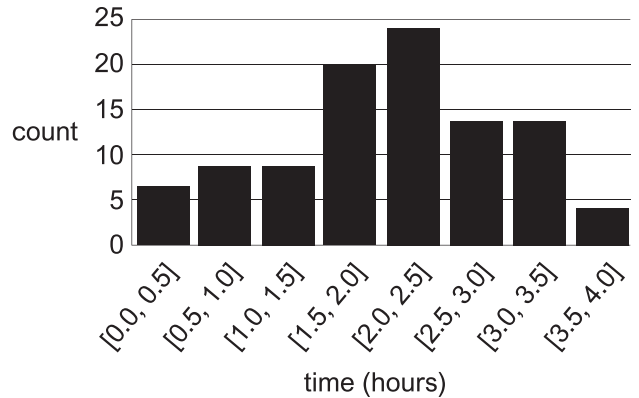
**Chart 2 – Average grades (Year 10)**



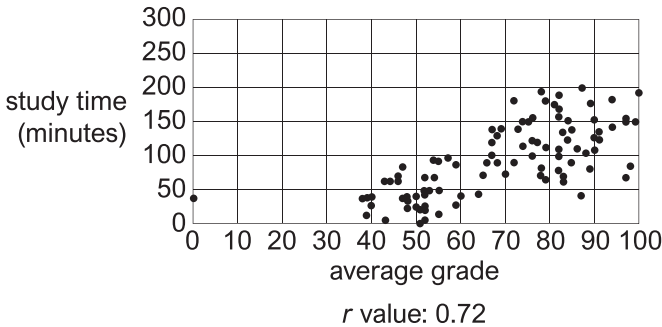
**Chart 3 – Study time per week (hours) – Year 8**



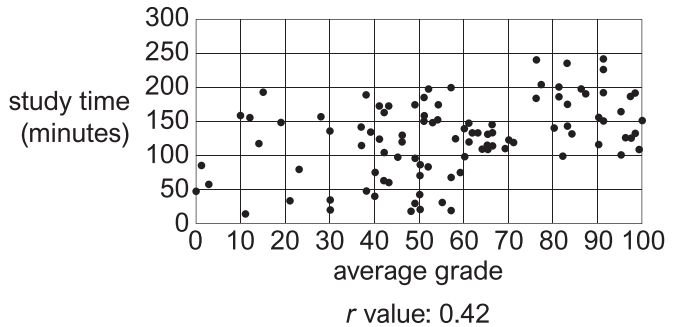
**Chart 4 – Study time per week (hours) – Year 10**



**Chart 5 – Year 8 data**



**Chart 6 – Year 10 data**



SAMPLE

- a. Using the data provided in the charts on page 6, complete the table below. 8 marks

	Data set 1: Year 8	Data set 2: Year 10
<i>Average grades</i> Descriptive statistics (median, minimum and maximum)		
<i>Study time</i> Descriptive statistics (median, minimum and maximum)		
Pearson's correlation coefficient ( $r$ )		
Shape and skew of the data		

- b. Using your interpretations from **part a**, comment on the conclusions that can be drawn about the data. 4 marks

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- c. Discuss **two** potential consequences for the hospital and its management team if they choose not to meet their obligations under the *Privacy Amendment (Notifiable Data Breaches) Act 2017*.

4 marks

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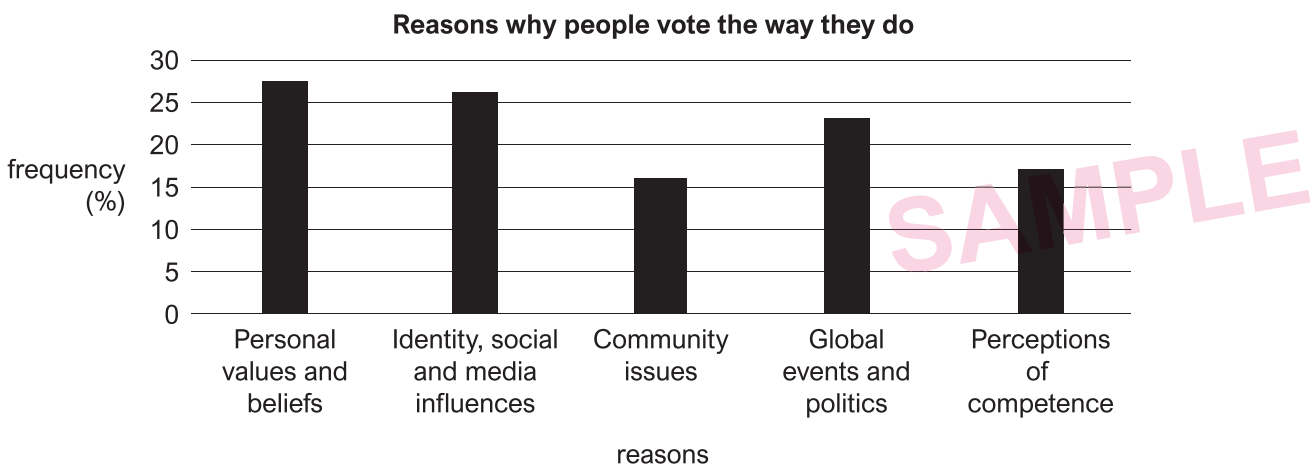
SAMPLE

**Question 6** (5 marks)

Jerry is researching the reasons why people vote the way they do. He has surveyed 200 people, asking them for their three top reasons, and then summarised the data, as shown in the table below.

Reason	Count	Frequency (%)
Personal values and beliefs	166	28
Identity, social and media influences	158	26
Community issues	97	16
Global events and politics	76	13
Perceptions of competence	103	17
<b>Total</b>	600	100

Jerry develops the following chart, using separate data visualisation software, in preparation for the eventual development of an infographic.



One of Jerry’s colleagues, Selina, has highlighted that Jerry will need to test that the chart he has created is representative of the data being visualised.

- a. Identify the error in the chart. 1 mark

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- b. State how this error could have occurred. 1 mark

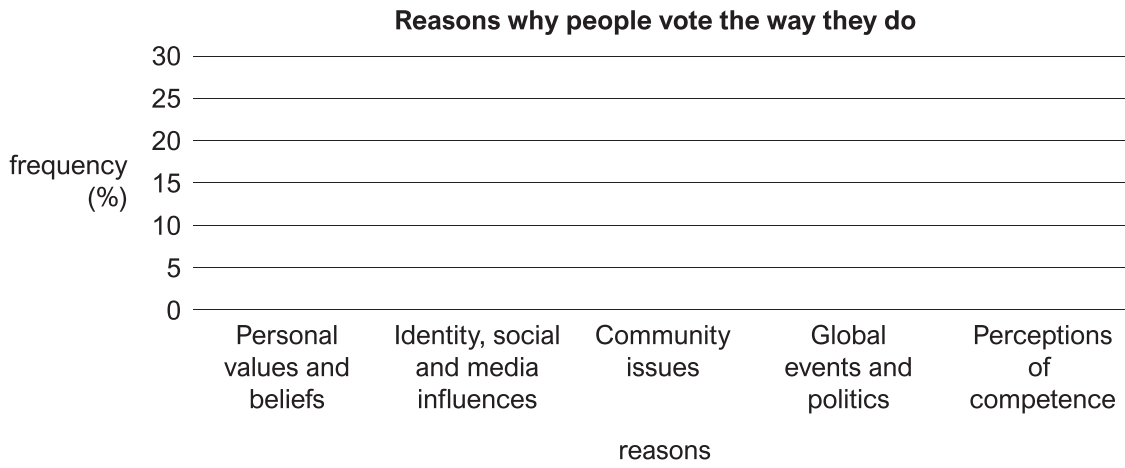
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c. Correct the error by completing the chart below.

3 marks



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**Question 7** (9 marks)

You are tasked with designing a comprehensive data dashboard for a local business to help it track its sales performance and customer engagement. The business sells sports equipment and clothing and has several stores across Victoria.

The business wants sales metrics, customer demographics and the user interface to be considered as part of the dashboard's design.

The following should be included as part of the sub-branches:

- monthly sales
- layout design
- age groups
- product performance
- geographic distribution
- interactive elements.

Complete the mind map below to provide a detailed outline of your design idea for the dashboard. Your mind map must include **three** main branches, each representing a key aspect of the dashboard's design.

