




**High School Student  
Engagement**

A decorative graphic consisting of a network of blue dots of various sizes connected by thin lines, resembling a molecular or digital structure, set against a dark blue background that fades into white.

# **Digital Solutions Unit 4: Practice Questions for the External Examination based on Unit 4 of the Digital Solutions Syllabus**

**This resource was updated in 2024 by Leigh Ferguson,  
Leader of Learning in Technologies, Stuartholme School.**

# Practice Questions for the External Examination based on Unit 4 of the Digital Solutions Syllabus

## Concept 1 focus: Encryption and authentication strategies

**Question one:** (2 Marks)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2019/2019comp-softdev-w.pdf>

Eliza is leading the development of a client management software solution for an employment agency. During a design meeting, her manager suggests that the data stored by the software solution will not need to be encrypted because the software solution will require users to log in with a username and password.

Explain why data protection and user authentication are both important within this software solution.

---

---

---

---

---

---

---

---

**The following is an example of a high-scoring response.**

Both data protection and user authentication are means of ensuring the security of the data. Requiring users to login aims to prevent unauthorized access by those who are trying to gain access to the data, while encrypting the data ensures that if an unauthorised does gain access despite the user authentication requirements, that the data is unreadable and still protected.

**Question two:** (2 Marks)  
**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0005/646196/2020\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0005/646196/2020_CSC_Written_Examination.PDF)

List two advantages of using passwords to ensure the security of networks.

**One:**

---

---

---

---

**Two:**

---

---

---

---

**Answers could include:**

Passwords can be secure, because only the correct user knows it.  
Passwords can be stored in an encrypted form in a password manager.

**Question three:** (2 Marks)  
**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0005/646196/2020\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0005/646196/2020_CSC_Written_Examination.PDF)

List two other methods that could be used to authenticate a user to a networked computer.

**One:**

---

---

**Two:**

---

---

**Answers could include:**

Biometric-based methods (e.g. fingerprints) and token-based methods (e.g. access cards).



**Question four:**

(6 Marks)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2018/2018comp-softdev-w.pdf>

Lilianna has decided to develop a backup strategy that includes backing up the customer data and database changes each day. She thinks the stored data should be encrypted. Arlen has suggested that an effective backup strategy is all they need and they do not need to consider encrypting the stored data.

Compare the purpose of a backup strategy and data encryption, and recommend, with justification, what Lilianna should implement.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Marking key:**

The following are two examples of high-scoring responses.

**Example 1**

The purpose of a backup strategy and encryption is both to increase data security. However they achieve this differently with a backup provide redundancy, allowing data to be restored if it ever gets deleted. Encryption provides security in a more traditional sense in encoding the data so that it is unreadable. To achieve best practice Lilianna should implement both of these strategies. Given that information such as credit card details is stored in the database, encryption should be considered as this information may be of high target for hackers. Furthermore, a backup should be used for redundancy to ensure that if any data is ever lost it can be restored. An incremental backup in which only data that has been changed since the last back up is backed should provide a good balance of speed and redundancy for the system.

**Example 2**

Data encryption is a security measure that is designed to protect data from being accessed by unauthorized users. Backup strategies such as incremental backup, where changes between any previous incremental or full backup are backed up each day, protect the company if they lose access to the data. As data encryption and backups serve different functions, one protecting security of data from attackers and another preventing data loss, it would be in Lilianna's interests to implement both. For Lillian's needs a daily incremental backup of the encrypted data on external hard drives, and a weekly full backup would be advisable.

**Question five:**

(2 Marks)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2017/2017comp-softdev-w.pdf>

Explain how two people who have never physically met can use public key cryptography to send data between them securely over the internet.

---

---

---

---

**The following is an example of a high-scoring response.**

They can do this through TLS which uses asymmetric encryption. The person requesting the data can send the other person a public key through which he can generate a ciphertext from plaintext and send to the first person who would be the only person able of reading the encryption through decrypting it with his unique private key. Hence data is sent securely.

**Question six:**

(1 Mark)

**Source:** [https://senior-secondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0003/1091271/2023-AIT-Examination.PDF](https://senior-secondary.scsa.wa.edu.au/_data/assets/pdf_file/0003/1091271/2023-AIT-Examination.PDF)

Which of the following scans computer files and programs for malicious code and removes or quarantines any detected threats?

- A) anti-virus software
- B) a firewall
- C) biometrics
- D) passwords

**Answer: A**

**Question seven:**

(1 Mark)

**Source:** [https://senior-secondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0003/1091271/2023-AIT-Examination.PDF](https://senior-secondary.scsa.wa.edu.au/_data/assets/pdf_file/0003/1091271/2023-AIT-Examination.PDF)

Charlie wants to send Alex an encrypted email. To do this, Charlie takes Alex's public key and encrypts the message. To read a message that is encrypted by a public key, Alex must use:

- A. a decompression algorithm that employs a secure HTTPS connection
- B. the corresponding public key
- C. the corresponding private key
- D. a decryption cipher

**Answer: C**

**Question eight:**

(1 Mark)

**Source:** <https://www.bbc.co.uk/bitesize/guides/znxxh39/test>

What is the ciphertext for 'computer science' when a Caesar cipher with a key value of +3 is used?

- A. eqorwvgt uekgpeg
- B. frpsxwhu vfhqfh
- C. iusvazkxyioktik
- D. zpjmrbqbo pzfkbzb

**Answer: B**



**Question nine:**

(1 Mark)

**Source:** <https://www.bbc.co.uk/bitesize/guides/znxxh39/test>

What does an encryption key do?

- A. It intercepts data packets on the internet
- B. It scrambles plaintext into an unreadable form, or unscrambles ciphertext
- C. It authenticates data
- D. Is a form of plaintext

**Answer: B**

**Question ten:**

(3 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0011/592238/2019\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0011/592238/2019_CSC_Written_Examination.PDF)

Explain how encryption could be used to enhance the security of networks.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Marking key:**

Description	Marks
Explains how encryption could be used to enhance the security of networks	3
Provides some relevant facts about how encryption could be used to enhance the security of networks	2
Makes superficial comment/s about how encryption could be used to enhance the security of networks	1
<b>Total</b>	<b>3</b>
Example of a three mark response: Encryption could be used at the source and destination nodes on a network or could be used during transport. The source/destination scenario assumes that the parties have a shared secret key or a public/private key pair each. The 'during transport' scenario means that end-user applications do not have to be altered as the encryption occurs at the lower layers.	
Accept other relevant responses	

**Question eleven:**

(8 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0011/592238/2019\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0011/592238/2019_CSC_Written_Examination.PDF)

The Wirratrack Wildlife Hospital (WWH) would like to create an online database system to track the care of the animals that require its services. The systems analyst has provided the following description for the WWH online system.

- An animal can be admitted to the hospital on more than one occasion.
- Treatment plans comprise one or more treatment items.
- One vet can treat one or more animals.
- One release officer is responsible for the release of one or more animals.

**Discuss the advantages and disadvantages of only encrypting the:**

i. Data on the local database server

(4 marks)

---

---

---

---

---

---

---

ii Traffic in transit between the WWH network and the external vet

(4 marks)

---

---

---

---

---

---

---



**Marking key:**

(i) data on the local database server (4 marks)

Description	Marks
Discusses the advantages and disadvantages of only encrypting the data on the local database server	4
Provides some relevant facts about the advantages and disadvantages of only encrypting the data on the local database server	3
Identifies a relevant aspect about the advantages and/or disadvantages of only encrypting the data on the local database server	2
Makes superficial comments about the advantages and/or disadvantages of only encrypting the data on the local database server	1
<b>Total</b>	<b>4</b>
<b>Examples</b> <b>Advantages:</b> <ul style="list-style-type: none"> <li>allows the data to remain separate from the device security where it is stored. Security is included with the encryption which permits administrators of the local database to store and transmit data via unsecured means.</li> <li>circumvents the potential complications that accompany local data breaches by providing protection of WWH intellectual property, even if it is lost or stolen.</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>data encryption is a large task for an IT specialist. The more data encryption keys there are the more difficult IT administrative tasks for maintaining all of the keys can be. If you lose the key to the encryption, you have lost the data associated with it.</li> <li>data encryption technology can be tricky when you are layering it with existing programs and applications and may negatively impact routine operations within the system.</li> </ul>	
Accept other relevant responses	

(ii) traffic in transit between the WWH network and an external vet. (4 marks)

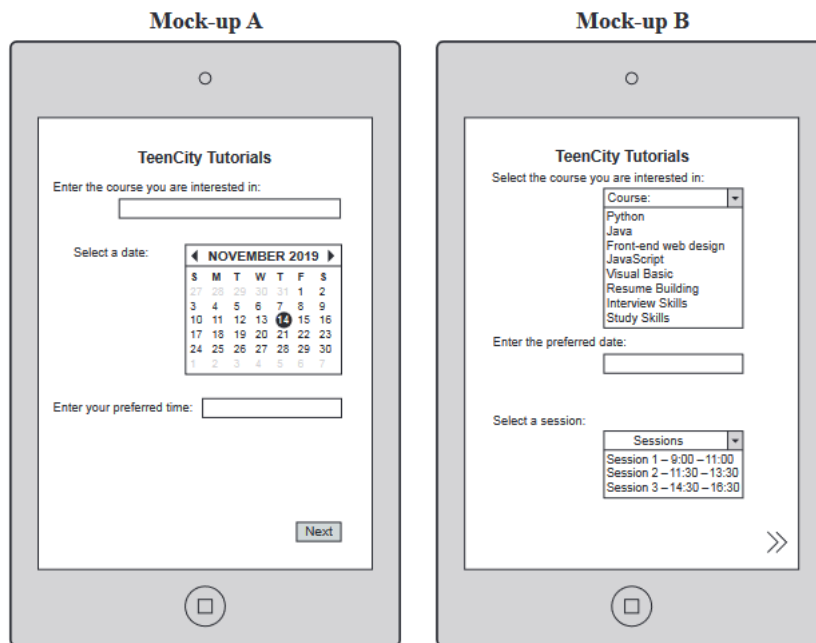
Description	Marks
Discusses the advantages and disadvantages of only encrypting the traffic in transit between the WWH network and an external vet	4
Provides some relevant facts about the advantages and disadvantages of only encrypting the traffic in transit	3
Identifies a relevant aspect about the advantages and/or disadvantages of only encrypting the traffic in transit	2
Makes superficial comments about the advantages and/or disadvantages of only encrypting the traffic in transit	1
<b>Total</b>	<b>4</b>
<b>Examples</b> <b>Advantages:</b> <ul style="list-style-type: none"> <li>because the encryption is on the data itself, the data is secure regardless of how it is transmitted to the external vet. An exception to the rule can be transmission tools such as email because sometimes a typical email account does not provide the necessary security.</li> <li>WWH network may be required to meet specific confidentiality requirements and other associated regulations and encrypting data means that it can only be read by the recipient who has the key to opening the data.</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>If WWH network administrators do not understand some of the restraints imposed by data encryption technology, it is easy to set unrealistic standards and requirements which could jeopardise data encryption security.</li> <li>can prove to be quite costly because the systems that maintain data encryption must have capacity and upgrades to perform such tasks. Without capable systems, the reduction of systems operations can be significantly compromised.</li> </ul>	
Accept other relevant responses	

## Concept 2 focus: Useability principles & Elements and principles of Visual Communication

Question one:

(4 Marks)

TeenCity Tutorials is a small business that offers two hour introductory technical skills tutorials, free of charge, to young people between the ages of 13 and 21. The two mock-ups below were created as two different application options for the first screen of the enrolment form to be used in the business's mobile application.



- A) Select one element from Mock-up A that would make the mobile application **more efficient** than if the corresponding element from Mock-up B were used. Explain why this element from Mock-up A is more efficient than the corresponding element from Mock-up B.
- (2 Marks)

Element \_\_\_\_\_

Explanation \_\_\_\_\_

**A suggested response could be as follows.**

Students were required to select the calendar control/date-time picker from Mock-up A, then explain why using a calendar control was efficient and why the text box in Mock-up B was not efficient. Student responses suggested a lack of in-depth understanding around what the term 'efficiency' meant in the context of the prompt. The calendar control in Mock-up A to pick the date for the session will allow for a faster selection of date than by typing it in. The field to enter the date in Mock-up B will not be as efficient.

- B) Select one element from Mock-up B that would make the mobile application **more effective** than if the corresponding element from Mock-up A were used. Explain why this element from Mock-up B is more effective than the corresponding element from Mock-up A. (2 Marks)

**Element** \_\_\_\_\_

**Explanation** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**A suggested response could be as follows.**

Students were required to select one of the two drop-down menus from Mock-up B, then explain why using one is effective and why their corresponding text boxes in Mock-up A were not effective. Student responses suggested a lack of in-depth understanding around what the term 'effectiveness' meant in the context of the prompt.

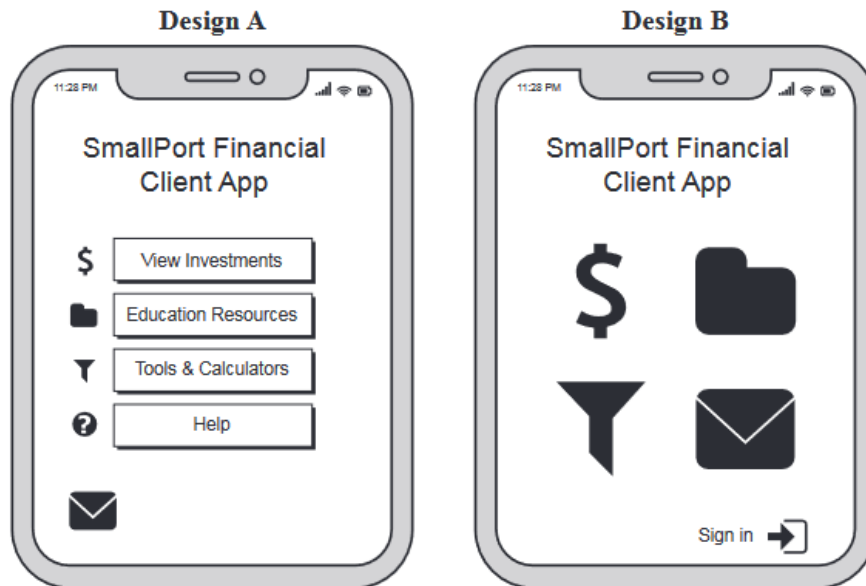
Selection of course is limited to the options available from the drop-down box meaning that data will be complete and reasonable (no validation for spelling errors would be required). Typing the course in could become an issue due to user error if not typed in as expected.

**Question two:**

(6 Marks)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2019/2019comp-softdev-w.pdf>

Before Ryan starts the development of the mobile application, he is required to generate some design ideas. Below are two design ideas created by Ryan, showing potential user interfaces for the mobile application.



- A) Select one design idea – Design A or Design B – based on the requirement of security. Justify your selection.  
(3 Marks)

**Suggested response:**

Most students identified the presence of a sign-in button as a security feature in Mock-up B and were able to discuss how it would secure the application and client data. However, many responses did not contain any discussion of Mock-up A as part of the justification.

- B) Select one design idea – Design A or Design B – based on the requirement of usability. Justify your selection.  
(3 Marks)

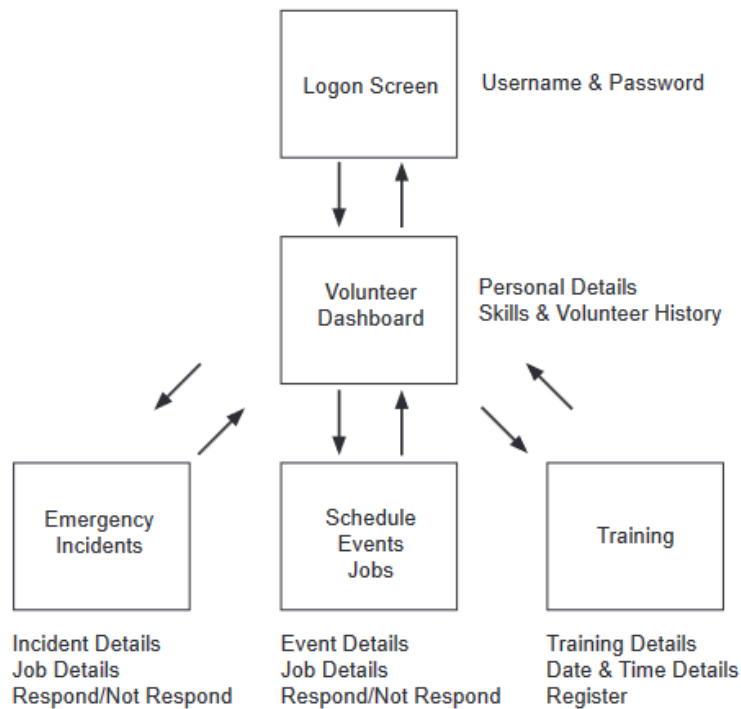
**Suggested response:**

This question was answered quite well, with many students discussing how the text labels enhanced the usability of Mock-up A's interface. Some students also considered how Mock-up B's larger buttons could improve usability for retirees and those with vision or fine-motor skill impairments. Similarly to Question 6a., many responses did not contain any discussion of the opposite mock-up as part of the justification

**Question three:**

**Source:** [https://senioresecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0003/943365/2021\\_CSC\\_Written\\_Examination.PDF](https://senioresecondary.scsa.wa.edu.au/data/assets/pdf_file/0003/943365/2021_CSC_Written_Examination.PDF)

EmergWA volunteers have to logon to a desktop to access their dashboard. The Chief Information Officer is keen to create a mobile application (app) that volunteers can use to check for emergency incidents, upcoming events and jobs. This would make it easier for volunteers to respond to requests. The navigation structure for the new application is shown below and includes key information that needs to be on the screens.



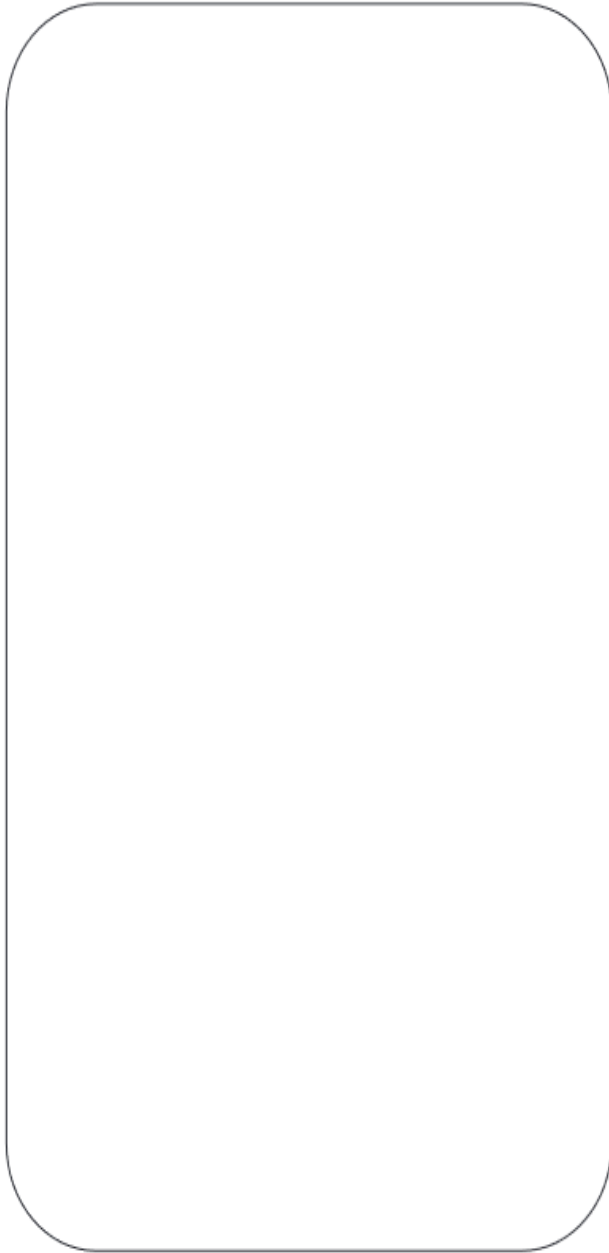
A) Design the visual interface for the following screens. Screen wireframes available on next page.

- Emergency Incidents
- Training

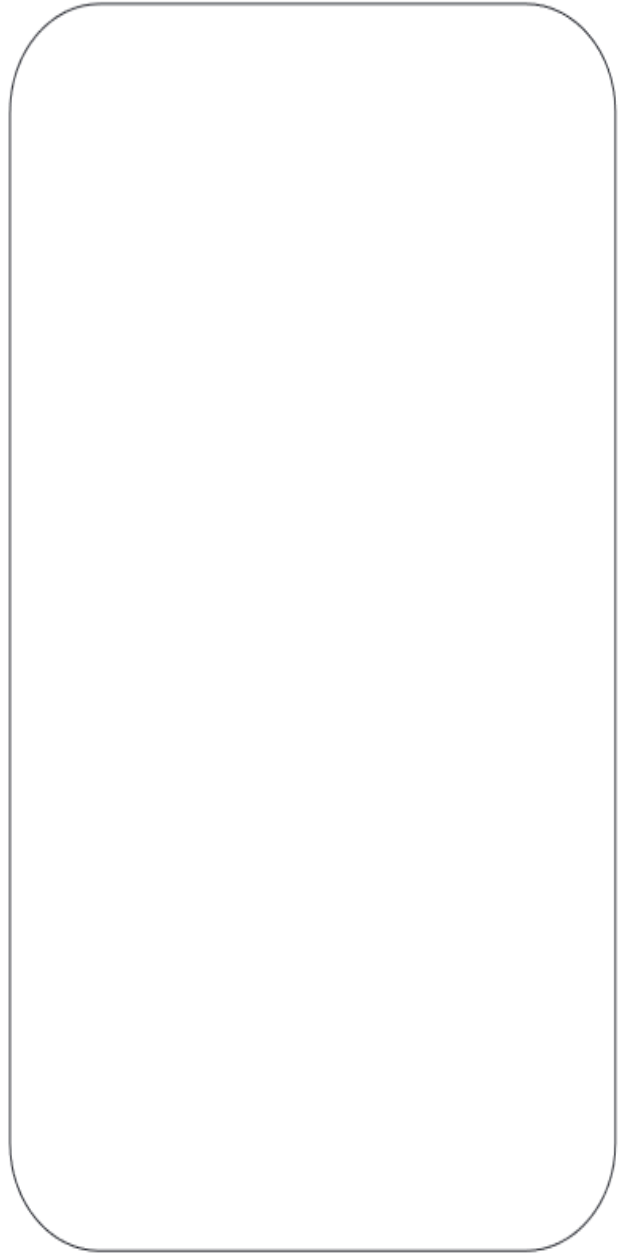
Ensure that you include at least four different aspects over the two screens that assist the volunteers in using the system.

(4 Marks)

**Emergency Incidents Screen**



**Training Screen**



**Marking key:**

Ensure that you include at least **four** different aspects over the two screens that assist the volunteers in using the system.

Description	Marks
Designs the visual interface using 4 different aspects over the two screens that assist the volunteers in using the system. Different aspects used to assist the volunteers in using the system.	4
Designs the visual interface using 3 different aspects over the two screens that assist the volunteers in using the system.	3
Designs the visual interface using 2 different aspects over the two screens that assist the volunteers in using the system.	2
Designs the visual interface using 1 different aspects over the two screens that assist the volunteers in using the system.	1
<b>Total</b>	<b>4</b>
Example of answer:  Should include: <ul style="list-style-type: none"> <li>• title of page</li> <li>• space to fill in details and/or display details</li> <li>• buttons for action</li> <li>• help button/icon</li> <li>• back and forward buttons to help with the navigation of the system</li> <li>• must include the following as these are essential for the screens to work as per information in question:               <ul style="list-style-type: none"> <li>• emergency incidents – includes incident details, job details and button for respond/not respond</li> <li>• training – training details, date &amp; time and register</li> </ul> </li> </ul> Note: aspects should address readability, navigation, inclusivity and logical order. Accept other relevant answers	

- C) Explain how the features and components you included in the design of the visual interface will enhance the user experience.  
(3 Marks)

---



---



---



---

**Marking key:**

Students should make reference to the Useability principles and / or Elements and Principles of Visual Communication.

Description	Marks
Explains how the different features and components will enhance the user experience.	3
Describes how the different features and components will enhance the user experience.	2
Outlines either the features or components will enhance the user experience.	1
<b>Total</b>	<b>3</b>
Example of answer:  Each component adds to the user experience. The title clearly shows which page of the app the volunteer is viewing. Colours are not clashing and are clearly contrasting with the background. Buttons are large and clear as to what the function will do. The fields are large enough so the volunteer can read without necessarily increasing the font size. Back and forth buttons to allow navigation to each page plus a home page to go to the volunteer dashboard. Help button allows volunteer to check for further information.  Note: features and components should address readability, navigation, inclusivity and logical order. Accept other relevant answers	

**Question four:**

(3 Marks)

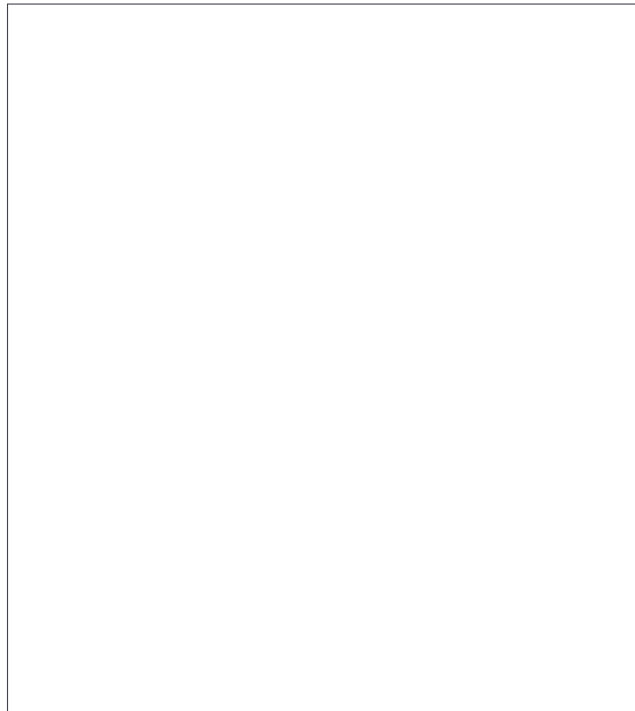
**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/ae3a3884-0982-47a1-a8c9-d593a7dea95d/2023-hsc-software-design-and-dev.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-ae3a3884-0982-47a1-a8c9-d593a7dea95d-oJ5.Va6>

A parking station requires a software application which allows customers to make an online booking for a parking space.

When making a booking online, customers will input:

- Date
- Time of entry
- Time of exit
- Car number plate eg SDD223
- Large or small vehicle

Design a user interface for capturing these booking details, using appropriate screen design elements.





**Marking key:**

Criteria	Marks
• Produces a well-designed interface which uses appropriate screen design elements	3
• Produces an interface with some appropriate elements	2
• Provides a diagram that demonstrates some understanding of the system	1

**Sample answer:**

**PARKING STATION**  
**Booking Form**

Please enter your details.

Date:  /  / 2023

Entry time:

Exit time:

Car registration:

Vehicle size:  Small  Large

**Question five:**

(1 Mark)

**Source:** <https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/digital-solutions/assessment>

The useability principle of utility can best be described as the ability of

- A. Different systems to present information in different ways to a single user
- B. Different systems to present information in the same way to a single user
- C. A system to be used by many different users
- D. A system to do the work a user needs to do

**Answer: B**

**Question six:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

A local council wants to find out from its residents the issues that are most important to them. An online survey is to be designed to collect data. Each resident will be presented with a list of issues and they can select three issues from the list relevant to them.

Which of the following screen elements should be used to capture the response?

<p>A.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Issue list</td> <td>Select three issues</td> </tr> <tr> <td>Issue 1</td> <td><input type="radio"/></td> </tr> <tr> <td>Issue 2</td> <td><input type="radio"/></td> </tr> <tr> <td>Issue 3</td> <td><input type="radio"/></td> </tr> <tr> <td>Issue 4</td> <td><input type="radio"/></td> </tr> </table> </div>	Issue list	Select three issues	Issue 1	<input type="radio"/>	Issue 2	<input type="radio"/>	Issue 3	<input type="radio"/>	Issue 4	<input type="radio"/>	<p>B.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Issue list</td> <td>Select three issues</td> </tr> <tr> <td>Issue 1</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Issue 2</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Issue 3</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Issue 4</td> <td><input type="checkbox"/></td> </tr> </table> </div>	Issue list	Select three issues	Issue 1	<input type="checkbox"/>	Issue 2	<input type="checkbox"/>	Issue 3	<input type="checkbox"/>	Issue 4	<input type="checkbox"/>
Issue list	Select three issues																				
Issue 1	<input type="radio"/>																				
Issue 2	<input type="radio"/>																				
Issue 3	<input type="radio"/>																				
Issue 4	<input type="radio"/>																				
Issue list	Select three issues																				
Issue 1	<input type="checkbox"/>																				
Issue 2	<input type="checkbox"/>																				
Issue 3	<input type="checkbox"/>																				
Issue 4	<input type="checkbox"/>																				
<p>C.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Issue list</td> <td>Select three issues</td> </tr> <tr> <td>Issue 1</td> <td><input type="text"/></td> </tr> <tr> <td>Issue 2</td> <td><input type="text"/></td> </tr> <tr> <td>Issue 3</td> <td><input type="text"/></td> </tr> <tr> <td>Issue 4</td> <td><input type="text"/></td> </tr> </table> </div>	Issue list	Select three issues	Issue 1	<input type="text"/>	Issue 2	<input type="text"/>	Issue 3	<input type="text"/>	Issue 4	<input type="text"/>	<p>D.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Issue list</td> <td>Select three issues</td> </tr> <tr> <td>Issue 1</td> <td><input style="width: 50px;" type="text"/></td> </tr> <tr> <td>Issue 2</td> <td><input style="width: 50px;" type="text"/></td> </tr> <tr> <td>Issue 3</td> <td><input style="width: 50px;" type="text"/></td> </tr> <tr> <td>Issue 4</td> <td><input style="width: 50px;" type="text"/></td> </tr> </table> </div>	Issue list	Select three issues	Issue 1	<input style="width: 50px;" type="text"/>	Issue 2	<input style="width: 50px;" type="text"/>	Issue 3	<input style="width: 50px;" type="text"/>	Issue 4	<input style="width: 50px;" type="text"/>
Issue list	Select three issues																				
Issue 1	<input type="text"/>																				
Issue 2	<input type="text"/>																				
Issue 3	<input type="text"/>																				
Issue 4	<input type="text"/>																				
Issue list	Select three issues																				
Issue 1	<input style="width: 50px;" type="text"/>																				
Issue 2	<input style="width: 50px;" type="text"/>																				
Issue 3	<input style="width: 50px;" type="text"/>																				
Issue 4	<input style="width: 50px;" type="text"/>																				

**KEY**

Radio Button     Check box     Text box     Drop down

**Answer: B**

**Question seven:**

(6 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0003/1091271/2023-AIT-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0003/1091271/2023-AIT-Examination.PDF)

Explain two usability features a web designer may include in a graphical user interface (GUI) of an application (app) for a clothing store.

**One:**

---

---

---

---

---

---

---

**Two:**

---

---

---

---

---

---

---

**Marking key:**

Description	Marks
For each feature (2 x 3 marks)	
Explains the usability feature for the clothing store application (app)	3
Describes the usability feature for the clothing store application (app)	2
Makes a general comment about a usability feature for the clothing store application (app)	1
<b>Total</b>	<b>6</b>

**Question eight:**

(9 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0003/1091271/2023-AIT-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0003/1091271/2023-AIT-Examination.PDF)

You have been employed to design a website for a new e-commerce store selling sports clothes and accessories.

Explain three ways in which you would apply the user interface (UI) elements and principles of visual communication to enhance the overall user experience (UX).

**One:**

---

---

---

**Two:**

---

---

---

**Three:**

---

---

---

**Marking key:**

Description	Marks
For each way (3 x 3 marks)	
Explains a way the user interface (UI) elements enhance the overall user experience (UX)	3
Describes a way the user interface (UI) elements enhance the overall user experience (UX)	2
Makes a general comment about user interface (UI) elements and/or user experience (UX)	1
<b>Total</b>	<b>9</b>

**Question nine:**

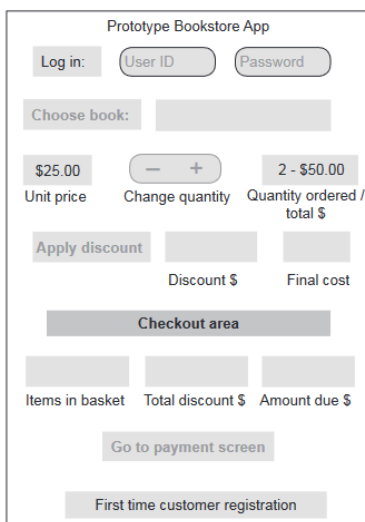
(4 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0011/458813/Computer\\_Science\\_exam\\_2017.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0011/458813/Computer_Science_exam_2017.PDF)

The manager of an online bookstore has decided to provide customers with the option of using a smartphone application (app) to access the bookstore. His draft design for the interface of the prototype is shown below.

Identify two strengths and two weaknesses of the design using the descriptors labelled 'A', 'B', 'C' and 'D'. Indicate each strength and weakness by circling it on the diagram and labelling it with the corresponding letter name.

- A. Effective navigational design
- B. Ineffective navigational design
- C. Logical order of use
- D. Illogical order of use



**Marking key:**

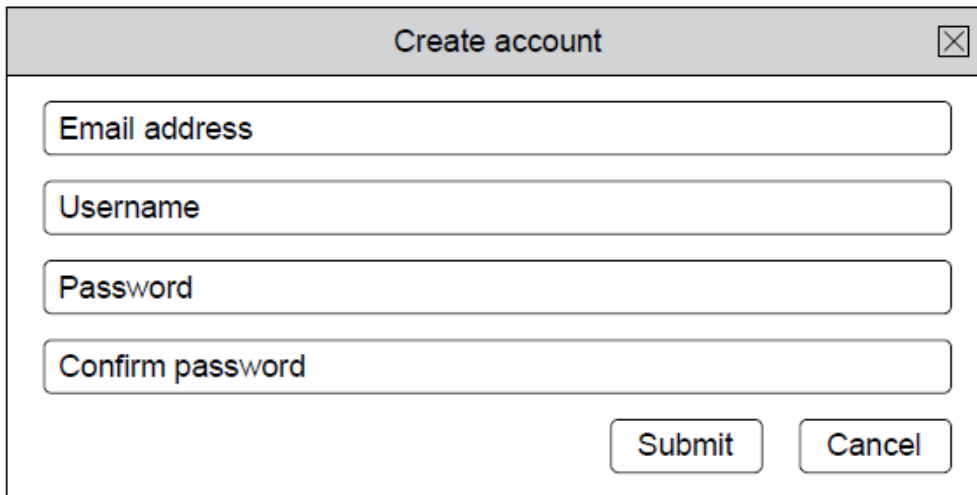
Description	Marks
Identifies <b>two</b> strengths of the design by circling relevant features on diagram and labelling with corresponding letters A and C.	1-2
Identifies <b>two</b> weaknesses of the design by circling relevant features on diagram and labelling with corresponding letters B and D.	1-2
<b>Total</b>	<b>4</b>

Question ten:

(1 Mark)

Source: <https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/digital-solutions/assessment>

Analyse the wireframe to determine which principle of visual communication has been applied.



The wireframe shows a 'Create account' dialog box. It features a title bar with the text 'Create account' and a close button (X). Below the title bar, there are four text input fields stacked vertically, labeled 'Email address', 'Username', 'Password', and 'Confirm password'. At the bottom right of the form, there are two buttons: 'Submit' and 'Cancel'.

- A. Proximity
- B. Hierarchy
- C. Alignment
- D. proportion

Answer: C

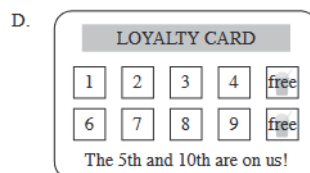
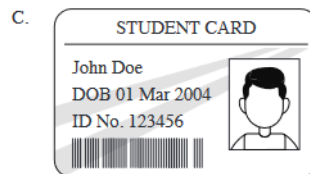
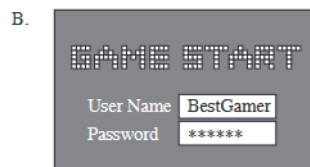
## Concept 3 focus: Security of Data

Question one:

( 1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/95cd109b-2a5e-40e2-ac14-b2c59450db4e/2023-hsc-vet-idt.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-95cd109b-2a5e-40e2-ac14-b2c59450db4e-oJ-Ofkb>

Which of the following contains personally identifiable information (PII)?



**Answer: C**

**Question two:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/95cd109b-2a5e-40e2-ac14-b2c59450db4e/2023-hsc-vet-idt.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-95cd109b-2a5e-40e2-ac14-b2c59450db4e-oJ-Ofkb>

The primary functions of the Office of the Australian Information Commissioner (OAIC) are associated with

- A. Personal information, workplace data and equal opportunity
- B. Government-held information, privacy and anti-discrimination
- C. Workplace information, anti-discrimination and equal opportunity
- D. Privacy, freedom of information and government information policy

**Answer: A**

**Question three:**

(3 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/95cd109b-2a5e-40e2-ac14-b2c59450db4e/2023-hsc-vet-idt.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-95cd109b-2a5e-40e2-ac14-b2c59450db4e-oJ-Ofkb>

A business is designing a privacy policy to protect its clients' personal information. Outline THREE key aspects that should be included in this policy.

---



---



---



---

**Marking key:**

Criteria	Marks
• Outlines THREE aspects that should be included in the privacy policy	3
• Outlines TWO aspects that should be included in the privacy policy OR • Identifies THREE aspects that should be included in the privacy policy	2
• Provides some relevant information	1

**Sample Answer:**

The policy should include a clear explanation of what personal information is to be collected and how it is collected. It could also include an explanation of how the business will use personal information and share it with third parties. It could outline how personal information is protected from unauthorised access.



**Question four:**

(4 Marks)

Source: <https://www.vcaa.vic.edu.au/Documents/exams/technology/2019/2019comp-softdev-w.pdf>

The mobile application will be used to communicate personal data and sensitive investment instructions between Portfolio Managers and clients. As a result, the security of the mobile application is a high priority for SmallPort Financial. After attending a financial cybersecurity conference, Peter is now worried that the mobile application is susceptible to a range of threats and may not be adequately secured.

- i) Describe two threats to the data transmitted and used by the mobile application.

---

---

---

---

---

---

---

**Marking key:**

Student responses typically identified relevant threats to data used and transmitted by the application; however, very few were able to provide any further details, despite the prompt asking for a description.

**An example of a mid-scoring response could be as follows.**

One accidental threat to the application is if the device is lost or misplaced, user data may be compromised. A deliberate threat to the data may occur if the application is not secure or protected and information transmitted between clients and SmallPort Financial is intercepted.

- ii) Identify and justify a security protocol that could be used by SmallPort Financial to protect data and information transmitted between the organisation and its clients' mobile devices.

---

---

**Marking key:**

Most students were not able to identify a relevant security protocol, such as TLS, SSL or HTTPS. Students who provided one of these protocols were typically able to justify how the protocol would protect data and information transmitted between the organisation and client mobile devices.



**Question five:**

(3 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0003/943365/2021\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0003/943365/2021_CSC_Written_Examination.PDF)

A hospital is upgrading its computer network system. There are several computers that are obsolete as their specifications are out of date. However, their hard drives contain confidential information about patients. Australian Privacy Principle 11 states that an entity must take reasonable steps to destroy personal information collected.

Describe a method for the secure disposal of data that would be appropriate for these computers.

---

---

---

---

---

---

---

---

---

---

---

---

**Marking key:**

Description	Marks
Describes a method for the secure disposal of data with relation to the hospital.	3
Outlines a method for the secure disposal of data.	2
Limited answer of why the drives need to be destroyed physically.	1
<b>Total</b>	<b>3</b>
Example of three marks answer:  The hospital could physically destroy the hard drives of the machines As the hard drives are out of date it is unlikely that they could be recycled, therefore physical destruction would ensure the data cannot be retrieved.  or  The hospital could use degaussing to overwrite the hard drives This method would allow the hard drives to be securely deleted, allowing them to be recycled into other machines. Accept other relevant responses	

**Question six:**

**(3 Marks)**

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

Explain how a code of conduct policy promotes ethical and lawful use of technology and data.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Marking key:**

<b>Description</b>	<b>Marks</b>
Explains how a code of conduct policy promotes ethical and lawful use of technology and data	3
Describes how a code of conduct policy promotes ethical and lawful use of technology and data	2
Outlines a code of conduct policy that promotes ethical and lawful use of technology and data	1
<b>Total</b>	<b>3</b>
Answers could include:  A code of conduct policy promotes ethical and lawful use of technology and data by setting clear expectations for appropriate behaviour and actions, defining ethical principles and values, and providing guidelines and consequences for violations. It helps establish a culture of integrity, accountability, and trust within an organisation or community, and encourages individuals to act in ways that align with the shared values and goals. It ensures that employees have a lawful understanding of the use of technology and data within their organisation.	
Accept other relevant answers.	

**Question seven:**

(3 Marks)

**Source:**

[https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0003/943365/2021\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0003/943365/2021_CSC_Written_Examination.PDF)

‘Online storage is the only disaster recovery tool a company should use.’

Describe why this statement is incorrect and identify two other tools that could be used by a company to protect its data in the event of a disaster.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Example of answer:**

Continually monitoring, evaluating and updating the system once it is operational. Activities include rectify bugs, request changes, update aspects, find errors, maintain code etc.

**Question eight:**

(1 Mark)

**Source:**<https://educationstandards.nsw.edu.au/wps/wcm/connect/fa956e13-b822-48f3-9387-f82c6dfe5fa0/2022-hsc-design-and-technology.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-fa956e13-b822-48f3-9387-f82c6dfe5fa0-ohkowUj>

What is the most appropriate way a designer could protect the intellectual property of a product such as a smart phone?

- A. Copyright
- B. License
- C. Patent
- D. Trademark

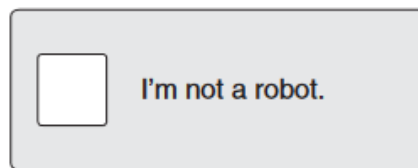
**Answer: C**

**Question nine:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/fa956e13-b822-48f3-9387-f82c6dfe5fa0/2022-hsc-design-and-technology.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-fa956e13-b822-48f3-9387-f82c6dfe5fa0-ohkowUj>

Many websites require the following to be completed.



This is an example of which data issue?

- A. Accuracy
- B. Matching
- C. Quality
- D. Security

**Answer: D**

**Question ten:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/cfc4f23e-0607-49cd-85fc-cbe8723204ea/2022-hsc-information-processes-and-technology.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-cfc4f23e-0607-49cd-85fc-cbe8723204ea-ofOsxHC>

Security breaches can be minimised by incorporating which feature into a system's operation?

- A. Installation of software of a user's choice
- B. The ability to log into multiple nodes, using only one account
- C. Forced logoff from the system if no activity has been detected
- D. Allowing the uploading and downloading of files to the system

**Answer: C**

## Concept 4 focus: Data Flow Diagrams

Question one:

(7 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0009/1037682/2022-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0009/1037682/2022-CSC-Examination.PDF)

Create a data flow diagram to symbolise following ordering system.

A clothing store informs customers when a new catalogue arrives. Customers visit the clothing store to view a selection of the items to purchase. If an item is not available in the store, the customer can order the item. The store orders the item from the supplier. The supplier dispatches the item. The customer is then notified when the item has arrived in the store. The customer visits the store, tries on the item and, if satisfied, purchases the item and receives a receipt. The store then pays the supplier for the item.

Marking key:

Description	Marks
Naming of system	1
Two entities – Supplier and Customer	1-2
Data flows in and out from system to Supplier	1-2
Data flows in and out from system to Customer	1-2
<b>Total</b>	<b>7</b>

**Question two:**

(22 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

Draw a Data Flow Diagram to model the membership and reservation and ticket purchase system as per the information.

Membership of the movie theatre company is open to the public. The company envisions the membership and reservation system involving the following.

**Membership section**

- To become a member, the public will go to [www.movietheatrescsa.com.au](http://www.movietheatrescsa.com.au). They will be invited to provide their first name, surname, date of birth, address, payment method details, email address and password. This information will be stored in the member database.
- Once the information has been saved, a verification email will be sent to authenticate their email address. After verification has been authenticated, the member will log on using their email address and password.
- The payment method details will be sent to the bank to be verified. Once verified, this information will be stored in the member database.

**Reservation and ticket purchase section**

- The member will search for movies from the theatre company's movies database, using a movie name or movie theatre location. Once the member has decided on the location and movie, they are prompted to choose the screening details. A seating plan showing available seats will be displayed from the cinema database and the member can then choose their seats. The seats will be blocked out in the seating plan and the cinema database updated.
- After submitting their choice, an invoice will be created with the details of the cinema location, movie, date, time and seats.
- The member will then check the details and the bank confirms payment. The tickets will be sent to the member via email. The transaction will then be saved in the bookings database.

**Question two Marking key:**

Description	Marks
<b>Draws a Level 0 data flow diagram that features:</b>	
Correct symbols	1
<b>Subtotal</b>	<b>1</b>
<b>Entities</b>	
<ul style="list-style-type: none"> <li>• Member</li> <li>• Bank</li> </ul>	1-2
<b>Subtotal</b>	<b>2</b>
<b>Data stores (named appropriately)</b>	
<ul style="list-style-type: none"> <li>• Member</li> <li>• Movies</li> <li>• Cinema</li> <li>• Bookings</li> </ul>	1-4
<b>Subtotal</b>	<b>4</b>
<b>Processes (must include number and verb)</b>	
1.0 Process membership 2.0 Verify email/CC 3.0 Verify payment 4.0 Search movie choice 5.0 Create invoice 6.0 Process payment 7.0 Process tickets	1-7
<b>Subtotal</b>	<b>7</b>
<b>Appropriate data flows (drawn in correct direction and labelled appropriately)</b>	
1.0 Process membership	
Appropriate data flow/s in: member details Appropriate data flow/s out: membership details	1
2.0 Verify email	
Appropriate data flow/s in: login details, membership details, authenticated email details Appropriate data flow/s out: verified email details	1
3.0 Verify bank	
Appropriate data flow/s in: payment details, verified payment details Appropriate data flow/s out: payment details, confirmed payment details	1
4.0 Search movie	
Appropriate data flow/s in: movie details, chosen seat details, seating plan details, available movie details Appropriate data flow/s out: screening details, seating plan details, updated seat details	1-2
5.0 Create booking invoice	
Appropriate data flow/s in: invoice details Appropriate data flow/s out: invoice details	1
6.0 Process payment	
Appropriate data flow/s in: member payment details, ticket payment details Appropriate data flow/s out: ticket payment details	1
7.0 Process tickets	
Appropriate data flow/s in: confirmed ticket payment details Appropriate data flow/s out: ticket details, transaction details	1
<b>Subtotal</b>	<b>8</b>
<b>Total</b>	<b>22</b>

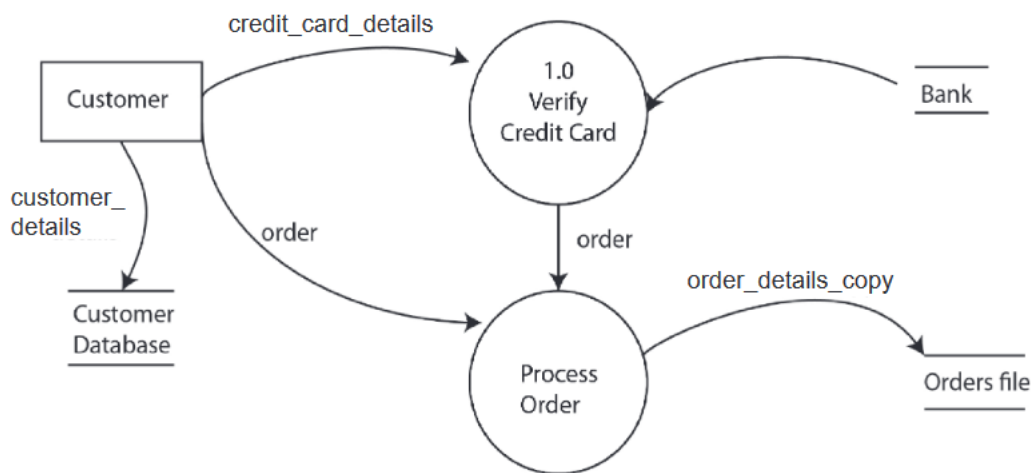


**Question three:**

(4 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0003/943365/2021\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0003/943365/2021_CSC_Written_Examination.PDF)

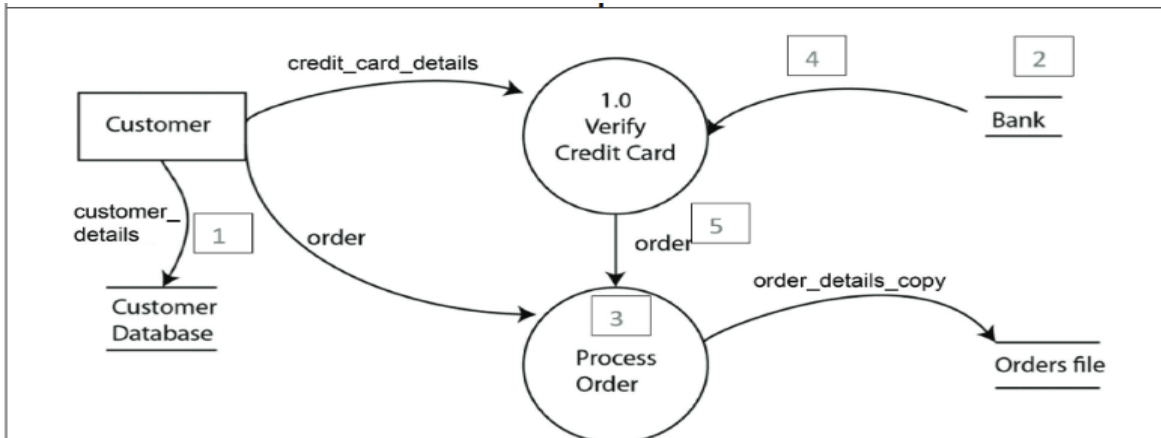
A mail order company takes orders from customers by telephone. Customers must pay for their goods by credit card. The sales operator verifies the customer's credit card number with the bank. The operator then processes the order and stores the customer's details in the customer datastore. The following data flow diagram (DFD) is constructed poorly.



The diagram above contains at least four errors. Identify four errors and number them on the diagram. Describe in the table below why each is an error. Ensure the number corresponds to the number identified on the diagram.

1	
2	
3	
4	

**Marking key:**



There are multiple errors - any four of these will be accepted

Description	Marks
Describes four errors identified in the diagram.	4
Describes three errors identified in the diagram.	3
Describes two errors identified in the diagram.	2
Describes one of the errors identified in the diagram.	1
<b>Total</b>	<b>4</b>

Answers include:

- 1 is entity to data store
- 2 is entity written as a data store
- 3 is no numbering of process
- 4 is no vector label for flow
- 5 is not clear label of vector should have details on end OR is a repetitious data flow.

Accept 4 errors.

**Question four:**

(1 Mark)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2017/2017comp-softdev-w.pdf>

The purpose of a data flow diagram is to display:

- A. The organisation of data in storage
- B. Where data originates and where it is stored
- C. The sequence of tasks involved in completing a project
- D. The order in which the processes within a system occur

**Answer: B**

**Question five:**

(7 Marks)

**Source:** [https://senior-secondary.scsa.wa.edu.au/](https://senior-secondary.scsa.wa.edu.au/data/assets/pdf_file/0003/943365/2021_CSC_Written_Examination.PDF)

[data/assets/pdf\\_file/0003/943365/2021\\_CSC\\_Written\\_Examination.PDF](https://senior-secondary.scsa.wa.edu.au/data/assets/pdf_file/0003/943365/2021_CSC_Written_Examination.PDF)

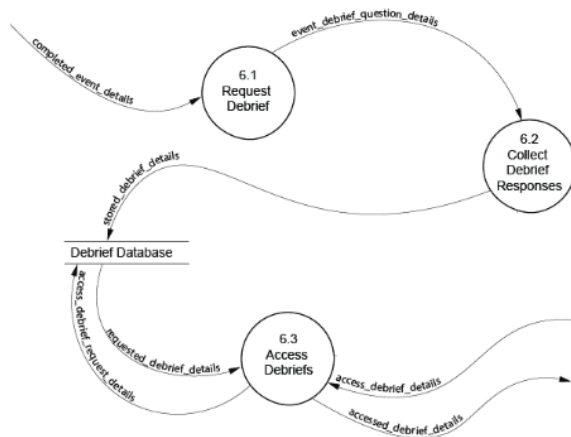
EmergWA use a variety of vehicles including 4-wheel drives, caravans, heavy rigid trucks and trailers. They are required to license each of the vehicles for a period of 12 months, six months or three months. Debriefing is an important process that needs to occur at EmergWA after each incident. Use the information below to draw a Data Flow Diagram for the debrief process.

- D) Once the incident is over, a debrief process commences. EmergWA asks volunteers to record a written debrief of the event after the danger has passed, in order to keep checks on the wellbeing of the volunteers and to reflect on their performance. The debriefs are stored in the new Debriefs datastore. These can be requested by the incident controller if required.

**Marking key:**

Description	Marks
Draws a L1 data flow diagram that features:	
Appropriate sub processes; must include number (x.x) and verb	
Request debrief Collect debrief responses Access debriefs	1-3
<b>Subtotal</b>	<b>3</b>
Data stores	
One data store: Debriefs	1
<b>Subtotal</b>	<b>1</b>
Appropriate data flows: Request debrief	
Appropriate data flow/s in: completed event details Appropriate data flow/s out: event debrief question details	1
<b>Subtotal</b>	<b>1</b>
Appropriate data flows: Collect debrief responses	
Appropriate data flow/s in: event debrief question details Appropriate data flow/s out: stored debrief details.	1
<b>Subtotal</b>	<b>1</b>
Appropriate data flows: Access debriefs	
Appropriate data flow/s in: requested debrief details, access debrief details Appropriate data flow/s out: accessed debrief details	1
<b>Subtotal</b>	<b>1</b>
<b>Total</b>	<b>7</b>

Note to markers:  
The below example is just one version of the L1 data flow diagram. Accept other relevant L1 DFDs diagrams as they relate to the question.



**Question six:**

(7 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0009/1037682/2022-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0009/1037682/2022-CSC-Examination.PDF)

The independent grocery store has been having a few issues with type of hazards occurring within their store. The current system is inadequate, and the owners would like an online Hazard Reporting System developed.

At present, when a hazard is identified, the employee fills in a paper form, which is saved in a database. The manager checks the form and sends it to be actioned. Once the hazard has been actioned, the form is saved to the filing cabinet. The manager copies the form and sends it to the head office.

Symbolise the flow of the grocery store’s Hazard Reporting System by drawing a data flow diagram.

**Marking key:**

Description	Marks
Processes with numbers correct	1–3
Data stores	1–2
Flow to entity (entity symbol is not required)	1
Data flows logically stated	1
<b>Total</b>	<b>7</b>

Answers could include:

```

graph TD
    Input(( )) -- hazard_details --> P1((1.1 Identify Hazard))
    P1 -- Identified_hazard_details --> DB[database]
    DB -- Identified_hazard_details --> P2((1.2 Check Form))
    P2 -- checked_form_details --> P3((1.3 Action Hazard))
    P3 -- Copied_form_details --> FC[Filing cabinet]
    P3 -- actioned_details --> FC
  
```

Accept other relevant answers.

**Question seven:**

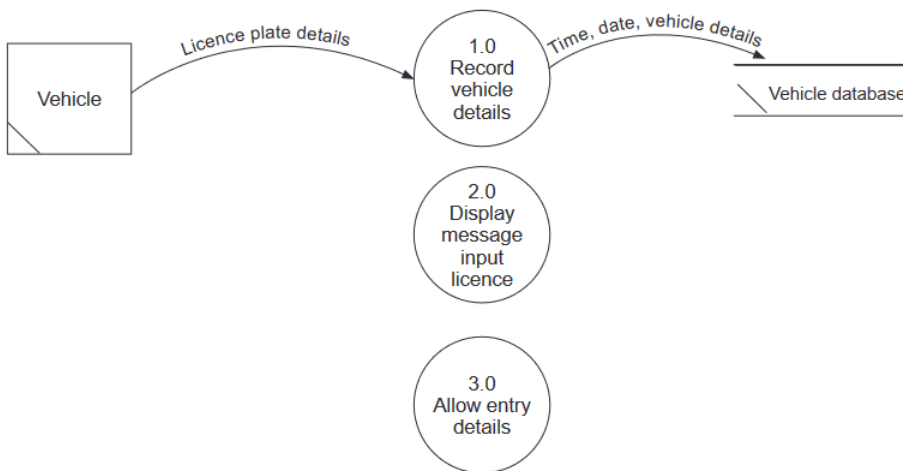
(29 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0007/646198/2020\\_CSC\\_Source-Booklet.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0007/646198/2020_CSC_Source-Booklet.PDF)

Refer to the following information to complete the Data Flow Diagram on the next page for CarPark Services. The company Carpark Services currently have parking inspectors who walk and drive around its carparks checking if drivers have overstayed the one hour free limit.

Carpark Services has employed you as the project manager to develop a system to enable automation of its carparks around the city and charge customers for time used over the free one hour. The description of the system to be developed is as follows.

- Each carpark has a specific maximum number of parking spaces for cars.
- Assume the carpark is not full at this stage. When a car is driven through the entry to the carpark, its licence plate number is captured using Licence Plate Recognition technology. The time and date of entry are also stored in the Vehicle database.
- Once this information is captured, the barrier gate will open and allow entry.
- The system will automatically be updated to add one to the variable maximum in the Vehicle database.
- If the maximum number of cars has been reached, the carpark full sign will be lit to inform incoming cars not to enter.
- If the licence plate cannot be read, a message will be displayed to manually input the number, which will then be stored in the Vehicle database.
- When the customer is ready to exit, they input their vehicle licence plate number into a payment machine.
- The payment machine will access the Cost Codes database and retrieve the amount owing by calculating the amount of time.
- The customer will insert a credit card to pay the amount owing and this will be verified by the bank.
- The machine will display 'go to barrier gate'.
- When the customer approaches the exit, the vehicle licence plate will be verified and, if the customer has paid, the barrier gate will open.
- If the customer has not paid, the machine at the gate will display the amount owing and the customer can insert a credit card for payment.
- When payment is completed, the barrier gate will open.
- The system will automatically subtract by one to update the Maximum Vehicle database.
- At the end of each month, the system will collate a report of transactions for the manager from the Vehicle database.



Marked rubrics key:

Description	Marks
Draws a Level 0 data flow diagram that features:	
Entities	
<ul style="list-style-type: none"> <li>MANAGER</li> <li>BANK</li> </ul>	1–2
<b>Subtotal</b>	<b>2</b>
Data stores (named appropriately)	
Vehicle data store	
<ul style="list-style-type: none"> <li>Maximum vehicle database</li> <li>Cost Codes database</li> </ul>	1–2
<b>Subtotal</b>	<b>2</b>

Processes (must include number and verb)	
1.0 Record vehicle details already present, 2.0 Display message 'input licence no', 3.0 Allow entry details	
<ul style="list-style-type: none"> <li>4.0 Update maximum vehicle database</li> <li>5.0 Display if carpark full</li> <li>6.0 Verify details</li> <li>7.0 Display amount owing</li> <li>8.0 Update exit details</li> <li>9.0 Update maximum vehicle details</li> <li>10.0 Collate report</li> </ul>	1–7
<b>Subtotal</b>	<b>7</b>
1.0 Record vehicle details	
Appropriate data flow/s in: licence details	
Appropriate data flow/s out: time, date, recorded licence details	
Appropriate data flow/s out: time, date, recorded licence details	
2.0 Display message 'input licence no'	
Appropriate data flow/s in: unrecorded licence details, licence details	1
Appropriate data flow/s out: input licence message details, inputted licence details	1
3.0 Allow entry details	
Appropriate data flow/s in: vehicle licence details	1
Appropriate data flow/s out: entry details	1
4.0 Update maximum vehicle database	
Appropriate data flow/s in: entry details, exit details	1
Appropriate data flow/s out: vehicle entry details	1
5.0 Display if carpark full	
Appropriate data flow/s in: updated details	1
Appropriate data flow/s out: full or available parking details	1
6.0 Verify details	
Appropriate data flow/s in: licence details, vehicle details	1
Appropriate data flow/s out: verified details	1
7.0 Display amount owing	
Appropriate data flow/s in: verified details, cost code details,	1
Appropriate data flow/s out: Amount owing details	1
8.0 Update exit details	
Appropriate data flow/s in: payment details, vehicle details, confirmed card details	1
Appropriate data flow/s out: credit card details, updated exit details, exit details	1
9.0 Update maximum vehicle details	
Appropriate data flow/s in: updated exit details	1
Appropriate data flow/s out: updated vehicle exit details	1
10.0 Collate report	
Appropriate data flow/s in: updated vehicle exit details	1
Appropriate data flow/s out: report details	1
<b>Subtotal</b>	<b>18</b>
<b>Total</b>	<b>29</b>

**Question eight:**

(3 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

A large technology company is developing an online booking system. This system will allow customers to logon and make bookings for the repair of their electronic devices which were manufactured by the company.

Customers open the company’s web page from a computer or mobile phone and fill in the booking form with their personal details, payment information and service requirements. These include the time and date of booking, hardware model, software version, service required and other relevant details.

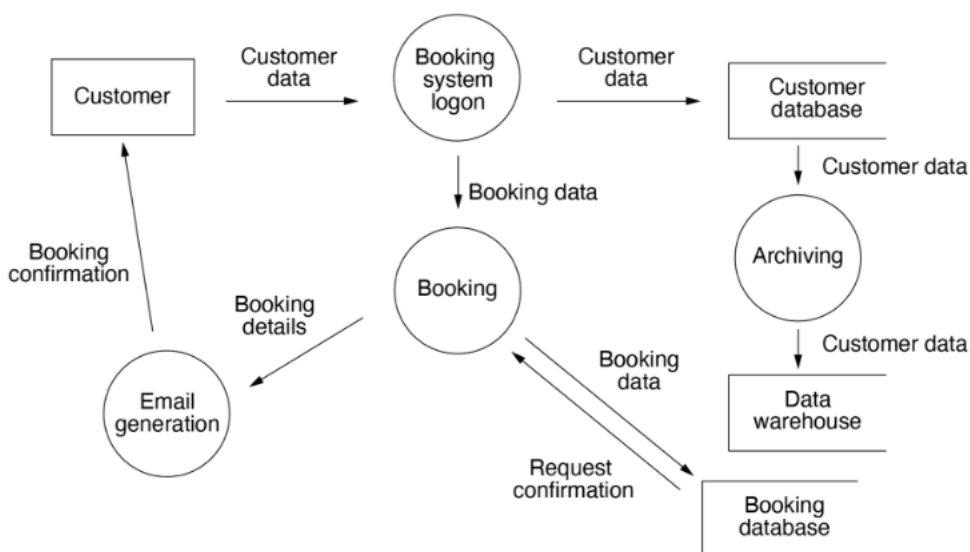
The system will send a confirmation email to the customer with their booking details. Data from the system is stored in the company’s data warehouse for future data mining.

Draw a data flow diagram that represents the technology company’s online booking system.

**Marking key:**

Criteria	Marks
• Draws a correct data flow diagram with all symbols and logic	3
• Draws a mostly correct data flow diagram	2
• Shows some understanding of data flow diagrams	1

**Sample answer:**

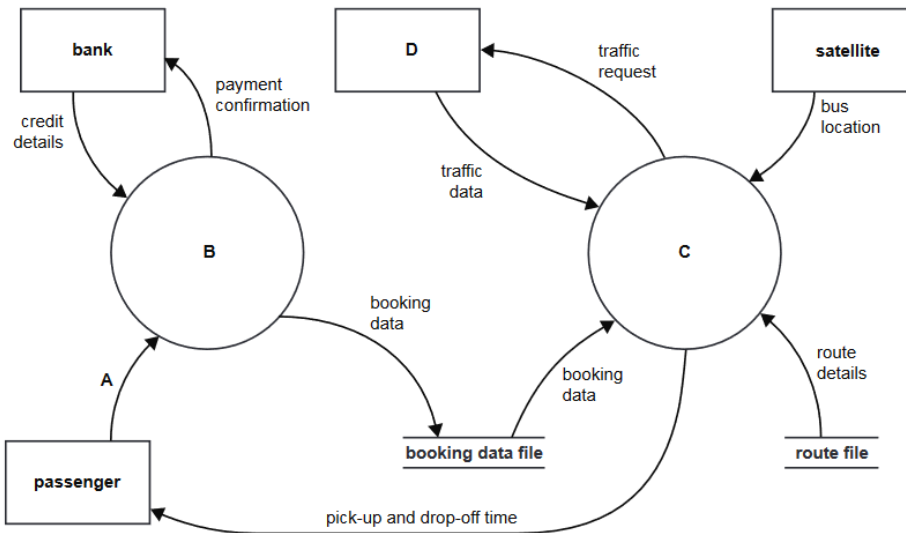


Question nine:

(4 Marks)

Source: <https://www.vcaa.vic.edu.au/Documents/exams/technology/2017/2017comp-softdev-w.pdf>

Logan considers the data flows for the proposed demand-responsive transport (DRT) system and begins to draw a data flow diagram for the central computer, the hardware and software on the minibuses, and the application on passengers' mobile devices.



Complete the data flow diagram that Logan has started by writing the correct labels for A, B, C and D in the spaces provided below.

A

---

B

---

C

---

D

---

**Answer:**

- A booking data
- B process a booking
- C confirm booking
- D Roads Department



Question ten:

(28 Marks)

Source: [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0014/543020/2018\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0014/543020/2018_CSC_Written_Examination.PDF)

**Scenario:**

The management of the C.C. Supermarket Corporation would like to develop a shopping portal for customers to order online and for deliveries to be dispatched within 24 hours. They would like to have the portal operating within six months. While they realise this is ambitious, they believe that it is possible. To meet project requirements, they have assembled a large development team consisting of a system analyst, who has been appointed as the project leader, six programmers, two database developers, two website developers, two document writers and three people to support on the help desk once the system goes live. Many meetings have been held so far and the analyst is tracking the project by using a number of computer-aided software engineering (CASE) tools. These tools ensure that the project time frame, milestones, resources and personnel are monitored carefully. The analyst has completed the preliminary design of the system and has outlined how the system will work below:

- To order online, the customer must first create an account to register with their personal details.
- Upon successful registration, the customer is emailed a confirmation of registration that includes an Identification number and password. This will be stored in the customer data store.
- To begin shopping, a customer logs in with their details.
- Their details are retrieved from the customer database and verified.
- The customer selects the item(s) that will be added to the shopping cart.
- The customer reviews their shopping cart, confirms their purchase order and proceeds to payment.
- The customer enters their credit card payment details, which are sent to the bank for verification.
- If the payment is successful, the customer receives an email notification that their payment details have been confirmed. The successful transaction is saved in the accounts database.
- Once payment has been processed, the final order is sent to the warehouse which will prepare the delivery of the order.
- The warehouse will send confirmation of delivery to the C.C. Supermarket Corporation.
- Online Shopping Portal system, which will then update the status of the customer's order in the completed order data store.

Draw a Data Flow Diagram (DFD) for the C.C. Supermarket Corporation online shopping portal system.

**Marking key:**

Description	Marks
<b>Draws a Level 0 DFD that features:</b>	
<b>Entities</b>	
<ul style="list-style-type: none"> <li>• CUSTOMER</li> <li>• BANK</li> <li>• WAREHOUSE</li> </ul>	1–3
<b>Subtotal</b>	<b>3</b>
<b>Data Stores (named appropriately)</b>	
<ul style="list-style-type: none"> <li>• Customer Data Store</li> <li>• Shopping Cart</li> <li>• Accounts Database</li> <li>• Completed Orders</li> </ul>	1–4
<b>Subtotal</b>	<b>4</b>
<b>Processes (must include number and verb)</b>	
<ul style="list-style-type: none"> <li>• 1.0 Create Account</li> <li>• 2.0 Verify Customer Details</li> <li>• 3.0 Collate Shopping Items</li> <li>• 4.0 Process Final Order</li> <li>• 5.0 Process Payment</li> <li>• 6.0 Send Final Order</li> <li>• 7.0 Update Order Details</li> </ul>	1–7
<b>Subtotal</b>	<b>7</b>
<b>Appropriate data flows (drawn in correct direction and labelled appropriately)</b>	
<b>1.0 Create account</b>	
◦ Appropriate data flow/s in: new customer details and account details	1
◦ Appropriate data flow/s out: account confirmation and new account details	1
<b>2.0 Verify customer details</b>	
◦ Appropriate data flow/s in: login details and customer details	1
◦ Appropriate data flow/s out: verified details	1
<b>3.0 Collects shopping items</b>	
◦ Appropriate data flow/s in: items details	1
◦ Appropriate data flow/s out: collated order details	1
<b>4.0 Process final order</b>	
◦ Appropriate data flow/s in: shopping cart details confirmed order details	1
◦ Appropriate data flow/s out: final order items details	1
<b>5.0 Process payment</b>	
◦ Appropriate data flow/s in: final order details, customer payment details and verified details	1
◦ Appropriate data flow/s out: customer payment details, confirmed payment details and updated order payment details, order invoice details	1
<b>6.0 Send Final Order</b>	
◦ Appropriate data flow/s in: confirmed order details	1
◦ Appropriate data flow/s out: order details	1
<b>7.0 Update Order Details</b>	
◦ Appropriate data flow/s in: confirmed delivery details	1
◦ Appropriate data flow/s out: updated order details	1
<b>Subtotal</b>	<b>14</b>
<b>Total</b>	<b>28</b>

## Concept 5 focus: Algorithms

Question one:

(3 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

As a programmer, you have been asked to create an algorithm to hold numerical scores for a basketball team. These scores are then used to calculate the average score for each player. Which data type would be the most appropriate to use in the algorithm? Justify your answer.

---

---

---

---

---

---

---

---

---

---

### Marking Key:

Description	Marks
Justifies which data type would be most appropriate	3
Describes which data type would be most appropriate	2
Identifies a data type that would be most appropriate	1
<b>Total</b>	<b>3</b>
<p>Answers could include:</p> <p>The most appropriate data type for this task would be a real floating-point number. This data type is designed to store decimal values with a high degree of precision, making it ideal for storing basketball scores. Furthermore, using a floating-point data type would allow the programmer to perform arithmetic operations on the scores, such as adding up all the scores and calculating the average score for each player, with a high degree of accuracy.</p> <p>Integers could be used for numerical scores, however the average must be calculated through a floating-point number. Furthermore, using a floating-point data type would allow the programmer to perform arithmetic operations on the scores, such as adding up all the scores and calculating the average score for each player, with a high degree of accuracy.</p> <p>Accept other relevant answers.</p>	



Question two:

(6 Marks)

Source: [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

Write an algorithm in pseudocode to:

- Store 10 product prices using a one-dimensional array
- Find the average price
- Print the average price

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

Marking Key

Description	Marks
For loop with correct assign of range	1
Input prices through loop	1
Calculation of total price	1
Calculation for average price	1
Output of the average price	1
Use of one-dimensional array	1
<b>Total</b>	<b>6</b>
Answers could include:  FOR i = 0 TO 9 DO INPUT (price) prices[i] = price total_price = total_price + price END FOR  average_price = total_price / 10 PRINT "The average price is: ", average_price Accept other relevant answers.	

**Question three:**

(6 Marks)

**Source:** [https://senioresecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://senioresecondary.scsa.wa.edu.au/data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

Refer to the partial algorithm below.

```

a <- 0
b <- 50
c <- a + b
    IF a > 0 THEN
        C = b / a
    Prnt 'The value of c is ' c
    Input_num = input ('Enter a number: ')
    Denominator = Input_num / 0
    Result = b / denominator
    Print 'The result is', result
    
```

Describe each of the following errors with reference to the partial algorithm above.

**Syntax error:** \_\_\_\_\_

**Run-time error:** \_\_\_\_\_

**Logical error:** \_\_\_\_\_

**Marking key:**

Describe each of the following errors with reference to the partial algorithm above.

Description	Marks
<b>For each error (3 x 2 marks)</b>	
Describes the error in the code with reference to the partial algorithm	2
Makes a general comment about the error in the code and/or with reference to the partial algorithm	1
<b>Total</b>	<b>6</b>
Answers could include:	
Syntax error Prnt is a syntax error and will not display c. There should be a comma after is, c and it should read Print('the value of c is', c)	
Run-time error The Denominator = input_num/0. The error is trying to divide by 0 as this is not possible	
Logical error IF a > 0. The IF statement checks if 'a' is greater than 0, but since 'a' is 0, as 'a' was initialised to 0 at the start, the statement inside the IF block will not execute.	
Accept other relevant answers.	

1	x <- 4
2	Do
3	y <- x + 10
4	If (x < 8) Then
5	x <- x + 1
6	Endif
7	While (y < 15)
8	Print x, y

**Question four:**

(1 Mark)

What is the output generated by the pseudocode above?

- A. 6, 15
- B. 6, 16
- C. 5, 15
- D. 15, 5

Answer: A

**Question five:**

(1 Mark)

Which control structure starts on line 4 and finishes on line 6?

- A. Infinite
- B. Iteration
- C. Selection
- D. Sequence

Answer: C

**Question six:**

(8 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0009/1037682/2022-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0009/1037682/2022-CSC-Examination.PDF)

Write a pseudocode example for each of the following control structures and scenarios.

Sequence: (Input 2 numbers, add these together and multiple by 6, then print the result.)

---

---

---

---

---

---

---

---

---

---

Selection: (Tickets prices differ according to age: 16 years and over pay \$35, 5-15 years pay \$20 and under 5 years pay \$10, output the price.)

---

---

Iteration: (Total an unknown number of scores and output the total.)

### Marking Key:

Description	Marks
<b>Sequence: Pseudocode examples.</b>	
Accurate example of sequence control structure to address scenario	2
Limited example of sequence control structure to address scenario	1
<b>Subtotal</b>	<b>2</b>
<b>Selection: Ticket prices differ according to age – 16 years and over pay \$35, 15–5 years pay \$20 and under 5 years pay \$10. Output the price</b>	
Accurate nested IF or Case statement used with all conditions	2
Incorrect use of IF or Case statement with some conditions missing	1
<b>Output</b>	
Output statement is accurate and in the correct placement	1
<b>Subtotal</b>	<b>3</b>
<b>Iteration: Total an unknown number of scores and output the total</b>	
Accurate iteration (either test first or last) used with the correct inputs and calculations	2
Incorrect use of iteration and/or some inputs calculations missing	1
<b>Output</b>	
Output statement is accurate and in the correct placement	1
<b>Subtotal</b>	<b>3</b>
<b>Total</b>	<b>8</b>
Answers could include: <b>Sequence</b> INPUT (Num1) INPUT (Num2) answer ← (Num1 + Num2) x 6 OUTPUT (answer)	
<b>Selection</b> <u>Two-way</u> INPUT (age) IF (age >= 16) THEN Price ← 35 ELSE IF (age < 5) THEN Price ← 10 ELSE Price ← 20 END IF END IF OUTPUT ('\$ ', Price)	
<b>Iteration (any one of the examples below)</b> <u>Test-last loop</u>	
total ← 0 REPEAT INPUT (score) total ← total + score INPUT (continue) UNTIL continue = 'N' OUTPUT (total)	<u>Test-first loop</u> total ← 0 continue ← 'Y' WHILE continue = 'Y' INPUT (score) total ← total + score INPUT (continue) END WHILE OUTPUT (total)
Accept other relevant answers.	



**Question seven:**

(6 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0009/1037682/2022-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0009/1037682/2022-CSC-Examination.PDF)

Review the partial pseudocode below.

```
BEGIN
  trees <- 0
  sales <- 0
  bonus <- 0
  FOR employee <- 1 to 8 DO
    Input(sales)
    Trees = trees + sales + bonus
  ENDFOR
END
```

A) Identify a constant and a variable in the pseudocode. (2 Marks)

Constant: \_\_\_\_\_

Variable: \_\_\_\_\_

B) Describe why it is important to have appropriate naming conventions for variables. (2 Marks)

---

---

---

---

C) Outline a difference between a one-dimensional array and a record. (2 Marks)

---

---

---

---

**Marking Key:**



- (a) Identify a constant and a variable in the pseudocode. (2 marks)

Description	Marks
Correctly identifies bonus as a constant.	1
Correctly identifies either trees, sales or employee as a variable.	1
<b>Total</b>	<b>2</b>

- (b) Describe why it is important to have appropriate naming conventions for variables. (2 marks)

Description	Marks
Describes why it is important to have appropriate naming conventions.	2
Outlines why it is important to have appropriate naming conventions	1
<b>Total</b>	<b>2</b>
Answers could include:  A variable name should reflect the value that it is holding. The name should reveal the intent with which it is to be used so that it is easily understood by the programmer and easier to change the code should it need it. Poorly named variables may make the program ambiguous. Accept other relevant answers.	

- (c) Outline a difference between a one-dimensional array and a record. (2 marks)

Description	Marks
Outlines a difference between a one-dimensional array and a record.	2
States a difference between a one-dimensional array and a record.	1
<b>Total</b>	<b>2</b>
Answers could include:  An array can be used to store a list of values of the same data type. A record can store data of multiple data types in fields. Accept other relevant answers.	

**Question eight:**

(1 Mark)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0011/592238/2019\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0011/592238/2019_CSC_Written_Examination.PDF)

Consider this pseudocode function designed to compute the average of an array of numbers of finite size and return the answer in the function name.

```

01 Function CalcAvg(List, Size)
02 Num  $\square$  0
03 FOR i  $\square$  0 TO Size - 1
04 Total  $\square$  Total + List[i]
05 END FOR
06 Result  $\square$  Total / Num
07 CalcAvg  $\square$  Result
08 End Function
  
```

Identify a local variable in the above pseudocode.

**Answer:** Any one of Num, i, Total, Result

**Question nine:**

(1 Mark)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2018/2018comp-softdev-w.pdf>

```
i = 0
WHILE ( i <= 100 )
    print i
    i = i + 21
ENDWHILE
```

How many times is the loop above executed?

- A. Four times
- B. Five times
- C. Six times
- D. Seven times

**Answer: B**

**Question ten:**

(4 Marks)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2017/2017comp-softdev-w.pdf>

The All-Star Sports Club needs to find out who is eligible to enter an upcoming Masters event. All participants in the Masters event must be 40 years old or older. The club needs to print out a list of eligible members. When the club's system is running, all data is stored in a series of arrays. The relevant fields are `date_of_birth[]`, `surname[]`, `firstname[]` and `gender[]`, all with the same index value for all fields of a member.

The variable `numbermembers` holds the number of members of the club and the arrays start at the value 1.

It has been proposed to add a procedure that will start at the first record and look through each record, printing out the first name, surname, gender and date of birth of each person who is at least 40 years old. To compute age, all members must be born before 1977.

Write the pseudocode for this procedure.

**Answer:**

```
For i = 1 to numbermembers
    If date_of_birth[i] < = 31/12/1976 Then
        Print firstname[i], surname[i], gender[i],
        date_of_birth[i]
    EndIf
Next i
```

## Concept 6 focus: SQL Querying

The following exam questions are from the mock sample external assessment documents available to the public on the QCAA website.

Source: <https://www.qcaa.qld.edu.au/senior/senior-subjects/technologies/digital-solutions/assessment>

### Question one:

(1 Mark)

The following extract from a medical database shows patient, vaccines by item number, when data vaccination is due, date immunised and the risk of contracting the disease post-immunisation.

Patients				Results			
ID	First	Last		Item	ID	Immunised	Risk
1684	John	Jones		1	1684	1990-09-08	0.001
2893	Mary	Smith		1	2893	1990-09-07	0.00021
3642	Jackie	Joyce		1	1206	1990-09-08	0.0005
1206	Michael	Mentos		1	1934	1990-09-10	0.001
1910	Midori	Ono		1	1935	1990-09-06	0.0005
1934	Beatrice	Thompson		1	3642	1990-09-09	0.00021
1935	Wanda	Granger		2	1684	1990-10-21	0.0005
				2	3642	1990-10-22	0.001
				2	1934	1990-10-21	0.0005
				2	2893	1990-10-22	0.0006
				2	1935	1990-10-21	0.00021
				3	3642	1990-12-10	0.0007
				3	1934	1990-12-08	0.001
				3	2893	1990-11-30	0.0014
				3	1935	1990-11-30	0.00021
				3	1684	1990-12-07	0.001
				3	1206	1990-12-11	0.004

Assess			
Item	Vaccine	Risk	Due
1	Measles	0.001	1990-09-08
2	Polio	0.00021	1990-10-21
3	Tetanus	0.0005	1990-12-02

```
SELECT first, last, immunised
FROM results r
INNER JOIN assess a ON r.item = a.item
INNER JOIN patients p ON p.id = r.id
WHERE a.item in (1,2)
AND r.immunised < a.due ;
```

The query above determines:

- A. The first name, last name and immunisation date for all patients who received items before they were due.
- B. The first name, last name and immunisation date for patients who received items 1 and 2 after they were due.
- C. The first name, last name and immunisation date for patients who received items 1 and 2 before they were due.
- D. The first name, last name and immunisation date for patients who received items 1 and 2 before they were due.

Answer: C

**Question two:**

**(17 Marks)**

Stimulus 2 (below) is an extract from a university course database that shows enrolled students, assessment items and student results for each assessment item.

The following query was developed to show all students (by ID) and their overall subject result.

**Stimulus 2**

<b>Students</b>				<b>Results</b>			
ID	First	Last		Item	ID	Submitted	Mark (%)
871	Hans	Schmidt		1	871	1990-09-08	80
862	Bill	White		1	862	1990-09-07	60
869	Nguyen	Ng		1	854	1990-09-08	70
854	Ann	Devlin		1	872	1990-09-10	55
831	Hans	Manaheim		1	868	1990-09-06	90
872	Betty	Thompson		1	869	1990-09-09	70
868	Will	Fletcher		2	871	1990-10-21	70
				2	869	1990-10-21	80
				2	872	1990-10-21	65
<b>Assess</b>							
Item	Description	Weight	Due				
1	Presentation	10	1990-09-08	2	862	1990-10-21	70
2	Assignment	30	1990-10-21	2	868	1990-10-21	75
3	Exam	60	1990-11-02	3	869	1990-11-02	95
				3	872	1990-12-02	45
				3	862	1990-12-02	40
				3	868	1990-11-02	50
				3	871	1990-12-02	60
				3	854	1990-12-02	65
<b>Ranking</b>							
Rank	Description						
100	A						
95	A						
90	A						
85	B						
.....							
0	E						

```

SELECT ID, SUM (Mark / 100)
FROM Results, Assess
GROUP BY Item

```



A) Identify and describe any errors in the query on the previous page. (6 Marks)

---

---

---

---

---

---

---

---

---

---

**Rubrics**

15a | There are three errors in the code.  
The first occurs on line 1 where dividing by 100 only determines percentage and not the overall grade (weighted).  
The second error is a missing line. In the code as it is there is no correlation that the item numbers are the same in each calculation.  
The third error occurs on line 3. Here the code groups by Item and not ID.

- identifies
  - line 1 error [1 mark]
  - missing line error [1 mark]
  - line 3 error [1 mark]
- describes the
  - line 1 error [1 mark]
  - missing line error [1 mark]
  - line 3 error [1 mark]

B) Refine the query to ensure it functions correctly. Justify the refinements made.  
(7 Marks)

---



---



---



---



---



---



---



---



---



---

**Rubrics**

<p>15b</p> <pre>FROM Results JOIN Assess ON Results.Item = Assess.Item</pre> <p>Justification of refinement 1: Multiplying each mark by the relevant weight will determine each weighted mark contribution to the overall percentage. Adding each of these weighted marks then gives a mark out of 100.</p> <p>Justification of refinement 2: Inclusion of this WHERE statement ensures that the item ID in the Results table correlates to the item ID in the Assess table</p> <p>Justification of refinement 3: The query specifications ask that the query output is grouped by student (ID), this change fulfils this specification</p>	<ul style="list-style-type: none"> <li>• provides use of SQL syntax (based on ANSI-style SQL, i.e. SQL-92) [1 mark]</li> <li>• provides correct refinement of             <ul style="list-style-type: none"> <li>- first error (SELECT ID statement) [1 mark]</li> <li>- second error (WHERE statement) [1 mark]</li> <li>- third error (GROUP BY statement) [1 mark]</li> </ul> </li> <li>• provides correct and logical justification of             <ul style="list-style-type: none"> <li>- first refinement [1 mark]</li> <li>- second refinement [1 mark]</li> <li>- third refinement [1 mark]</li> </ul> </li> </ul>	<p>Accept INNER JOIN and JOIN.</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------

C) Refine the query to show only students with a subject rank of 'A'.  
(4 Marks)

---

---

---

---

---

---

---

---

---

---

### Rubrics

```
15c | SELECT ID, SUM(Mark*Weight/100)
    | FROM Results
    | JOIN Assess
    |     ON Results.Item = Assess.Item
    | GROUP BY ID
    | HAVING SUM(Mark*Weight/100) =
    |     (SELECT Rank
    |      FROM Ranking
    |      WHERE Rank >= 90);
```

- provides use of SQL syntax (based on ANSI-style SQL, i.e. SQL-92) [1 mark]
- provides correction of errors from 15(b) [1 mark]
- provides `Select Rank` from Ranking statement [1 mark]
- provides `where Description = 'A'` condition [1 mark]

**Question three:**

(1 Mark)

In the design of a database query, which sequence of SQL keyword commands would correctly search for data and display it?

- A. SELECT, LIST, WHEN
- B. SELECT, TABLE, WHEN
- C. SELECT, FROM, WHERE
- D. SELECT, GROUP, WHERE

**ANSWER: C**

**Question four:**

(1 Mark)

A librarian wants to use SQL to generate a list of people who borrowed books in January 2023, including the book title and author. Which combination of SELECT and WHERE statements will achieve this?

- A. SELECT Name, Title, Author  
WHERE Date\_Borrowed >= 1/1/2023 AND Date\_Borrowed <= 31/1/2023
- B. SELECT Name, Date\_Borrowed, Title, Author  
WHERE Date\_Borrowed <= 1/1/2023 AND Date\_Borrowed >= 31/1/2023
- C. SELECT Name, Title, Author  
WHERE Date\_Borrowed < 1/1/2023 AND Date\_Borrowed > 31/1/2023
- D. SELECT Name, Date\_Borrowed, Title, Author  
WHERE Date\_Borrowed > 1/1/2023 AND Date\_Borrowed < 31/1/2023

**ANSWER: A**

**Question five:**

(3 Marks)

A database is to be developed to manage a graduation dinner. Students will be able to invite guests to the dinner. The data dictionary for the booking table is shown. Some information about the fields is missing. Write a SQL statement to list the names in alphabetical order (A-Z) by Last\_Name of the students who have more than one guest.

<i>Field name</i>	<i>Data type</i>	<i>Field size</i>	<i>Description</i>
Student_ID	Number	5	
First_Name	Text	25	
Last_Name	Text	25	
Phone_Number			Student's mobile number eg 0499123456
No_of_guests	Number	1	
Deposit_Paid			Shows whether a deposit has been paid

**Answer:** SELECT First\_Name, Last\_Name FROM Booking  
WHERE No\_of\_guests > 1  
ORDER BY Last\_Name ASC



**Question six:**

(9 Marks)

An online games store is converting its flat-file database to a relational database. This table shows some of the data in its flat-file database. The data stored in the flat-file database will be organized into three tables in the relational database.

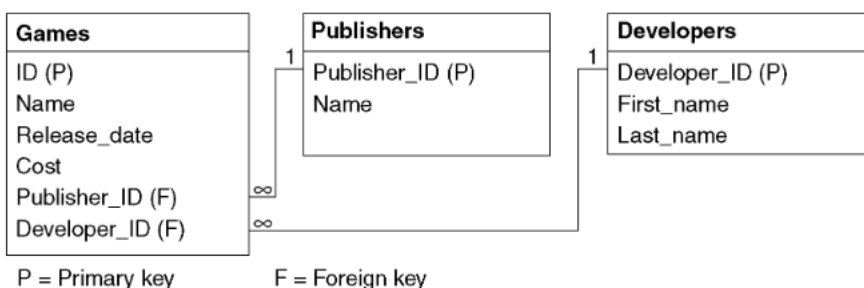
Game ID	Game name	Release date	Cost	Publisher ID	Publisher	Developer ID	Developer
HB001	Ants	10/02/2018	\$29.00	P001	Abcd	D108	John Jones
HB002	Bats	21/06/2018	\$15.00	P002	DCBA	D108	John Jones
JG007	Cats	18/11/2019	\$75.00	P002	DCBA	D311	Yen Nguyen
LD118	Foxes	01/02/2020	\$68.00	P001	Abcd	D409	Sam Smith

- Describe the benefits for the games store of converting its flat-file database to a relational database. (3 Marks)
- Construct a data dictionary representing the three tables in the relational database, clearly identifying primary keys, foreign keys and relationships. (3 Marks)
- Design a query using a structured query language (SQL) to display games that have been released from March 2018 to March 2020. List the results in alphabetical order by game name. (3 Marks)

**Question 6A sample answer:**

By converting its flat-file database to a relational database, the games store could remove unnecessary repetition of data (eg the multiple occurrences of a developer’s name) and reduce the amount of storage space required for its data. This would allow more efficient sorting, searching and querying, and minimise the amount of updating needed of the database. Since a relational database organises data into tables and links them using relationships, data input errors may also be reduced by applying data validation rules that can look up the relevant tables.

**Question 6B sample answer:**



**Question 6C sample answer:**

```

SELECT Name, Release_date FROM Games
WHERE Release_date >= '01/03/2018' AND <='31/03/2020'
ORDER BY Name (ASC)
    
```

**Question seven:**

(1 Mark)

Consider the following query written in a structured query language (SQL).

```
Line 1 SELECT StudentID, StudentName, Marks
Line 2 FROM STUDENT, RESULTS
Line 3 WHERE STUDENT.StudentID = RESULTS.StudentID AND RESULTS.Marks > 49
Line 4 ORDER BY Marks DESC
```

Which statements specify the query's search criteria and how the data is displayed?

- A. Line 1 and Line 2
- B. Line 1 and Line 4
- C. Line 3 and Line 2
- D. Line 3 and Line 4

**ANSWER: D**

**Question eight:**

(1 Mark)

A sporting club manager wants to search the club's database for members who are under 16 as well as members who play soccer. Which of the following is the correct structured query language (SQL) criteria to obtain this information?

- A. Age < 16 OR sport = 'soccer'
- B. Age < 16 AND sport = 'soccer'
- C. Age > 16 OR sport = 'soccer'
- D. Age > 16 AND sport = 'soccer'

**ANSWER: A**

**Question nine:**

(1 Mark)

Janice entered the following SQL command to retrieve information about the products in her store.

```
SELECT Products.ProductNumber
FROM Products
WHERE Products.Quantity < minimum stock
ORDER BY Products.Quantity ASC
```

Which list would be produced as a result of this query?

- A. All products in alphabetical order
- B. Products due to be delivered in order of urgency
- C. Products sold in the last month in order of popularity
- D. Products that need to be reordered based on stock levels

**ANSWER: D**

**Question ten:**

(1 Mark)

```
Line 1  SELECT  STUDENTID, STUDENTNAME, MARKS  
Line 2  FROM STUDENTS, RESULTS  
Line 3  WHERE  STUDENT.StudentID = RESULTS.StudentID  
        AND RESULTS.MARKS > 49
```

In the above SQL, what does line 2 do?

- A. It specifies the criteria used for data retrieval
- B. It identifies the fields displayed in the results
- C. It identifies the tables to be used for data retrieval
- D. It determines the sequence for the displayed results

**ANSWER: C**

## Concept 7 focus: Emerging Technologies

Question one:

(15 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/95cd109b-2a5e-40e2-ac14-b2c59450db4e/2023-hsc-vet-idt.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-95cd109b-2a5e-40e2-ac14-b2c59450db4e-oJ-Ofkb>

An IT company is considering replacing the client support team with the use of a ‘chatbot’ to reduce costs and improve the efficiency of the client support service. The chatbot is a piece of software that can simulate conversation with human users. The chatbot is equipped with a knowledge base. It can track helpdesk tickets and provide answers to a list of frequently asked questions.

Explain the pros and cons of replacing the client support team with a chatbot. Would you recommend this proposal and justify why or why not?

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Marking key:**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Demonstrates a comprehensive understanding of the issues associated with the proposal in the scenario</li> <li>• Provides a logical and cohesive, response that reflects a high level of organisation</li> <li>• Consistently uses relevant workplace examples and industry terminology</li> </ul>	13–15
<ul style="list-style-type: none"> <li>• Demonstrates a well-developed understanding of the issues associated with the proposal in the scenario</li> <li>• Provides a logical response that reflects a high level of organisation</li> <li>• Uses some workplace examples and industry terminology</li> </ul>	10–12
<ul style="list-style-type: none"> <li>• Demonstrates a sound understanding of the issues associated with the proposal in the scenario</li> <li>• Provides a response displaying sound organisation</li> <li>• Uses some workplace examples and/or industry terminology</li> </ul>	7–9
<ul style="list-style-type: none"> <li>• Demonstrates some understanding of the issues associated with the proposal in the scenario</li> <li>• Provides a response displaying some organisation</li> <li>• Refers to workplace examples and/or industry terminology</li> </ul>	4–6
<ul style="list-style-type: none"> <li>• Demonstrates a basic understanding of the issues in the scenario</li> <li>• Provides a response displaying basic organisation</li> </ul>	1–3

**Answers could include:**

- Implications in replacing the client support team can cause concern about job loss. This could have a negative impact on the team if they're worried about their jobs.
- Alternatively, it could free up the team to work on more complex issues giving them more job satisfaction, reduced costs and improved efficiency of the client support service.
- This system creates an electronic record of all the queries/questions so it would be easy to see where the most problems have been and the areas that need the most support. This will allow the team to focus on the areas of most need.
- The solution is an industry standard. Most businesses and websites now have a chatbot element to assist in bringing the company up to date with technology. It should not replace all human assistance otherwise the client may feel that they're not getting value for money with their level of support.
- It could save the client time if their problems are in the FAQ but could be frustrating if they can't get a response in a timely manner or require a response not listed in the chatbox. The chatbot solution could be positive for everyone if both support team and clients are on board, and it is used as an additional tool to support clients and improve their experience rather than replace people.

**Question two:**

(2 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0005/646196/2020\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0005/646196/2020_CSC_Written_Examination.PDF)

Describe one way in which convergence has influenced the development of mobile devices.

---

---

---

---

---

**Marking Key:**

Description	Marks
Describes one way convergence has impacted on the development of mobile devices	2
States a superficial comment about convergence	1
<b>Total</b>	<b>2</b>
Answers could include:  Digital convergence has brought together many functions in fewer devices, such as the smartphone. Computing power, telephony and Bluetooth technology, wireless connectivity, photograph, video and music capabilities, mobile viewing and listening, live television and health profiles can all be melded into one device. This impacts on mobiles by increasing processing power, battery capacity and access to applications that replace more discrete devices over time.	
Accept other relevant answers.	

**Question three:**

(3 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0011/592238/2019\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0011/592238/2019_CSC_Written_Examination.PDF)

Explain how the features of the RFID (Radio Frequency Identification) communication protocol could make the technology suitable for use in identifying a family pet.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Marking key:**

Description	Marks
Explains how the features of the RFID communication protocol could be used to identify a family pet	3
Provides some relevant facts about how RFID could be used to identify a family pet	2
Makes superficial comment/s about how RFID could be used to identify a family pet	1
<b>Total</b>	<b>3</b>
<b>Example of a three mark response:</b> An RFID tag is a (usually) passive i.e., non-powered, electronic device that can be inserted under the skin of a pet or attached to the pet's collar. As the tag is passive, it needs to pass through a reader or scanner to be activated. The tag can then send a radio signal to the reader with the identification number of the pet, facilitating identification and return of the pet, from, for example, a city council to the pet owner. Accept other relevant responses	

**Question four:**

(3 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/ae3a3884-0982-47a1-a8c9-d593a7dea95d/2023-hsc-software-design-and-dev.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-ae3a3884-0982-47a1-a8c9-d593a7dea95d-oJ5.Va6>

Robots are used to serve food in a restaurant. The food is placed on a shelf of a robot and a table number is entered, which tells the robot where to take the food.



Between the kitchen and the table, there are several obstacles, such as other robots, customers, chairs and other tables that need to be navigated.

Explain how heuristics and goals could be used in the software system for these robots.

**Marking key:**

Criteria	Marks
<ul style="list-style-type: none"> <li>Explains how both heuristics and goals could be used in the software for this scenario</li> </ul>	3
<ul style="list-style-type: none"> <li>Describes how goals and/or heuristics could be used in the software for this scenario</li> </ul>	2
<ul style="list-style-type: none"> <li>Demonstrates some understanding of goals or heuristics</li> </ul>	1

**Sample answer:**

With changing conditions, it is impractical to code a set path from the kitchen to the desired table. Therefore, a combination of goals and heuristics should be used in this case as the path changes based on the conditions found. The goal that would be coded is the map location of the table. Heuristics could be included to find a reasonable path that leads to the goal in a short time frame, as needed in a restaurant. This path would change when conditions cause an obstacle to block it.



**Question five:**

**(4 Marks)**

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/cfc4f23e-0607-49cd-85fc-cbe8723204ea/2022-hsc-information-processes-and-technology.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-cfc4f23e-0607-49cd-85fc-cbe8723204ea-ofOsxHC>

A video-on-demand system is a neural network that provides a customised watch list based on viewing history. Possible indicators include actors, directors and language.

Explain the use of pattern matching in this scenario.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Marking key:**

<b>Criteria</b>	<b>Marks</b>
• Explains the use of pattern matching in a neural network with clear reference to the scenario	4
• Describes the use of pattern matching in a neural network with clear reference to the scenario	3
• Outlines the use of pattern matching in a neural network	2
• Identifies a feature of pattern matching or a neural network	1

**Sample answer:**

Pattern matching is the process of finding similarities in data and linking those similarities to grow the neural network. For example, a customised watch list of movies is created, based on the viewer's selection of actors, directors and language. The neural network incorporates new patterns into its existing body of knowledge to form new watch lists.

**Question six:**

(4 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/cfc4f23e-0607-49cd-85fc-cbe8723204ea/2022-hsc-information-processes-and-technology.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-cfc4f23e-0607-49cd-85fc-cbe8723204ea-ofOsxHC>

A pizza shop is installing a semi-automated pizza-making robot. The robot makes pizza bases, adds toppings and moves the pizza into an oven. Once cooked, the robot cuts the pizza into slices and places it into a box.

Explain the advantages and disadvantages of semi-automating this pizza shop.

---

---

---

---

---

---

---

---

**Marking key:**

Criteria	Marks
• Explains the advantages and disadvantages of the use of semi-automation in the production of pizzas	4
• Describes advantages and disadvantages of the use of semi-automation in the production of pizzas	3
• Outlines advantages and disadvantages	2
• Identifies an advantage or a disadvantage	1

**Sample answer:**

Semi-automating the pizza-making system will have the advantage of human oversight on quality control and adjustment. This human oversight will allow for issues with cooking to be identified, such as spilt or overflowing toppings in the oven, which can be rectified quickly before further issues arise. If fully automated, these quality check practices would not occur.

A disadvantage of the semi-automated system is that it would perform slower than a fully automated pizza production system. This is because of the extra time it takes for a human to perform physical tasks.

**Question seven:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

What is a disadvantage of both satellite and infrared transmission?

- A. Implementation cost is low
- B. Direct line of sight is required
- C. Direct wired connection is required
- D. Transmission speed over long distance is high

**Answer: B**

**Question eight:**

(3 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

Doctors diagnose patients by observing a patient’s symptoms and asking them questions. Describe the role of the inference engine in an expert system that helps doctors diagnose patients.

---



---



---



---



---

**Marking key:**

Criteria	Marks
• Describes the role of the inference engine in an expert system that helps doctors diagnose patients	3
• Outlines the role of the inference engine and/or expert system that helps doctors diagnose patients	2
• Provide some relevant information	1

**Sample answer:**

The role of an inference engine in an expert system is to process the knowledge base and user queries to generate deductions and make informed decisions. An inference engine is the decision-making component of an expert system. It processes the knowledge base, user inputs, and rules to generate logical deductions and provide recommendations based on the expert knowledge data in the system.

In a doctor’s surgery, the expert system will reference a large database of medical conditions (the knowledge base) and their symptoms on file. Doctors can query the system with patient information and medical history for the inference engine to make a diagnosis.

**Question nine: (6 Marks)**

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

A new geographical information system (GIS) is being developed to represent different walking trails used by bushwalkers. It provides information on where to find and book picnic facilities as well as providing weather and other environmental conditions. Information is updated regularly on whether walking trails are accessible or facilities are available to be booked.

Explain how the use of a geographical information system in this scenario allows for the analysis of unstructured situations. In your response, include reference to the information processes of analysing and symbolising.

**Marking key:**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Demonstrates a comprehensive understanding of how the use of a geographical information system in the scenario allows for the analysis of unstructured situations</li> <li>• Includes detailed reference to analysing and displaying</li> </ul>	6
<ul style="list-style-type: none"> <li>• Demonstrates a thorough understanding of how the use of a geographical information system in the scenario allows for the analysis of unstructured situations</li> <li>• Includes reference to analysing and displaying</li> </ul>	5
<ul style="list-style-type: none"> <li>• Demonstrates a sound understanding of how the use of a geographical information system in the scenario allows for the analysis of unstructured situations</li> <li>• Includes reference to analysing and/or displaying</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• Demonstrates some understanding of how the use of a geographical information system in the scenario allows for the analysis of unstructured situations</li> </ul>	2
<ul style="list-style-type: none"> <li>• Provides some relevant information</li> </ul>	1

**Sample answer:**

The use of a Geographical Information System (GIS) provides a tool for managing and visualising complex data sets in an easy-to-read map. Unstructured decision support systems assist in making decisions in complex and ambiguous situations where there is a lack of well-defined processes or structured data such as this.

Weather and environmental conditions can change rapidly and provide little consistency in the data provided from reading to reading, thus presenting the data in a logical and easy to read overlay to the map data will assist bushwalkers plan their movements.

For example, a GIS can be used to identify areas that are prone to flooding when there is a lot of rain, or higher risk areas for bushfires in times of drought. This gives bushwalkers solid data to assist when planning walks. By integrating real-time data such as weather conditions and booking information, the GIS can determine the status of trails and facilities at any given time. This analysis helps bushwalkers plan their trips and make informed decisions about which trails to choose. Through maps, charts, and interactive interfaces, the GIS can present the analysed information to users in a comprehensible and user friendly manner.

Question ten:

(3 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

Using an example, describe how the integration of sensors into manufacturing machinery can automate processing.

---

---

---

---

---

---

---

---

---

---

Marking key:

Criteria	Marks
• Uses an example to describe how the integration of sensors into manufacturing machinery can automate processing	3
• Outlines features of integrated sensors	2
• Provides some relevant information	1

**Sample answer:**

In a robotic arm, sensors are integrated into the function of the arm to collect data from the environment, and to create a control loop that assists in automating the data feed and decision making for the control of the actuators by the processor of the robotic arm. This control loop allows for the movement of the robotic arm to be tracked in real-time, for the control unit to analyse the collected data, and then for the control unit to process the data and form instructions for the actuators of the robotic arm to move. The integration of the sensors into the robotic arm allows for effective automation to occur that ensures successful and accurate fulfilment of the designed task.

**Answers could include:**

Conveyor belts

## Concept 8 focus: Desk Checking

Question One:

(1 Mark)

Source: [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0009/1037682/2022-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0009/1037682/2022-CSC-Examination.PDF)

```
a <- [5, 6, 7, 8]
total <- 0
FOR i <- 0 to End of a
    total <- total + a [i]
Next
Print total
```

Which trace table is representative of the algorithm above immediately after the loop is executed for the second time?

A.

a						
0	1	2	3	i	total	Output
5	6	7	8	0	0	0

B.

a						
0	1	2	3	i	total	Output
5	6	7	8		0	
				0	5	5

C.

a						
0	1	2	3	i	total	Output
5	6	7	8		0	
				0	5	
				1	11	11

D.

a						
0	1	2	3	i	total	Output
5	6	7	8		0	
				0	5	
				1	11	

**Answer: D**

**Question Two:**

(3 Marks)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/95cd109b-2a5e-40e2-ac14-b2c59450db4e/2023-hsc-vet-idt.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-95cd109b-2a5e-40e2-ac14-b2c59450db4e-oJ-Ofkb>

Refer to the partial pseudocode below:

```
IF a > 5 AND a < 25
  Print a
ENDIF
```

Describe, with an example, the test data you would use to check this algorithm for accuracy.

---



---



---



---



---

**Marking Key:**

Description	Marks
Describes the test data using an example as to how they would use to check the algorithm for accuracy.	3
States the test data using an example as to how they would use to check the algorithm for accuracy.	2
Limited information of the test data they would use to check the algorithm for accuracy. May provide an example.	1
<b>Total</b>	<b>3</b>
Answers could include:  Test data should be used on either side of the statement as well as in the middle. Need a number below 5, greater than 25 and in the range. To have further accuracy also use the numbers 5 and 25.  Accept other relevant answers.	

**Question three:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/95cd109b-2a5e-40e2-ac14-b2c59450db4e/2023-hsc-vet-idt.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-95cd109b-2a5e-40e2-ac14-b2c59450db4e-oJ-Ofkb>

Consider the following code fragment.

```
BEGIN
  X = 4
  Y = 7
  X = Y
  Y = X
  Print X, Y
END
```

What output is produced?

- A. 4, 4
- B. 4, 7
- C. 7, 4
- D. 7, 7

**Answer: D**

**Question four:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/ae3a3884-0982-47a1-a8c9-d593a7dea95d/2023-hsc-software-design-and-dev.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-ae3a3884-0982-47a1-a8c9-d593a7dea95d-oJ5.Va6>

Consider the following code:

```
BEGIN Main
  Num is local
  Num = 4
  Sub2
  print Num
END Main

BEGIN Sub2
  Num is local
  Num = 4
  Num = Num - 2
  print Num
END Sub2
```

What is the output produced when the above code is executed?

- A. 2 2
- B. 2 4
- C. 4 2
- D. 4 4

**Answer: B**



**Question five:**

(3 Marks)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2018/2018comp-softdev-w.pdf>

Genna has designed a function to be incorporated into a software solution to record test scores for a class. The function is called `Average_mark`.

The marks are entered into an array called `classmarks`. `classmarks` can hold up to a maximum of 30 student test scores. The index number of the first element is 0.

Each year the number of students in the class will change, so Genna needs to allow for a range of up to 30 students in the class.

The algorithm is shown below.

```

Function Average_mark(classmarks, class_size)
    count <- 0
    sum <- 0
    avemark <- 0
    While count < class_size
        sum <- sum + classmarks[count]
        count = count + 1
    EndWhile
    avemark = sum / class_size
    return avemark
End Function
    
```

Construct a trace table for a class of three students to check that the function meets the design specifications. The students have the following results: 52, 89, 21.

Below is a possible response.

Classsize	Count	Sum	Avemark	WHILE loop
3	0	0	0	T
	1	52	0	T
	2	141	0	T
	3	162	0	F
			162/3=54	

**Question six:**

(3 Marks)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2018/2018comp-softdev-w.pdf>

Before a customer can complete a purchase, there are two important checks that must be completed. The distance (delivery\_distance) that the robot must travel for delivery must be less than or equal to 2.5 km and the order cannot include any fragile items (fragile  false). If both of these conditions are met, the order will be processed as 'order valid'. If either of these conditions is not met, then the order will be considered 'order invalid'.

The following pseudocode is used to check these conditions.

```

IF delivery_distance >= 2.5 and fragile = True
    print("order valid")
ELSE
    print("order invalid")
ENDIF
    
```

Complete the following test table so that this pseudocode is fully tested, and include expected and actual results.

Test no.	delivery_distance (km)	fragile	Expected result	Actual result
1	3	True	order invalid	order valid
2	2.5	True	order invalid	order valid
3	1	False	order valid	order invalid
4				
5				
6				

**Answer:**

Test no.	delivery_distance (km)	fragile	Expected result	Actual result
1	3	True	order invalid	order valid
2	2.5	True	order invalid	order valid
3	1	False	order valid	order invalid
4	3	False	Order invalid	Order invalid
5	2.5	False	Order valid	Order invalid
6	1	True	Order invalid	Order invalid

**Question seven:**

(3 Marks)

**Source:** <https://cma.education.tas.gov.au/api/Document/4969/ITC315118%20Computer%20Science%20TASC%20Exam%20Paper%202023.pdf>

Trace the following code and find the final value of the variable f.

```
int f = 3;

FOR (int i = 0; i <= 7; i++) {

    IF (i >= 2 && i < 5)
    {
        f = f + 2;
    }
}

ENDIF

ENDFOR
```

**Answer:**

<b>i</b>	<b>f</b>
0	3
1	
2	5
3	7
4	9

**Value of f is 9.**

Question eight:

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/8b0014e8-87c9-415f-9077-2c4fde1e20a5/2018-hsc-software-design-and-development.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-8b0014e8-87c9-415f-9077-2c4fde1e20a5-nbDp117>

Consider the following code fragment.

```
BEGIN
    X = 5
    Y = 8
    X = Y
    Y = X
    print X, Y
END
```

What output is produced?

	X	Y
A.	5	5
B.	5	8
C.	8	5
D.	8	8

**Answer: D**

Question nine:

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/8b0014e8-87c9-415f-9077-2c4fde1e20a5/2018-hsc-software-design-and-development.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-8b0014e8-87c9-415f-9077-2c4fde1e20a5-nbDp117>

An algorithm has been developed to check temperature. 'Too cold' is displayed if the temperature is below 40 degrees and 'Too hot' is displayed if it is 60 degrees or more.

Otherwise, the display is 'Just right'. The algorithm has been tested with the values 30, 50, 60 and 70.

Which other value should definitely be tested?

- A. 0
- B. 20
- C. 40
- D. 80

**Answer: C**

Question ten:

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/8b0014e8-87c9-415f-9077-2c4fde1e20a5/2018-hsc-software-design-and-development.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-8b0014e8-87c9-415f-9077-2c4fde1e20a5-nbDp117>

The following code fragment was developed to display the awards at a competition, based on scores up to 100.

```
BEGIN Awards
    Input Score
    CASEWHERE Score IS
        <91:          Display "Distinction"
        <71:          Display "Credit"
        <51:          Display "Participation"
    OTHERWISE:      Display "High Distinction"
    ENDCASE
END Awards
```

What is displayed if a score of 51 is entered?

- A. Credit
- B. Distinction
- C. Participation
- D. High Distinction

**Answer: B**

## Concept 9 focus: Networks

Question one:

(5 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

Outline a purpose for each of the following layers within the Department of Defence (DoD) transmission control protocol / internet protocol (TCP / IP) model.

Transport layer:

---



---



---

Network layer:

---



---



---

Application layer:

---



---



---

Marking key:

Description	Marks
For each layer (3 x 1 mark)	
Outlines the purpose of a layer	1
<b>Total</b>	<b>3</b>
Answers could include:  Transport layer: its purpose is to provide reliable end-to-end data transfer between applications running on different hosts.  Network layer: responsible for the efficient forwarding of data packets within a single network segment and oversees how data is physically sent through the network.  Application layer: its purpose is to provide network services to user applications, such as email, file transfer, web browsing or remote login. Accept other relevant answers.	

**Question two:**

(6 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

A business is experiencing slow performance with its network. It has become worse after its recent expansion, with more employees and devices connected to the network. They have employed your services as a network consultant. You have identified two factors that could be affecting the network – bandwidth and network design. Describe each of the two factors and outline one solution for each that could improve the network performance.

Bandwidth:

---



---

Network design:

---



---

**Marking key:**

Description	Marks
<b>For each description (2 x 2 marks)</b>	
Describes how bandwidth/network design could affect the network	2
Makes a general comment about how bandwidth/network design could affect the network	1
<b>Subtotal</b>	<b>4</b>
<b>For each solution (2 x 1 mark)</b>	
Outlines a solution	1
<b>Subtotal</b>	<b>2</b>
<b>Total</b>	<b>6</b>
<p>Answers could include:</p> <p><b>Bandwidth</b> Bandwidth is the amount of data that can be transmitted over the network at any given time. Insufficient bandwidth can cause slow network performance, especially when there are more users and devices connected to the network.</p> <p>One solution to improve network performance due to bandwidth issues is to upgrade the network's bandwidth capacity by increasing the available bandwidth or by implementing technology that can prioritise network traffic.</p> <p><b>Network design</b> Network design can also affect network performance. Poor network design can lead to network congestion and slow performance, especially when there are more users and devices connected to the network.</p> <p>One solution is to include adding more switches, routers, and/or wireless access points to the network to improve connectivity or redesigning the network to provide load balancing.</p> <p>Accept other relevant answers.</p>	



**Question three:**

(4 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0005/1091309/2023-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0005/1091309/2023-CSC-Examination.PDF)

Describe how the following strategies are used to compromise the security of networks.

Denial of service:

---



---



---

IP spoofing:

---



---



---

**Marking key:**

Description	Marks
<b>For each strategy (2 x 2 marks)</b>	
Describes how the strategy is used to compromise the security of networks	2
Makes a general comment about the strategy	1
<b>Total</b>	<b>4</b>
<p>Answers could include:</p> <p>Denial of service floods a network or system with traffic or requests to overwhelm its capacity, making it vulnerable to attacks.</p> <p>IP spoofing is when attackers falsify the source IP address of a packet to disguise their identity and location, making it difficult for network administrators to trace the origin of the attack.</p> <p>Accept other relevant answers.</p>	



**Question four:**

(1 Mark)

**Source:** <https://www.vcaa.vic.edu.au/Documents/exams/technology/2019/2019comp-softdev-w.pdf>

Which one of the following is an advantage of a wireless network over a wired network?

- A. More reliable data transmission
- B. Less expensive set-up costs
- C. Slower data transfer rates
- D. Increased data security

**Answer: B**

**Question five:**

(10 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0010/1037683/2022-CSC-Ratified-Marking-key.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0010/1037683/2022-CSC-Ratified-Marking-key.PDF)

Outline the role of the following hardware devices in network communications.

Router:

---

---

---

---

Wireless access point:

---

---

---

Gateway:

---

---

---

Switch:

---



---



---

Firewall:

---



---



---

**Marking key:**

Description	Marks
For each device (5 x 2 marks)	
Outlines the role of the hardware device in network communications.	2
Limited information of the role of the hardware device in network communications is provided.	1
<b>Total</b>	<b>10</b>
<p>Answers could include:</p> <p><b>Router:</b> A router connects two or more networks or subnetworks. It will read a packet's header to determine its destination (IP address), then refers to a routing table to determine most efficient route before forwarding the packet to its IP address.</p> <p><b>Wireless access point:</b> Is a wired network device that emits signals for wireless devices to connect and access the network.</p> <p><b>Gateway:</b> This is a network point that allows access to another network that uses different protocols. It acts as a 'gate' between the two networks.</p> <p><b>Switch:</b> Connects multiple wired devices within a network together. A switch receives and forwards network packets from one device to another on a network.</p> <p><b>Firewall:</b> A network security device that monitors traffic and either allows or blocks data packets based on a set of rules. Can help protect network by filtering traffic and blocking outsiders from gaining unauthorized access to the private data on your computer.</p> <p>Accept other relevant answers.</p>	

**Question six:**

(5 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0009/1037682/2022-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0009/1037682/2022-CSC-Examination.PDF)

A) Explain a factor that can influence the performance of a network

(2 Marks)

---

---

---

---

---

B) Describe how a denial of service strategy works to compromise the security of networks.

(3 Marks)

---

---

---

---

---

---

---

---

---

---

**Marking key:**

(a) Outline a factor that can influence the performance of a network. (2 marks)

Description	Marks
Outlines a factor that can influence the performance of a network.	2
Identifies a factor that can influence the performance of a network.	1
<b>Total</b>	<b>2</b>
Answers could include:	
<ul style="list-style-type: none"> <li>The different factors that can influence the performance of a network include: bandwidth, network design, data collisions and excess broadcast traffic.</li> <li>The bandwidth can influence through the method of transmission and medium used.</li> </ul>	
Accept other relevant answers.	

(b) Describe how denial of service strategy works to compromise the security of networks. (3 marks)

Description	Marks
Describes how denial of service strategy compromises the security of networks.	3
Outlines how denial of service strategy works compromises the security of networks.	2
Limited information about how denial of service strategy works.	1
<b>Total</b>	<b>3</b>
Answers could include:	
A denial of service strategy usually works flooding the target host or network with traffic until the target can't respond or crashes. The targeted systems operations are affected when users are unable to access information systems and or network services.	
Accept other relevant answers.	

**Source:** [https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf\\_file/0009/1037682/2022-CSC-Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/data/assets/pdf_file/0009/1037682/2022-CSC-Examination.PDF)

The owners of the independent grocery store decided to open an internet café next to their store a few months ago, however, they have been experiencing problems lately.

- The network performance has been getting slower and slower for the Point of Sale (POS) system, particularly during the school holidays and weekends.
- All the equipment is only a few months old.
- For some reason, business report printouts for the grocery store are being printed at the café which are confidential.
- The owners are also worried about the potential for hacking due to the increasing number of reports in the news.
- The current network consists of a modem, 3×100Mb 24 port switches, and wireless access point and has Cat5 100MB cabling installed for each computer.
- There is a POS server that manages the POS transactions located in the grocery store.
- The Business Server and POS server are connected to the office switch.
- Currently all employees use the same admin login and password.
- The login and the password to the wireless point is displayed on the counter in the café for convenience.

A) Identify and explain a method the internet café could use to ensure it's network is secure.

---

---

---

---

---

---

---

---

**Marking key:**

Description	Marks
Explains a method that could be used to ensure its network is secure.	3
Describes a method that could be used to ensure its network is secure	2
Identifies a method that could be used to ensure its network is secure.	1
<b>Total</b>	<b>3</b>
Answers could include: <ul style="list-style-type: none"> <li>• install a firewall and access control within the network to protect against unauthorised access by the public</li> <li>• installation of a router to isolate the office network from the internet café</li> <li>• install a printer for office use only.</li> </ul> Accept other relevant answers.	

B) Recognise and describe one reason for how the network design makes the data vulnerable. (2 Marks)

---

---

---

---

---

---

**Marking key:**

Description	Marks
Outlines one reason how the network design makes the data vulnerable.	2
Limited information about how the network design makes the data vulnerable.	1
<b>Total</b>	<b>2</b>
Answers could include:	
The current network design allows any access point to access all parts of the network with no segmentation using routers and/or firewalls have been implemented to improve security.	
Accept other relevant answers.	

All employees use the same admin username and password.



**Question eight:**

(3 Marks)

**Source:** [https://seniorsecondary.scsa.wa.edu.au/\\_data/assets/pdf\\_file/0005/646196/2020\\_CSC\\_Written\\_Examination.PDF](https://seniorsecondary.scsa.wa.edu.au/_data/assets/pdf_file/0005/646196/2020_CSC_Written_Examination.PDF)

Phishing is a popular strategy used to compromise the security of networks. Using an example, explain how phishing works.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**Answers could include:**

Phishing involves a criminal masquerading as someone else. This could be done in-person, by phone or by email. For example, an email could be delivered as spam (sent to many users) or sent to a specific person or persons (spear phishing). The email appears to be from a legitimate firm (e.g. a courier company or a bank) and asks the target to perform some action which appears legitimate (e.g. click on a link to check a password), usually with some urgency. The link performs another function which subverts security.

**Question seven:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/cfc4f23e-0607-49cd-85fc-cbe8723204ea/2022-hsc-information-processes-and-technology.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-cfc4f23e-0607-49cd-85fc-cbe8723204ea-ofOsxHC>

In which situation would Voice Over Internet Protocol (VOIP) be the most effective means of communication?

- A. The live development of an information system between two companies
- B. Delivering a team building video presentation and workshop
- C. Attaching PDF copies of a funding management plan
- D. Simultaneous editing of a requirements report

**Answer: A**

**Question eight:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/cfc4f23e-0607-49cd-85fc-cbe8723204ea/2022-hsc-information-processes-and-technology.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-cfc4f23e-0607-49cd-85fc-cbe8723204ea-ofOsxHC>

Which of the following statements correctly identifies the function of a TCP?

- A. Transmitting data packets quickly and without delay
- B. Using encryption in the transmission of data packets
- C. Specifying the route transmitted data packets will take
- D. Assembling transmitted data packets in the right order

**Answer: D**

**Question nine:**

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

Which of the following best describes the Ethernet protocol?

- A. Infrared or microwave signals are used to transmit data.
- B. Data is transmitted by sending light signals though wires.
- C. Data is transmitted between a sequence of nodes on a network.
- D. A medium is shared where all devices have access to transmit on a network.

**Answer: D**



Question ten:

(1 Mark)

**Source:** <https://educationstandards.nsw.edu.au/wps/wcm/connect/73f510f3-545b-4576-a2ec-13ba6975f6d8/2023-hsc-ipt+20240305.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-73f510f3-545b-4576-a2ec-13ba6975f6d8-oUbHPI3>

How do HTTP and SSL protocols work together to create a secure connection?

- A. Encode and encrypt data between nodes
- B. Use twisted pair and coaxial cables for transmission
- C. Authenticate and synchronise data during network logon
- D. Define an address and establish a route between the recipients

**Answer: A**