Government of **Western Australia**
School Curriculum and Standards Authority

COMPUTER SCIENCE

ATAR course examination 2019

Marking key

Marking keys are an explicit statement about what the examining panel expect of candidates when they respond to particular examination items. They help ensure a consistent interpretation of the criteria that guide the awarding of marks.

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Section One: Short answer **40% (92 marks)**

Question 1 **(2 marks)**

Give **two** differences between a context diagram and a level 0 data flow diagram.

Description	Marks
One mark for each difference	
Answers could include: • context diagram contains only one process node to represent the function of the entire system in relationship to the external entities. Level 0 breaks down this single process into several processes. • context diagram does not contain a datastore whereas Level 0 DFD has a datastore.	1–2
Total	**2**
Accept other relevant responses	

Question 2 **(2 marks)**

Describe **one** task that is commonly undertaken during the first phase/stage of the System Development Life Cycle (SDLC).

Description	Marks
Describes one task that is commonly undertaken during the first phase/stage of the System Development Life Cycle (SDLC)	2
States one task that is commonly undertaken during the first phase/stage of the System Development Life Cycle (SDLC)	1
Total	**2**
Example of a two mark response: The preparation of a system proposal which lists the problem definition, objectives of the study, terms of reference for study, constraints, expected benefits of the new system, etc. in the light of the user requirements.	
Accept other relevant responses (include feasibility studies)	

Question 3 **(3 marks)**

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

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
Total	**3**
Example of a three mark response: 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 4 **(4 marks)**

(a) Expand the acronym 'RAID'. (1 mark)

Description	Marks
Redundant array of inexpensive disks or a redundant array of independent disks	1
Total	**1**

(b) State **three** benefits/features of using RAID. (3 marks)

Description	Marks
One mark for each benefit or feature	
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Total	**3**
Accept other relevant responses	

Question 5 **(7 marks)**

(a) Describe the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) protocol. (2 marks)

Description	Marks
Describes the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) protocol	2
Makes superficial comments about the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) protocol	1
Total	**2**

Accept other relevant responses

(b) Describe the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol. (2 marks)

Description	Marks
Describes the Carrier Sense Multiple Access with Collision Detect (CSMA/CD) protocol	2
Makes superficial comments about the Carrier Sense Multiple Access with Collision Detect (CSMA/CD) protocol	1
Total	**2**

Accept other relevant responses

(c) In the context of a conversation involving multiple users, explain why the principle of Collision Avoidance is used when speaking instead of Collision Detection. (3 marks)

Description	Marks
Explains why CA is preferred to CD in the context of a phone app that allows multiple users on the same call	3
Provides some relevant facts about why CA is preferred to CD in the context of a phone app that allows multiple users on the same call	2
Makes superficial comment/s about why CA is preferred to CD in the context of a phone app that allows multiple users on the same call	1
Total	**3**

A three mark response could include:

Accept other relevant responses

Question 6 **(1 mark)**

Identify **one** difference between logical and physical design.

Description	Marks
Logical design sets boundaries for how the data moves in the system, not how this will be accomplished. In contrast, a physical design outlines how the system will physically be built and organised	1
Total	**1**
Accept other relevant responses	

Question 7 **(4 marks)**

Explain the purpose of benchmarking to determine system performance.

Description	Marks
Explains the purpose of benchmarking to determine system performance	4
Provides some relevant facts about the purpose of benchmarking to determine system performance	3
Identifies a relevant aspect about the purpose of benchmarking to determine system performance	2
Makes a superficial comment/s the purpose of benchmarking to determine system performance	1
Total	**4**
Example of a four mark response: For copyright reasons this text cannot be reproduced in the online version of this document.	
Accept other relevant responses	

Question 8 **(2 marks)**

List **two** environmental issues relating to the disposal of computer components.

Description	Marks
One mark for each environmental issue	
Answers could include: • components inside smaller computers tend to be glued or covered in plastic, making the raw materials difficult to recycle • computers can contain toxic elements such as lead and mercury, meaning precautions need to be taken during dismantling.	1–2
Total	**2**
Note: Must relate to disposal of computer components.	
Accept other relevant responses	

Question 9 **(6 marks)**

(a) Describe **two** data-gathering techniques used in the SDLC. (4 marks)

Description	Marks
Two marks for each data-gathering technique	
Describes the data-gathering technique in detail	2
Makes general or superficial comments about the data-gathering technique	1
Total	**4**
Examples of two mark responses: • Observation – collect primary data by recording or watching users using the system • Questionnaire – ask users or stakeholders to respond to questions about the system • Interview – conduct single or group interviews where users describe their experiences of and interactions with the system • Sample forms – collect data in forms regarding a range of system operations • Sampling volume of work processed by system – review data gathered to ascertain how the system is processing in real time.	
Accept other relevant responses	

(b) Describe how the techniques in part (a) improve the overall quality of the completed system. (2 marks)

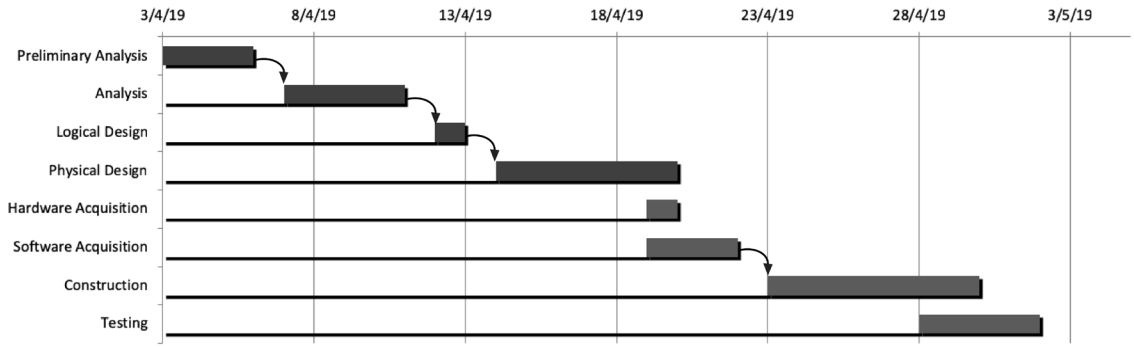
Description	Marks
Relates the data gathering technique to quality; may use an example	2
Makes general or superficial comments about the data gathering technique as it relates to quality	1
Total	**2**
Note: Must relate to increasing quality by relating it closely to user needs.	

Question 10 **(9 marks)**

(a) Draw a Gantt chart to illustrate the following: (8 marks)

Description	Marks
Draws a Gantt chart that features:	
date on x axis; correctly spaced	1
label on y axis; correct order.	1
Correctly identifies task durations:	
all task durations	3
most task durations	2
some task durations.	1
Correctly identifies task dependencies:	
all task dependencies	3
most task dependencies	2
some task dependencies.	1
Total	**8**

Example of an eight mark response:



Note: Candidates should produce neat, legible Gantt charts.

(b) Determine the length of time for the critical path (in days). (1 mark)

Description	Marks
30 days	1
Total	**1**

Question 11 **(4 marks)**

Explain **one** benefit of virtualisation, using an example.

Description	Marks
Explains one benefit of virtualisation, using an example	4
Provides some relevant facts about one benefit of virtualisation	3
Identifies a relevant aspect about one benefit of virtualisation	2
Makes superficial comment/s about one benefit of virtualisation	1
Total	**4**
Example of a four mark response: Virtualisation can be used to enable multiple operating systems to be used on the same computer. If you are running a Linux machine, you can install a software program that creates a Windows machine within the Linux one. The benefit could be cost savings by only having one device. Then you can install Windows software within the virtual machine. For all intents and purposes the simulated machine (virtual machine) is a Windows machine.	
Accept other relevant responses	

Question 12 **(5 marks)**

(a) Draw an Entity Relationship (ER) diagram below to show the resolved relationship, including the following:

- entity names
- relationships
- cardinality. (3 marks)

Description	Marks
Identifies all entities, relationships and cardinalities correctly	3
Identifies all entities and most relationships and cardinalities correctly	2
Identifies some entities	1
Total	**3**
Note: The response must have a relevant ER diagram for the given context that includes entities, relationships and cardinalities. In allocating marks consider the candidate's interpretation of the given context and the ER diagram they have drawn.	

(b) State **two** reasons why this relationship might change to many-to-many over time. (2 marks)

Description	Marks
One mark for each reason	
Answers could include: • one teacher might use many devices • one device might be used by many teachers.	1–2
Total	**2**
Accept other relevant responses	

Question 13 **(14 marks)**

(a) Describe **two** differences between source code and byte code. (4 marks)

Description	Marks
Two marks for each difference	
Describes a difference between the source code and byte code	2
Provides limited information about a difference between source code and byte code	1
Total	**4**
Examples of two mark responses: • source code is human-readable text, byte code is an intermediate format • source code can be compiled to byte code, byte code can be executed by a virtual machine.	
Accept other relevant responses	

(b) Identify a local variable in the pseudocode. (1 mark)

Description	Marks
Any one of Num, i, Total, Result	1
Total	**1**

(c) (i) Describe the role of one-dimensional arrays in programming (2 marks)

Description	Marks
Describes the role of one-dimensional arrays	2
Provides a simple comment on the role of one-dimensional arrays	1
Total	**2**
Example of a two mark response: One-dimensional arrays hold an indexed sequence of variables of the same data type. **or** Arrays can be used to store values of the same data type and the array is then used as a singular variable to increase efficiency	
Accept other relevant responses	

(ii) State **one** reason why an array is a suitable data structure for the code on page 12. (1 mark)

Description	Marks
States one reason why an array is a suitable data structure for this code	1
Total	**1**
Example: An array facilitates iteration over the same data type.	
Accept other relevant responses	

Question 13 (continued)

(d) (i) Identify **two** lines on which errors occur and describe briefly the error types.

(4 marks)

Description	Marks
Two marks for each line number and brief description	
Identifies the line on which the error occurred	1
Briefly describes the error type	1
Total	**4**

Example of a four mark response:

Line number with an error	Description
line 04	uninitialised variable
line 06	division by zero

Accept other relevant descriptions

(ii) Write the **two** lines of code to correct the errors. (2 marks)

Description	Marks
One mark for each line of new code to correct the errors	1–2
Total	**2**

Example of a two mark response:

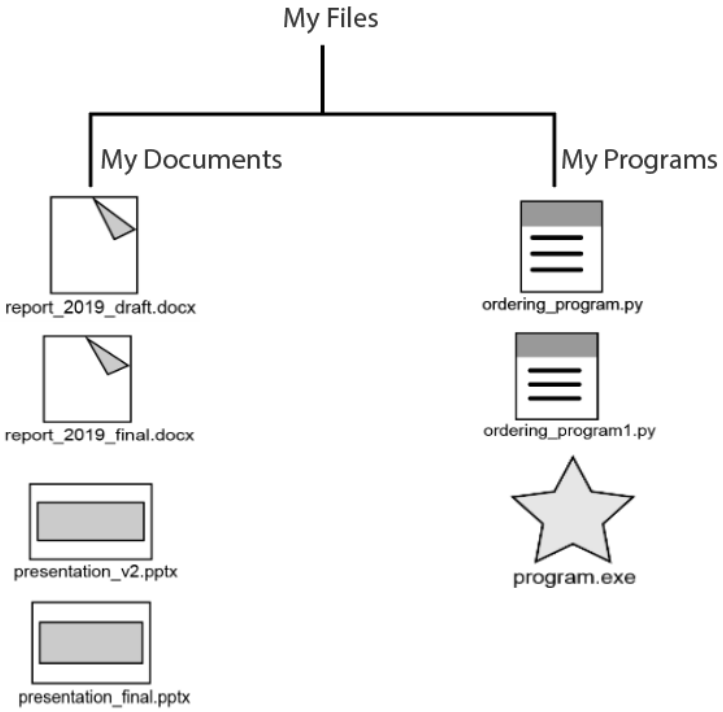
Line number	New code
line 02	Total ← 0
line 06	Result ← Total / Size

Question 14 **(4 marks)**

(a) Draw a diagram structuring the above files into a folder structure, using at least **two** directories. (1 mark)

Description	Marks
Diagram is correct and logical using at least two directories	1
Total	**1**

Example of a one mark response:



Note: There are many ways to draw this logically but candidates must have grouped at least two categories and given descriptive names to the directories to be awarded the mark.

(b) Justify how your structure in part (a) improves efficiency for the user as the number of files increases. (3 marks)

Description	Marks
Justifies how this structure improves efficiency, relating it to increasing number of files in the system	3
Outlines how this structure could improves efficiency	2
Makes general or superficial comments relating to the file system and/or efficiency	1
Total	**3**

Example of a three mark response:
The user can group all executable files together as applications, meaning that time will be saved locating these files as they will not be in the same directory as documents. The user will reduce time searching if the files are in well-named directories that state the contents clearly.

Accept other relevant responses

Question 15 **(4 marks)**

Give **two** advantages and **two** disadvantages of using cloud services to store data.

Description	Marks
One mark for each advantage	
Answers could include: • access to data stored on cloud services is not tied to a geographical location • cloud services are available 24x7.	1–2
One mark for each disadvantage	
Answers could include: • data stored on cloud services may be spread across national borders • cloud services may make it difficult to maintain confidentiality.	1–2
Total	**4**
Accept other relevant responses	

Question 16 **(2 marks)**

Identify **two** reasons why an online database should use its own Forward/Back buttons during record editing, instead of using browser controls.

Description	Marks
One mark for each reason	
Answers could include: • the online database is functional regardless of the type of browser being used • the online database is not reliant on external software; it is good design for controls to be integrated.	1–2
Total	**2**
Accept other relevant responses	

Question 17 **(4 marks)**

(a) State **two** benefits for an organisation in adopting a Standard Operating Environment. (2 marks)

Description	Marks
One mark for each benefit	
Answers could include: • easier training for end-users • consistent fault diagnosis.	1–2
Total	**2**
Accept other relevant responses	

(b) State **two** reasons why an organisation might **not** adopt a Standard Operating Environment. (2 marks)

Description	Marks
One mark for each reason	
Answers could include: • a specialised hardware environment • specialised software needed for some users.	1–2
Total	**2**
Accept other relevant responses	

Question 18 **(4 marks)**

Discuss the impact of data redundancy in a relational database and recommend a strategy to minimise its effect.

Description	Marks
Discusses the impact of data redundancy in a relational database and recommends a strategy to minimise its effect	4
Provides some relevant facts about the impact of data redundancy in a relational database and recommends a strategy to minimise its effect	3
Identifies a relevant aspect about the impact of data redundancy in a relational database and/or recommends a strategy to minimise its effect	2
Makes superficial comment/s about the impact of data redundancy in a relational database and/or recommends a strategy to minimise its effect	1
Total	**4**

Example of a four mark response:
Redundancy means having multiple copies of same data in the database. This leads to the unnecessary increase in size of databases, and the likelihood of data corruption being a direct result of redundancy. The problems caused by data redundancy are update anomaly, insert anomaly and delete anomaly. A strategy to minimise its effect is

Accept other relevant responses

Question 19 **(4 marks)**

Consider the data stored below in two tables, named Customer and Discount. Write a query using Structured Query Language (SQL) that will return the name and percentage discount rate of all customers born between the 15th and 30th of June inclusive.

Customer

FirstName	LastName	BirthDay	BirthMonth	BirthYear
Silvah	Arjab	02	June	2001
John	Kim	28	June	2002
Carrie	Hough	27	May	2001
Ling	Hudaya	22	August	2002

Discount

Month	Rate
May	20
June	10
August	12

Description	Marks
Writes a query that features:	
correct syntax i.e. SELECT Field name… FROM Table name…	1
condition is stated appropriately	1
fields are named correctly	1
entities are named correctly.	1
Total	**4**

Example of a four mark response:

```
SELECT   Customer.FirstName, Customer.LastName, Discount.Rate
FROM     Customer, Discount
WHERE    From BirthMonth = June AND BirthDay >= 15 AND BirthDay <= 30
```

Note: The query shown is just one example of a query. Dot notation is not required.

Accept other relevant responses

Question 20 **(3 marks)**

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

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
Total	**3**
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 21 **(4 marks)**

Describe **two** differences between a switch and a repeater.

Description	Marks
Two marks for each difference	
Describes a difference between a switch and a repeater	2
Provides a simple comment on the difference between a switch and a repeater	1
Total	**4**
Examples of two mark responses: • a repeater is a two-port device that copies (repeats) a signal from one port to another • a switch is a multi-port device that uses a table of addresses to send a signal through the correct port.	
Accept other relevant responses	

Section Two: Extended answer **60% (121 Marks)**

Question 22 **(39 marks)**

(a) Identify the system development methodology that the hospital manager of Wirratrack Wildlife Hospital (WWH) should use for the development of its new online portal system and explain your reasoning. (3 marks)

Description	Marks
Identifies the system development methodology that WWH should use	1
Explains why the system development methodology should be used	2
Identifies aspects of the system development methodology	1
Total	**3**
Example of a three mark response: Iterative/RAD – as this is an update of an existing system and requires small improvements, it would make more sense to avoid a detailed, full process. As it is a volunteer organisation, they may not have the resources for a full linear methodology at this time. The users of the system only require an online portal for remote access and may wish to be regularly consulted on the progress, therefore iterative will be sufficient. **or** Linear – waterfall/cascade – because the safety of animals and release location is important. The client knows what they want, so there are clear outcomes but also they need a lot of control due to funding restrictions and there are legal and environmental issues.	
Accept other relevant responses	

(b) Describe **two** validation rules that could be used in the WWH when a new admission record is created. (4 marks)

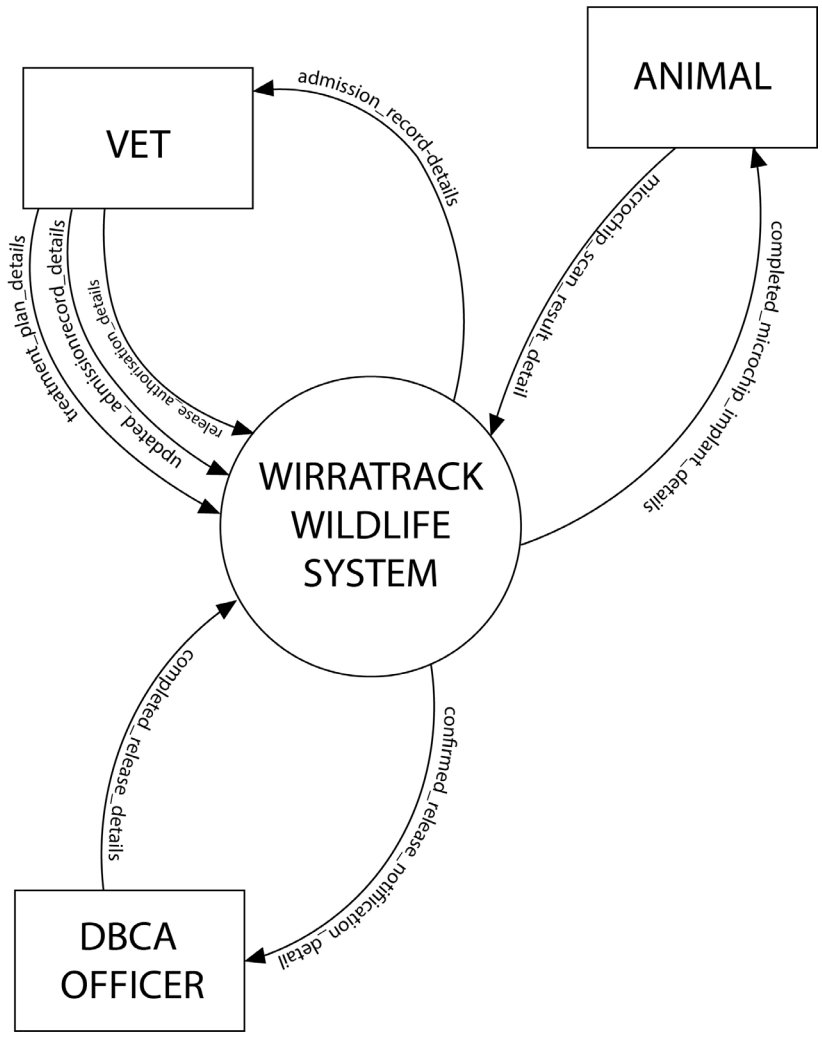
Description	Marks
Two marks for each validation rule	
Describes how the validation rule could be used for the new records added to the database	2
Makes general comments relating to the database or the scenario or identifies a validation rule	1
Total	**4**
Examples of two mark responses: • use no zero or null values for Admission_ID or Animal_ID to ensure there has to be an input • set the requirement for the Release_Date to be on or after the Treatment_Complete_Date • use correct formatting to ensure wildlife carers put the information into the correct format (dd/mm/yyyy) for dates, formatting for Vet_ID limited to 5 characters • have a drop down box for lists of animal species so that a valid species is able to be identified and selected.	
Accept other relevant responses	

Question 22 (continued)

(c) Complete the context diagram below for the WWH online portal system. (7 marks)

Description	Marks
Draws a context diagram that has appropriate data flows (drawn in correct direction and labelled appropriately)	
ANIMAL:	
data flow/s in: microchip scan results detail	1
data flow/s out: microchip implant details.	1
VET:	
data flow/s in: treatment plan details, updated admission details, release authorisation details	1–2
data flow/s out: admission record details.	1
DBCA OFFICER:	
data flow/s in: completed release details	1
data flow/s out: confirmed release notification details.	1
Total	**7**

Example of a seven mark response:



Note: For VET entity, give one mark for most inflows and two marks for all inflows.

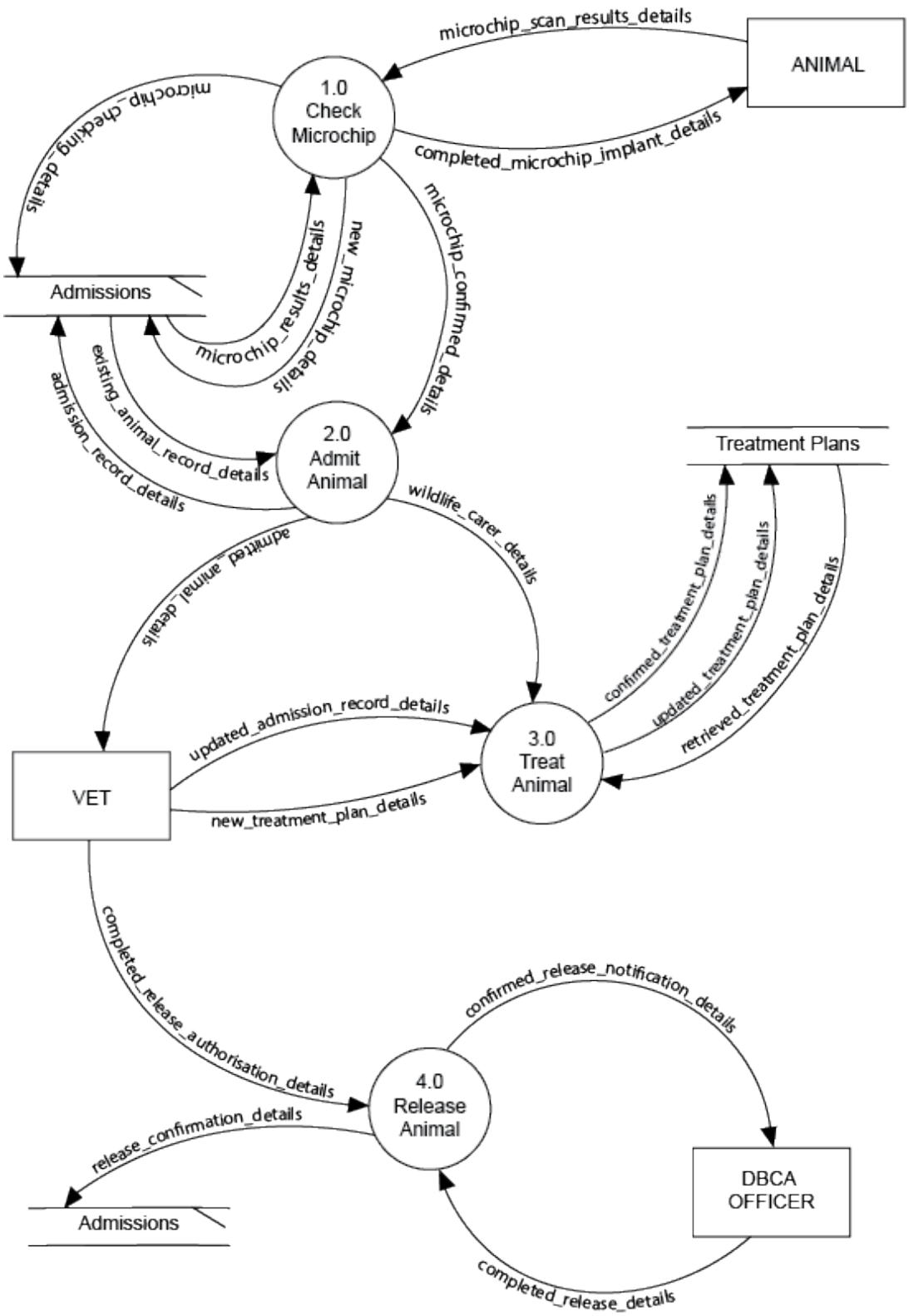
Accept other relevant context diagrams as they relate to the question

(d) Draw the Level 0 Data Flow Diagram (DFD) for the WWH online portal system. The first process has been done for you. (16 marks)

Description	Marks
Draws a Level 0 data flow diagram that features:	
Entities	
• ANIMAL	1
• VET	1
• DBCA OFFICER	1
Data stores: (named appropriately)	
• admissions data store	1
• treatment plans data store.	1
Processes (must include number and verb) 1.0 Check Microchip already present	
• 2.0 Admit Animal	1
• 3.0 Treat Animal	1
• 4.0 Release Animal	1
Appropriate data flows (drawn in correct direction and labelled appropriately)	
1.0 Check Microchip:	
data flow/s in: microchip scan results, details, microchip results details	1
data flow/s out: microchip checking details, new microchip details, completed microchip implant details.	1
2.0 Admit Animal:	
data flow/s in: existing animal record details, confirmed microchip details	1
data flow/s out: admission record details, wildlife carer details, admitted animal details.	1
3.0 Treat Animal:	
data flow/s in: updated admission record details, new treatment plan details, retrieved treatment plan details	1
data flow/s out: confirmed treatment plan details, updated treatment plan details.	1
4.0 Release Animal:	
data flow/s in: completed release authorisation details, completed release details	1
data flow/s out: release confirmation details, confirmed release notification details.	1
Total	**16**

Question 22 (continued)

Example of a sixteen mark response:



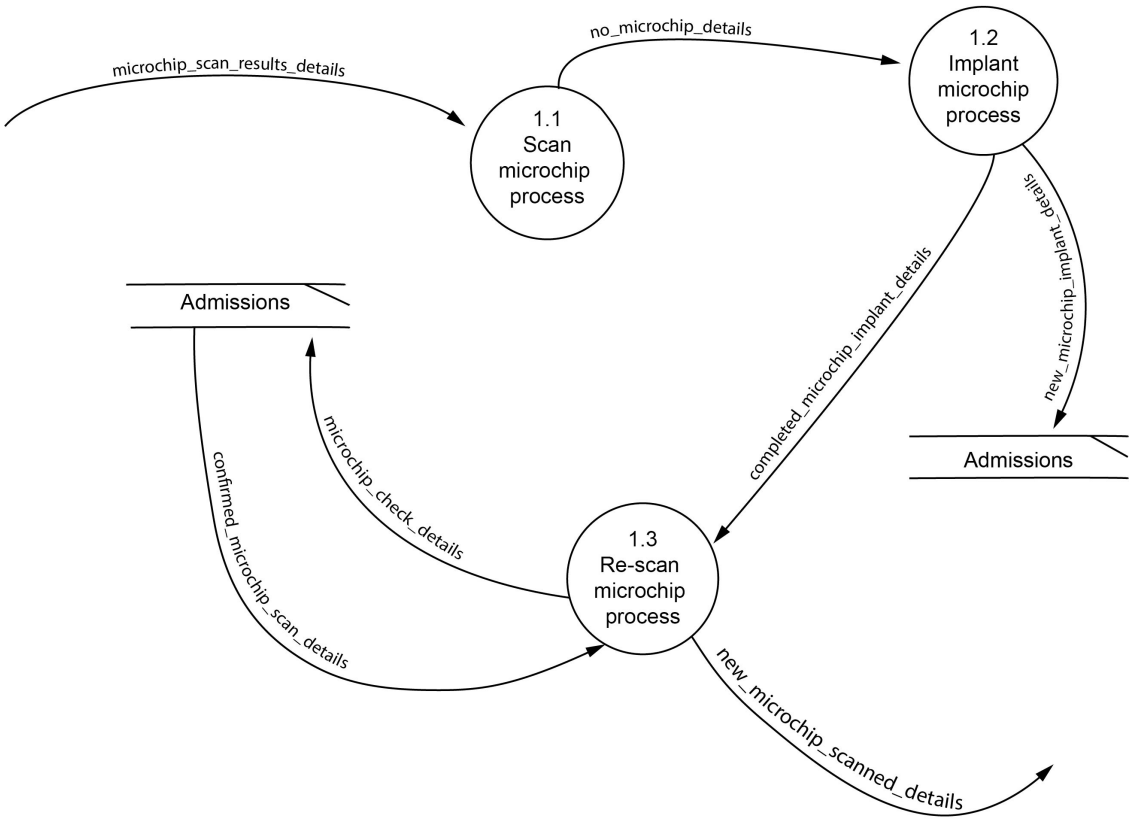
Note: Can use fewer or more processes, as long as logic is clear and works.

Accept other relevant DFDs

(e) With reference to your Level 0 DFD in part (d), draw a Level 1 DFD by expanding Process 1.0 Check Microchip Process. (9 marks)

Description	Marks
Draws a L1 data flow diagram that features:	
Appropriate sub processes; must include number (1.x) and verb	
Scan microchip	1
Implant microchip	1
Re-scan microchip	1
Data stores	
One data store: Admissions	1
Appropriate data flows	
SCAN MICROCHIP:	
data flow/s: no microchip details, microchip scan result details.	1
IMPLANT MICROCHIP:	
data flow/s in: no microchip details	1
data flow/s out: new microchip implant details, completed microchip implant details.	1
RESCAN MICROCHIP:	
data flow/s in: completed microchip implant details, confirmed microchip scan details	1
data flow/s out: new microchip scan details, confirmed microchip scan details.	1
Total	**9**

Example of a nine mark response:



Accept other relevant L1 DFDs diagrams

Question 23 **(33 marks)**

(a) Using Chen's notation, draw an ER diagram that includes the following:

- names of all primary keys
- names of all foreign keys
- relationships
- cardinality.

You need to resolve all many-to-many relationships. (18 marks)

Description	Marks
Draws a relevant ER diagram for the given context that includes:	
Chen notation	
Uses Chen notation appropriately	1
Entities, relationships and cardinalities	
Identifies all entities, relationships and cardinalities correctly	6
Identifies all entities and most relationships and cardinalities correctly	5
Identifies all entities and some relationships and cardinalities correctly	4
Identifies most entities and some relationships and cardinalities correctly	3
Identifies some entities and some relationships and/or cardinalities correctly	2
Identifies some entities	1
Primary keys (appropriate to entities)	
One mark for each primary key identified correctly. Maximum six marks. Note: allow for the potential inclusion of composite key(s) for an associative entity.	1–6
Foreign keys (appropriate to entities)	
One mark for each foreign key identified correctly. Maximum five marks.	1–5
Total	**18**
Note: Consider the candidate's interpretation of the given context and the ER diagram they have drawn.	

(b) Refer to your ER solution in part (a) and write a query, using Structured Query Language (SQL) that will display the release date for each animal from 1/09/19 to 30/10/19 inclusive with the following information.

- Admission_ID
- Animal_ID
- Vet_ID
- Release_officer_ID (4 marks)

Description	Marks
Writes a query that features:	
correct syntax i.e. SELECT Field name…FROM Table name…	1
fields that are listed correctly	1
fields based on part (a) that are named appropriately	1
entities based on part (a) that are named appropriately.	1
Total	**4**
Example of a four mark response: SELECT Admission.Admission_ID, Admission.Animal_ID, Admission.Vet_ID, Admission.Release_officer_ID FROM Admission WHERE From Release_date >= 1/09/2019 AND Release_date <=30/10/2019	
Note: The query shown is just one example of a query for the ER diagram. Dot notation not required.	

(c) Refer to your ER solution in part (a) and describe why it is necessary to normalise the data to 3rd normal form (3NF). (2 marks)

Description	Marks
Describes why it is necessary to normalise the data to 3NF	2
Provides some relevant information about why it is necessary to normalise the data to 3NF	1
Total	**2**
Example of a two mark response: To eliminate redundancy and inconsistent dependency. For example if an animal is seen by a vet more than once, the vet's details will not be duplicated in the admission record.	
Accept other relevant responses	

(d) Complete the data dictionary below for the Animal Entity. (5 marks)

Description		Marks
One mark for each correct piece of data		
Animal_ID	Required (automatically created when record added)	1
Species	String	1
Sex	Appropriate size for the attribute	1
Age	The estimated age of animal	1
Weight	Real	1
	Total	**5**
Note: Accept any other reasonable responses, for example, Species: Text.		

(e) Draw a sample form layout below that could be used for the WWH online portal system. Your form layout should enable the entry of all required input fields for admitting an animal. (4 marks)

Description	Marks
Form layout (input screen) for admitting the animal features:	
all appropriate fields	4
most of the appropriate fields	3
some appropriate fields	2
a limited drawing of a visual interface.	1
Total	**4**

Question 24 **(28 marks)**

(a) Given the information above, write a function in pseudocode to calculate correctly and return the dose for an animal of any weight, in kilograms. (5 marks)

Description	Marks
Writes a function in pseudocode that features:	
the initialising of a variable that stores the dose or Function start	1
assignment of the weight as a parameter	1
correct computation of dose for a given weight	1
assignment of final value to function	1
closure of function.	1
Total	**5**

Example of a five mark response:

```
Function CalcDose(weight)
dose ← 5

ans ← dose * weight

CalcDose ← ans
End Function
```

Accept other relevant and logical responses

(b) Call the function in part (a) from a module that prints the dose required for animals weighing in the range 1–5 kg inclusive. Assume integer values only for weight. (7 marks)

Description	Marks
Writes a module in pseudocode that features:	
a control structure over the weight range with correct indices	1–2
correct function call	1
passing of parameter variable as function argument	1
output of dose	1
calculation in scope	1
begin and closure of module.	1
Total	**7**

Example of a seven mark response:

```
Module CorrectDose

For weight ←1 to 5
        ans ← CalcDose(weight)
        Output (ans)
End For

End Module
```

Accept other relevant and logical responses. Other interpretations include the calculation of a single dose for a given weight.

(c) The dose calculated in part (a) is actually an hourly rate. Write pseudocode to calculate correctly and print the hourly dose rate for a 3 kg animal under anaesthesia for between 1–4 hours. Note that the cumulative dose cannot exceed 45 mg for this size of animal, so after 3 hours no further anaesthetic can be given. (12 marks)

Description	Marks
Writes a module in pseudocode that features:	
initialisation of variables	1
correct function call with parameter and return value	1–3
an iteration structure over the hourly range with correct indices	1–2
passing of iterator variable as function argument	1
output of cumulative dose	1
calculation of cumulative dose	1
test for cumulative dose	1–2
Begin and closure of module.	1
Total	**12**

Example of a twelve mark response:

```
Module CorrectDose
cumulativeDose ← 0
size ← 3

ans ← CalcDose(size)

For hours ←1 to 4
        Output (ans)

        cumulativeDose ← cumulativeDose + ans

        If cumulativeDose >= 45
                ans ← 0
End For

End Module
```

Accept other relevant and logical responses

(d) Verify that your code works correctly by creating a trace table for your pseudocode in part (c), listing all the relevant variables and their corresponding values for each iteration. (4 marks)

Description	Marks
One mark for each correct line in the table	1–4
Total	**4**

Example of a four mark response:

ans	hours	cumulative Dose
15	1	15
15	2	30
15	3	45
0	4	45

Accept logical trace tables that are complete and accurate

Question 25 **(21 marks)**

(a) Discuss the advantages and disadvantages of only encrypting the:

(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
Total	**4**

Examples

Advantages:

- 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.
- circumvents the potential complications that accompany local data breaches by providing protection of WWH intellectual property, even if it is lost or stolen.

Disadvantages:

- 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.
- 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.

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
Total	**4**

Examples
Advantages:
- 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.
- 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.

Disadvantages:
- 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.
- 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.

Accept other relevant responses

(b) Draw a labelled network diagram that shows a connection between an off-site vet practice and WWH. (13 marks)

Description	Marks
Diagram shows a viable solution with sequencing of devices for the vet surgery connection with an appropriate order of components	
• Example: • PC, • wireless point (wireless router/modem, cable modem or equivalent), • Internet, • ISP (OK to include internals of ISP, but not required), • WWH Firewall, • Router, • Switch, • Database server, • Web server.	1–9
Separation of database/webserver	1
Appropriate use of CISCO conventions for up to three devices	1–3
Total	**13**
Accept other relevant responses	

ACKNOWLEDGEMENTS

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