LUI								Schoo	l code				
Schoo	l nam	e											
Given	name	e/s								Attach	-		
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Digital Solutions

Time allowed

- Perusal time 15 minutes
- Working time 120 minutes

General instructions

- Answer all questions in this question and response book.
- Planning paper will not be marked.

Section 1 (10 marks)

• 10 multiple choice questions

Section 2 (41 marks)

• 3 short response questions

Section 3 (21 marks)

• 1 extended response question



Section 1

Instructions

- Choose the best answer for Questions 1–10.
- This section has 10 questions and is worth 10 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	В	С	D
Example:				0

	A	В	С	D
1.	0			0
2.				\bigcirc
3.				\bigcirc
4.		\bigcirc		\bigcirc
5.		\bigcirc		\bigcirc
6.	0		0	0
7.				
8.				\bigcirc
9.	0	\bigcirc		\bigcirc
10.	0	\bigcirc		\bigcirc

Section 2

Instructions

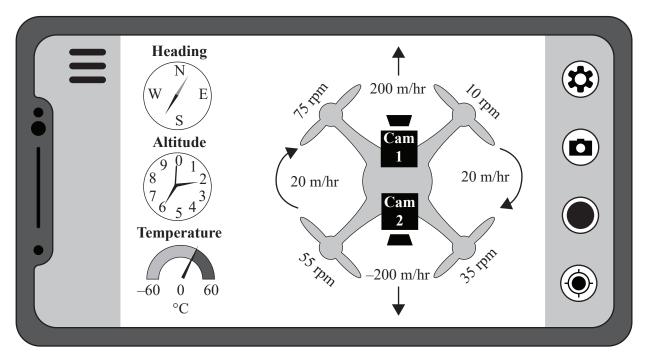
- Write using black or blue pen.
- Respond in paragraphs consisting of full sentences.
- If you need more space for a response, use the additional pages at the back of this book.
 - On the additional pages, write the question number you are responding to.
 - Cancel any incorrect response by ruling a single diagonal line through your work.
 - Write the page number of your alternative/additional response, i.e. See page ...
 - If you do not do this, your original response will be marked.
- This section has three questions and is worth 41 marks.

DO NOT WRITE ON THIS PAGE

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QUESTION 11 (21 marks)

The diagram shows the user interface for a drone control panel.



a)	Explain how three elements and three principles of visual communication						
	(excluding colour) have been used.	[12 marks]					

		you make a mistake in the diagram, cancel it by ruling a single diagonal line through he additional response space on page 18 of this question and response book.

QUESTION 12 (8 marks)

Marine markers are placed throughout Queensland waterways. Each marine marker is fitted with an Internet of Things (IoT) device that can broadcast a fault status via a satellite internet link.

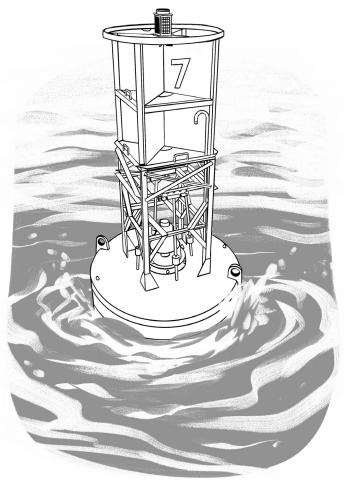
Each day, the IoT device checks the status of the marker. If a fault is detected, the device broadcasts the marker's unique identifier, a positive fault status flag and the fault occurrence date and time.

This is an example data structure provided by a marine marker's IoT device:

```
"QldMarineMarkerId" : "3446",
"QldMarineMarkerFault" : "True",
"QldMarineMarkerDateTime" : "2020-02-02T18:00:00.000Z",
}
```

A request has been made for a quarterly release of an ongoing summary of fault issues per area. The information will be centrally stored in this way:

MarineMarkerStatus [MarkerID, MarkerType, AreaDescription, Latitude, Longitude, Fault _ Detected]



	Evaluate the proposed solution against the criteria of reliability and accuracy.	[2 marks
Re	iability:	
Ac	curacy:	
b)	State two additional criteria and evaluate the proposed solution against these criteria.	[4 marks
Cri	terion:	
Cri	terion:	
c)	Justify why JSON is an effective method of data exchange between the marine markers and the central database system. Provide two reasons to justify your response.	Γ2 ··· ····l··
	markers and the central database system. I for de two reasons to justify your response.	[2 marks

QUESTION 13 (12 marks)

A games arcade has developed a digital solution for recording members' points. Members receive a membership card, which they scan when they play games at the arcade. The card records how many points a member receives from winning a game. A sample of the data is shown.

members					
id	given_name	last_name	email	phone	
24	Adalai	Akkad	adacutiepie@email.com	0491 570 006	
25	Michael	McNealy	mikemcnealy@email.com	0491 571 266	
26	Shruti	Flynn	shrutikins@email.com	0491 574 118	
27	Adam	Steinberg	steintheman@email.com	0491 577 644	
28	Julia	Wong	juliawong@email.com	0491 579 455	

members_activity						
id	card_number	join_date	last_visit	points_balance		
24	789987	2005-08-12	2020-01-20	570		
25	456654	2009-02-15	2019-12-20	80		
26	753951	2010-05-05	2020-02-25	249		
27	654123	2019-10-19	2020-03-10	1200		

a) Develop an algorithm to list all members by name. Sort the list alphabetically

[4 mas	by last name.

b)	Develop an algorithm to list member IDs and join dates for memberships of 10 or more years. Sort the list by join date in ascending order.	[4 mark



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CONTINUE TO THE NEXT PAGE

Section 3

Instruction

• This section has one question and is worth 21 marks.

QUESTION 14 (21 marks)

Two novice programmers who live in different locations want to develop a method for securing their email communication. They have decided to:

- 1. meet in the same location
- 2. use a generic code library that contains functions relating to a set of cryptology algorithms called 'Blowfish'
- 3. use only UTF-8 data encoding, e.g. the character '%' is considered to have a length of 8 bits in total
- 4. create their own programs using different languages
- 5. generate encrypted text using their programs
- 6. copy and paste encrypted text into their emails.

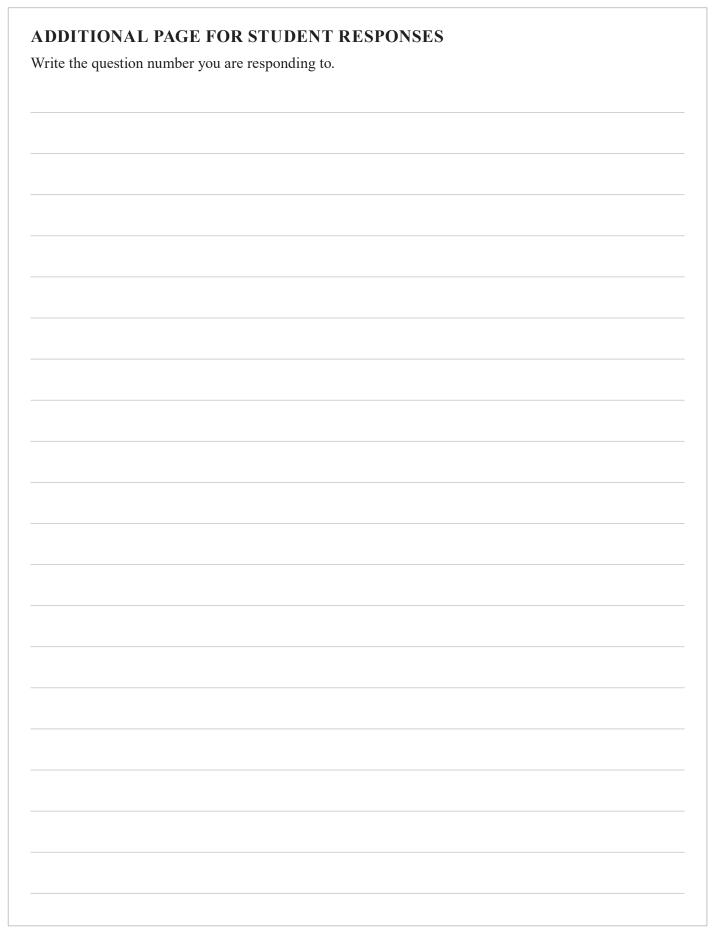
Function name	Blowfish key expansion	Blowfish crypt
Function code	BlowfishInitiate(key)	Blowfish(Value, KeySet, Process-Type)
Purpose	Completes the initial key expansion processes.	Completes the block algorithm process for encryption or decryption.
	Returns a data structure called Blowfish KeySets.	Accepts a 64-bit—length set of values in the form of text, along with the pre-processed Blowfish KeySets.
Inputs	Key: text-based, 64-bit in length	Value: text-based, 64-bit in length
		KeySet: returned data structure from the BlowfishInitiate function
		Process-Type: 1 for encrypt, 2 for decrypt
Returns	KeySet	Text-based value
Example	BlowfishInitiate("J\$8%*\$#d")	Blowfish("abcdefg",MyKeySet,1)

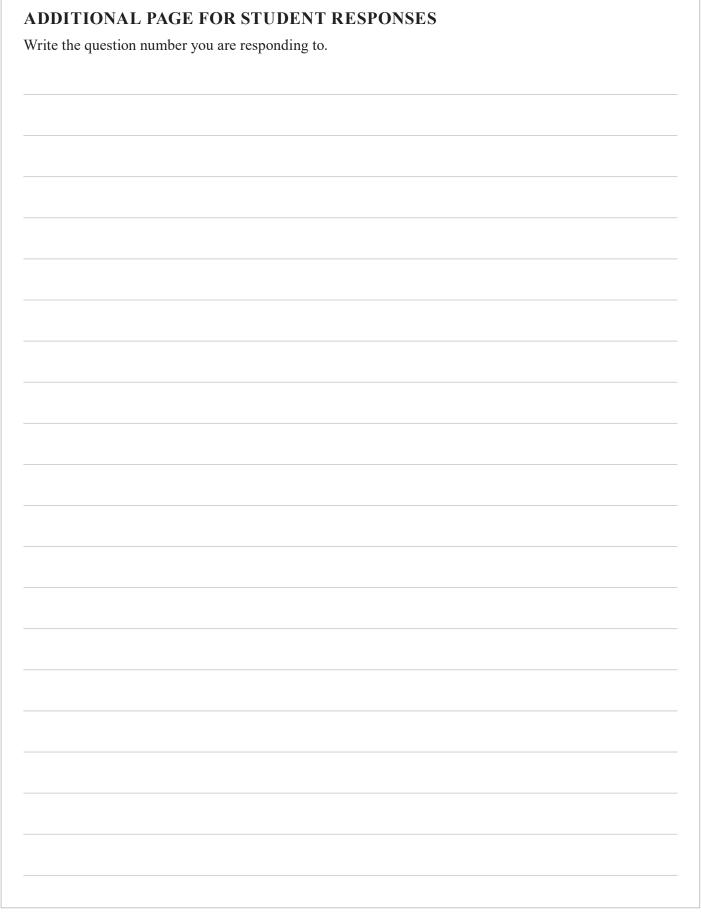
Note: If any input does not meet a function's length requirements, the function will fail and potentially cause a runtime error.

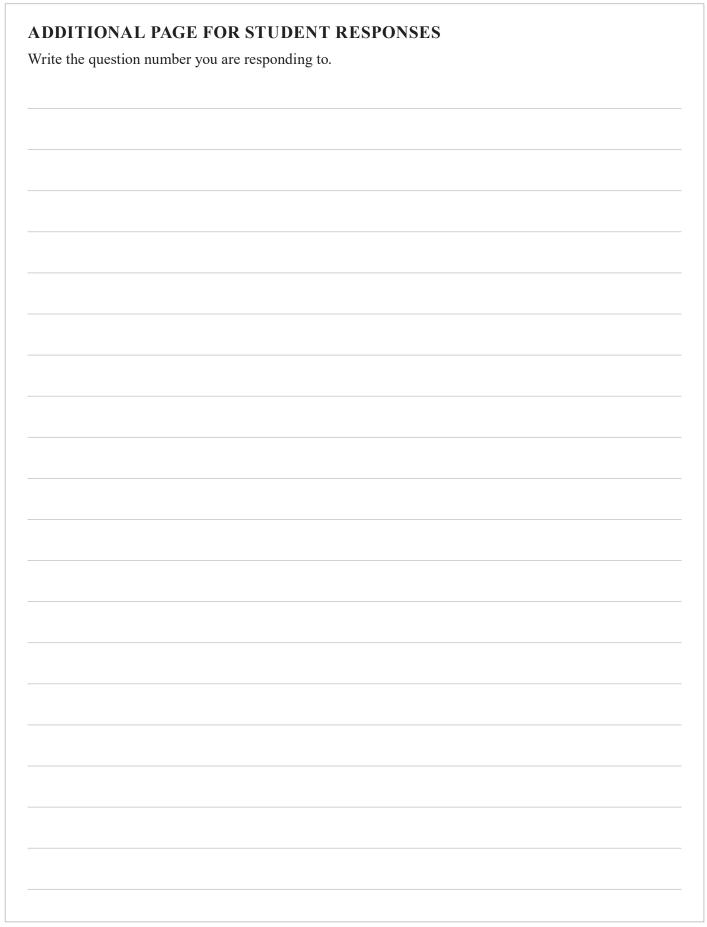
a)	Symbolise an algorithm that the programmers could use to encrypt their Unicode set of text. The algorithm should use the function library calls in the table as required.	[6 mark.

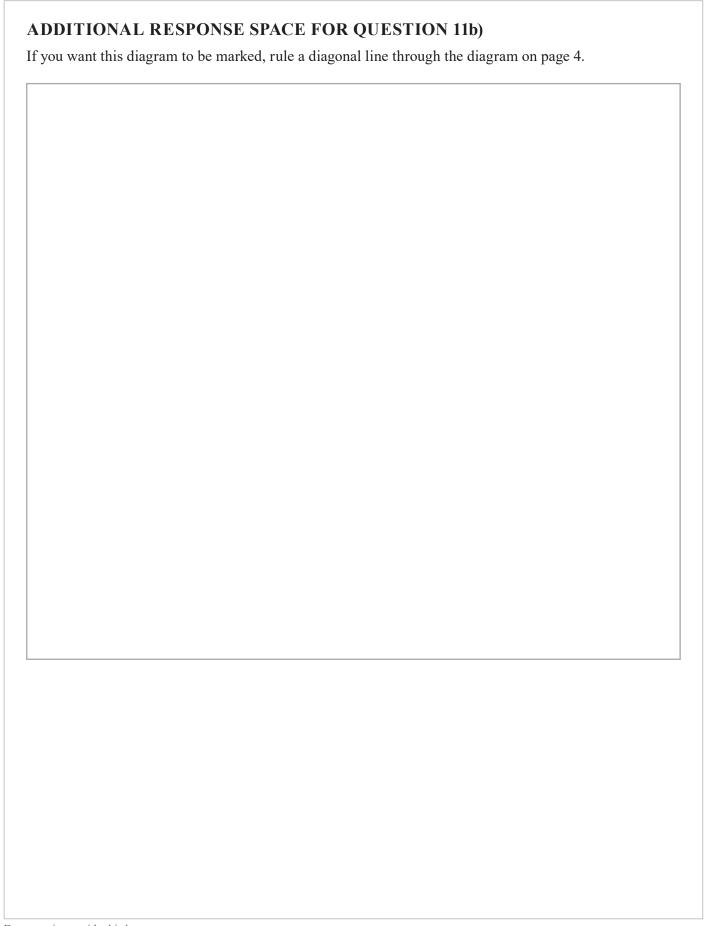
application. Explain and justify how they could implement two useability principles to optimise user experience.	[6 marks

Support all statements with examples. Provide two recommendations and justify how each recommendation would improve security.	[9 mark











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