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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Fall 2025
Course Code: CSE413, Course Title: Mobile Application Design
Level: 4 Term: 2 Batch: 62

Time: 02:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.		A startup in Hawkins wants to create a "Monster Info App" that provides real-time information about creatures appearing in the Upside Down. The app fetches data like creature name, type, last spotted location, and threat level from a central server. The developers want the app to dynamically retrieve data, display it in lists or cards, and ensure the system is secure, reliable, and reusable. **Explain** the role of an API in this scenario, **describe** at least three key features that make an API suitable for this app, briefly **explain** how an API works to provide the requested data, and **discuss** the role of JSON in fetching and displaying the creature information.		**CO2**
	a)	**Explain** the role of an API in the given application scenario.	**[2]**	
	b)	**Describe** any three features of an API that make it suitable for this mobile application.	**[3]**	
	c)	**Explain** how an API retrieves data from a server and provides it to a mobile application.	**[3]**	
	d)	**Explain** the role of JSON in transferring and displaying the creature information in the app.	**[2]**	
2.		In Stranger Things, the Hawkins AV Club is building a Voice-Activated Field Log App to help the team record spoken notes during investigations of Upside-Down activity. The app must convert speech into text using Flutter and the speech_to_text package.		**CO3**
	a)	**Implement** a Flutter code snippet that shows how to start or stop speech recognition, display the recognized text, and toggle the microphone icon based on listening state.	**[6]**	
	b)	**Demonstrate** how to handle at least two design challenges when integrating emerging technologies (AR/VR, advanced sensors, etc.) into mobile apps, providing a practical example for each.	**[4]**	

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3.		Joyce Byers is using her Christmas-light communication wall to receive messages from Will in the Upside Down. She wants a digital replica of this wall built in Flutter. Each time a message comes through, one specific light on the screen should fade in or fade out smoothly, recreating the supernatural blinking effect seen in the series.		**CO4**
	a)	**Analyze** the design requirements for a Flutter animation that fades a green rectangular light in and out when a button is pressed, **justify** the use of `AnimatedOpacity`, and **implement** the solution.	**[6]**	
	b)	**Analyze** and **justify** best practices to keep Flutter animations performant and accessible, especially for frequently blinking effects.	**[4]**	
4.	***a)***	In Hawkins, Eleven from Stranger Things is tracking the number of Eggo waffles she eats each day. They notice a pattern: • On day 1, she eats 1 waffle. • On day 2, she eats 2 waffles. • From day 3 onward, the number of waffles eaten equals the number eaten the previous day plus twice the number eaten two days ago. **Analyze** this pattern and **implement** a function eggoWaffles(int n) that returns the number of waffles eaten on the nth day. Write unit tests to verify correctness for days 1 through 6.	**[5]**	**CO4**
	b)	A client wants a cross-platform mobile app with a highly consistent UI across all devices, support for custom UI components, and a fast development cycle with features like hot reload. **Analyze** the requirements and propose a suitable cross-platform framework and **implement** a code snippet using it to display centered text saying "Stranger Things" in bold with a specific font size.	**[5]**	