

**LANG BUDDY - A Bilingual Language Learning
Android Application**

CS19611 – MOBILE APPLICATION DEVELOPMENT LAB

Submitted by

YOGESH CV (220701327)

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**RAJALAKSHMI ENGINEERING COLLEGE
THANDALAM , CHENNAI - 602105**

RAJALAKSHMI ENGINEERING COLLEGE, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Project titled “**LANG BUDDY**” is the Bonafide work of “**YOGESH CV(2116220701327)**”, who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE

Dr. Duraimurugan N.,, M.Tech., Ph.D.,

SUPERVISOR

Professor

Department of Computer Science and Engineering,
Rajalakshmi Engineering
College, Chennai-602 105.

Submitted to Project Viva-Voce Examination held on _____

Internal Examiner

External Examiner

ABSTRACT

In today's interconnected world, the ability to communicate in multiple languages has become a valuable skill, both personally and professionally. Traditional methods of language learning can often feel rigid, monotonous, and difficult to sustain, especially for beginners. To address this gap, *Lang Buddy* is developed as a mobile-based language learning solution designed to make language acquisition simple, interactive, and enjoyable. Built using Android Studio and Kotlin, Lang Buddy leverages a quiz-based approach to teach users basic vocabulary and sentence structures in French and German — two widely spoken European languages.

The app features a clean and intuitive user interface with vibrant visuals and engaging interactions that mimic popular learning platforms like Duolingo. Users are guided through a series of multiple-choice questions with immediate feedback for each response. Correct answers are rewarded with positive reinforcement, while incorrect answers display the right solution to promote effective learning. A progress bar helps learners track their advancement through the lesson, and a final score screen at the end provides an overall performance summary along with options to restart the lesson or exit.

Lang Buddy's architecture is modular, allowing easy addition of new languages, question types, and learning modes in the future. It focuses on low-bandwidth usability and offline capabilities, ensuring access to education without heavy system requirements. By combining educational psychology, gamification principles, and mobile-first design, Lang Buddy

offers a modern and scalable solution to language learning — one that prioritizes user experience, engagement, and retention.

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TABLE OF CONTENT

CHAPTER NO	TITLE	PAGE NO
	ABSTRACT	
	ACKNOWLEDGMENT	
1	INTRODUCTION	1
2	LITERATURE SURVEY	2
3	METHODOLOGY	4
4	FLOW DIAGRAM	12
5	ARCHITECTURE DIAGRAM	13
6	OUTPUT SCREENSHOT	14
7	RESULTS AND DISCUSSION	15
8	CONCLUSION & FUTURE ENHANCEMENTS	18
9	REFERENCES	21

CHAPTER-1

1.INTRODUCTION

Language serves as the cornerstone of human communication, playing a vital role in education, business, travel, and social interaction. In an increasingly globalized and multicultural society, the demand for multilingual skills is higher than ever. However, traditional language learning approaches—such as textbooks, classroom lectures, and rote memorization—can often feel tedious, time-consuming, and disconnected from real-world usage, especially for beginners.

Mobile applications offer a flexible, engaging, and interactive environment for learners to explore new languages at their own pace. This shift opens up new opportunities for personalized and gamified learning experiences that enhance motivation and retention.

Lang Buddy is an Android-based mobile application designed to simplify and enhance the language learning process for beginners. It currently supports two languages: French and German. The app adopts a quiz-based methodology where users are presented with vocabulary and simple sentence-based questions in a multiple-choice format. Immediate feedback, score tracking, and a clean user interface are provided to create an immersive and enjoyable learning journey.

The app is developed using Android Studio and Kotlin, and is structured with modular components to allow easy future expansion into additional languages and advanced learning modes. *Lang Buddy* is designed to be beginner-friendly, visually appealing, and suitable for both self-paced learning and casual daily practice.

CHAPTER-2

LITERATURE SURVEY

The domain of mobile-assisted language learning (MALL) has evolved rapidly, with several academic and commercial efforts contributing to the development of interactive and gamified learning applications. The following surveys highlight the foundational research and existing systems that influenced the development of *Lang Buddy*:

1. **Mobile Learning in Language Education:** Numerous studies have explored the benefits of mobile applications in language learning. According to a review by Kukulska-Hulme and Shield (2008), mobile devices offer flexibility and accessibility, allowing learners to engage in short, context-sensitive learning sessions throughout the day. These attributes make mobile learning particularly suitable for vocabulary and phrase acquisition — a core focus of *Lang Buddy*.
2. Research by Deterding et al. (2011) emphasized the role of gamification in increasing learner engagement and motivation. Language learning apps like Duolingo and Memrise have successfully implemented game elements(points, rewards, streaks).

3. Studies in cognitive psychology (e.g., Roediger & Karpicke, 2006) suggest that quiz-based learning and testing improve memory retention better than passive study methods. Recalling an answer during a quiz activates the brain's retrieval pathways, enhancing long-term retention. *Lang Buddy* leverages this "testing effect" by using structured multiple-choice questions to strengthen the learner's recall and understanding.
4. Traditional tools like printed dictionaries and grammar books are limited in interactivity and adaptability. Research by Godwin-Jones (2011) noted that many learners abandon such tools due to lack of engagement and personalized pacing. In contrast, mobile apps like *Lang Buddy* provide immediate feedback, adaptive difficulty progression, and on-the-go access, making them more aligned with modern learner expectations.

CHAPTER-3

3.METHODOLOGY

The development of the language learning mobile application *Lang Buddy* follows a structured methodology comprising distinct phases: **Requirement Analysis, System Design, Implementation, Testing, and Deployment**. The project utilizes **Kotlin** as the primary development language in **Android Studio**, with a focus on offline usability, smooth UI design, and quiz-based interaction to support language learners at the beginner level.

1. Requirement Analysis

- Identified the core features:
- Language selection screen
- Quiz-based learning interface
- Multiple-choice questions (MCQs) for vocabulary and sentence formation
- Instant feedback on user answers
- Score tracking and final evaluation

2. System Design

- **Architecture:**
Adopted a modular design to separate UI, data, and logic, enabling easy scalability and maintenance. Future enhancements like lesson banks, APIs, or database integration can be plugged in with minimal changes.
- **UI Design:**
Built using standard XML layout files with a focus on visual clarity, colorful buttons, and emoji-enhanced feedback to improve user engagement. Rounded buttons and dynamic text sizes were used to create a welcoming interface.
- **Lesson Data:**
Used Kotlin objects and data classes to structure lessons per language. Questions, options, and correct answers are pre-defined for fast offline access.
- **Feedback and Scoring Logic:**
Integrated `AlertDialogs` to display correct/incorrect feedback, and tracked scores across the session. A final dialog shows the user's performance and offers a "Restart Lesson" or "Exit" option.

3. Implementation

- Developed UI screens:
 - `MainActivity`: Language selection screen
 - `LessonActivity`: Interactive quiz with questions, options, and progress bar
- Created `LessonData.kt`:
 - Includes French and German lessons with both vocabulary and sentence-based questions.
 - Each question includes 3 options and one correct answer.

- Integrated features:
 - Progress bar to track completion
 - Dialog-based feedback after each question
 - Final result popup showing marks
 - Option to restart the lesson

4. Testing

- **Unit Testing:**
Verified activity navigation, data loading, and score tracking logic
- **Integration Testing:**
Ensured correct functioning of UI components, dialog interactions, and progress updates
- **Manual Testing:**
Performed on different Android device versions to check UI responsiveness, correctness of questions, and user experience
- **Edge Case Testing:**
Checked behavior when user skips answers, restarts lessons, or reaches end of lesson with 0 or full marks

5. Deployment

- The app is built and tested on Android emulators and physical devices running Android 8.0 and above
- Packaged for APK generation and ready for deployment to users via:
 - Direct installation
 - Future submission to Google Play Store
- Designed for future scalability:
 - Easy addition of new languages
 - Integration of speech/audio for pronunciation

- Backend database for dynamic question delivery
- Authentication and user progress tracking

Backend Infrastructure

1. Frontend (Mobile App - Android)

- Language: Kotlin
- UI Framework: XML Layouts
- Architecture Pattern: Modular
- Features:
 - Home Screen: Displays app title and two main options (French or German)
 - Lesson Screen: Presents vocabulary/sentence-based multiple-choice questions. Tracks progress with a progress bar. Provides instant feedback through pop-up dialogs. Final screen shows **score** and options to **restart** or **exit** the lesson.
 - Score & Progress Tracking: Tracks correct answers throughout the lesson. Displays score summary at the end of the session.
 - Feedback Dialogs: Displays “Correct” or “Wrong” with correct answers after each question.

2. Backend (Real-time Services)

The current version of *Lang Buddy* is a fully **offline language learning application**, meaning it does not rely on any server or cloud backend for its operation. Instead, all data and logic are handled locally within the app to ensure quick access, low latency, and usability without an internet connection. However, the app is structured in a way that allows for **future backend integration** with minimal changes.

3. Database Schema

```

fun getFrenchLessons(): List<Lesson> {
    return listOf(
        Lesson("What is 'Bonjour'?", "Hello", "Goodbye", "Thanks", "Hello"),
        Lesson("What is 'Merci'?", "Sorry", "Thank you", "Good night", "Thank
you"),
        Lesson("What is 'Je suis étudiant'?", "I am a student", "You are a
teacher", "He is a doctor", "I am a student"),
        Lesson("What is 'Comment ça va?'?", "How are you?", "Who are you?", "Where
are you?", "How are you?"),
        Lesson("What is 'Bonne nuit?'?", "Good night", "Goodbye", "Hello",
"Good night"),
        Lesson("What is 'S'il vous plaît?'?", "Please", "Thank you", "Sorry",
"Please"),
        Lesson("What is 'Pardon?'?", "Excuse me", "Good morning", "No
problem", "Excuse me"),
        Lesson("What is 'Oui?'?", "No", "Yes", "Maybe", "Yes"),
        Lesson("What is 'Non?'?", "Yes", "No", "Hello", "No"),
        Lesson("What is 'Au revoir?'?", "Hello", "Goodbye", "Please",
"Goodbye")
    )
}

fun getGermanLessons(): List<Lesson> {
    return listOf(
        Lesson("What is 'Danke?'?", "Sorry", "Thank you", "Yes", "Thank you"),
        Lesson("What is 'Guten Morgen?'?", "Good night", "Good morning",
"Good evening", "Good morning"),
        Lesson("What is 'Ich bin Lehrer?'?", "I am a teacher", "You are a student",
"He is a boy", "I am a teacher"),
        Lesson("What is 'Wie geht es dir?'?", "Where are you?", "How are
you?", "Who are you?", "How are you?"),
        Lesson("What is 'Auf Wiedersehen?'?", "Goodbye", "Hello", "Thank
you", "Goodbye"),
        Lesson("What is 'Bitte?'?", "Please", "Sorry", "You're welcome",
"Please"),
        Lesson("What is 'Entschuldigung?'?", "Good job", "Excuse me",
"Welcome", "Excuse me"),
        Lesson("What is 'Ja?'?", "Yes", "No", "Maybe", "Yes"),
    )
}

```

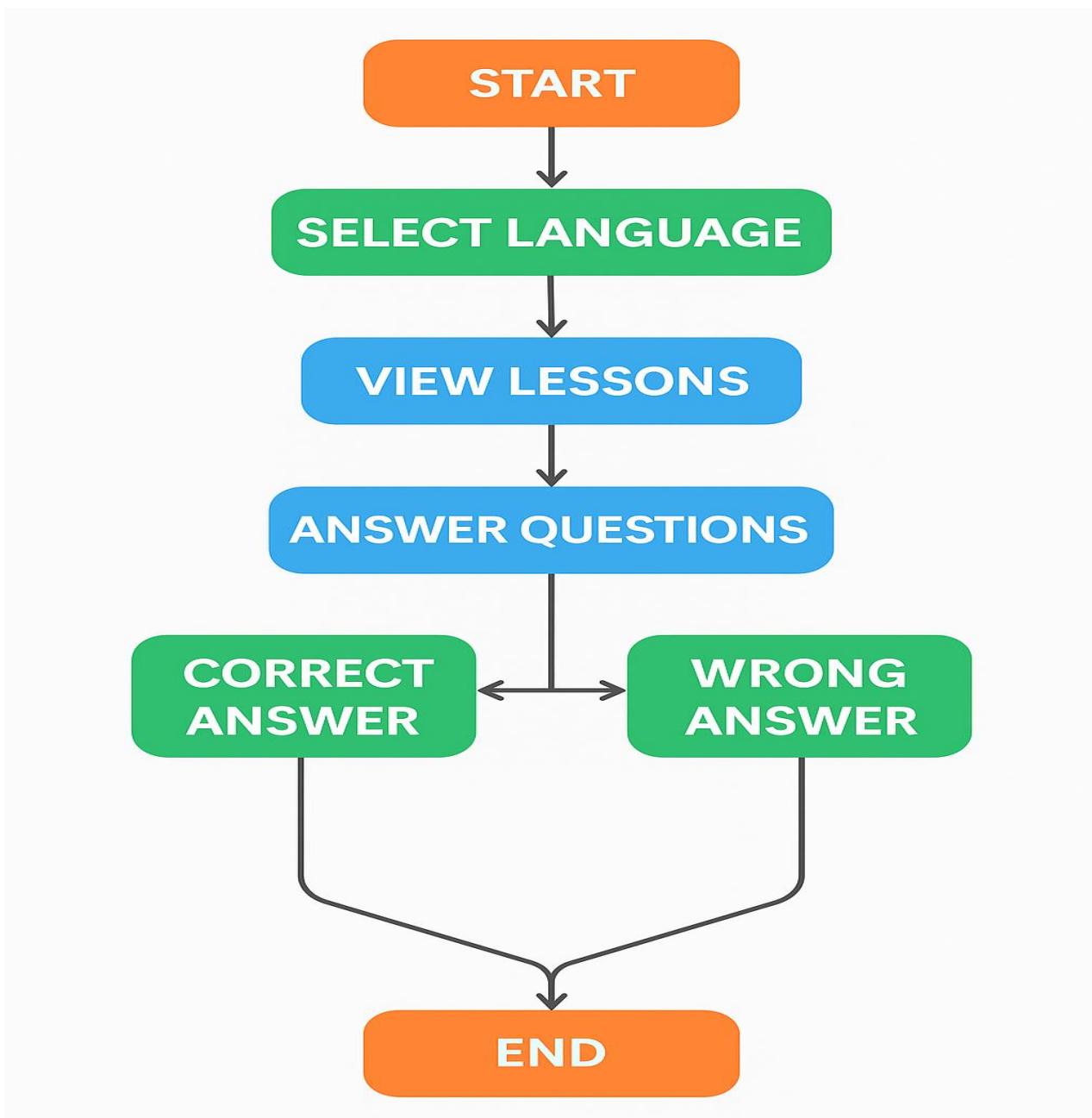
```
Lesson("What is 'Nein?'", "Yes", "Maybe", "No", "No"),
Lesson("What is 'Tschüss?'", "Goodbye", "See you tomorrow", "Hello",
"Goodbye")
)
}
```

OBJECTIVES

- **To create a lightweight and accessible mobile app** for learning basic French and German, optimized for beginner learners.
- **To develop a clean and intuitive user interface (UI)** that encourages regular interaction and learning without overwhelming the user.
- **To implement a quiz-based learning system** that enhances vocabulary retention through repetition, recall, and immediate feedback.
- **To track user performance within each session** using score counters and visual progress indicators to boost motivation and learning confidence.
- **To provide meaningful feedback for each answer** (both correct and incorrect) so that users can learn from their mistakes and reinforce correct choices.
- **To design the system in a modular and scalable way** so that additional languages, lesson types, and features (such as flashcards, audio pronunciation, and grammar modules) can be integrated in the future.
- **To ensure complete offline usability**, allowing users to learn anywhere without dependency on internet access.
- **To lay the foundation for future enhancements**, including user authentication, cloud-based lesson delivery, and personalized learning paths.

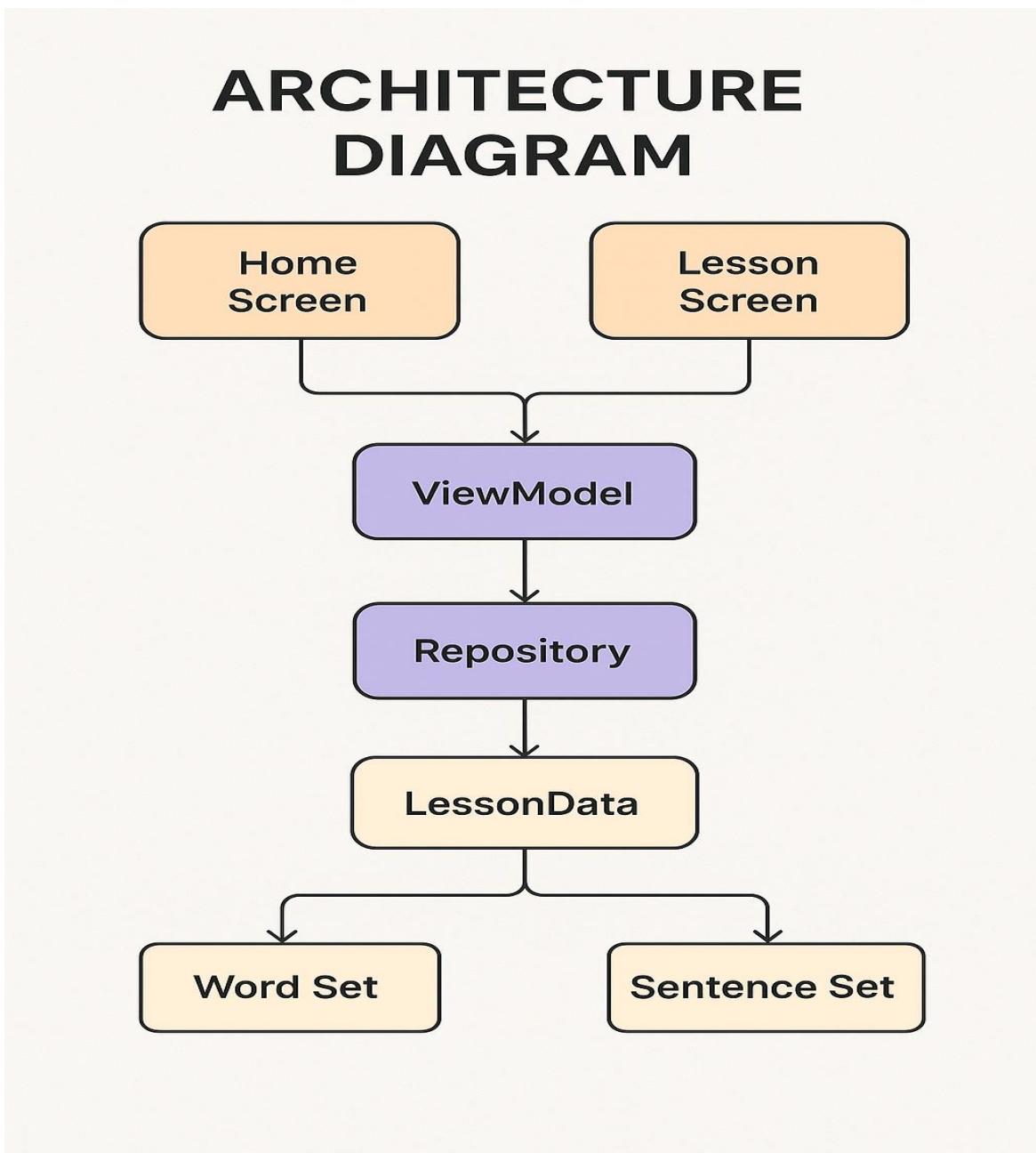
CHAPTER 4

FLOW DIAGRAM



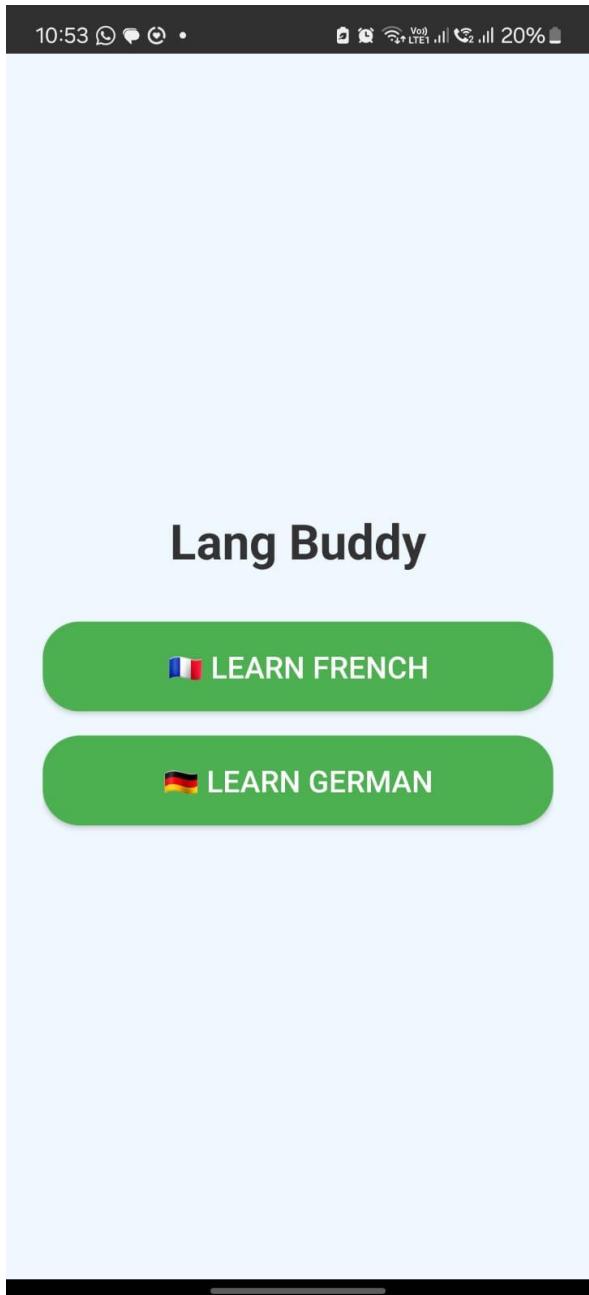
CHAPTER-5

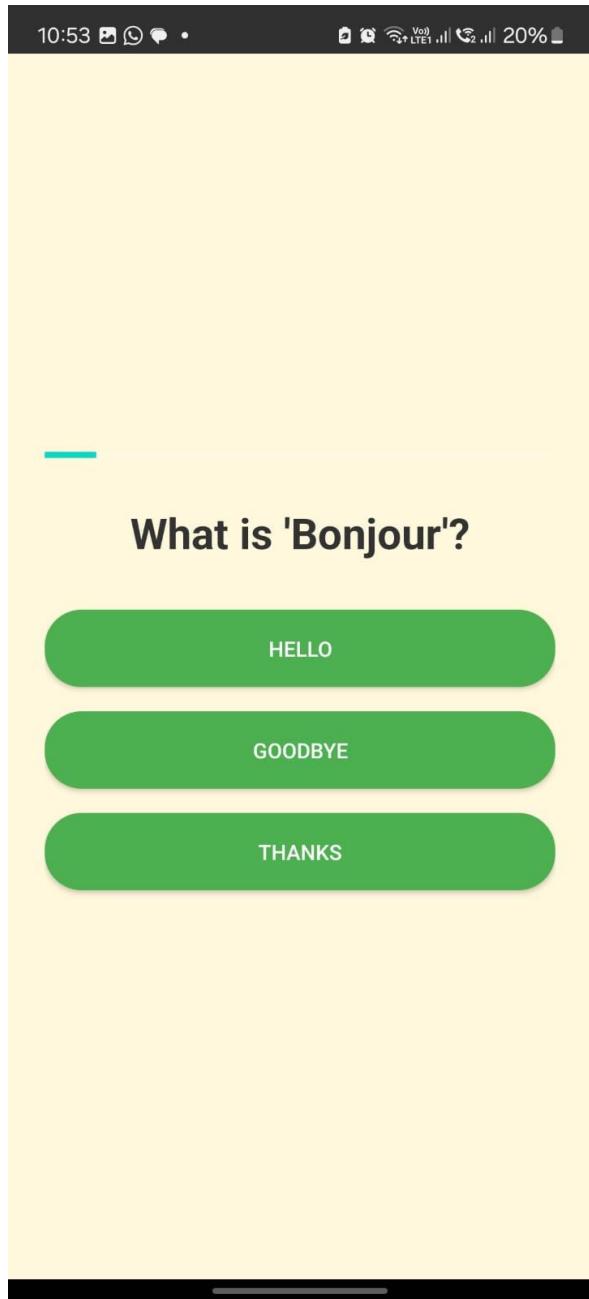
ARCHITECTURE DIAGRAM



CHAPTER-6

OUTPUT SCREENSHOT





10:53 VoLTE 20% 10:54 VoLTE 20%

What is 'Bonjour'?

Correct! 🎯

Good job!

What is 'Merci'?

Wrong! 😞

Correct Answer: Thank you

NEXT

THANKS

GOOD NIGHT

The image displays two side-by-side screenshots of a mobile application interface, likely from an Android device, showing different language lessons.

Screenshot 1 (Left):

- Header:** Shows the time as 10:54, battery level at 20%, and signal strength.
- Section Title:** "What is 'Au revoir'?"
- Message:** "Congratulations!" with a confetti icon.
- Text:** "You scored 7 out of 10"
- Buttons:** "EXIT" and "RESTART LESSON" (both in white text)
- Text at Bottom:** "GOOD LUCK"

Screenshot 2 (Right):

- Header:** Shows the time as 10:56, battery level at 20%, and signal strength.
- Section Title:** "What is 'Danke'?"
- Options:** Three green rounded rectangular buttons with white text:
 - SORRY
 - THANK YOU
 - YES

CHAPTER-7

RESULTS AND DISCUSSION

The *Lang Buddy* application was successfully developed as an offline, quiz-based language learning tool supporting French and German for beginner users. The final build of the app was tested across various Android versions and devices to evaluate its functionality, performance, and user experience. The results were consistent with the project objectives and demonstrated the effectiveness of the app's simple, gamified learning structure.

Key Results

1. Smooth Navigation and UI Responsiveness

- a. The app's navigation between the home screen and lesson screens was seamless.
- b. The user interface was clean, intuitive, and responsive across different screen sizes.

2. Correctness of Learning Logic

- a. The app accurately tracked the correctness of answers and calculated scores without errors.
- b. The feedback dialogs for both correct and incorrect answers worked as expected, helping users reinforce learning in real time.

3. Quiz Flow and Completion Tracking

- a. The progress bar dynamically updated with each answered question, providing real-time visual feedback.
- b. At the end of each session, the final score summary displayed correctly, with options to restart or exit.

4. Scalability and Extensibility

- a. The internal structure of the app allows for easy addition of new languages and question sets.
- b. The codebase is modular enough to support future backend integration, audio support, and flashcard learning modules.

Discussion

- The quiz-based format proved effective for vocabulary reinforcement, especially with the added feedback mechanism.
- The use of dialog boxes instead of toasts increased the user's focus on learning by pausing and confirming each response.

- Although the current version is offline, the app's design supports future cloud integration for dynamic content delivery and user authentication.
- One limitation is the static nature of questions; once familiar with the fixed questions, learning impact may reduce. This can be addressed by expanding the lesson bank and randomizing questions.
- The lack of audio support was noted during testing; adding text-to-speech or pronunciation clips would significantly enhance the app's learning depth, particularly for pronunciation and listening practice.

CHAPTER-8

CONCLUSION & FUTURE ENHANCEMENTS

CONCLUSION

The development of *Lang Buddy* successfully demonstrates how mobile applications can be utilized to create an engaging and effective environment for language learning. Focused on French and German, the app provides beginner-level users with vocabulary and sentence-building practice through an interactive, quiz-based approach. The clean UI, immediate feedback, and offline usability make Lang Buddy accessible and useful for learners across different age groups and technical backgrounds.

Through its modular design and simple architecture, Lang Buddy also serves as a solid foundation for future upgrades. The project has met its primary objectives—delivering a lightweight, user-friendly language learning app with performance, correctness, and visual clarity.

FUTURE ENHANCEMENTS

To improve functionality, user experience, and scalability, the following enhancements can be considered for future versions of Lang Buddy:

1. Audio Pronunciation Support

- a. Integrate Text-to-Speech (TTS) or pre-recorded audio clips to improve pronunciation learning.

2. Flashcard Learning Mode

- a. Add a "Learn First" feature where users view vocabulary flashcards before attempting quizzes.

3. Dynamic Lesson Loading

- a. Replace hardcoded lessons with cloud-based or database-driven content using Firebase or REST APIs.

4. User Authentication & Progress Saving

- a. Allow users to sign in and track their scores, badges, and completed lessons over time.

5. Leaderboard and Badges

- a. Gamify learning further with daily goals, experience points (XP), and a leaderboard system.

6. Multi-language Support

- a. Expand the app to include more global languages like Spanish, Japanese, or Hindi.

7. Grammar Practice Modules

- a. Incorporate simple grammar lessons with exercises for verb conjugations, sentence structure, and more.

8. Dark Mode and Accessibility Options

- a. Improve accessibility with font size controls, screen reader support, and theme toggles.

CHAPTER-9

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