

PROJECT ABSTRACT

Flashcard Learning App with Spaced Repetition

A spaced-repetition flashcard app for exam prep: create decks, study with an Again/Hard/Easy grading flow, and let the SM-2-inspired scheduler decide review intervals, with retention stats and streaks — built-to-order with source code, report, PPT and viva kit.

01. Title

Flashcard Learning App with Spaced Repetition

02. Introduction / Background

Cramming feels productive and fails reliably: memory research since Ebbinghaus shows recall decays exponentially unless reviews are spaced at increasing intervals. Spaced-repetition software (SRS) exploits this — each card is re-shown just before it would be forgotten — and it is the standard tool behind medical and language-exam preparation worldwide. This project builds an SRS flashcard app for Android aimed at semester exams and placement prep: decks of question-answer cards, a study session with self-graded recall (Again / Hard / Easy), and a scheduler that stretches or shrinks each card's next review interval based on the grade. Retention statistics and streaks make the forgetting curve visible.

03. Problem Statement

Students revise by re-reading notes, which builds familiarity without recall — the weakest form of studying. Existing SRS apps are powerful but generic; a final-year project needs an original, explainable implementation whose scheduling algorithm the student can defend in a viva. This project implements the classic SM-2-inspired scheduling from first principles with honest, inspectable interval math.

04. Objectives

- Implement deck and card management (create, edit, delete, import).
- Build a study session UI with question → reveal → self-grade (Again/Hard/Easy) flow.
- Implement an SM-2-inspired scheduler computing each card's next review interval and ease factor from grades.
- Show due-card counts, daily review queues and session progress.
- Provide retention statistics: recall rate, cards mastered, per-deck retention, study streaks.
- Support offline study with all scheduling computed on-device.

05. Proposed Methodology

Each card stores an ease factor, interval (days) and due date. Grading follows the SM-2 family: Again resets the interval to under a day and lowers ease; Hard keeps a short interval with a small ease penalty; Easy multiplies the interval and raises ease slightly. The daily queue is all cards with due date $\leq$ today, ordered by overdue-ness. After each review the card's next due date is written back to the local database. Statistics are aggregations over the review log: recall rate is the fraction of non-Again grades over a window, streaks count consecutive study days. The report documents the exact interval update rules so the viva discussion can walk through

them.

06. System Architecture / Working

Three layers: (1) Data layer — decks, cards (ease, interval, due date) and a review log; (2) Scheduler — due-queue builder and the interval-update function applied on every grade; (3) UI layer — deck list, study session with flip animation and grading buttons, and the statistics section with heatmaps and retention tables. The working flow is: open deck → due cards queue → read question → reveal answer → grade recall → scheduler sets the next review → stats update.

07. Hardware / Software Requirements

- Android phone (Android 8.0+) — no other hardware needed
- Kotlin or Java with Android SDK; SQLite (Room) for local storage
- No internet required; scheduling is fully on-device

08. Expected Outcomes

A working Android app where a study session grades cards, intervals visibly adapt (Again shortens, Easy stretches), and the statistics section reflects the review history. Retention percentages in the demo dataset are illustrative; the scheduler's behaviour is deterministic and documented rule-by-rule in the report.

09. Applications

- Semester exam and viva revision
- Placement-prep question banks (OOP, DBMS, OS)
- Language vocabulary learning
- Any memorization-heavy coursework

10. Future Scope

- Image and audio cards for language learning
- Shared deck marketplace with ratings
- Cloze-deletion card type
- FSRS (newer scheduler) as an optional algorithm setting