



Chen Hui - Project Portfolio

Project:  [Dukemon] RepoSense: [Chen Hui] [Team]

Tutors: [James Pang] [Ms. Anita]



Team members: [Chen Hui] [Yi Da] [Subbash] [Jason] [Paul]



1. Overview of Dukemon

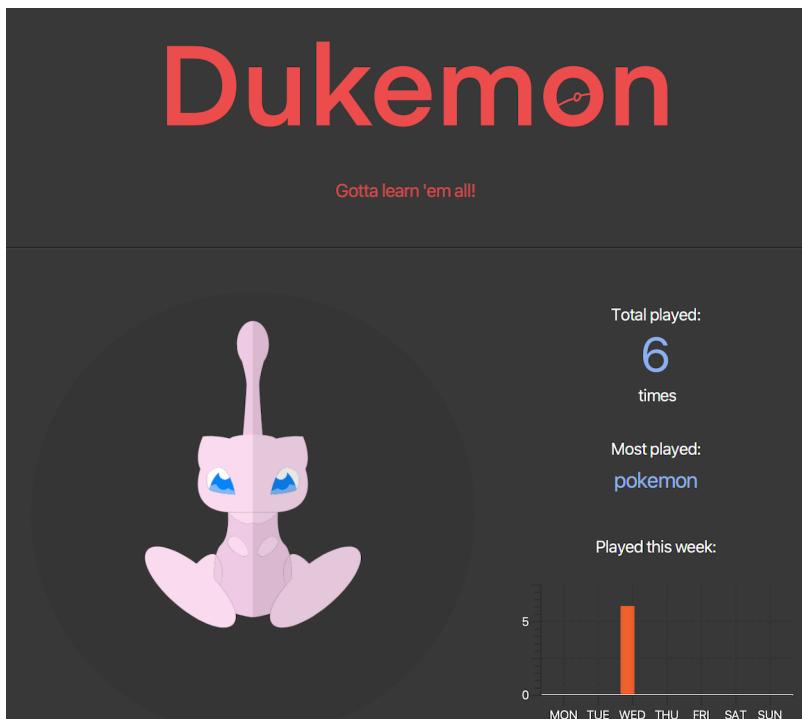


Figure 1. Dukemon's design.

Dukemon is a desktop flashcard application, which aims to streamline and gamify the process of learning words and definitions.

The user interacts with it primarily through a CLI (Command Line Interface), with some GUI (Graphical User Interface) features.

Allow me to brief you on some useful terms and to give you a context.

1. Flashcards are termed as **Cards**.
2. A collective set of **Cards** are termed as **WordBank**.
3. A general flow of *Dukemon*'s usage is as follows:
 - a. Note taking phase
 - i. User creates/selects a **WordBank**.
 - ii. User populates the **WordBank** with **Cards**, or edit the **Cards**.
 - b. Learning phase
 - i. User starts the game using selected **WordBank**.
 - ii. *Dukemon* prompts the questions, and user has to answer accordingly.
 - iii. *Dukemon* ends the game.
 - iv. User reviews performance from statistics page.

2. Summary of contributions

2.1. Major feature

WordBank Management

- **What it does:**

- Enables user to have a high level management for his *WordBanks* and *Cards* through CLI and GUI.

Is semi-automated by *Dukemon* to enhance user's learning experience.

Consists of four complementary distinct sections.

1. **WordBank's data structure and its storage system:**

Allows developers to use and extend this architecture to streamline their feature implementation.

Allows user to save and load their *WordBanks*.

Is implemented with a robust underlying **WordBankList** data structure, with its own **WordBankListStorage**, along with rich integration of **Model**, **Storage**, **Logic** and **UI** to synchronise its data.

2. **User Commands:**

Allows user to customise *Cards* / *WordBanks* through **CardCommands** / **WordBankCommands**.

3. **Drag and drop:**

Allows user to export their *WordBanks* out of their computer simply by dragging it out of *Dukemon*.

Likewise, it allows user to import a *WordBank* file from their computer by dragging it into *Dukemon*.

4. Revision *WordBank*:

Allows user to visit a centralised word bank that automatically collects cards for revision.
Cards that were answered wrongly are automatically added to this revision bank.
Likewise, cards that were answered correctly during game play are automatically removed from this revision bank.

- **Justification:**

- Well designed architecture and well implemented data structure streamlines integration and allows extension for features that builds on top of it. (*Statistics, Game, Settings*)
- Management system is essential for a self-typed flashcard app like *Dukemon*.
- Drag and drop accelerates the sharing of knowledge/notes with friends, thereby enhancing user experience.
- Revision *WordBank* improves the learning process by helping the user collate cards that requires revision.

- **Highlights:**

- There exists multiple ways to design and implement *WordBank* management. Throughout *Dukemon*'s development, it has been restructured and rewritten a few times before finally coming to how it is implemented now.
This was primarily because my teammate's features requires heavy and continuous integration with *WordBank*'s management. We came together twice every week to discuss how our features should be integrated with one another.
To best implement it, I spent considerable amount of effort to study different design patterns and architectural styles, such as *MVC (Model View Controller)*, *Observer Pattern*, *n-Tier Style*, *Event-Driven Style*, to realise the final design.
- Continual in-depth discussion with team member, Subbash, to find the best design to integrate user commands with his different modes.
- Discussed with team member, Paul, who is in-charge of UI, on *Observer Pattern* usage to display *Cards* and *WordBanks* that automatically update itself.
- Consulted team member, Jason, on how I can best leverage his *Statistics* feature to streamline my revision bank implementation.
- Learned and adapted *Callbacks* and *Functional Programming* into my drag and drop section to preserve the quality and structural integrity of the existing code base, from team member Yi Da.
- Individually sourced for proper online tutorials and online code references to implement drag and drop section, and design concepts such as *Observer Pattern* and *MVC* within *Cards* and *WordBanks*.

- **Credits:**

- Online resources
 - [\[JUnit 5\]](#) [\[JavaFX\]](#) [\[TestFX\]](#) [\[Jackson\]](#)
 - [\[Drag and drop JavaFX documentation\]](#) [\[Drag and drop video tutorial\]](#)

- [MVC framework in Ruby on Rails by Herbert]
- [Observer Pattern video explanation]
- Teammates
 - For their continual discussion, presence and support as mentioned in my highlights above.
- Tutors
 - For their unconditional effort in guiding us and providing us with valuable resources and feedback throughout *Dukemon*'s development.

2.2. Minor features

- Default WordBanks for new players
 - Implemented multiple user friendly word banks for user to try out. (pokemon, arithmetic, trivia, graph, cs2103t)
 - Created on the first launch of *Dukemon* (implemented through preferences file), and behaves like normal word bank. (Can be edited and removed)
 - Implemented the initialisation of required folders for related files automatically if not present.
- User experience centric messages
 - Played the game insane amount of times to design constructive feedback to display on the command box from the user perspective.
 - Developed user friendly command usage feedback that guides the user to using *Dukemon*.

2.3. Other contributions

- **Code contributed:**
 - Overall: [[All Commits](#)] [[RepoSense](#)] [[GitHub](#)]
 - Functional:
 - WordBank: [[WordBank](#)] [[WordBankList](#)]
 - Storage: [[WordBank storage](#)]
 - Commands: [[Card commands](#)] [[WordBank commands](#)]
 - Command parsers: [[Card command parser](#)] [[WordBank command parser](#)]
 - UI: [[Card display](#)] [[WordBanks display](#)]
 - Data for *Dukemon*: [[Default data](#)]
 - Tests:
 - Commands: [[Card command test](#)] [[WordBank command test](#)]
 - WordBank: [[WordBank storage test](#)]
 - Data for testing: [[WordBank test data](#)] [[WordBankList test data](#)]

- **Other contributions :**

- Discovered and fixed huge amount of bugs across different parts of *Dukemon*. [[Issues resolved](#)] [[Bugs fixed](#)]
- Project management:
 - Found members and formed the team. Went extra miles to bond everyone through fine details.
 - Heavily scrutinised ideas during early stage of idea development, inorder to develop a product idea that our team can fully believe in and dedicate effort.
 - Set up organisation repo, including issues, label and milestones.
 - Set up Netlify to improve workflow.
 - Took initiative to kick start the project by scheduling meetings.

- **Documentation:**

- Wrote a major chunk of User Guide's skeleton for my teammates (This does not include writing my own section within UG): [[UG update 1](#)] [[UG update 2](#)] [[UG update 3](#)]
- Studied and improved styling for team's UML diagrams. [[Style.puml](#)]

- **Community:**

- Reviewed PRs. (with positivity): [[TimeBook](#)] [[Jason's new command](#)] [[Yida's clean code](#)]
- Reported bugs for other teams in the class, in the form of GitHub issues. [[Njar](#)]

- **Tools:**

- [[JUnit 5](#)] for testing.
- [[JavaFX](#)] [[SceneBuilder](#)] for *Dukemon*'s UI.
- [[PlantUML](#)] for UML diagrams.
- [[Netlify](#)] for workflow improvement.

3. Contributions to the User Guide

Given below are sections I contributed to the User Guide. They showcase my ability to write documentation targeting end-users.

I will prioritise sections that contains diagrams to showcase my ability to engage the user.

4. WordBank management

4.1. Drag and drop

Streamlines the process of sharing of *WordBanks* with friends.



From **HOME** mode, you can view your *WordBanks*.

Simply drag and drop a *WordBank* json file from your computer into the *Dukemon* GUI.



Likewise, drag and drop a *WordBank* out of the application, into say, your desktop, or chat applications.

Try it!

NOTE

Dukemon only accepts json files when importing *WordBanks*. Attempting to import or export other types files will not be successful.

4.2. Revision WordBank

A revision bank is automatically updated for you, every time a game session ends. It collates all your wrong *cards*, whichever *WordBank* it may have came from. It is also smart enough to remove the *cards* if you have cleared it afterwards.

Quick look at revision bank's page.

The screenshot shows a dark-themed user interface for a revision bank. On the left, there's a sidebar with the title "revision" and three small circular icons. Below the title, it says "Played 0 times", "High Score: 0", and "Fastest Clear: -". The main area displays three cards:

- 1. 1024**
Medium
 $2^{\wedge}10 = ?$ [Word Bank: arithmetic]
- 2. 2103**
EZ
 $21 * 100 + 3 = ?$ [Word Bank: arithmetic]
- 3. Mewtwo**
psychic
Mew's clone [Word Bank: pokemon]

The revision bank is best appreciated when you actually play around with some *WordBanks*, and then visit the revision bank to revise wrong *cards*. Give it a try!

- Due to page limit constraints, I am unable to fully cover the breadth and depth of my User Guide's documentation.

Below are the links to my other contributions in User Guide. Do visit them for a better understanding of the breadth and depth of my effort and contribution.

- [\[Full documentation of Card commands\]](#) [\[Full documentation of WordBank commands\]](#)
- [\[Full command summary\]](#)

5. Contributions to the Developer Guide

Given below are sections I contributed to the Developer Guide. They showcase my ability to write technical documentation and the technical depth of my contributions to the project.

Due to page limit constraints, I will collate different UML diagrams across different sections that I have contributed.

A link to the full documentation will be included for each of the diagrams. Do visit them for a better understanding of the breadth and depth of my effort and contribution.

5.1. WordBank's data structure and its storage

WordBank's storage system integration.

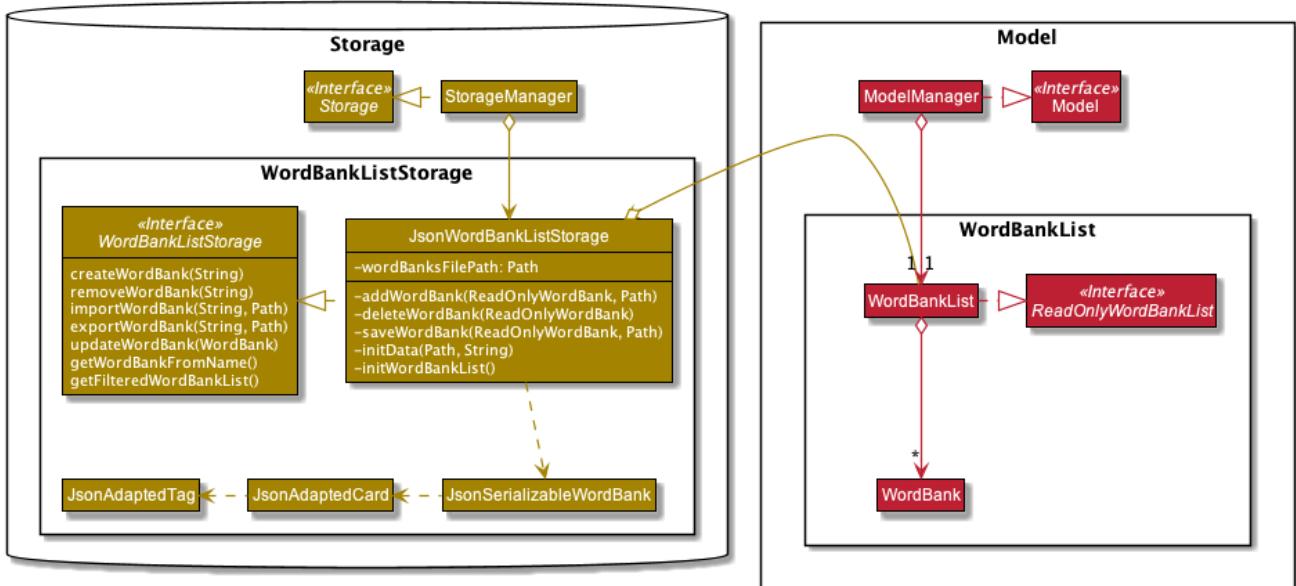


Figure 2. Integration of `WordBankList` within `Storage` and `Model`.

`WordBankListStorage` consists of robust methods in which developers can use and extend upon easily.

Alongside with `WordBank`'s data structure, they lay the foundation for the other complementary sections of `WordBank` Management.

On top of that, they serve as a essential foundation for Dukemon. As such, these data structures and methods were required by the team, to build individual features. (*Statistics, Game, Settings*)

- [Full documentation of `WordBank`'s data structure and its storage system]

5.2. User commands

Allows user to customise *Cards* and group them according to topics (*WordBanks*). User commands edits and manipulates *Cards* and *WordBanks* heavily.

NOTE As mentioned previously, user commands will extend and utilise `WordBank`'s data structure and storage heavily.
You can refer to it to enhance your understanding of this implementation.

Let us first introduce you how these commands are implemented and structured in `Logic`.

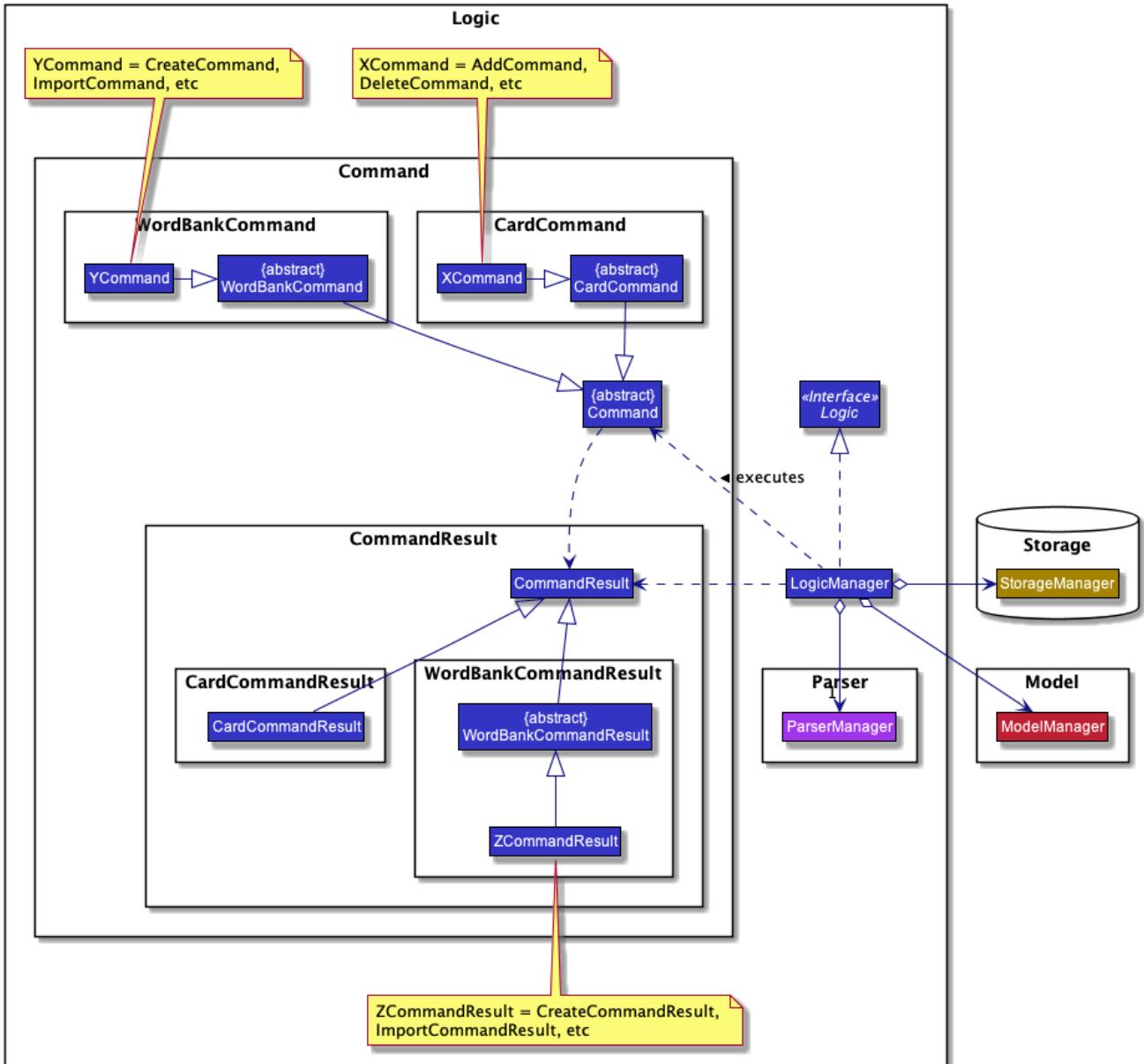


Figure 3. Overview class diagram of **Logic** with emphasis on **CardCommands** and **WordBankCommands**.

- [Full documentation of User Commands]

5.3. Drag and drop

Walkthrough - Drag in.

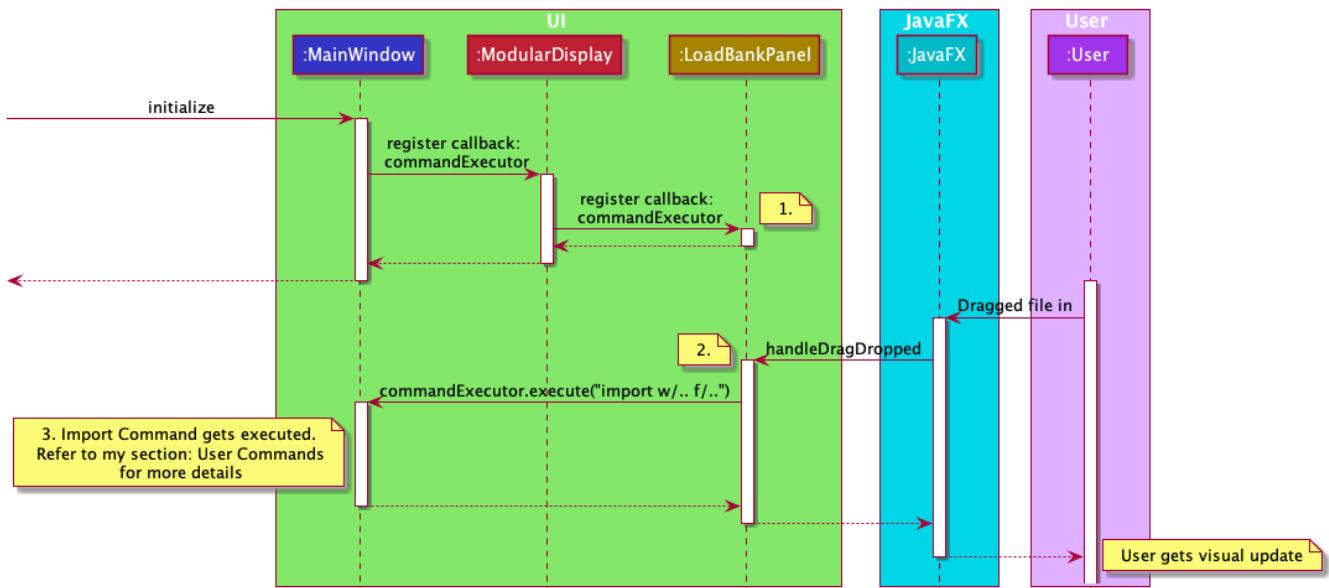


Figure 4. Sequence diagram showing how drag and drop utilises the `ImportCommand` and thus the `WordBank's storage`.

`LoadBankPanel` is the corresponding class and the FXML file that displays the `WordBanks` for the user.

It is deeply nested within `UI` and only has access to an `ObservableList<WordBank>`. This means it has no way to perform `commands`, update `model` or update `storage`.

1. To work around this, a functional callback is registered within `LoadBankPanel`.
2. `LoadBankPanel` registers JavaFX's UI drag detection and drag dropped methods, with the `callback`.
3. After which, the `callback` essentially performs an `ImportCommand`, to load the `WordBank`.

It is also noteworthy to mention that, dragging into Dukemon functionality is well guarded against:

- Not json file format.
- Json file but data in wrong format.
- Json file with correct format but contains duplicate *cards* within.

User receives apt feedback through the command box for different cases. This is possible with careful exceptions handling within the `ImportCommand` itself.

[Full documentation of Drag and drop]

5.4. Revision WordBank

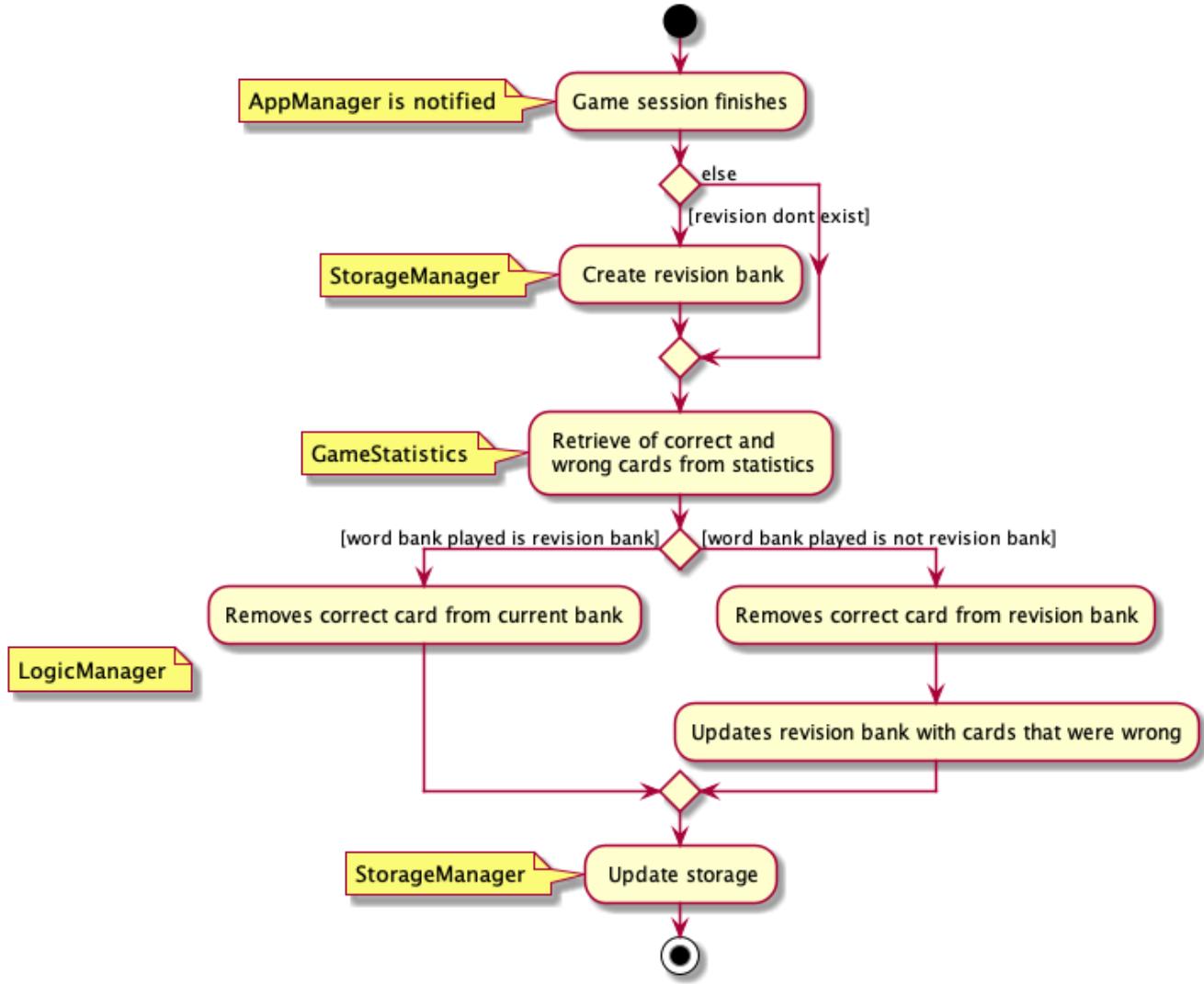


Figure 5. Activity diagram showing different scenarios possible while trying to update revision bank.

[\[Full documentation of Revision WordBank\]](#)

[\[Full documentation of entire WordBank Management Feature\]](#)

- Below are the links to my other contributions in Developer Guide. Do visit them for a better understanding of the breadth and depth of my effort and contribution.

- [\[Model\]](#) [\[Storage\]](#)
- [\[Design considerations\]](#)

6. More about me

- [\[GitHub\]](#) [\[LinkedIn\]](#)