Baymax - Developer Guide

Table of Contents

1. Introduction

Baymax is a desktop appointment manager made for clinic receptionists. It focuses on the Command Line Interface (CLI) while providing users with a simple and intuitive Graphical User Interface (GUI). Thus, the main interaction with Baymax will be done through user text-based commands.

Baymax allows receptionists to keep track of patients and appointments in a single, integrated platform.

The purpose of this Developer Guide is to help you understand the design and implementation of Baymax, so that you can become a contributor to this project as well.

2. Setting up, getting started

Refer to the guide *Setting up and getting started*.

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3. Design

In this section, you will learn about the general design and structure of the Baymax application. This section explains how each component in Baymax works individually. Baymax is created with the Object-Oriented Programming Paradigm in mind, and follows the Facade Pattern and Command Pattern in software design.

3.1. Architecture

The ***Architecture Diagram*** given above explains the high-level design of the App. Given below is a quick overview of each component.

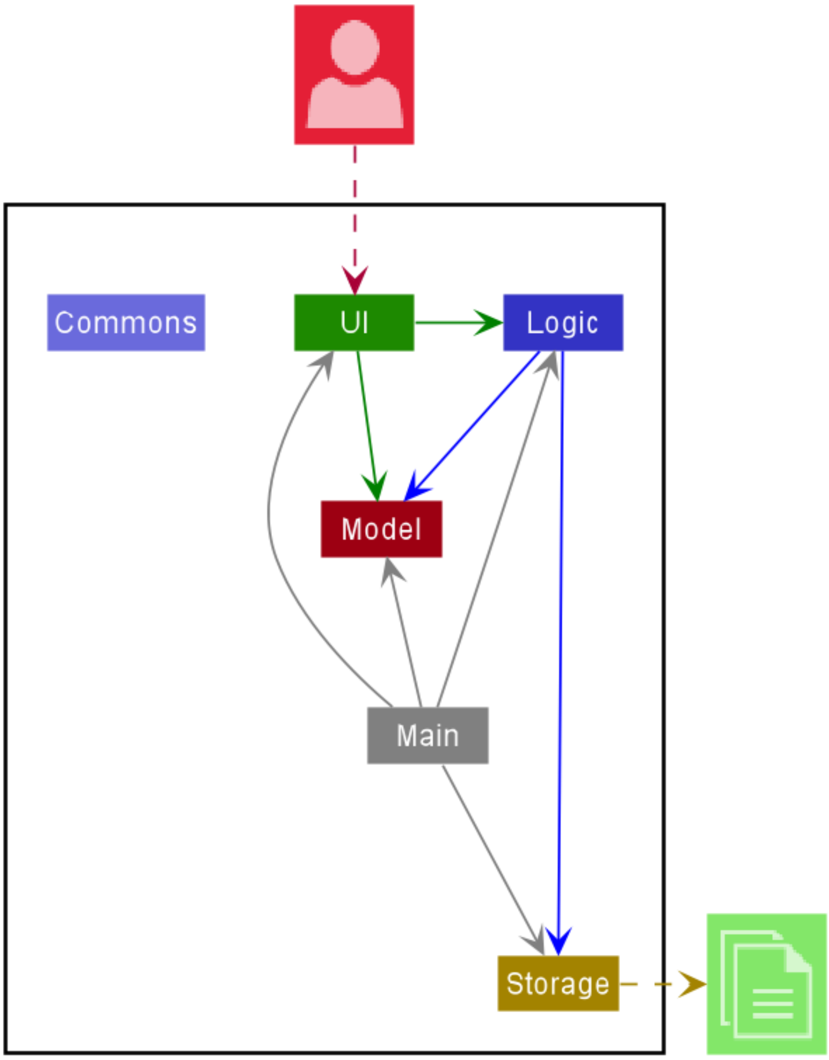


Figure 1. Architecture Diagram of Baymax

💡 **Tip:** The `.puml` files used to create diagrams in this document can be found in the diagrams folder. Refer to the *PlantUML Tutorial* at se-edu/guides to learn how to create and edit diagrams.

The following table provides a quick overview of each component of Baymax. More details about each individual component can be found in the following subsections.

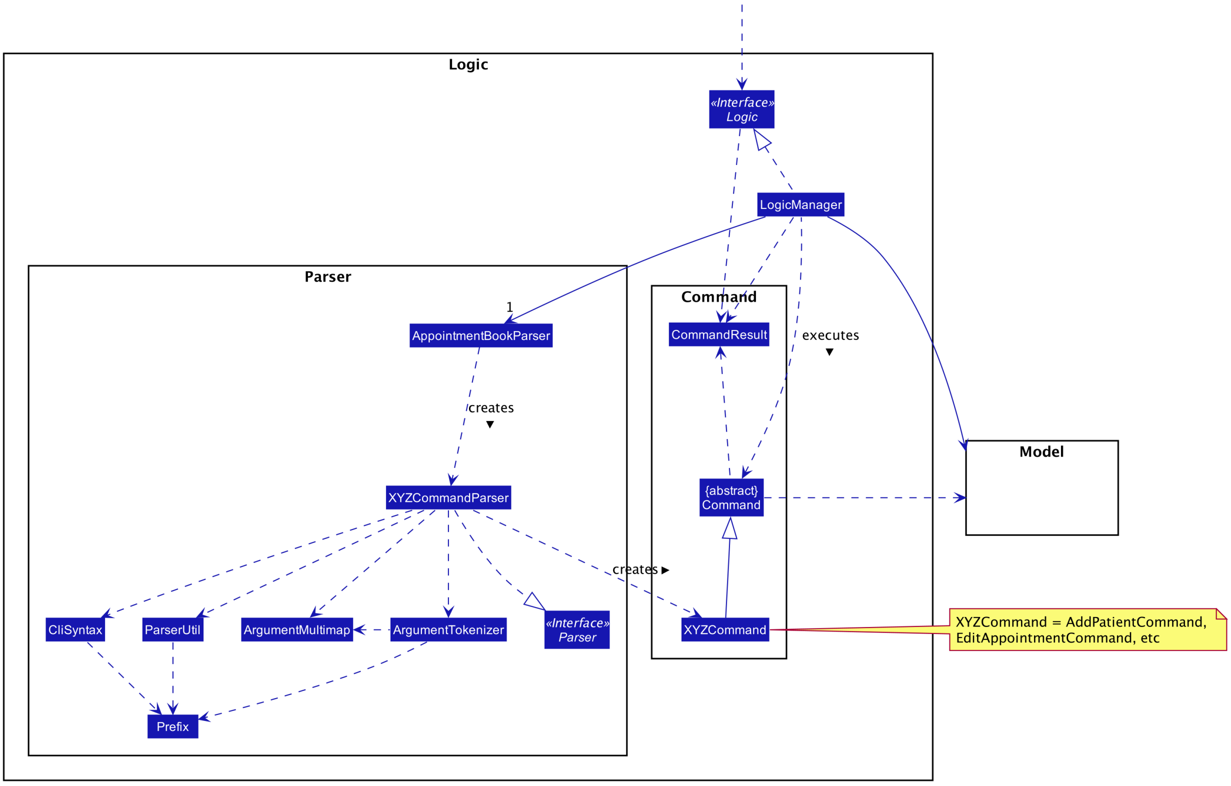
Component	Description
`Main`	Has two classes called Main and MainApp. It is responsible for: 1. At App launch: Initializes the components in the correct sequence, and connects them up with each other. 2. At shut down: Shuts down the components and cleanup resources where necessary.
`Commons`	Represents a collection of classes used by multiple other components. It also contains the LogCenter component. The LogCenter component plays an important role at the architectural level and is used by many classes to write log messages to the App's log file.
`UI`	Handles the UI of the App.

Component	Description
`Logic`	Executes commands.
`Model`	Holds the data of the App in memory.
`Storage`	Reads data from, and writes data to, the hard disk.

Each of the four components,

- defines its *API* in an `interface` with the same name as the Component.
- exposes its functionality using a concrete `{Component Name}Manager` class (which implements the corresponding API `interface` mentioned in the previous point.

For example, the `Logic` component (see the class diagram given below) defines its API in the `Logic.java` interface and exposes its functionality using the `LogicManager.java` class which implements the `Logic` interface.



XYZCommand = AddPatientCommand, EditAppointmentCommand, etc

Figure 2. Class Diagram of the Logic Component

How the architecture components interact with each other

The *Sequence Diagram* below shows how the components interact with each other for the scenario where the user issues the command `deleteappt 1`.

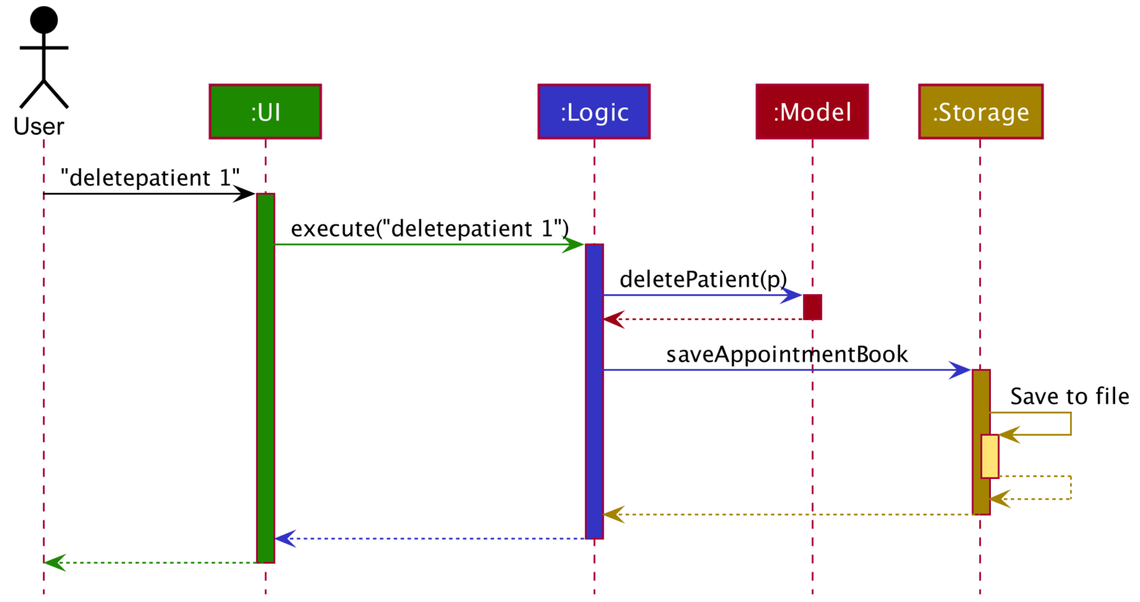


Figure 3. Architecture Sequence Diagram

The sections below give more details of each component.

3.2. UI component

(Contributed by Li Jianhan)

This segment will explain the structure and responsibilities of the `UI` component.

3.2.1. Structure

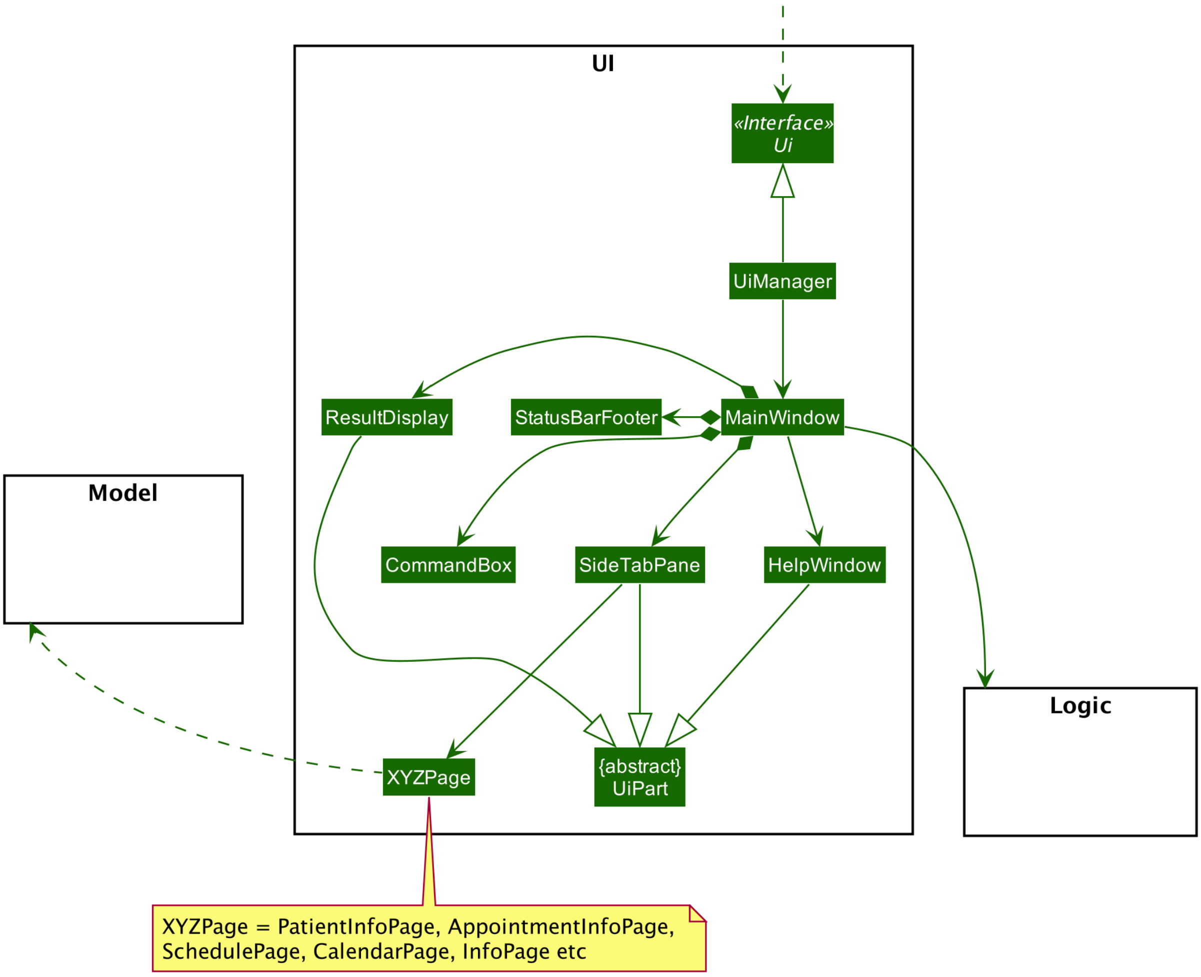


Figure 4. Structure of the UI component

API :
`Ui.java`

The `UI` component uses JavaFx UI framework. The layout of these UI parts are defined in matching `.fxml` files that are in the `src/main/resources/view` folder.

The UI consists of a `MainWindow` that is made up of parts such as `PatientListPanel`, `CalendarPage` as shown in the *Class Diagram* above. All these, including the `MainWindow`, inherit from the abstract `UiPart` class.

The `Page` is an abstract class that represents a page corresponding to each tab in the GUI. Each tab will display information on different features of Baymax. The following classes inherit from the `Page` abstract class:

- Dashboard
- PatientInfoPage
- AppointmentInfoPage
- CalendarPage
- InfoPage

3.2.2. Responsibilities

The `UI` component,

- Executes user commands using the `Logic` component.

- Listens for changes to `Model` data so that the UI can be updated with the modified data.

3.3. Logic component

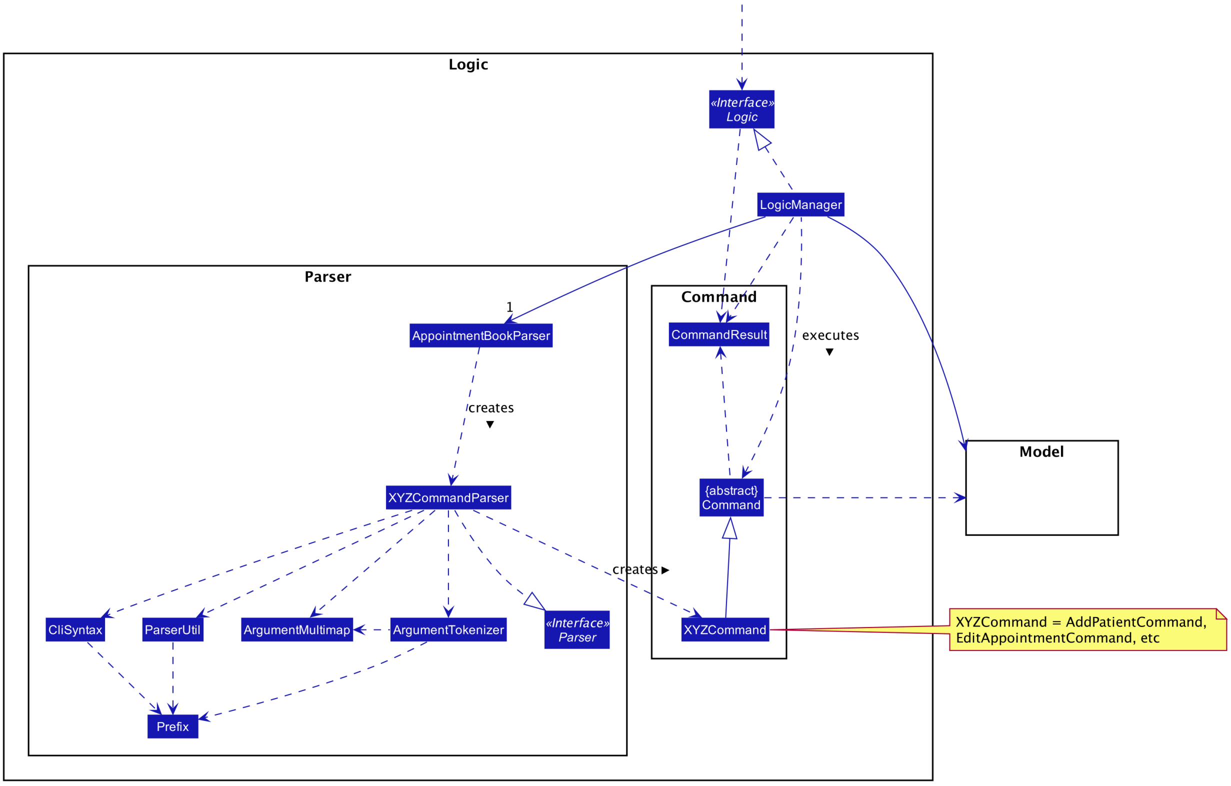


Figure 5. Structure of the Logic Component

API :
`Logic.java`

1. `Logic` uses the `AppointmentBookParser` class to parse the user command.
2. This results in a `Command` object which is executed by the `LogicManager`.
3. The command execution can affect the `Model` (e.g. adding a patient), which is executed by the `ModelManager` which calls `PatientManager` and `AppointmentManager`.
4. The result of the command execution is encapsulated as a `CommandResult` object which is passed back to the `Ui`.
5. In addition, the `CommandResult` object can also instruct the `Ui` to perform certain actions, such as displaying help to the user.

Given below is the Sequence Diagram for interactions within the `Logic` component for the `execute("deleteappt 1")` API call.

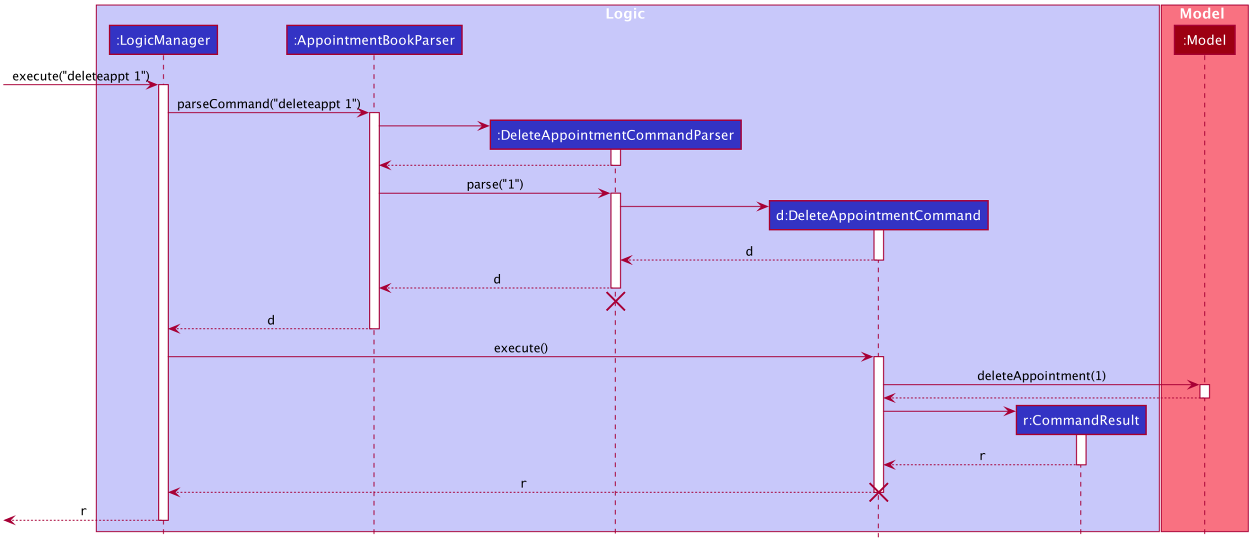


Figure 6. Delete Appointment Sequence Diagram

ℹ️ **Note:** The lifeline for `DeleteCommandParser` should end at the destroy marker (X) but due to a limitation of PlantUML, the lifeline reaches the end of diagram.

3.4. Model component

This segment will explain the structure and responsibilities of the Model component.

3.4.1. Structure

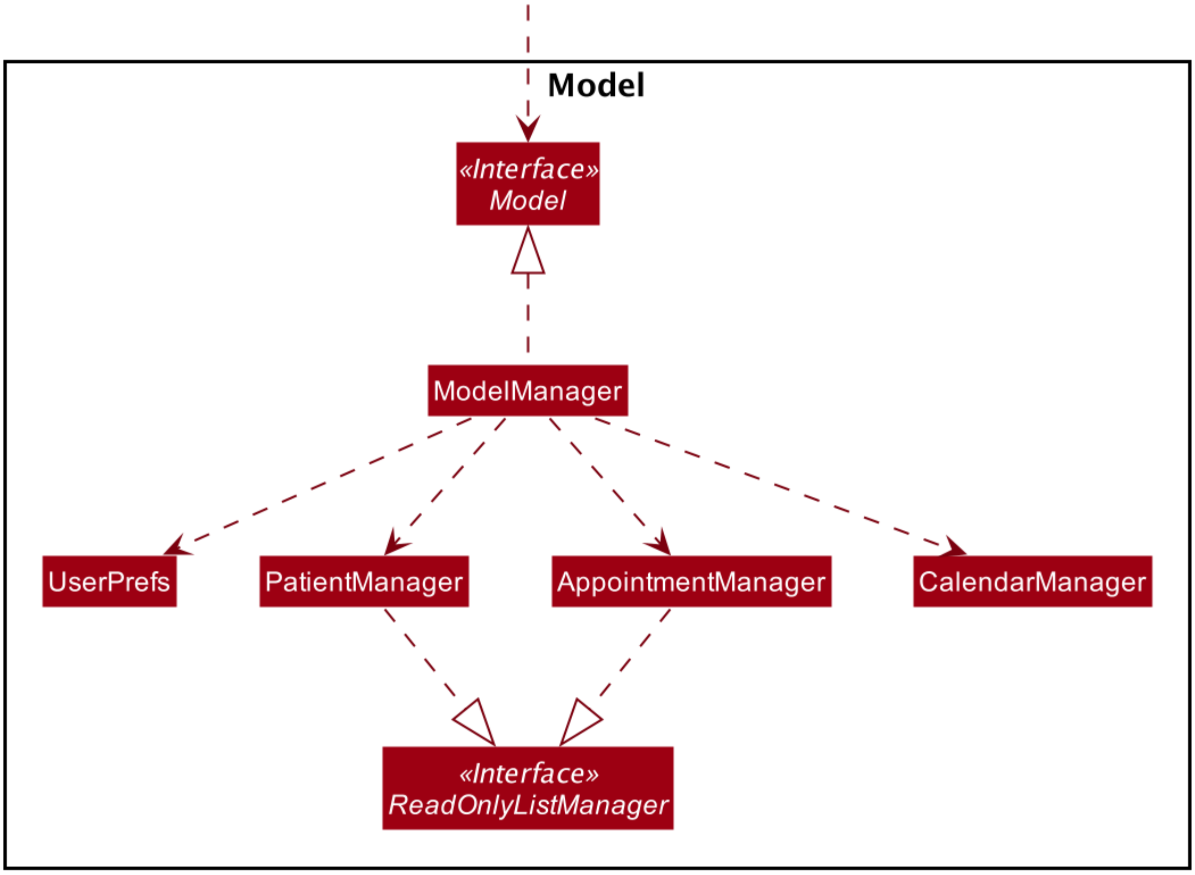


Figure 7. Structure of the Model Component

API : `Model.java`

The `Model` component contains `ListManager`s that handle two main types of data in Baymax, `Patient` and `Appointment`. Each type of data is handled by a separate `ListManager` (to give `PatientManager` and `AppointmentManager`), and a `ModelManager` facade class exposes the methods that enable other components to perform getting, setting, searching and editing functions on the different types of data.

The `Model` component also contains

- a `UserPref` object that represents the user’s preferences.
- unmodifiable `ObservableList` objects for each type of data that can be 'observed' e.g. the UI can be bound to this list so that the UI automatically updates when the data in the list change.

The `Model` component does not depend on any of the other three components.

3.4.2. Responsibilities

The `Model` component,

- Stores different types of data in memory when Baymax is running
- Represents data in `ObservableList` to automatically update the GUI when there is a change

3.5. Storage component

This segment will explain the structure and responsibilities of the Storage component.

3.5.1. Structure

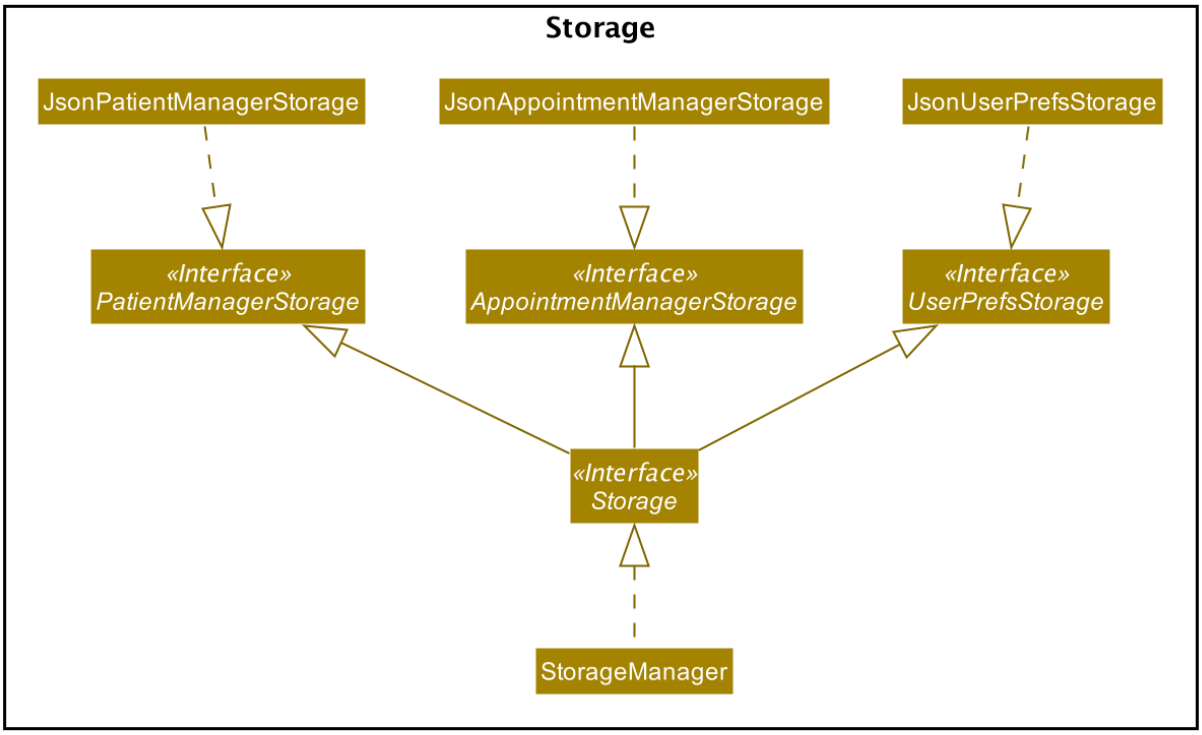


Figure 8. Structure of the Storage Component

API : `Storage.java`

The `Storage` component contains interfaces for `Patient` data (`PatientManagerStorage`) and `Appointment` data (`AppointmentManagerStorage`) which defines methods for reading and saving the `Model` components to memory. This allows for multiple different implementations of storage to store the data in different formats, e.g. json, csv, plaintext. A facade class `StorageManager` is used to expose these reading and writing methods.

The `JsonPatientManagerStorage` and `JsonAppointmentManagerStorage` are specific implementations of `PatientManagerStorage` and `AppointmentManagerStorage` that saves the `Patient` and `Appointment` data to json files. The path to these files are obtained from the `UserPref` object.

3.5.2. Responsibilities

The `Storage` component,

- can save `UserPref` objects in json format.
- can parse a json file in the correct format to get a `UserPref` object.
- can save `Patient` and `Appointment` data in json format.
- can parse a json file in the correct format to get a `PatientManager` or `AppointmentManager` object.

3.6. Common classes

Classes used by multiple components are in the `seedu.addressbook.commons` package.

4. Implementation

This section describes some noteworthy details on how certain features are implemented.

4.1 List Managers

(Contributed by Kaitlyn Ng)

List Managers allow the Baymax application to handle lists of the different types of data in the application, namely `Patient` and `Appointment`. `ListManager` defines methods for Create, Read, Update and Delete (CRUD) operations that are common to all the types of data, and needed to manage the lists of data effectively.

4.1.1 Rationale

The separation of `Patient` and `Appointment` data into separate ListManagers allow for a common software architecture between data types. Lists of data within the application can thus be handled more efficiently, and other types of data can be added to extend the application with minimal modification to the code.

4.1.2. Current Implementation

Each `ListManager`contains a `UniqueList` which is a generic class that stores all the data items in a list and and maintains the uniqueness of the data objects in the list while doing so. This ensures that in every `UniqueList`, there is only one of each object. The `UniqueList` class is a generic class that can only contain data items that extend the `UniqueListElement` interface, which ensures data items contain the necessary comparison functions for `UniqueList` to maintain uniqueness.

Each ListManager implements the `ReadOnlyListManager` interface. This interface has the `getReadOnlyList()` method which returns an `ObservableList` of data items, to be monitored by the GUI.

4.1.3. Design Consideration

Aspect: Separation into distinct list managers for each type of data.

Option 1: Split into separate lists (Current)

Pros:

- Increases modularity of the code by separating it into distinct sections to handle data whose operations do not often require interaction between them.
- Allows for more straightforward implementations in other components by ensuring each data type is handled with the class architecture.

Cons:

- A lot of boilerplate code for implementing the list managers as separate classes but with similar functionalities

Option 2: Store all the information in a single `DataManager`

Pros:

- Easier to implement, as only one manager class is needed.

Cons:

- Violates the Separation of Concerns principle, making it difficult to implement future extensions without significant change to other components.

Reason for choosing Option 1:

Sound design principles are key to ensuring that the program is bug-free, easily testable and easily extendable in the future. Option 1 increases modularity of the code to create more opportunities for module upgrade, reuse and independent development for each data type, limiting the amount of change needed to other components when there are changes in the `Model`. This will save time in the long run and reduce the possibility of introducing breaking bugs due to unnecessary dependencies between data types.

Aspect: Extract common CRUD operations with a generic class

Option 1: Extract common CRUD functionalities of the `ListManager`s into a single `UniqueList` class. The `ListManager`s will store data items in the `UniqueList` generic class and build on top of the generic CRUD operations from the class.

- Pros: Reduces amount of repeated code as all the lists of data essentially perform the same functions.

- Cons: Generics can be harder to comprehend, thus making it harder for other programmers to understand and use the component.

Option 2: Do not extract any common functionalities

- Pros: Easier for programmers to work on each code related to each data item completely separately, and implement methods specific to the data item in a more straightforward manner.

- Cons: Violates the Don't Repeat Yourself principle as there will be a lot of repeated CRUD operations.

Reason for choosing Option 1:
Following the Don't Repeat Yourself design principle will allow for more abstraction and less duplication in the code, which facilitates future extensions and reduce effort in maintenance and testing by reducing repeated code.

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4.2 Patient Manager

(Contributed by Thuta Htun Wai)

Baymax allows the user to manage patient information. A user can only deal with a single patient at any time. i.e. Only a single patient's information can be managed at one time. A user can:

- Add a new patient
- Delete an existing patient
- Edit a patient's details
- List all the patients in the system
- Find a patient by using a keyword from his/her name
- List all the appointments of a specific patient

=======

4.2.1 Rationale

The Patient Manager feature is included in Baymax because it is one of the core features of the application.
If the user wants to keep track of the patient's information, he/she has to record the details
of the patient and be able to look up a patient in the system easily.

4.2.2. Current Implementation

The `patient` package in the `Model` component contains the necessary information related to a patient.

When a user enters a valid command (Let's say the `addpatient` command), the parser classes parses the command word and the arguments and then creates an `AddPatientCommand` object. When the `AddPatientCommand` is executed, the new patient is added into the appointment book and a success message is printed in the results display box.

The following diagram shows what happens when a user enters an `addpatient` command.

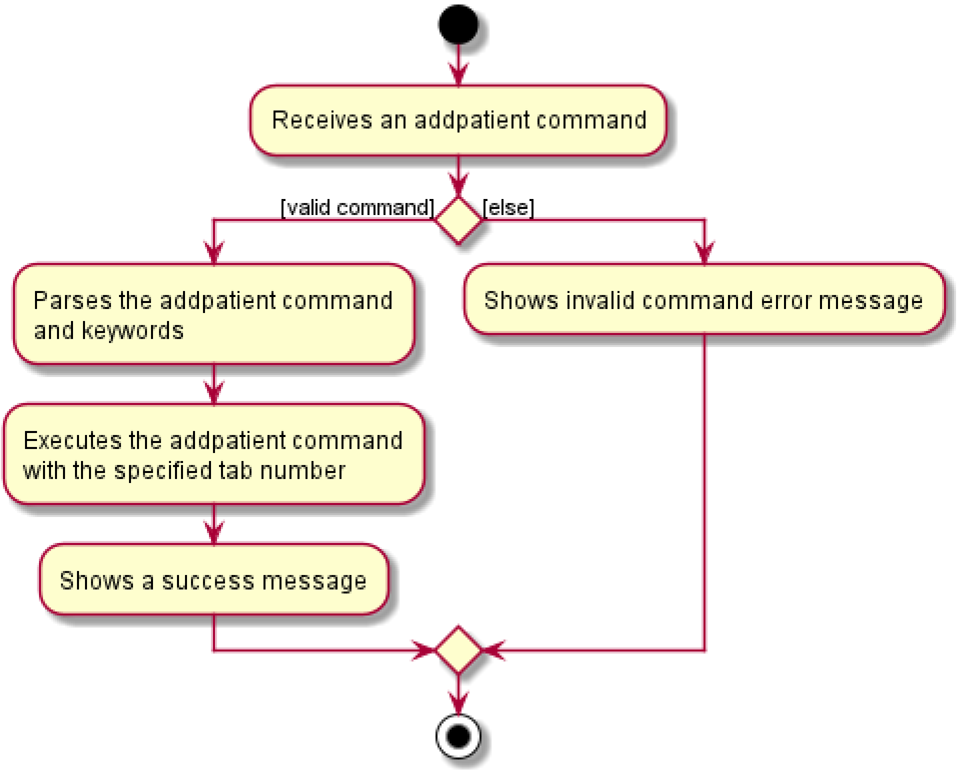
Receives an addpatient command
[valid command]
[else]
Parses the addpatient command and keywords
Shows invalid command error message
Executes the addpatient command with the specified tab number
Shows a success message

Figure 9. Workflow of an addpatient command

The following table shows the commands related to managing a patient's details.

Command	Purpose
`addpatient`	Adds a patient to the appointment book.
`deletepatient`	Deletes a patient.
`listpatient`	Lists all patients.
`editpatient`	Edits a patient's details.
`findpatient`	Finds a patient with the given search string (name).
`listpatientappts`	Lists all the appointments of a specific patient.

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4.2.3. Design Consideration

For all the commands except the `listpatientappts` command, the current implementation is the best we came up with in terms of following good coding principles and
making the user easily understand the commands.

As for the `listpatientappts` command, we decided not to continue this functionality from the `listappt` command in the `appointment` package. This is because we feel that it is better to have a separate class and a separate command word to list all the appointments of a specific patient instead of adding a new prefix keyword after `listappt` i.e `listappt by/PATIENT INDEX`.

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4.3 Appointment Manager

(Contributed by Shi Hui Ling & Reuben Teng)

Scheduling, viewing, and otherwise dealing with appointments is a key feature area for Baymax. `AppointmentManager` maintains a `UniqueList` of all `Appointment`s in the app, and executes the logic of most appointment commands.

`AppointmentManager` contains the methods necessary to operate on the `UniqueList` of `Appointment`s. These include:

1. Adding an appointment
2. Editing an appointment
3. Deleting an appointment
4. Finding a specific appointment by `Patient` and `DateTime`
5. Sorting the list of appointments

These methods are used by the `AppointmentCommand` classes to execute their logic.

4.3.1 Rationale

The `AppointmentManager` class contains a summary of all the "back-end" logic of appointment commands on the app's `UniqueList` of `Appointment`s. This follows the SRP, as everything related to the execution of appointment commands can be found here. This also forces the customising of code to fit exactly the purposes needed for appointment commands, even if the methods simply call a `UniqueList` method that fulfills the exact purpose.

4.3.2. Current Implementation

Makes use of many methods from `UniqueList`, e.g. `add`, `setElement`, `remove`, `sort`.

4.3.3. Design Consideration

Aspect 1: `deleteappt` Command

For this command, we only required the specifying of `DateTime` of the appointment and we allowed specifying the `Patient` by `name`, `nric`, or `index` (in the currently displayed list). This is to ensure that receptionists can opt for either a more intuitive way to specify a `Patient` (by `name` or `index`) or a quicker and more "guaranteed correct" way (by `nric`).

Additionally, we only require matching of `DateTime` and `Patient` of appointment as no two appointments should have those two fields exactly the same. By paring down the command's arguments to the minimum possible, we make the command more succinct and easy to use for receptionists. It is also easier implementation-wise.

Aspect 2: `nric` field

To ensure that `Appointment`s are json serialisable for `Storage` in the same way as `Patient`s, all fields of the `Appointment` class have to be serialisable. To achieve this, an `nric` field is added to each `Patient` to uniquely identify patients currently stored in the system. When serialising an `Appointment`, the patient field stores the `nric` string of the patient instead, and when reading an `Appointment` from memory a lookup is performed on the existing list of patients before a valid `Appointment` object is created containing an existing Patient object.

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4.3.2. Current Implementation

Makes use of many methods from `UniqueList`, e.g. `add`, `setElement`, `remove`, `sort`.

4.3.3. Design Consideration

done ?

Use activity diagram

deleteappt.

→ by index

→ by datetime and name

Aspect 1: `deleteappt` Command

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4.4 Calendar Feature

(Contributed by Li Jianhan & Kaitlyn Ng)

Baymax allows the user to manage appointments using a built-in calendar. Baymax is implemented in such a way that the application revolves around one central calendar. In the Calendar Manager, the user can set a particular year and month, following which any calendar-related commands entered will be with respect to that year and month.

4.4.1 Rationale

The Calendar feature is included in Baymax because it makes displaying appointments by date more intuitive. On top of that, it provides a visual view of appointments in a day relative to time, serving as a tool for helping the receptionist to avoid potential collisions in appointment timings. The calendar's month view also serves the purpose of giving a broad overview of how busy each day is in a month.

4.4.2. Current Implementation

The `CalendarManager` class in the `Model` component contains a `AppointmentCalendar` object, storing the currently set `year`, `month` and `day`. Note that the `year`, `month` and `day` attributes may not necessarily be storing the current year, month and day. Rather, it is dependent on what the user set them to. Hence, it follows that there should be setter methods inside the `CalendarManager` class that allow the user to change the value of those fields, so as to view all appointments relative to a particular year or month.

① mention add appt at time

② Influences schedule view

The following table shows the commands related to managing the appointment calendar.

Command	Purpose
`year`	Sets the calendar to a particular year. This defaults to the current year.
`month`	Sets the calendar to a particular month. At the same time, the calendar UI changes to reflect the data in the newly declared month. This defaults to the current month.
`day`	Sets the calendar to a particular day. At the same time, the calendar UI changes to reflect a list of appointments on this day. This defaults to the current day of the month.

4.4.3. Design Consideration

Aspect: the necessity of a day view

Option 1: Necessary (Current)

- Pros: User is able to see all appointments on a particular day, in chronological order. This gives the receptionist better clarity of which other appointments are booked on that day. Thus, it will lead to better user experience.
- Cons: More difficult to implement as another view needs to be implemented which adds to the complexity of the application.

Option 2: Not necessary

- Pros: User can simply find appointments by date to list out all appointments on that day. This is much easier to implement, and also means less commands to remember since it can be grouped under a find command.
- Cons: It is less intuitive and requires longer commands.

Reason for choosing Option 1:

- Having a day view in the calendar allows the user to zoom in to a particular day, and hence makes the calendar more complete.
- Having a chronological view of the appointments in a day allows the receptionist to spot timing collisions, and hence schedule appointments more efficiently.

5. Documentation

- Documentation guide

- Configuration guide

6. Testing

- Testing guide
- Logging guide

7. Dev Ops

- DevOps guide

Appendix A: Product scope

(Contributed by Thuta Htun Wai)

Target user profile:

- needs to manage significant number of patients and appointments
- wants to keep track of patients and appointments efficiently
- wants to look up patients and/or appointments easily by using matching words
- wants to look at current and past appointments through a calendar view
- prefers desktop apps over other types
- can type fast
- prefers typing to mouse interactions
- is reasonably comfortable using CLI apps

Value proposition:

- A handy tool for clinic staff, especially the receptionists, to deal with a large amount of patient information and their appointments.
- Baymax can manage patient information and appointments better than a typical mouse driven medical appointment management app.

Appendix B: User stories

(Contributed by Kaitlyn Ng)

Priorities: High (must have) - `* * *`, Medium (nice to have) - `* *`, Low (unlikely to have) - `*`

Priority	As a …	I want to …	So that I can…
`* * *`	forgetful receptionist of a clinic	display all available commands	refer to the list of commands when I forget them
`* * *`	receptionist of a clinic	add a new patient	
`* * *`	receptionist of a clinic	list out all patients	
`* * *`	receptionist of a clinic	add a patient's contact information	contact them if needed

Priority	As a …	I want to …	So that I can…
`* * *`	receptionist of a clinic	add a patient's emergency contact information	contact the patient's family members in times of emergencies
`* * *`	receptionist of a clinic	view a patient's profile	
`* * *`	receptionist of a clinic	delete a patient profile	
`* * *`	receptionist of a clinic	add an appointment for a patient	
`* * *`	receptionist of a clinic	list a patient's appointment history	keep track of it in case of future reference (like to track patient's medical progress through frequency of appointments)
`* * *`	receptionist of a clinic	list a patient's future appointments	remind them of the appointments that they have made
`* * *`	receptionist of a clinic	delete an existing appointment	remove cancelled appointments
`* *`	busy receptionist of a clinic	find patients by name	quickly retrieve the patient's information given just the patient's name
`* *`	receptionist of a busy clinic	find patient by NRIC	find patients using a unique ID if there are multiple patients with the same name
`* *`	receptionist of a clinic using the app for the first time	clear all current patient data	get rid of sample/experimental data I used for exploring the app
`* *`	receptionist of a clinic with busy patients	change a patient's appointment date	accommodate for last-minute changes in the patient's schedule
`* *`	receptionist of a clinic	delete all existing appointments of a patient	change all of a patient's appointments in the case of recovery or a serious change in medical condition
`* *`	receptionist of a clinic	mark an appointment as missed	keep track of which appointments did not occur due to various circumstances, and possibly arrange for other appointments in its place
`*`	receptionist of a patient-centric clinic	add preferred but currently unavailable slots for patient's appointments	give patients their more preferred slot if it is becomes available
`*`	careless receptionist in the clinic	undo appointment deletion	restore appointments that I accidentally delete
`*`	careless receptionist in the clinic	backdate an appointment	add in appointments that I accidentally missed out

Priority	As a …	I want to …	So that I can…
`* *`	receptionist of a clinic	view all the coming appointments in a particular year	have a gauge of the business of the clinic over that year
`* *`	receptionist of a clinic	display daily availability status of a month	
`* *`	receptionist of a clinic	display the coming appointments in the next n days	gauge the business of the clinic in the next few days
`* *`	receptionist of a clinic	display all the appointments on a particular day	check the availability of the clinic on that day to arrange for other appointments
`*`	receptionist of a clinic using the app for the first time	see sample data in the app	visualise how the app looks like when it is in use and interact with existing data

Appendix C: Use cases

(Contributed by Li Jianhan)

For all use cases below, the **System** is `Baymax` and the **Actor** is the `user`, unless specified otherwise.

Patient Profile Management

> **Use case: Edit a patient’s profile**

MSS

1. User requests to displays the patient’s profile

2. Baymax displays the patient profile

3. User requests to edit the patient’s profile

4. Baymax saves the changes

   Use case ends.

Extensions

- 1a. Patient does not exist

  - 1a1. Baymax displays a not found message

  Use case ends

- 2a. The given user ID is invalid

  - 2a1. Baymax displays an error message

Use case ends.

> **Use case: Delete a patient’s profile**

MSS

1. User requests to display the patient’s profile

2. Baymax displays the patient's profile

3. User requests to delete the patient’s profile

4. Baymax deletes the patient profile

   Use case ends.

Extensions

- 1a. Patient does not exist

  - 1a1. Baymax displays a not found message

  Use case ends

- 2a. The given user ID is invalid

  - 2a1. Baymax displays an error message

  Use case ends.

Appointment Management

> **Use case: Change the date of an appointment**

MSS

1. User requests to display an appointment

2. Baymax displays the requested appointment

3. User requests to change the date of appointment

4. Baymax changes the date of the appointment

   Use case ends.

> **Use case: Delete an appointment on a particular day**

MSS

1. User requests to list out all appointments on a particular day

2. Baymax displays the appointments

3. User requests to delete the appointment

4. Baymax deletes the appointment

   Use case ends.

Calendar

> **Use case: List all appointments on a particular day**

MSS

1. User requests to set the calendar to a particular year

2. Baymax calendar switches to the stipulated year

3. User requests to set the calendar to a particular month

4. Baymax calendar switches to the stipulated month in the given year

5. User requests to list all appointments on a given day in that month

6. Baymax displays a list of appointments on that given day

   Use case ends.

> **Use case: List all appointments in the next *n* days**

MSS

1. User requests to set the calendar to a particular year

2. Baymax calendar switches to the stipulated year

3. User requests to set the calendar to a particular month

4. Baymax calendar switches to the stipulated month in the given year

5. User requests to list all appointments in the next 7 days

6. Baymax displays a list of appointments in the next 7 days

   Use case ends.

{More to be added}

Appendix D: Non-Functional Requirements

(Contributed by Shi Hui Ling))

Technical Environment

- Application should work on any mainstream OS as long as it has Java 11 or above installed.
- Application should work without requiring an installer.
- Application should not depend on a remote server or other remote resources.
- Application should work without an online connection.

- Application should work on both 32-bit and 64-bit environments.

Performance

- Application should be able to save and load 200 patients’ worth of data without any noticeable delay in performance.
- Application should respond within 2 seconds to all commands.

Quality

- A user with above-average typing speed for regular English text should be able to accomplish most of the tasks faster by typing commands than using the mouse.
- Application should be easy to use for a new user when following the User Guide or `help` instructions.
- Application should have a user-friendly graphical user interface and display.

Data

- Application data should load correctly on any mainstream OS given the data file is transferred properly.
- Application data should never be lost or removed except when user explicitly deletes something.

Project Scope

- Application is not required to handle detailed medical information about patients.
- Application is not required to handle the printing of patient profiles or saving them in a user-friendly manner (only displaying).
- Application is not required to handle multiple users.

Process

- The project is expected to adhere to a schedule that delivers a feature set every two weeks.

Extensibility & Documentation

- Application should be easily extended by developers looking to improve or expand it.
- Application should be well-documented such that new developers can be on-boarded quickly just by reading through documentation.

Appendix E: Glossary

(Contributed by Reuben Teng)

UI

- Abbreviation for User Interface, representing the point of human-computer interaction and communication.

API

- Abbreviation for Application Programming Interface, which defines interactions between multiple software intermediaries.

OOP

- Abbreviation Object-Oriented Programming, in which programmers organise software design around data (objects), rather than functions and logic.

CLI

- Abbreviation for Command Line Interface, referring to an interface which accepts user inputs and commands in the form of text.

MSS

- Abbreviation for Main Success Scenario, describing the most straightforward interaction for a given use case, which assumes that nothing goes wrong.

OS

- Abbreviation Operating System, referring to mainstream Operating Systems Windows, Linux, OS-X.

Private contact detail

- A contact detail that is not meant to be shared with others.

Boilerplate code

- Code that is reused without significant changes. Usually a sign of poor coding practices.

Separation of Concerns principle

- Principle of separating code into different sections, with each section handling a different concern. This allows for

a more modular approach to implementation, with changes to one section not affecting another.

Appendix F: Instructions for manual testing

Given below are instructions to test the app manually.

ℹ️ **Note:** These instructions only provide a starting point for testers to work on;
testers are expected to do more *exploratory* testing.

Launch and shutdown

1. Initial launch

    i. Download the jar file and copy into an empty folder

    ii. Double-click the jar file Expected: Shows the GUI with a set of sample contacts. The window size may not be optimum.

2. Saving window preferences

    i. Resize the window to an optimum size. Move the window to a different location. Close the window.

    ii. Re-launch the app by double-clicking the jar file.

    Expected: The most recent window size and location is retained.

3. *{ more test cases … }*

Deleting a patient

1. Deleting a patient while all patients are being shown

    i. Prerequisites: List all patients using the `list` command. Multiple patients in the list.

    ii. Test case: `delete 1`

        Expected: First contact is deleted from the list. Details of the deleted contact shown in the status message. Timestamp in the status bar is updated.

    iii. Test case: `delete 0`

        Expected: No patient is deleted. Error details shown in the status message. Status bar remains the same.

    iv. Other incorrect delete commands to try: `delete`, `delete x`, `...` (where x is larger than the list size)

        Expected: Similar to previous.

2. *{ more test cases … }*

Saving data

1. Dealing with missing/corrupted data files

    i. *{explain how to simulate a missing/corrupted file, and the expected behavior}*

2. *{ more test cases … }*