Developer Guide

Acknowledgements

- The structure of this Developer Guide is inspired by AB-3.

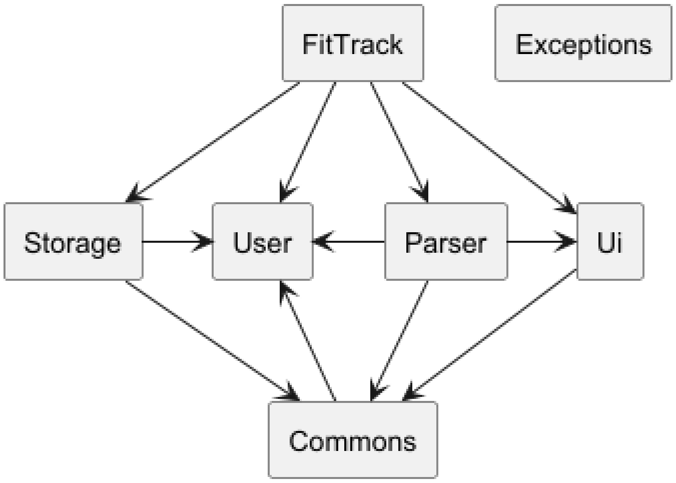
Setting up, getting started

First , **fork** this repo, and clone the fork into your computer.

1. **Configure the JDK**: Follow the guide [se-edu/guides] IDEA: Configuring the JDK to ensure Intellij is configured to use **JDK 17**.
2. **Import the project as a Gradle project**: Follow the guide [se-edu/guides] IDEA: Importing a Gradle project to import the project into IDEA.
3. Verify the setup: (i) Run the FitTrack.Main and try a few commands like `help` . (ii) Run the tests to ensure that all of it pass.

Design & implementation

Software Architecture



The Architecture Diagram shown above depicts the high-level design of the FitTrack CLI application.

FitTrack is the main class and entry point of the application. It manages high level functionalities by coordinating the four main classes:

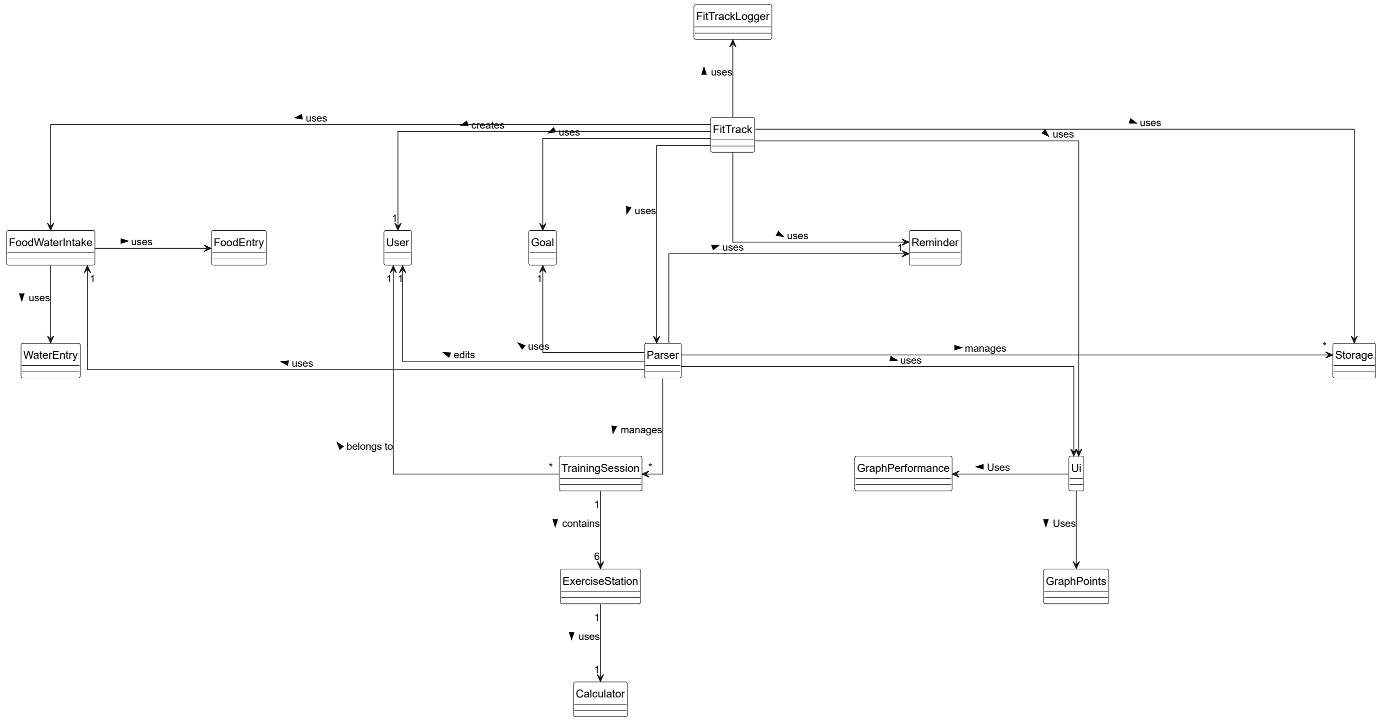
Class	Functionality
Storage	Manages saving and loading data from a persistent storage file
User	Records the user’s information, such as age and gender, and provides methods to modify or retrieve this data
Parser	Handles parsing of user input, converting it into commands and actions
Ui	Handles user interaction and CLI output, printing messages and data to the console

Commons and **Exceptions** represent a collection of lower level Classes and Exceptions used by the main classes above. **Commons** classes are as follows:

Class	Functionality
FitTrackLogger	Manages logging for the application, ensuring errors and important events are properly recorded
TrainingSession	Represents a single training session, including exercises and metadata (e.g. date and description)
Exercise	Represents different types of exercises available in the application, like pull-ups or shuttle runs
Calculator	Look up points achieved by user based on age, gender and performance result of each exercise station
GraphPoints	Illustrates the cumulative points earned across sessions, showcasing overall fitness progress and achievements.
GraphPerformance	Visualises performance metrics for a specific exercise, adapting for time-based or rep-based tracking.
Reminder	Allows users to set reminders to be track deadlines and upcoming events.
Goal	Allows users to set, list, and delete specific goals related to fitness and overall well-being
FoodWaterIntake	Allows users to add, view, and delete water and food intake logs to monitor daily hydration levels

The following Class Diagram elaborates on the interactions between major classes and their multiplicities.

Overall Class Diagram



Features

Storage

Storage Overview

The `Storage` class handles the reading and writing of data for the application, interacting with various objects such as `TrainingSession` , `Goal` , `Reminder` , `FoodEntry` , and `WaterEntry` . The data is saved in a file located at `data/saveFile.txt` , with functionality to initialize the save file, load data from it, and update the file with the latest information. Below is a breakdown of the methods used for these tasks:

1. Initializing the Save File

The `initialiseSaveFile()` method ensures that the necessary directory and save file exist. If the "data" directory or "saveFile.txt" file is not found, the method attempts to create them. If successful, a message is logged confirming the creation of the new save file or the access to an existing one. This method also asserts that the file exists after the initialization.

- **Helper Functions:**
    - `Files.createDirectories(dirPath)` : Creates the necessary directory for the save file.
    - `file.createNewFile()` : Creates the save file if it doesn't already exist.

2. Loading the Save File

The `loadSaveFile(ArrayList<Saveable> loadList)` method reads the save file and populates the provided list (`loadList`) with objects that are deserialized from the file. It uses a `Scanner` to read the file line by line. Each line corresponds to a serialized object (such as `TrainingSession` , `Goal` , or `Reminder`), and the method delegates the parsing to the `createSaveableFromString(String saveString)` method, which identifies the type of object based on the prefix of the line.

- **Helper Functions:**
    - `createSaveableFromString(String saveString)` : This method inspects the prefix of each line in the save file and
    - creates the appropriate object by invoking the `fromSaveString` method of the corresponding class
    - (e.g., `TrainingSession.fromSaveString(saveString)`).
    - `Scanner` : Reads the file content line by line.

3. Updating the Save File

The `updateSaveFile()` method writes the latest data to the save file. It serializes objects from the provided lists (`sessionList` , `goalList` , `reminderList` , and `foodWaterList`) and writes each object's string representation to the save file. It ensures that the lists are non-null before attempting to write, and for each object, it calls the `toSaveString()` method to retrieve the string representation. After each entry, a newline is added to separate entries. The method uses `FileWriter` to perform the writing operation.

- **Helper Functions:**
    - `toSaveString()` : Called for each object to retrieve its serialized string representation.
    - `FileWriter` : Writes the serialized data to the save file.

4. Error Handling and Logging

Throughout these operations, appropriate error handling is implemented. If the save file cannot be found or created, or if an invalid data format is encountered during loading, an exception is thrown or logged. For instance, `InvalidSaveDataException` is thrown if an unrecognized descriptor is found in the save file. Additionally, the `LOGGER` object is used extensively to log the success or failure of various operations, providing insight into the application's file handling processes.

Sequence of Events for Each Operation

1. **Initialization of Save File:**
    - The method checks for the existence of the directory and file.
    - If they do not exist, it creates them and logs the event.
    - If successful, the method ensures the file exists with an assertion.
2. **Loading Data from Save File:**
    - The method initializes a `Scanner` to read the save file.
    - For each line, it calls `createSaveableFromString()` to convert the line into an appropriate object.
    - Each object is added to the `loadList` .
    - On success, a message is logged indicating successful loading.
3. **Saving Data to File:**
    - The method iterates through each list (`sessionList` , `goalList` , `reminderList` , `foodWaterList`).
    - For each object in the list, it calls `toSaveString()` to convert the object to a string representation.
    - The string is written to the save file using `FileWriter` .
    - After each entry, a newline character is added.
    - The process concludes with a log indicating that the file has been successfully updated.

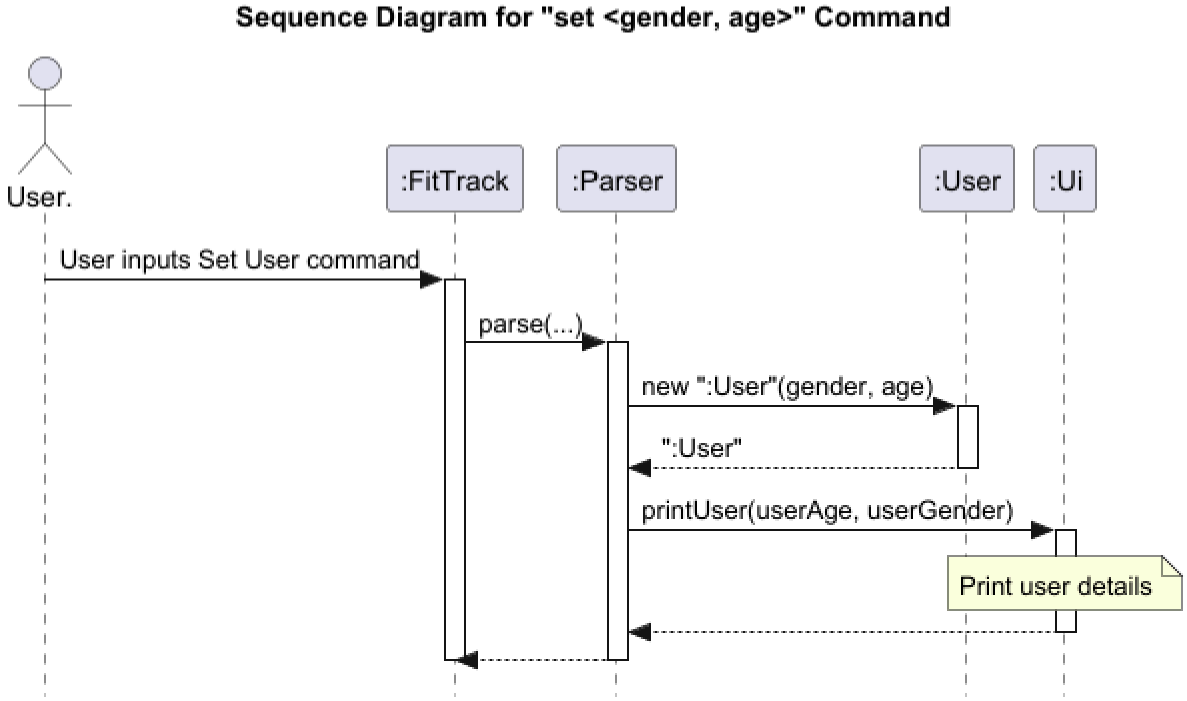
This system provides an efficient and reliable way to persist and retrieve application data, ensuring data integrity and ease of maintenance.

Set User

When the application starts up, it will prompt the user for their gender and age via the Set User feature. Their input is processed by Parser and stored in a newly created instance of the User class, which is assigned to the object "user". Upon successful setting of the gender and age fields, a confirmation of the user's gender and age will be printed in the CLI via the Ui class.

If the user wants to update their age or gender after the initialization process, they can set it again at any time by calling the "set" command. This performs the same operations, re-instantiating the "user" object with a new User instance with the updated details.

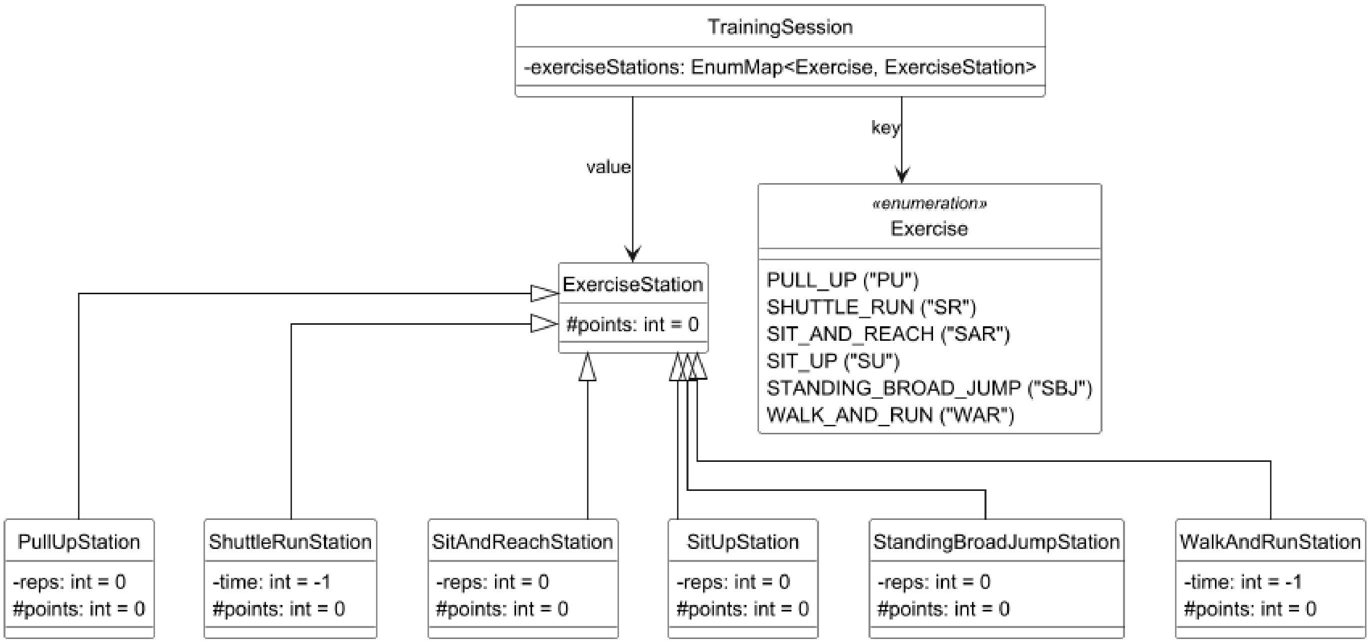
The sequence diagram for this process is shown below.


Sequence Diagram for "set <gender, age>" Command
User.
:FitTrack
:Parser
:User
:Ui
User inputs Set User command
parse(...)
new ":User"(gender, age)
":User"
printUser(userAge, userGender)
Print user details

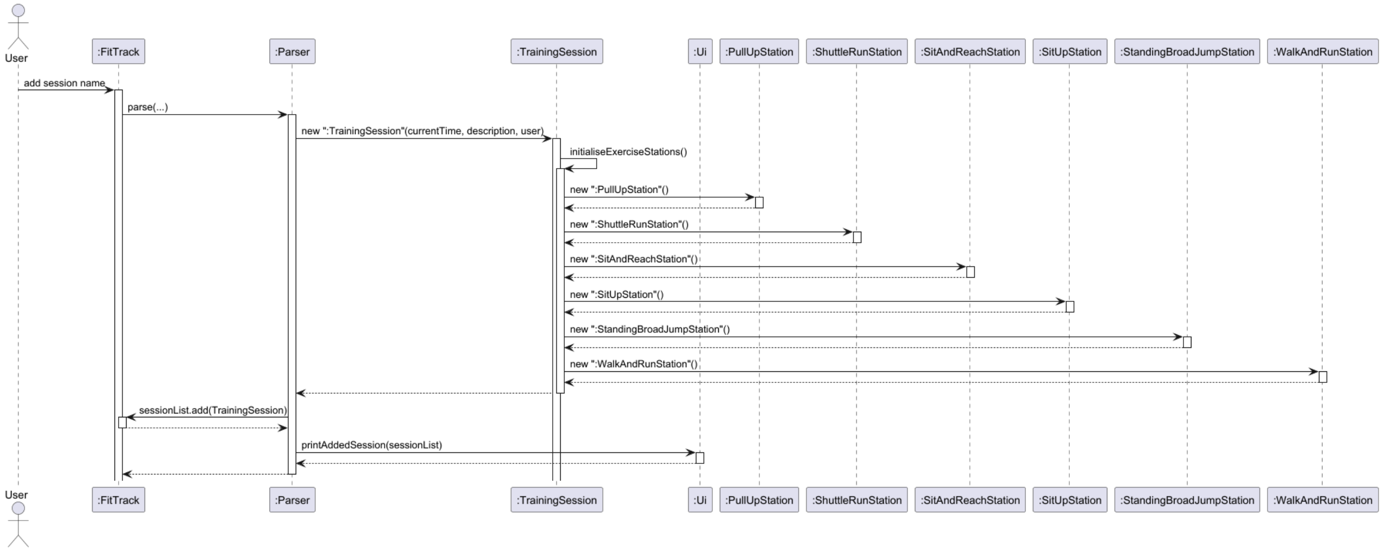
Add Training Session

1. Class Interaction Overview

When the user adds a new training session, an instance of the `TrainingSession` class is created. This instance initializes an EnumMap, which instantiates the 6 `ExerciseStation` child classes with their initial values. Below is a class diagram showing the EnumMap after an instance of `TrainingSession` is created.



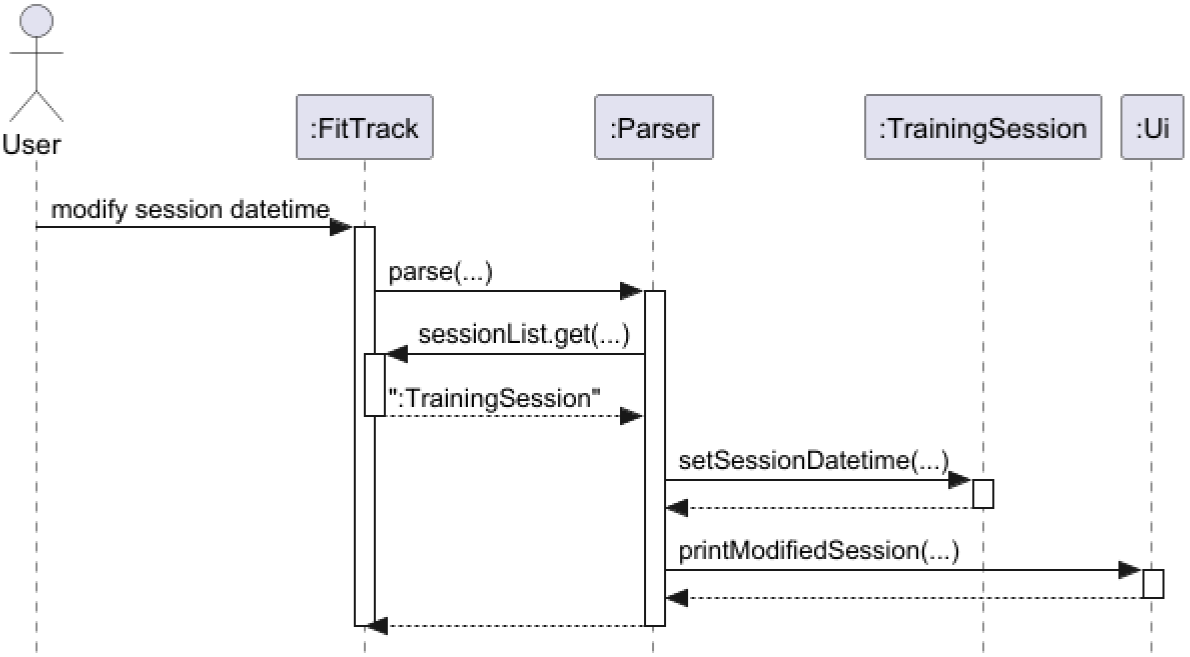
2. Sequence of Events


User
:FitTrack
:Parser
:TrainingSession
:Ui
:PullUpStation
:ShuttleRunStation
:SitAndReachStation
:SitUpStation
:StandingBroadJumpStation
:WalkAndRunStation
add session name
parse(...)
new ":TrainingSession"(currentTime, description, user)
initialiseExerciseStations()
new ":PullUpStation"()
new ":ShuttleRunStation"()
new ":SitAndReachStation"()
new ":SitUpStation"()
new ":StandingBroadJumpStation"()
new ":WalkAndRunStation"()
sessionList.add(TrainingSession)
printAddedSession(sessionList)

1. **User inputs the add command**: The User initiates the "add " command by calling Parser with the appropriate input.
2. **Instantiation of TrainingSession**: The Parser creates a new TrainingSession object with the current time, description, and user.
3. **Instantiation of Exercise Stations**: Within TrainingSession class, all 6 subclasses of exercise stations are instantiated.
4. **UI Interaction**: The Parser calls Ui.printAddedSession(sessionList), which: (i) Begins a UI segment (ii) Prints a session message (iii) Prints the description of the last added session (iv) Calls printSessionCount to show the total count (v) Ends the segment.
5. Refer to Section on Edit Exercise and Point Calculation for specific implementation of performance metric and point conversion.

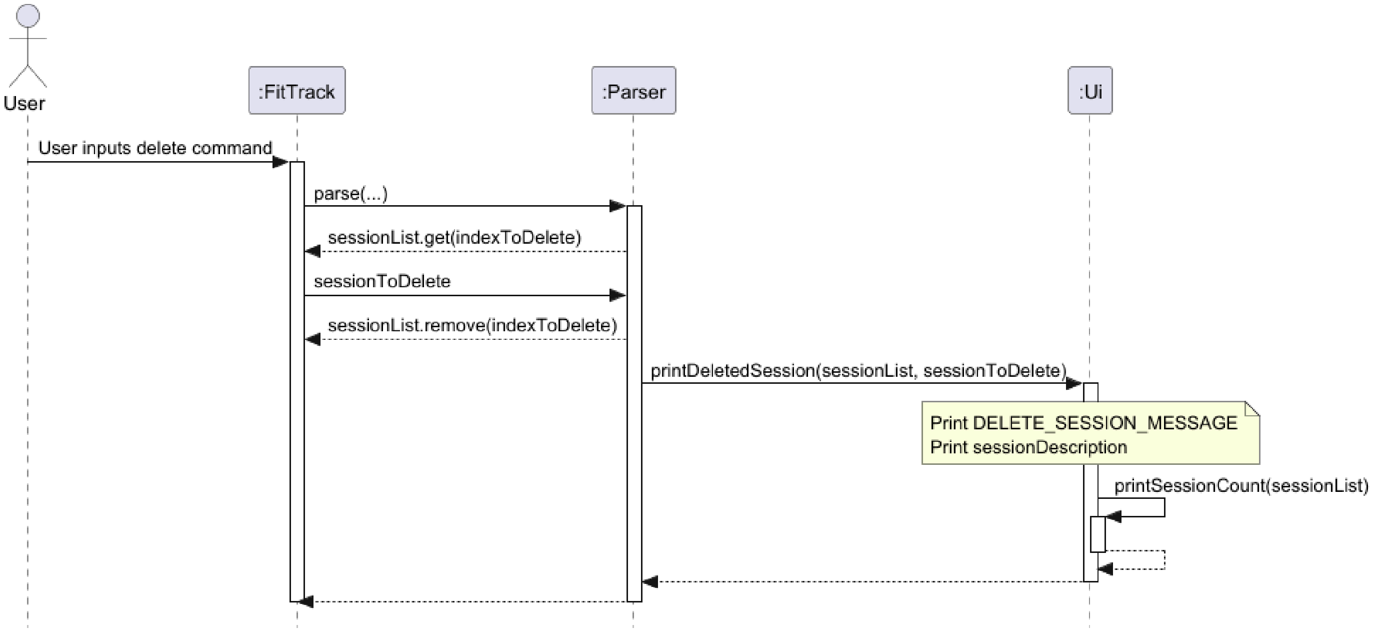
Modify the DateTime of a Training Session

When Parser detects the "modify" command, the TrainingSession instance at the user's specified index in sessionList will be overwritten with the new DateTime as specified by the user via the setDateTime function call.



Delete Training Session

When Parser detects the "delete" command, the TrainingSession instance at the user's specified index in sessionList will be copied into a new private TrainingSession instance called sessionToDelete. The original instance in sessionList will then be deleted. The new private instance is used to print the details of the deleted session, giving the user confirmation that the TrainingSession they wished to delete has been successfully deleted. The new TrainingSession instance is then disposed of.

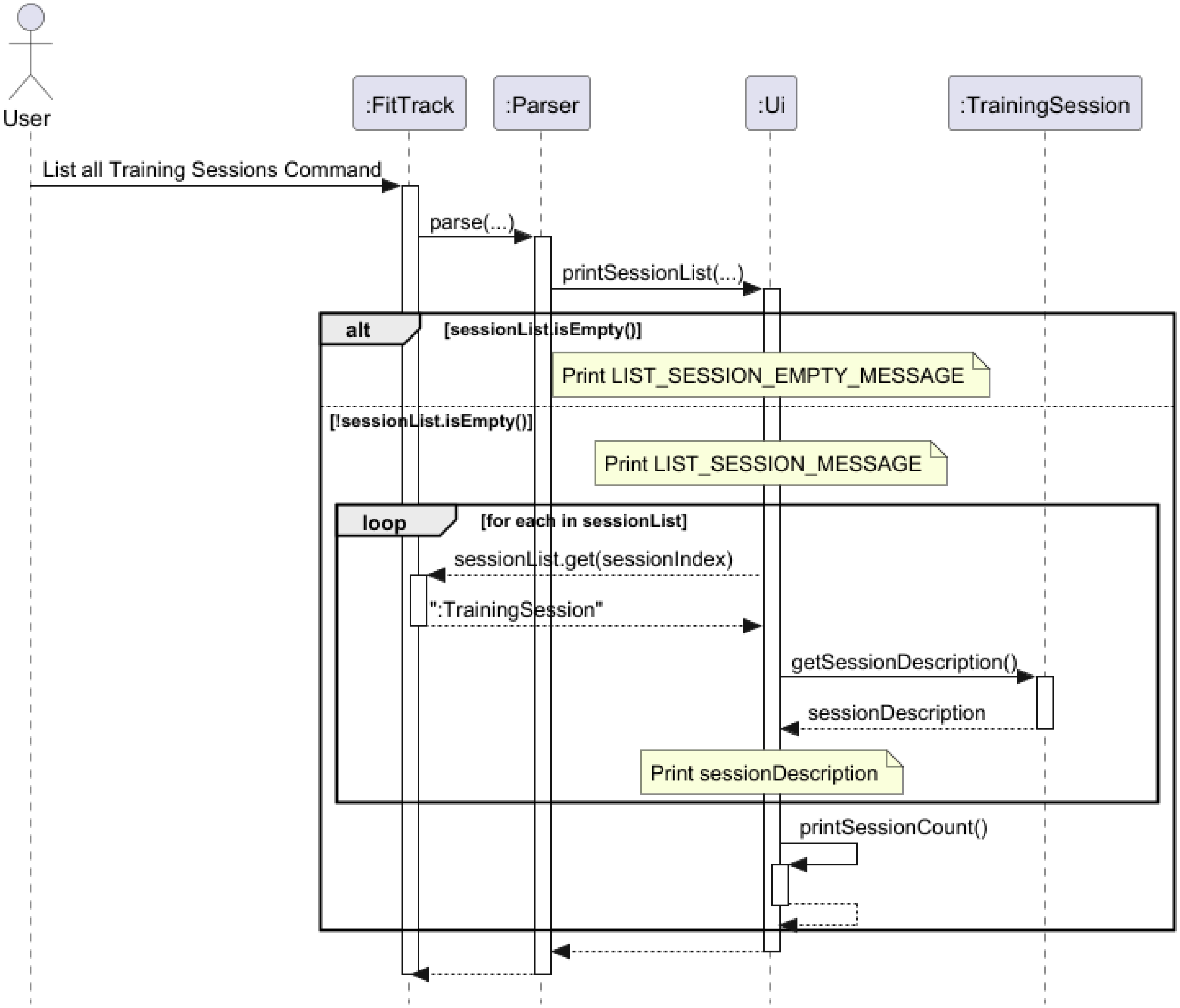

User
:FitTrack
:Parser
:Ui
User inputs delete command
parse(...)
sessionList.get(indexToDelete)
sessionToDelete
sessionList.remove(indexToDelete)
printDeletedSession(sessionList, sessionToDelete)
Print DELETE_SESSION_MESSAGE
Print sessionDescription
printSessionCount(sessionList)

Sequence Diagram for "delete <index of a training session>" Command

List Training Sessions

When Parser detects the "list" command, it calls printSessionList() followed by printSessionCount(). printSessionList() first checks if sessionList is empty. If sessionList is empty, it prints a message saying so. If sessionList is not empty, it will be iterated through. For each TrainingSession in sessionList, getSessionDescription will be called, returning its details as a String. The TrainingSession's index will be printed, followed by the session description before iterating to the next index. When all the TrainingSessions have been printed, Ui calls printSessionCount() to display the total number of TrainingSessions in sessionList.

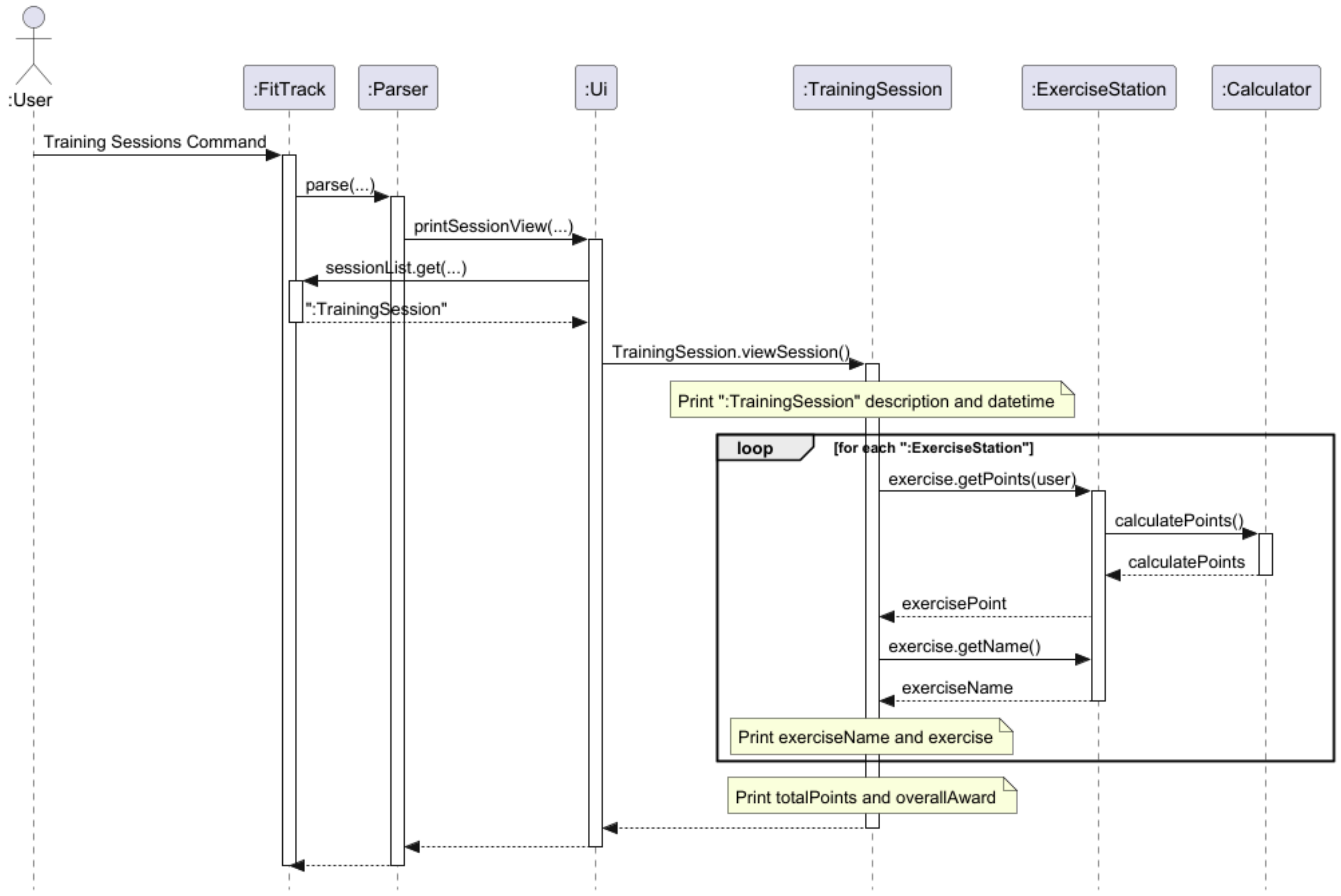
Sequence Diagram for "list" (all Training Sessions) Command



View Training Session

When Parser detects the "view" command, it calls printSessionView() on the user's specified session index. This in turn calls viewSession(), which outputs the details of the TrainingSession instance in the CLI. This process fetches the details of each of the 6 ExerciseStation classes, which fetch details from the Calculator classes. These details are then printed to the CLI.

Sequence Diagram for "view <Training Session Index>" Command

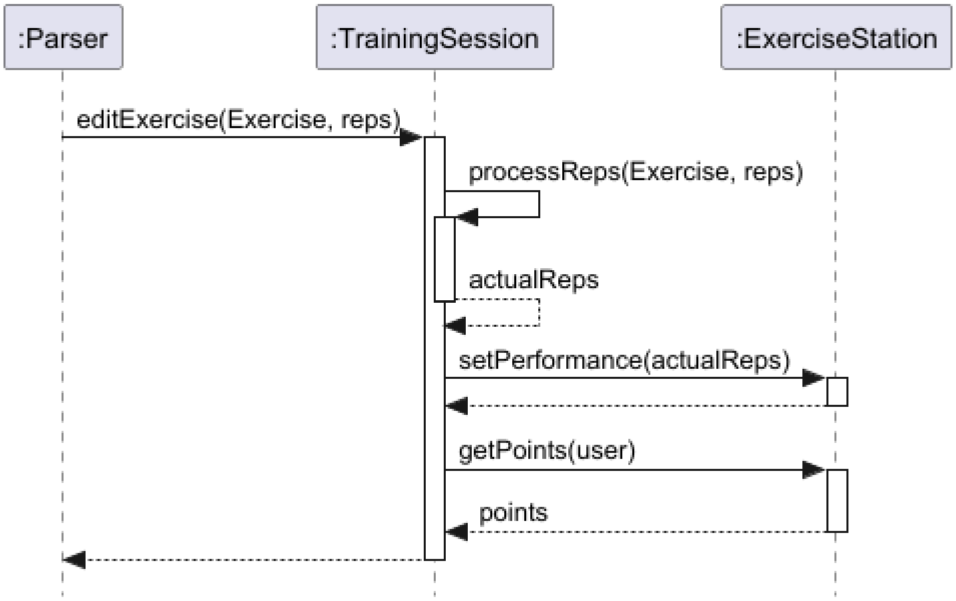


Edit Exercise

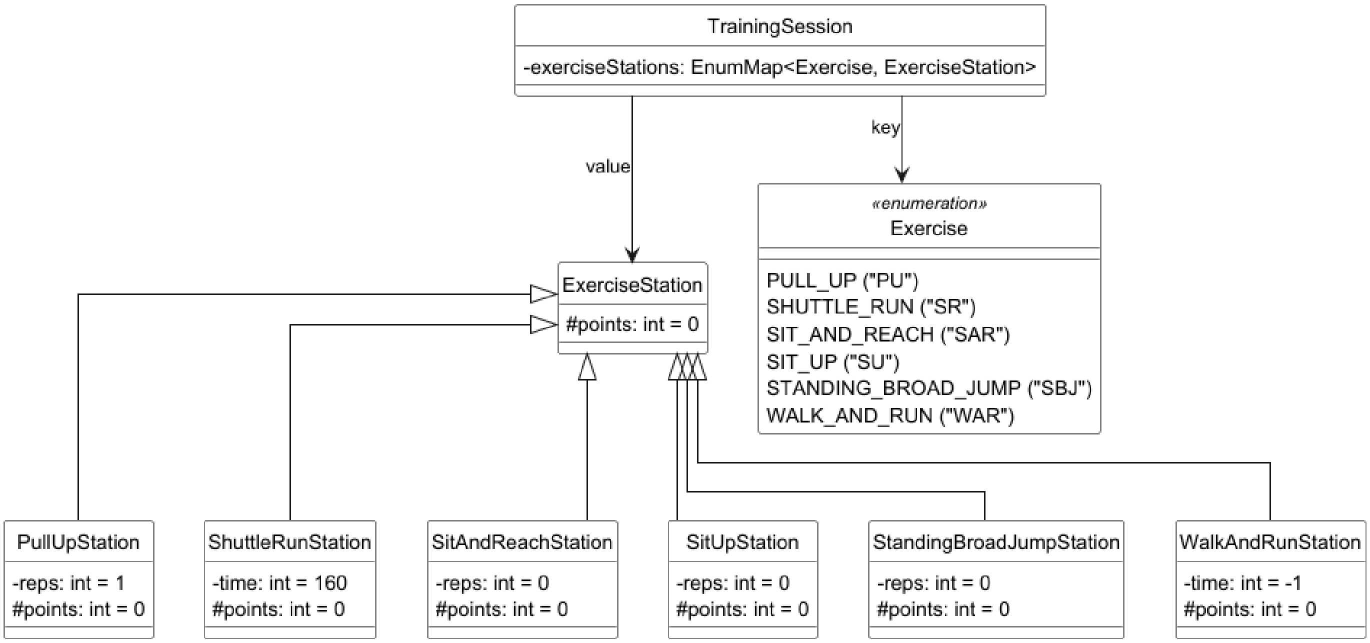
The **Edit Exercise** feature is managed by the `TrainingSession` class, and is primarily carried out by its `editExercise()` function. This feature utilizes the `setPerformance()` and `getPoints()` methods from the `ExerciseStation` classes to edit the performance for the user's selected exercises. Additionally, it calculates the points the user will earn for each exercise based on the updated performance values.

When the user wishes to edit a training session, they specify an `Exercise` Enum, and the reps/timing to be inputted. These variables are then passed to the `editExercise` function. This function calls the relevant methods to update the repetitions or timings and calculates the corresponding points for the specified exercise.

The following sequence diagram illustrates the function calls involved in this process:


:Parser
:TrainingSession
:ExerciseStation
editExercise(Exercise, reps)
processReps(Exercise, reps)
actualReps
setPerformance(actualReps)
getPoints(user)
points

Additionally, the state diagram below shows the end state of the `editExercise` function after execution of the command, `editExercise(Exercise.PULL_UP, 1)` and `editExercise(Exercise.SHUTTLE_RUN, "16.0")` :



Add Reminder

When a user inputs the command to add a new reminder (`remind <description> <deadline>`), a new instance of the Reminder class is created. This Reminder object is initialized via the constructor function with the provided description, deadline, and user information. This object is then added to the main reminder list passed from the main `Fittrack` class. After addition, `printReminderDescription()` is invoked to display details of the new reminder to confirm successful addition. The `updateSaveFile` function is then called within the `Parser` class, using the local `toSaveFile` helper method to write a formatted string to the SaveFile Document - for information permanence between user sessions.

List Reminder

The "view reminders" command triggers a sequence that iterates through the main reminder list. For each reminder, `printReminderDescription()` is called, displaying the description and deadline of each reminder. If the list is empty, the system outputs a message indicating no reminders are available. This functionality lets users view all saved reminders at a glance.

List Upcoming Reminders

The "list upcoming reminders" command (`list-remind`) invokes the `findUpcomingReminders(ArrayList<Reminder> mainReminderList)` helper method. This method iterates through `remainderList` , checking if each reminder's deadline is within one week from the current date. For reminders that match this condition, they are added to an `upcomingReminderList` . Finally, for each reminder in `upcomingReminderList` , `printReminderDescription()` is called, displaying only those reminders with due dates in the upcoming week. This function is called automatically at program initialisation to provide a summary reminder for users starting the program.

Delete Reminder

The delete command (`delete-remind <index>`) removes a reminder at the specified index from the main list. Before removal, the specified reminder is copied to a temporary instance, `sessionToDelete` , which holds the reminder's data for confirmation. Following deletion, the details of the deleted reminder are printed by invoking `printReminderDescription()` on `sessionToDelete` , confirming successful removal. The `sessionToDelete` instance is then discarded, ensuring efficient memory use. The `updateSaveFile` function is then called within the `Parser` class, using the local `toSaveFile` helper method to write a formatted string to the SaveFile Document - for information permanence between user sessions.

Add Goals

Goals allow users to set specific objectives within the application. Users can add goals using the `add-goal <description> <date> <time>` command and view a list of all current goals via list-goal. Goals can also be deleted by their unique IDs using the `delete-goal <goal ID>` command. This feature provides users with a clear structure for setting, tracking, and managing their fitness objectives. Goals are stored separately from training sessions and are accessible as a distinct list. After both the addition (`add-goal`) and deletion (`delete-goal`) functions are executed, the `updateSaveFile` function is called within the `Parser` class, using local `toSaveFile` helper methods to write a formatted string to the SaveFile Document - for information permanence between user sessions.

Add Food Intake

Food intake tracking helps users monitor their daily calorie intake. Each entry records a food item's name, quantity, and calorie count. This data is used to calculate total calorie intake, which can be viewed as a summary. The functionality supports daily nutritional monitoring, helping users align their diet with fitness goals.

When the user inputs the command to add a new food item (`add-food <food name> <calories>`), an instance of FoodEntry is created, containing details like the food name, calorie count, and timestamp. This FoodEntry instance is then passed to the `addFood(FoodEntry food)` method in the FoodWaterIntake class. Here, the food item is added to the `foodList` , a list that stores all the user's food entries. UI confirmation output is generated once the call returns to the `Parser` class. The `updateSaveFile` function is then called within the `Parser` class, using the local `toSaveFile` helper method to write a formatted string to the SaveFile Document - for information permanence between user sessions.

Delete Food Intake

When the user enters a command to delete a food item (`delete-food <index>`), the system calls the `deleteFood(int foodIndex)` method with the specified index in the `FoodWaterIntake` class. Inside this method, an index validation checks if the provided index is within the range of `foodList` . If valid, `remove(int index)` is invoked to remove the specified `FoodEntry` from `foodList` . The removed item is temporarily stored in a `FoodEntry` instance named `removed` , allowing it to be printed with a confirmation message If the index is invalid, the system outputs an error message. The `updateSaveFile` function is then called within the `Parser` class, using the local `toSaveFile` helper method to write a formatted string to the SaveFile Document - for information permanence between user sessions.

Add Water Intake

Water intake tracking helps users monitor their daily hydration. Users can add entries with the amount of water consumed, view a list of past entries, and delete specific records if needed. This feature aids in maintaining a balanced hydration level, which is essential for overall health and fitness performance.

The command to add water intake (`add-water <amount in ml>`) creates a new instance of WaterEntry, encapsulating the amount of water consumed and the timestamp. This instance is then passed to `addWater(WaterEntry water)` , where it is appended to waterList, a collection of all water entries. This addition is stored in waterList for later retrieval or display. Like `addFood` , this method returns a UI confirmation to the user, then the `updateSaveFile` function is then called within the `Parser` class, using the local `toSaveFile` helper method to write a formatted string to the SaveFile Document - for information permanence between user sessions.

Delete Water Intake

Upon parsing the command `delete water <index>` , `deleteWater(int waterIndex)` is invoked within the `FoodWaterIntake` class, which checks the validity of the specified index against `waterList` . If the index is valid, `remove(int index)` is used to delete the specified WaterEntry from waterList, storing it temporarily in a WaterEntry instance named `removed` . This instance data is then used to confirm deletion via a UI message to the user. If the index is invalid, a message is displayed to notify the user. The `updateSaveFile` function is then called within the `Parser` class, using the local `toSaveFile` helper method to write a formatted string to the SaveFile Document - for information permanence between user sessions.

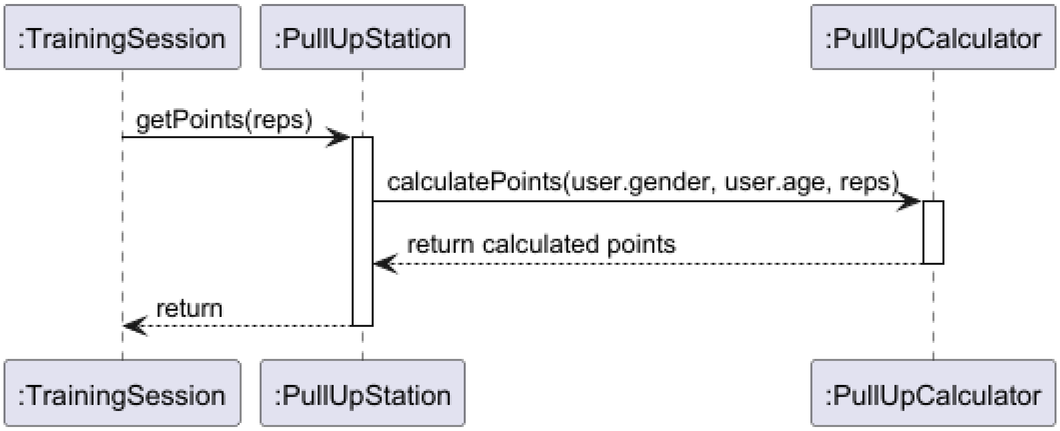
Points Calculation

The **points calculation feature** is a significant part of the `ExerciseStation` system. It allows for the calculation of user-specific points based on their performance in various exercises (e.g., pull-ups, sit-ups). This process involves interaction between the `ExerciseStation` and the `Calculator` classes, ensuring that the correct points are assigned based on predefined lookup tables found here.

1. Class Interaction Overview

Each `ExerciseStation` subclass (e.g., `PullUpStation` , `SitUpStation`) has its own implementation of the `getPoints()` method. The main responsibility of this method is to invoke the `calculatePoints()` function from the respective **calculator** class (e.g., `PullUpCalculator` , `SitUpCalculator`), which holds the points calculation logic.

2. Sequence of Events:



1. **User Inputs Performance**: The user's performance (e.g., number of pull-ups) is passed to the `setPerformance()` method in the exercise station.
2. **Invoke Points Calculation**: Once the performance is set, the `getPoints()` method is called. This method interacts with the calculator class (e.g., `PullUpCalculator`) to compute the points.
3. **Calculator Logic**: The calculator class uses a lookup table, which maps the user's performance to points based on their age and gender. The points are returned to the exercise station, where they are stored.

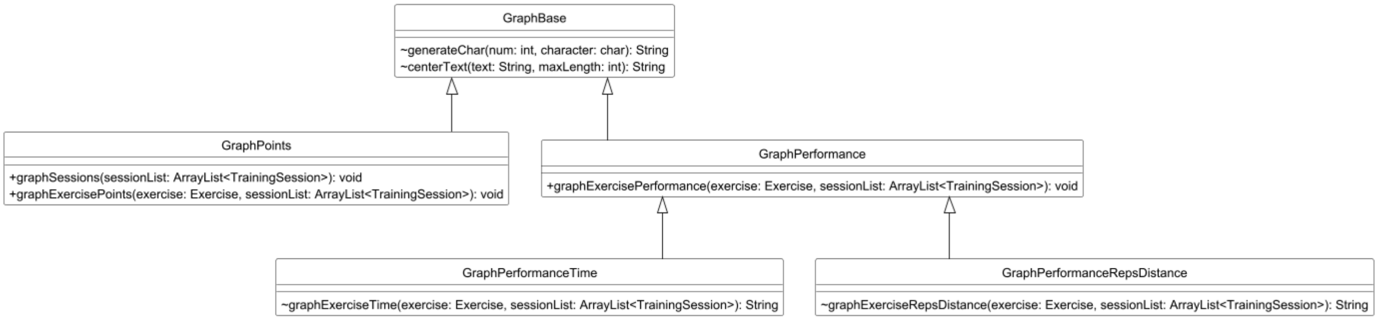
Training Data Visualisation (Points/Performance)

This **visualisation feature** called from the `Ui` class enables users to generate various visualisations of training session data, providing insights into progress and performance. This feature, due to its size and complexity, is implemented in helper classes (expanded below) instead of directly within `Ui`.

The `GraphPerformance` and `GraphPoints` classes handle data visualisation for training sessions, each designed to offer targeted graphing capabilities:

- `GraphPoints` : Displays points accumulated across training sessions.
- `GraphPerformance` : Focuses on visualising performance metrics (reps or timings) for specific exercises.

These classes inherit from the abstract `GraphBase` class, which consolidates shared methods for both subclasses. A class diagram is provided below to illustrate the structure and inheritance of the these classes:


GraphBase
~generateChar(num: int, character: char): String
~centerText(text: String, maxLength: int): String
GraphPoints
+graphSessions(sessionList: ArrayList<TrainingSession>): void
+graphExercisePoints(exercise: Exercise, sessionList: ArrayList<TrainingSession>): void
GraphPerformance
+graphExercisePerformance(exercise: Exercise, sessionList: ArrayList<TrainingSession>): void
GraphPerformanceTime
~graphExerciseTime(exercise: Exercise, sessionList: ArrayList<TrainingSession>): String
GraphPerformanceRepsDistance
~graphExerciseRepsDistance(exercise: Exercise, sessionList: ArrayList<TrainingSession>): String

1. `GraphPoints` Class

The `GraphPoints` class provides two main functions to visualise points across training sessions, as outlined below:

1. `graphSessions(ArrayList<TrainingSession> sessionList)`
   - Purpose: Display the total points achieved in each training session.

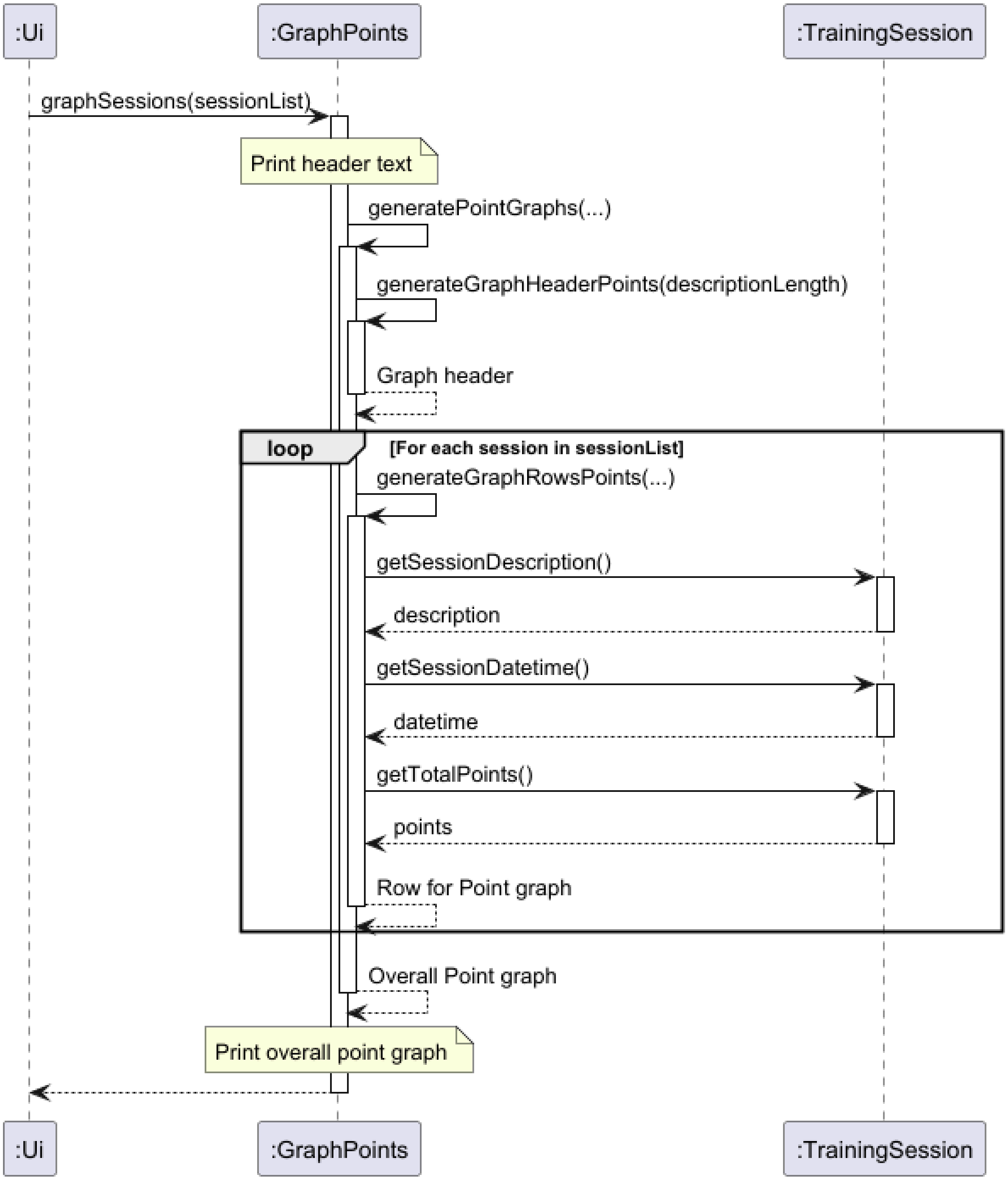
- Usage: Takes a list of `TrainingSession` objects and outputs a graph showing cumulative points per session.

2. `graphExercisePoints(Exercise exercise, ArrayList<TrainingSession> sessionList)`
   - Purpose: Visualise points progression for a specified exercise over multiple sessions.
   - Usage: Takes an `Exercise` object and a list of `TrainingSession` objects, displaying a points graph focused on the specified exercise.

Workflow of the graph points functions

1. **Header Generation**:
   - The header string is generated for each column in the visualisation.
2. **Row Generation**:
   - Each row, representing a training session, is iteratively generated.
   - Rows are appended to the a `StringBuilder`, which accumulates the entire graph's content.
3. **CLI Output**:
   - The accumulated graph string is printed to the CLI.

A sequence diagram is shown below to illustrate the workflow:



> Note: The primary difference between `graphSessions` and `graphExercisePoints` lies in the the calculation method called. (`getTotalPoints` for sessions, `getExercisePoints` for specific exercises).

2. `GraphPerformance` Class

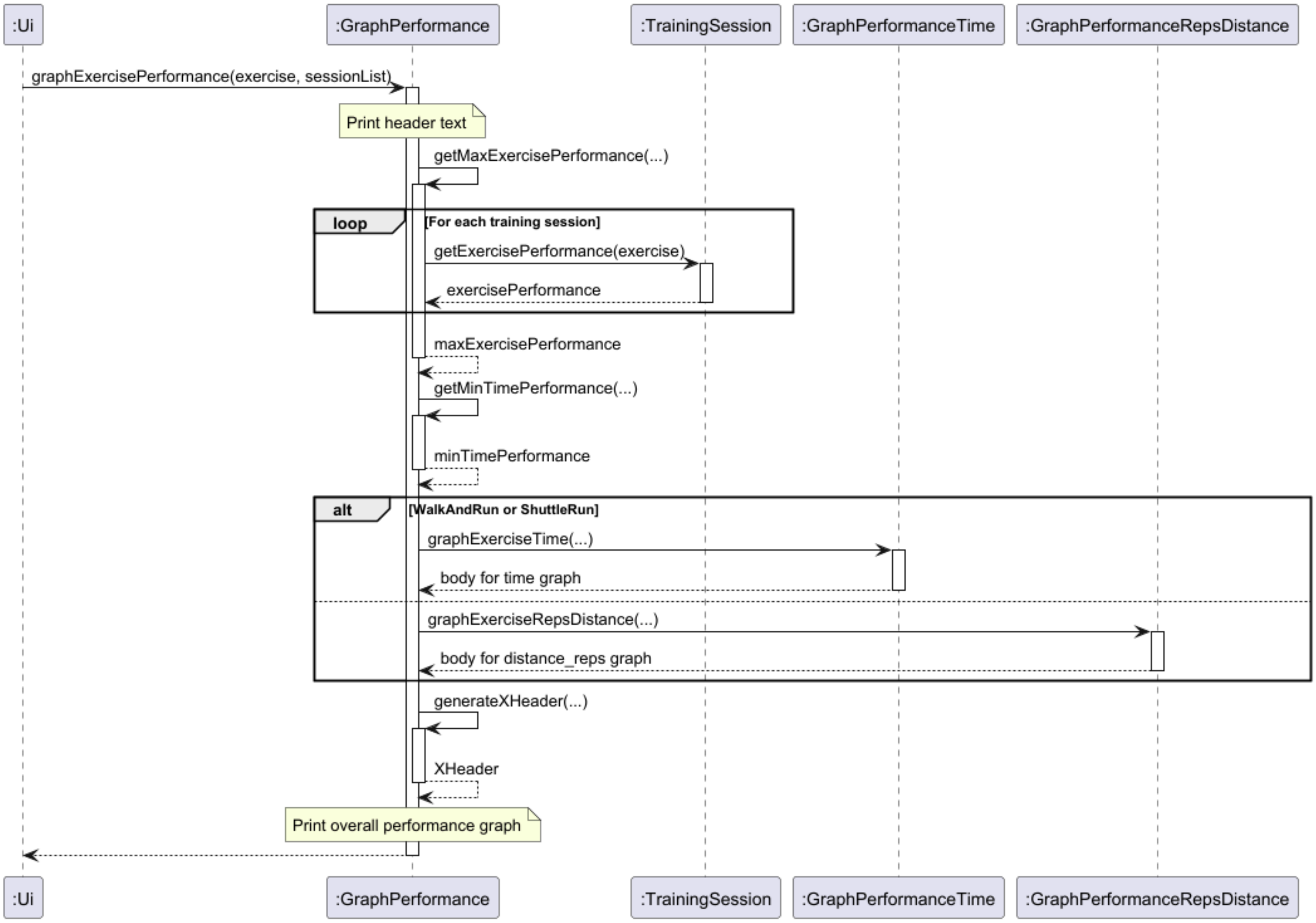
The `GraphPerformance` class is an abstract base for generating visual representations of exercise performance across multiple training sessions. Given the need for varied visualisation styles based on exercise type, `GraphPerformance` is extended by two specific subclasses:

- `GraphPerformanceTime` : Handles time-based exercises.
- `GraphPerformanceRepsDistance` : Manages rep-based and distance-based exercises.

Each subclass customises the graph body content generation to reflect the nature of the exercise data. The shared aspects, including headers and basic layout, are handled in `GraphPerformance` to avoid repetitive code. The primary method of `GraphPerformance` is `graphExercisePerformance` which handles both time based and rep based visualisations for performance. Its workflow is described below.

Workflow of `graphExercisePerformance`

1. **Generate X-Axis Headers**
   - Create a String for X-Axis headers, including session descriptions and dates.
2. **Generate Graph Body Content**
   - Subclasses `GraphPerformanceTime` and `GraphPerformanceRepsDistance` generate their respective row content for time or reps data, represented by asterisks. This row content is compiled in a String.
3. **Display Output to CLI**
   - Compiles the X-Axis headers, and body content in a String to display a complete graph. This is directly output to the command line, allowing users to visualize exercise progress.


:Ui
:GraphPerformance
:TrainingSession
:GraphPerformanceTime
:GraphPerformanceRepsDistance
graphExercisePerformance(exercise, sessionList)
Print header text
getMaxExercisePerformance(...)
loop
[For each training session]
getExercisePerformance(exercise)
exercisePerformance
maxExercisePerformance
getMinTimePerformance(...)
minTimePerformance
alt
[WalkAndRun or ShuttleRun]
graphExerciseTime(...)
body for time graph
graphExerciseRepsDistance(...)
body for distance_reps graph
generateXHeader(...)
XHeader
Print overall performance graph
:Ui
:GraphPerformance
:TrainingSession
:GraphPerformanceTime
:GraphPerformanceRepsDistance

Static Design Rationale

> All methods within `GraphPoints and` GraphPerformance` are static as they work independently of instance-specific data.

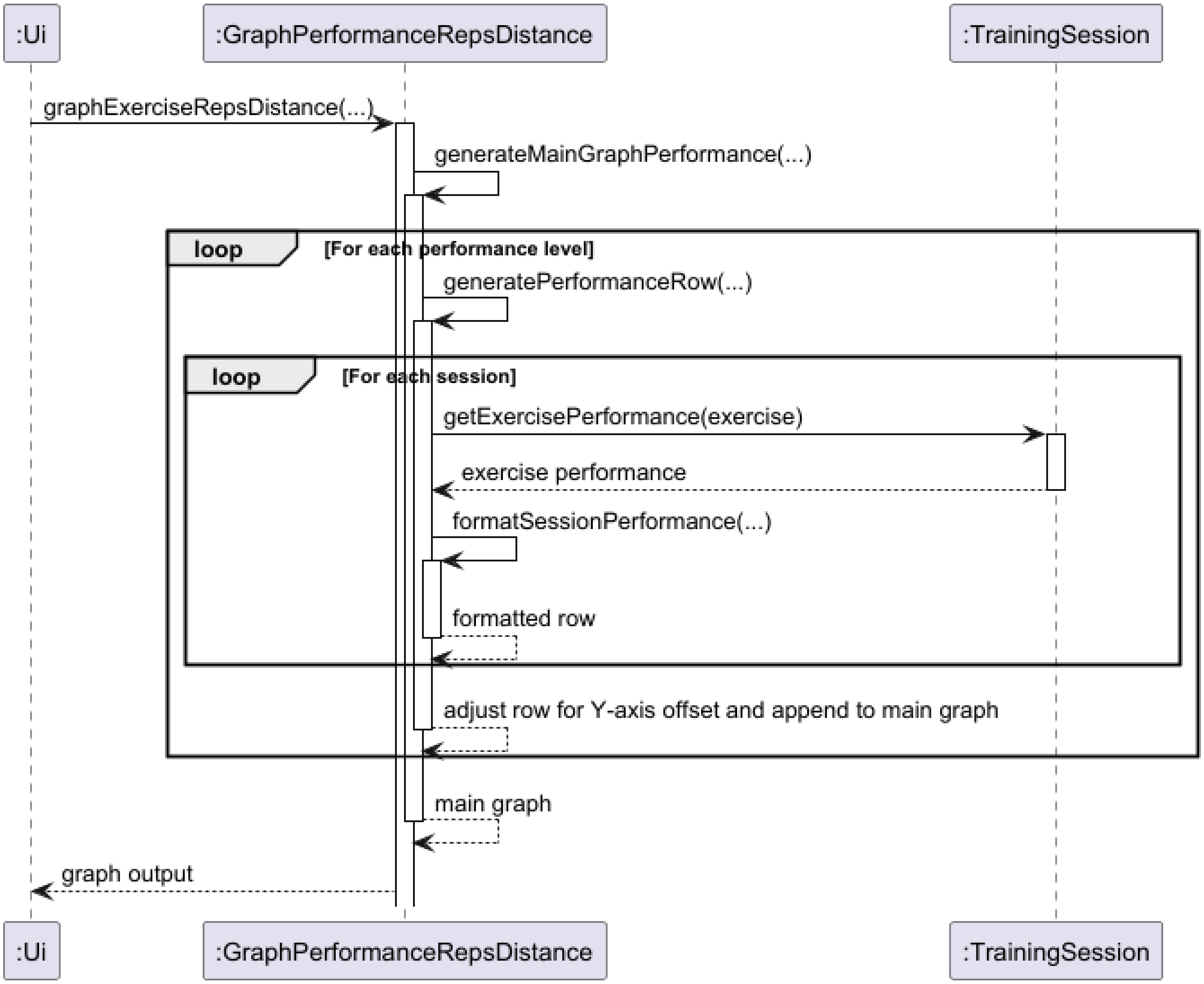
`GraphPerformanceRepsDistance` Class

This class is responsible for visualising reps or distance, over time. It generates a **bar** graph where the y-axis represents the units of performance (reps or distance), and each training session is represented by a column on the x-axis. Each row within a column contains asterisks (`*`), where each asterisks represents one unit of performance. In addition, the total points for each session displayed at the top of the column.

Workflow

1. **Building the String for a row**
   - For each level of performance (row), iterate through each training session.
   - If that session's performance is greater than or equal to the current level, an asterisk (`*`) is placed in that column.
   - If that session's performance is greater than the current level by 1 performance metric, append the points achieved for that exercise in that particular training session.
2. **Repeat for all performance levels**
   - Iteratively place asterisks for each level of performance, starting from the maximum, until the minimum level is reached.

Below is a sequence diagram detailing the above workflow:


:Ui
:GraphPerformanceRepsDistance
:TrainingSession
graphExerciseRepsDistance(...)
generateMainGraphPerformance(...)
loop
[For each performance level]
generatePerformanceRow(...)
loop
[For each session]
getExercisePerformance(exercise)
exercise performance
formatSessionPerformance(...)
formatted row
adjust row for Y-axis offset and append to main graph
main graph
graph output
:Ui
:GraphPerformanceRepsDistance
:TrainingSession

`GraphPerformanceTime` Class

Purpose

The `GraphPerformanceTime` class is a specialized subclass of `GraphPerformance` , designed to handle the visual representation of time-based performance data for *Shuttle Run* and *Walk and Run* stations. This class formats and prints a scatter graph of normalized time data against sessions to the command line. Normalized data points are represented with an asterisk (`*`).

Normalization Process

The class uses a normalization technique to represent the data points on a scale from 0 to 1, ensuring that the graph maintains a consistent appearance regardless of the raw performance range. This scaling allows for a uniform distribution of data across the graph, enhancing readability.

$$\text{Normalized Performance} = \frac{\text{Performance} - \text{Min Performance}}{\text{Max Performance} - \text{Min Performance}}$$

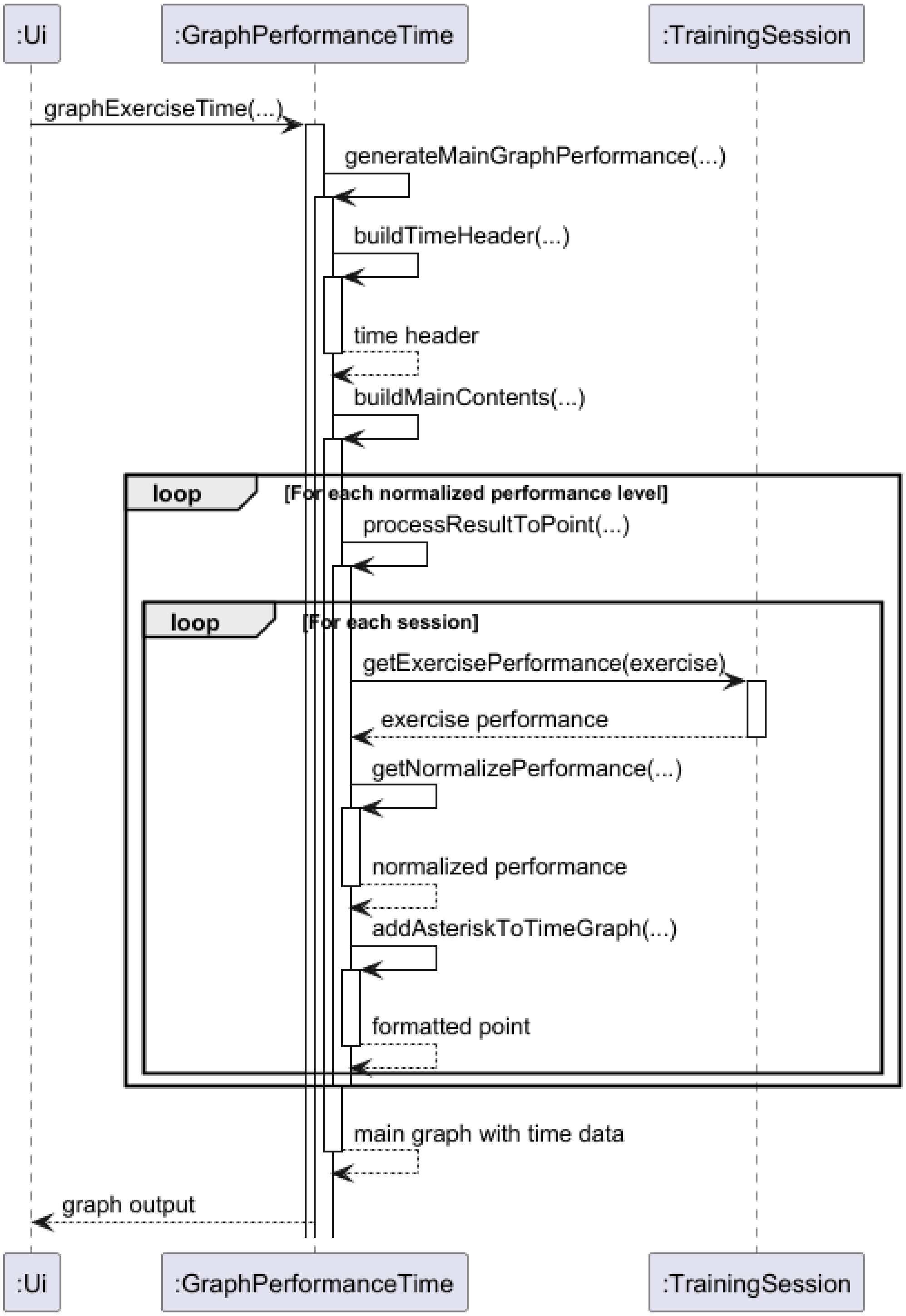
Implementation Details of graph body

1. **Generating Main Graph Content**:
    - The `buildMainContents` method is responsible for constructing the main body of the graph. It iterates through a range of normalized values, decrementing by 0.05 to create rows representing performance levels from 1.00 to 0.00.
    - For each row, the `processResultToPoint` method checks whether the normalized performance of each training session aligns with the current level. If it matches within a tolerance (e.g., 0.025), an asterisk (`*`) is placed on the graph.
2. **Formatting Display Time**:
    - The `processDisplayTime` method formats the raw time data depending on the type of exercise.
    - (i) For *Shuttle Run*, the time is shown in seconds to one decimal place.
    - (ii) For *Walk and Run* exercises are displayed in `mm:ss` format, with leading zeros added for consistency.
    - If there are no time data found in a specfic session, `NIL` is displayed.

Edge Cases Handled

- **No Data Available**: If no valid performance time data exists, the graph will not display any asterisk (`*`) for that session.
- **Consistent Performance**: When all performance values are the same, the class ensures that a line of points is printed at the top of the graph to indicate uniformity.

Below is a sequence diagram detailing the above workflow:



Product scope

Target user profile

FitTrack is made for students who are training for NAPFA, who should not be distracted by a GUI interface.

Value proposition

FitTrack provides a convenient way of recording and tracking their NAPFA performance. It automatically computes their scores and awards, saving them time and hassle. It is optimized to be simple, lightweight and minimalistic so that students do not have to exit their study environment.

User Stories

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

Priority	As a ...	I want to ...	So that I can ...
***	new user	see usage instructions	refer to them when I forget how to use the app
***	user	add a new training session	record my NAPFA training progress
***	user	edit my new training session	record the reps/time I attained for each exercise
***	user	modify the DateTime of an existing session	correct errors in TrainingSession creation
***	user	delete a training session	remove a session that was added by mistake
***	user	view a list of past training sessions	track the number of training sessions I have done
***	user	view the details of a training session	have an overview of my performance for that session
***	user	store my training sessions	keep a record of my sessions when the app is closed
**	user	calculate my NAPFA points per exercise	conveniently view my standing for each station
*	user	know my NAPFA achievement level	know my NAPFA standard at a glance
***	user	add, view, and delete goals	keep track of my fitness objectives
***	user	log my mood regularly	monitor and improve my mental well-being
***	user	log food intake and calorie count	manage my diet alongside my fitness regimen

Non-Functional Requirements

Any mainstream OS with Java 17 installed

Glossary

- NAPFA: National Physical Fitness Award
- Mainstream OS: Windows, Linux, Unix, macOS

Instructions for manual testing

Help Function

1. Prerequisites: None.

2. Test case 1: `help`
   Expected: The help message will be printed, guiding the user on valid commands.

   Test case 2: `help blah`
   Expected: The help message will be printed, guiding the user on valid commands.

Set User

1. Prerequisites: None.

2. Test case 1: `set male 12`
   Expected: The user's gender and age will be set to `male` and `12` .

   Test case 2: `set female 15`
   Expected: The user's gender and age will be set to `female` and `15` .

Add Training Session

1. Prerequisites: User's gender and age must be valid.

2. Test case 1: `add session1`
   Expected:
   ```
   Got it. I've added a new training session:
   1. session1
   There are 1 sessions in the list.
   ```

   Test case 2: `add session2 blah`
   Expected:
   ```
   Got it. I've added a new training session:
   2. session2 blah
   There are 2 sessions in the list.
   ```

   Test case 3: `add 07/11/2024`
   Expected:
   ```
   Got it. I've added a new training session:
   3. 07/11/2024
   There are 3 sessions in the list.
   ```

Test case 4: `add`
Expected: `Please provide a valid session name .`

Modify Training Session DateTime

1. Prerequisites: None.

2. Test case 1: `modify 0`
   Expected:
   ```
   Please provide a valid session index and DateTime (e.g. 12/03/2007 10:15).
   ```
   Test case 2: `modify 1 blah`
   Expected:
   ```
   Please provide a valid session index and DateTime (e.g. 12/03/2007 10:15).
   ```
   Test case 3: `modify 1 10/11/2024 12:30`
   Expected:
   ```
   Session 1 has been modified:
   New Date/Time: 10/11/2024 12:30
   ```

List all Training Sessions

1. Prerequisites: None.

2. Test case 1: `list` (sessionList is empty)
   Expected: `Your session list is currently empty.`

   Test case 2: `list` (sessionList has 2 TrainingSessions)
   Expected:
   ```
   Here are your training sessions:
   session1 | 29/10/2024 12:40
   session2 | 29/10/2024 12:41
   There are 2 sessions in the list.
   ```

View a Training Session

1. Prerequisites: None.

2. Test case 1: `view 1` (sessionList is empty)
   Expected: `Please provide a valid session index.`

   Test case 2: `view 1` (sessionList contains at least 1 TrainingSession)
   Expected:
   ```
   Training Session: session1
   Training Datetime: 07/11/2024 12:40
   Mood: No mood recorded
   Pull Up Station | Reps: 0 | 0 points
   Shuttle Run Station | Time: NA | 0 points
   Sit and Reach Station | Distance: 0cm | 0 points
   Sit Up Station | Reps: 0 | 0 points
   ```

```
Standing Broad Jump Station | Distance: 0cm | 0 points
Walk and Run Station | Time: NA | 0 points
Total points: 0
Overall Award: No Award
```

Edit a Training Session

1. Prerequisites: None.

2. Test case 1: `edit 1 PU 30` (sessionList is Empty)
   Expected: `Please provide a valid session index, station and reps.`

   Test case 2: `edit 1 PU 30` (sessionList contains at least 1 TrainingSession)
   Expected:
   ```
   Training Session: session1
   Training Datetime: 07/11/2024 12:40
   Mood: No mood recorded
   Pull Up Station | Reps: 30 | 5 points
   Shuttle Run Station | Time: NA | 0 points
   Sit and Reach Station | Distance: 0cm | 0 points
   Sit Up Station | Reps: 30 | 0 points
   Standing Broad Jump Station | Distance: 0cm | 0 points
   Walk and Run Station | Time: NA | 0 points
   Total points: 5
   Overall Award: No Award
   ```

Delete a Training Session

1. Prerequisites: None.

2. Test case 1: `delete` (No session index is inputted)
   Expected: `Please provide a valid session index.`

   Test case 2: `delete -1` (Invalid session inputted)
   Expected: `Please provide a valid session index.`

   Test case 3: `delete 1` (Input session index is valid)
   Expected:
   ```
   Got it. I've deleted this training session:session1
   There are 1 sessions in the list.
   ```

Exit FitTrackCLI

1. Prerequisites: None.

2. Test case 1: `exit 1` (User's exit input contains extraneous non-empty characters)
   Expected: `I'm sorry, I don't know what that means.`

   Test case 2: `exit` (User's exit input only contains the exit command.)
   Expected: `Bye! Hope to see you again soon!`