

Assignment 3 - Modeling

Exercise 1

You are given the class diagram of the *Dictaphone* system in Figure 1.

1. Read the sequence diagram from Figure 2 and write down the corresponding Java code for the method `PlayMessage`. You can assume that all the `index` arguments have type `int`, `text` is a `String`, and `audioBlock` is an instance of `AudioBlock`.
2. Draw a sequence diagram for the following use cases:
 - Use case 1: Delete the message

User	System
1. The user asks the system to delete the <i>i</i> -th message.	2. The system checks if the message is locked (extension point). 3. The message is not locked, so the system deletes the message and notifies the user.

- Use case 2: Fail to delete the message (extends use case 1)

User	System
	3. The message is locked, so the system displays an error to the user.

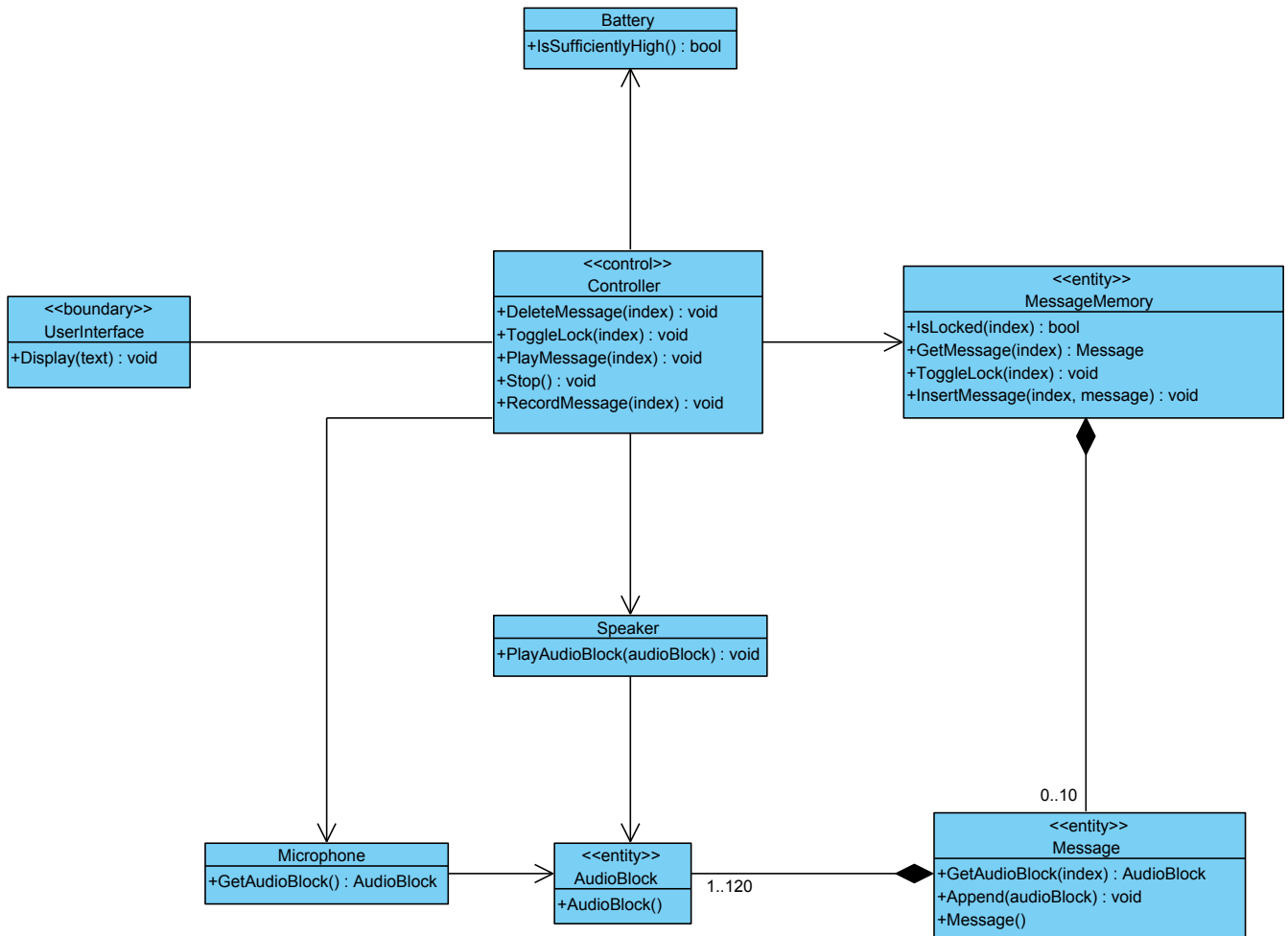


Figure 1: Class diagram of the Dictaphone system

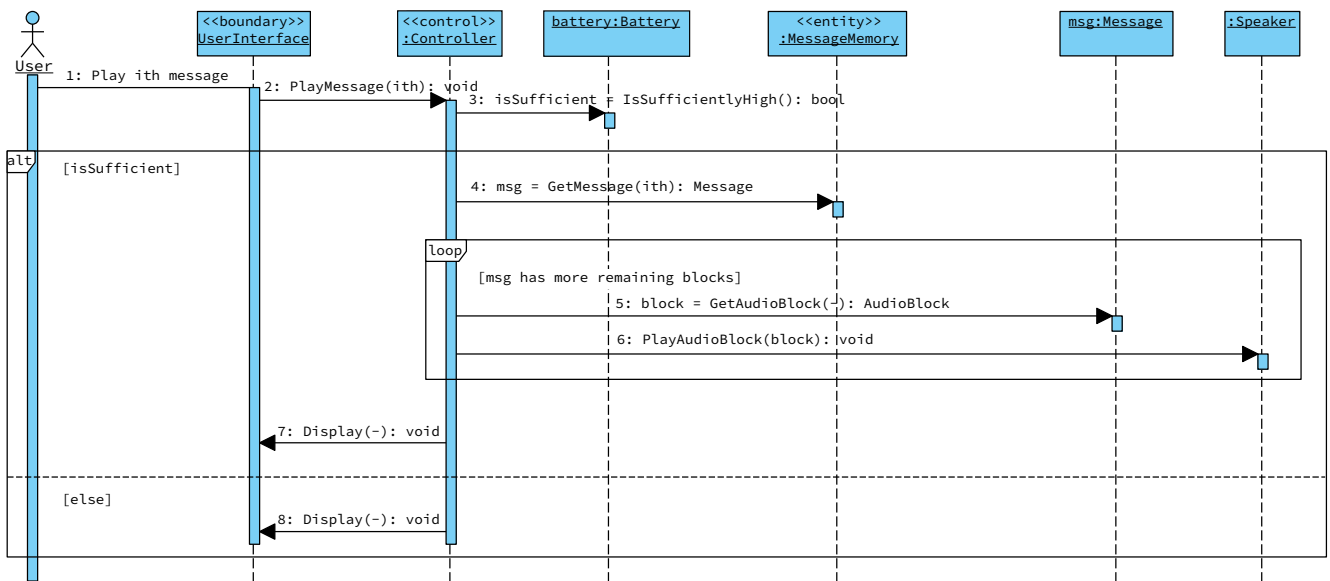


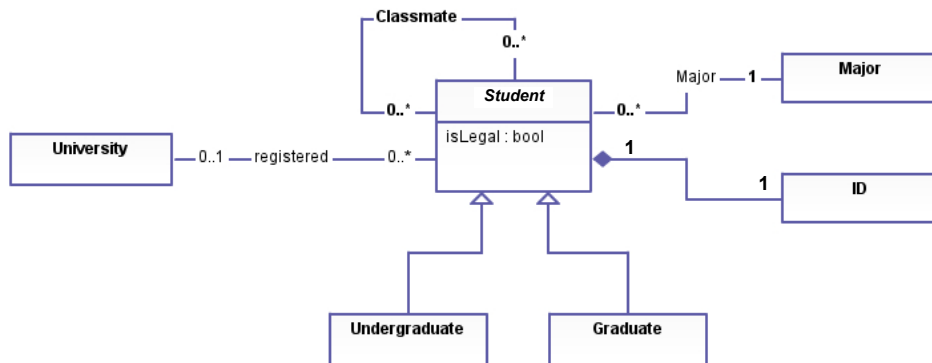
Figure 2: Sequence diagram of the Dictaphone system

Exercise 2

Create an Alloy model of the system described below:

1. there are undergraduate students and graduate students, no student is both undergraduate and graduate student;
2. a student should register at a university, and only registered students are legal students;
3. every student has a unique student ID, and he or she has exactly one major;
4. students with the same major who are registered at the same university are regarded as classmates, students can have several classmates;
5. graduates and undergraduates are never classmates;
6. the `classmate` relation is not reflexive (a student cannot be his/her own classmate).

Try to stick roughly to the UML-design from last week's exercise:



Visualize the model for 2 Universities, 3 Majors, 3 Students and 3 IDs.

Exercise 3

Download the .zip-file containing additional files from the course website. Open the files below and answer the questions in the comments:

1. Properties of binary relations. File: properties.als
2. Refactoring navigation expressions. File: distribution.als
3. Doris Day's song. File: everybody.als
4. Barber paradox. File: barber.als
5. Modeling the Tube. File: tube.als

Note that only the solutions for the tasks **3. Doris Day's song**, **4. Barber paradox**, and **5. Modeling the Tube** will probably be discussed during the exercise session. We still recommend you to solve all the tasks, because they will help you for the second part of the first project.