Assignment 3

Exercise 1

You are given the class diagram for 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-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)

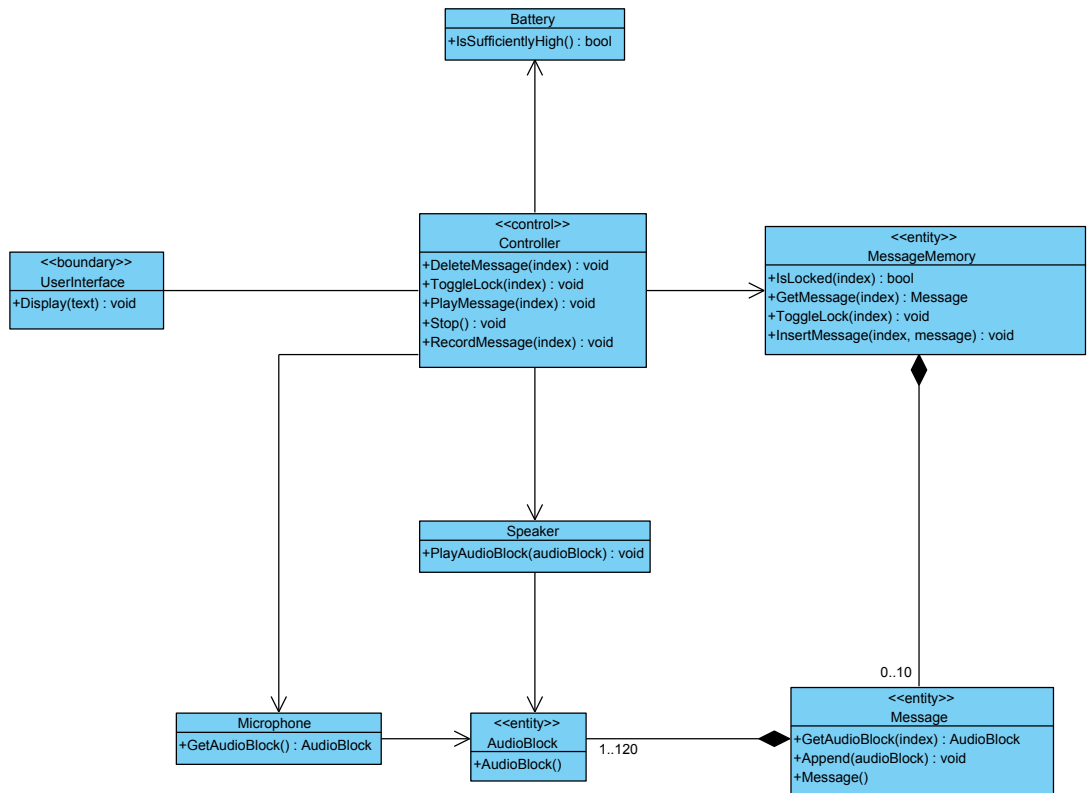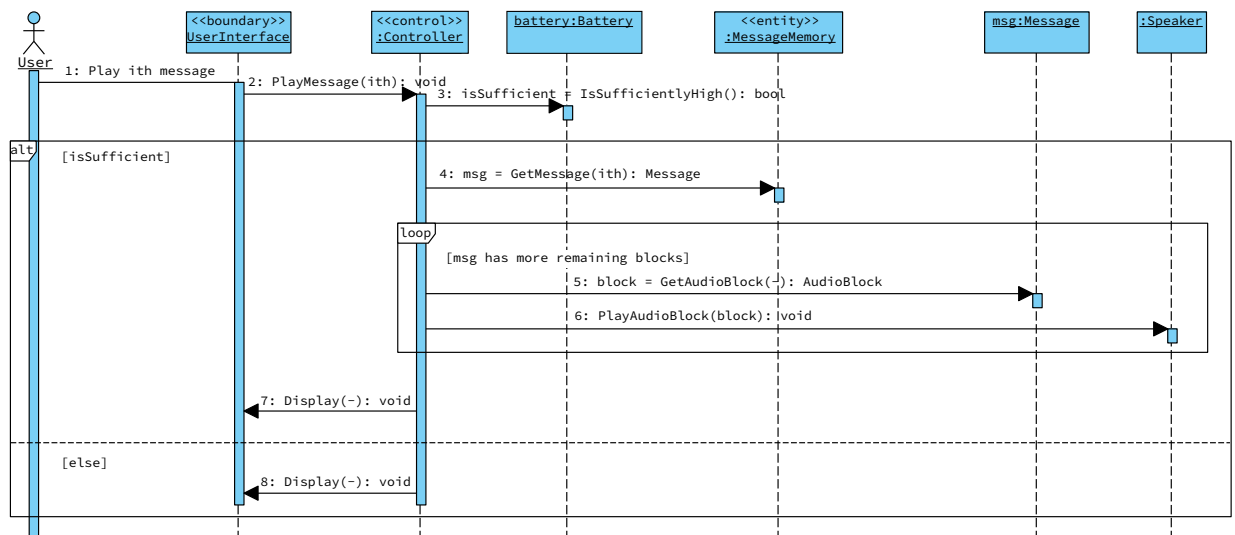 | User | System |
    | --- | --- |
    | | 3. The message is locked, so the system displays an error to the user. |

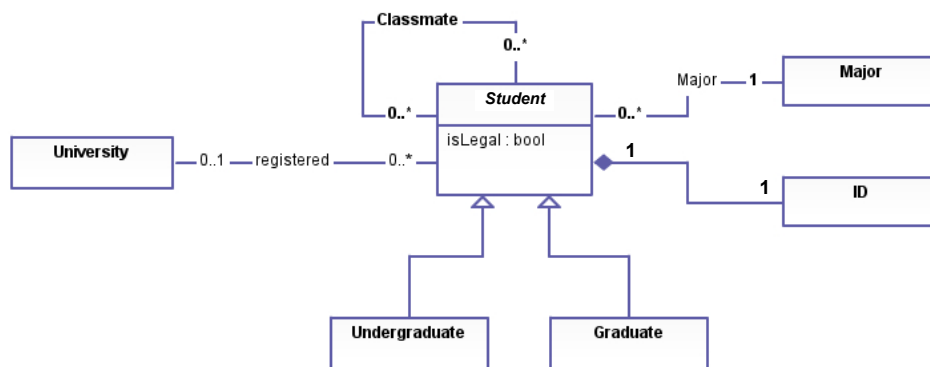Figure 1: Class diagram for the *Dictaphone* system

Figure 2: Sequence diagram for the *Dictaphone* system

Exercise 2

Create an Alloy model for 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 and 3 Students.

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