

EECS486 Object-Oriented Methodology

Homework 4

Assigned: 04MR03
Due: 14MR03, by 8:40am
Points Possible: 40 points

- Students must work individually to complete this homework.
- Diagrams may be drawn using Visio or by hand.

Homework Goals and Content

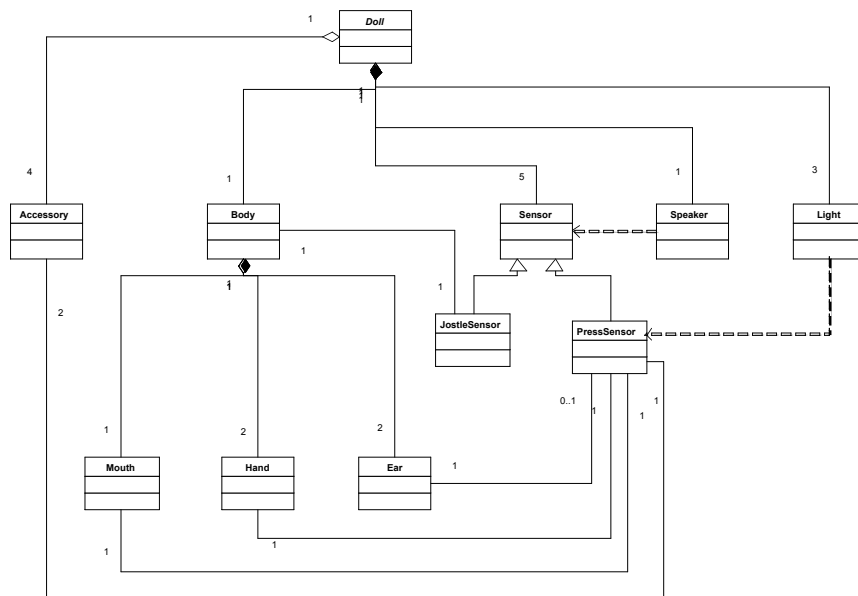
- Increased understanding of the following UML diagrams:
 - Interaction Diagrams (Sequence Diagrams and Collaboration Diagrams)
 - Packages and Subsystems.
- Increased understanding of the interplay between the above diagram types.

Questions

Sequence Diagram (8 pts)

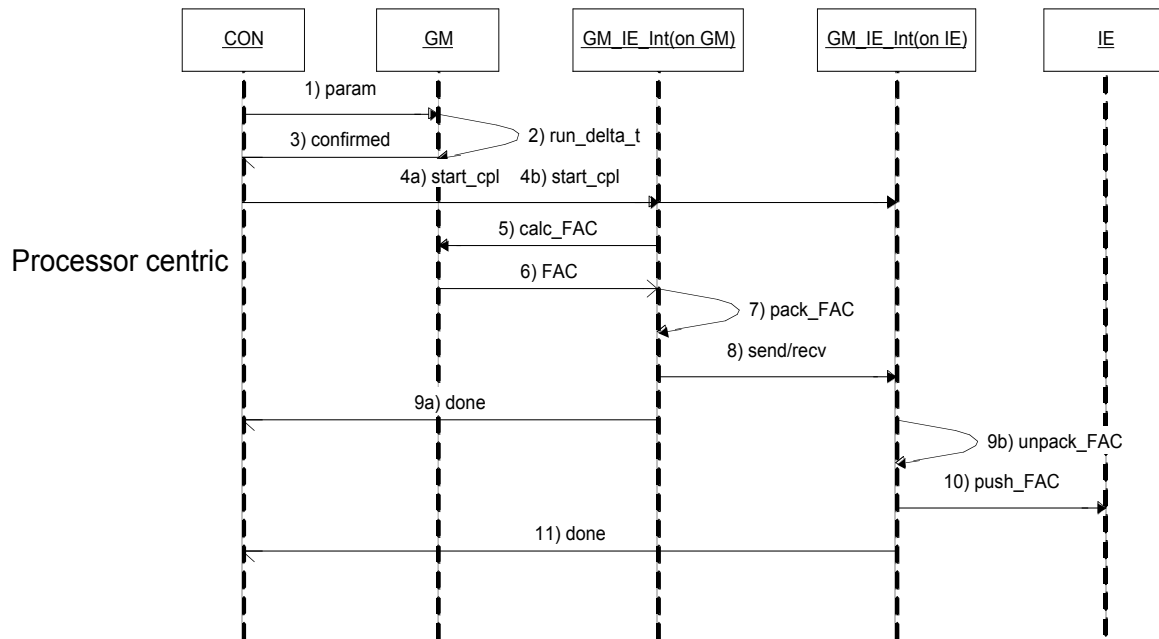
1. Below is a class diagram for the doll from a earlier homework. Assume that the class diagram is correct. Draw the sequence diagram for the scenario below:

- Doll is switched on and giggles;
- User jostles doll and doll giggles;
- In the middle of the giggle, the user switches the doll off;
- Doll is switched on (once again) and giggles (once again);
- User presses left hand and causes the doll to be sick (doll reacts accordingly);
- User presses throat sensor to 'cure' doll (doll reacts accordingly);
- User presses right hand and causes the doll to be sick (doll reacts accordingly);
- User presses throat sensor and doll does not react (wrong 'cure' sensor);
- User presses ear sensor to 'cure' doll (doll reacts accordingly);
- Doll is switched to off.



Collaboration Diagram (8 pts)

2. Below is a sequence diagram for communication within and between physics modules in a Space Weather Model Framework. Derive the equivalent collaboration diagram from the sequence diagram. Note that the student does not need to understand the domain (space weather) in order to answer this question.



Interplay between Sequence and Collaboration Diagram Question (14 pts)

3. Below is a bulletized list of a possible scenario for the amusement park ride. Please refer to both homeworks 2 and 3 for additional detail regarding the functionality of the amusement park ride. The scenario may look familiar to some ☺. Derive a sequence diagram from the scenario indicating the objects and messages between objects. Next, derive a collaboration diagram from the sequence diagram. Note that *two* diagrams are required for full credit: a sequence diagram and a collaboration diagram.

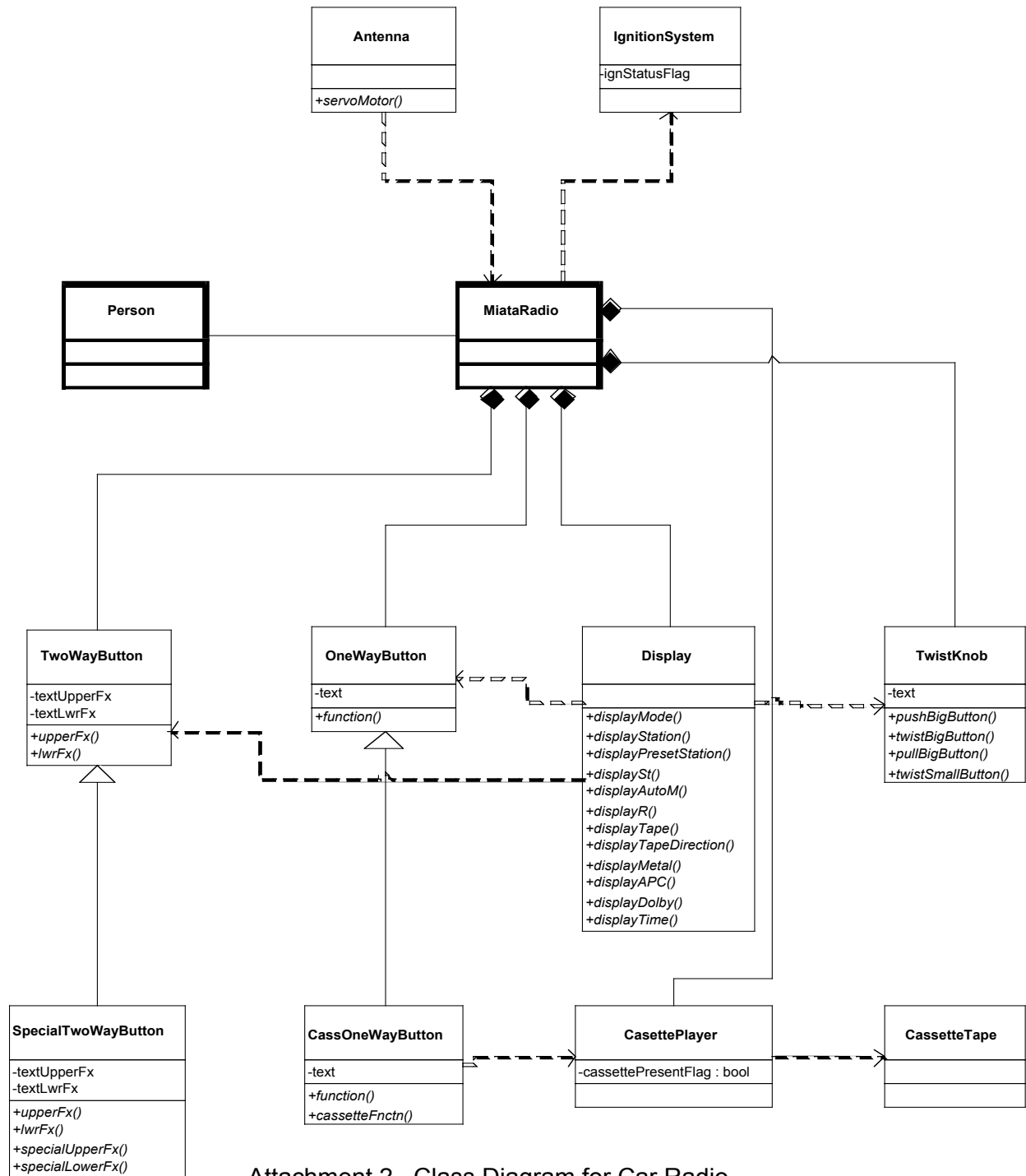
- Operator presses green button (nothing happens);
- Operator uses physical key to enable control box;
- Operator presses green button (ride begins);
- Rider presses control button (car rises to maximum height);
- Rider releases control button (car lowers to minimum height);
- Rider presses control button (car rises to maximum height);
- Ride time elapses, but ride does not lower nor come to stop;
- Operator presses red button which stops ride and lowers all cars;
- Operator uses physical key to disable control box;
- ...time passes in which ride is repaired;
- Operator uses physical key to enable control box;
- Operator presses green button (ride begins);
- Rider presses control button (car rises to maximum height);
- Ride time elapses and all cars lower and come to stop.

Packages and Subsystems Question (10 pts)

Attached is the class diagram for the Miata radio from Homework 3. Assume that the diagram is correct. Recall that a *subsystem* is part of complete system defined by an interface and with hidden internal structure. Recall that a *package* is a general purpose mechanism for organizing modeling elements into groups.

4. First, partition the original class diagram into subsystems. Textually describe your reasons for the partitioning.
5. Second, partition the original class diagram into packages. Textually describe your reasons for the partitioning.

Note that the answers to questions 4 and 5 may be the same, as long as acceptable rationale is given.



Attachment 2. Class Diagram for Car Radio.