Assignment 5
EFSMs Models

Model-Based Testing
DIT848/GU and TDA260/Chalmers

April, 2013

1 Introduction

This assignment is concerned with a wireless communicating system between a car onboard computer and a smart phone. The smart phone is used to open and close the car, and also to upload statistical information from the car computer, automatically transferred to the mobile phone when this is detected on a given radius of proximity (after having opened the car with the phone). Due to security concerns this transmission is not done to any mobile phone in the range of the wireless communication, but only to the phones of the owners (which have been previously registered in a database in the car computer). It is assumed that the car computer already has those phones registered in the database.

2 Submitting your work

If you want to have feedback on your assignment, check with Hamid Ebadi (`hamide #@# chalmers.se`). If you want to submit, please attach a .zip or .tar.gz archive, containing your source code and .txt, .pdf or .doc file describing your answers. For subject of your email and also to name your archive file, please use the assignment number and your (last) name as in the following example: `assignment05_names.zip`.
The deadline for this assignment is **Wednesday, 8 May 2013**.

3 Models (State machines)

3.1 Task 1

Your task in this exercise is to define a Finite-State Machine (FSM) for the car computer according to the following specification:

1. The car computer keeps waiting on a standby state till a mobile phone is detected;
2. If the mobile phone is not in the database then it is ignored.
3. If the mobile phone is already registered (it is in the database) then a connection is established and a window asking for a code is shown in the screen of the phone.
4. If the correct code is entered then the car is opened; if not the car computer keeps waiting for the correct code.
5. After the car is opened (due to the input of the correct code) then certain predefined data is automatically uploaded into the mobile phone.
6. The transmission is then finished and the car computer goes back to standby.

3.2 Task 2

Give 2 test cases that can be extracted from the above FSM, and two that cannot be extracted from it (in the latter case provide test cases that you think might be useful to further test your system, though they cannot be extracted from the FSM as it is too abstract).

3.3 Task 3

Draw an Extended Finite-State Machine (EFSM) for a modified extension of the system described in **Task 1** above. The new description of the system is as follows:

1. The car computer keeps waiting on a stand-by state till a mobile phone is detected.
2. If the mobile phone is not in the database then it is ignored.
3. If the mobile phone is already registered (it is in the database) then a connection is established and a window asking for a code is shown in the screen of the phone.
4. The user of the phone can only have 3 failed attempts to enter a correct code; if the correct code is entered then the car is opened; after failing 3 times the phone is blocked.
5. After the car is opened (due to the input of the correct code on the phone, not when opened with a normal key) then certain predefined data is automatically uploaded into the mobile phone.
6. After the data is transmitted there is a timeout for the engine: it must start within 15 min, otherwise the car is automatically closed and the car computer goes to standby.
7. If the engine starts within 15 min then the car computer goes to standby.

Note: Draw new machines for each exercise separately. Be sure you provide meaningful names for each action, variable, state, etc., and provide a short explanation of each.