Lab 1. Unified Modeling Language (UML)

Introduction

The aim of this lab practice is to gain a deeper insight into system modeling by means of UML diagrams. To this end, you are asked to model three simple examples using the UML tool of your choice. You can also try a couple of alternatives to determine which one you feel more comfortable with or suits your research needs best. There is a good quick reference guide on UML at http://www.nomagic.com/images/guides/no_magic_quick_reference_guide_uml.pdf that might be useful.

Objectives

By the end of the session, the student should be capable of:

- Designing basic diagrams using a UML modeling tool.
- Distinguishing between the most common types of UML diagrams and identifying which are the most appropriate to model a given system.

1. Activity diagram: Hotel booking

Design an activity diagram to model the process of booking a room in a hotel. When a customer calls to make a reservation, the hotel employee first checks if there are rooms available. If there are, he inserts the guest's personal information in the system and verifies with the bank that the card number provided has enough credit. If everything is in order, the booking is confirmed. The room will be paid upon check-in.

Reservations may be cancelled up to 2 days before arrival without any penalty. If the reservation is cancelled after this date or the guest does not show up, a charge equal to the first night of stay will be made to the credit card.

2. State machine diagram: Microwave[1]

Develop a simplified state machine diagram for a microwave oven. The device has a switch to choose between full (800 W) and half power (400 W), a knob to select the cooking time, a start/stop button, and an alphanumeric display. For safety reasons, the oven should not operate while the door is open. The sequence of actions to use the microwave is:

1. Select the power level.
2. Input the cooking time using the knob and press Start.
3. When the time is elapsed, the oven will switch off automatically and a buzzer will sound.

3. Sequence diagram: Withdraw money from an ATM

Create a sequence diagram that describes the scenario of successfully withdrawing money from an ATM using a debit card.

[1] Adapted from: I. Sommerville, *Software Engineering*, 9th Ed., Pearson, 2011.