Assignment 4: Model Checking of Real-Time Systems

Design a communication protocol, where the communication between the ***Sender*** and the ***Receiver*** is done through a lossy and noisy ***Channel***.

The ***Sender*** sends the message, and awaits the acknowledgment from the ***Receiver***. Since the communication is done through the ***Channel***, the message might be passed to the ***Receiver*** after 1 time unit or lost. If the ***Receiver*** receives the message, it will send the acknowledgement after 1 time unit. Again, this is done through the ***Channel***, so the acknowledgement can be send to the ***Sender*** after 1 time unit or lost. In case the acknowledgement does not reach the ***Sender*** in 5 time units (either the message or the acknowledgement is lost), the ***Sender*** will send the message again without dely. Similarly, after the acknowledgement is received, the ***Sender*** will send another message without delay.

Modeling guidelines:

- Model the system as a network of 3 timed automata: Sender, Channel, and Receiver;
- The messages between the Sender, Channel and Receiver should be modeled as modeled as regular UPPAAL channels;

- The Sender should identify that a message has been lost based on the value of its internal clock.

Model the system in UPPAAL and verify the following properties:

- The system cannot deadlock;
- The receiver might send an acknowledgment;
- The messages sent by the sender are eventually received by the receiver.

Submit the UPPAAL model and the requirement files (.xml and .q), together with a short report. Deadline: December 19, 2016.