Activity 1

Radio Broadcast Message

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Goal

The goal of this project is to create a simulation in Cooja app made by three TinyOS motes. Each mote communicates with others over radio, sending messages in broadcast. Every time a message is received, an action is fired.

Constraints

- Every message should contain a counter of the messages received and the sender ID.
- Messages are sent with frequency of 1, 3, 5 Hz for mote 1, 2, 3 respectively
- Messages sent by mote 1, 2, 3 toggle led 0, 1, 2 of each node
- Messages with “counter mod 10 == 0” turn off all leds

Implementation

The project is made from 3 files:

- Activity1.h
- Activity1AppC.nc
- Activity1C.nc

Activity1.h is the header file where message structure is defined. Here we have declared the message *broadcastMsg_t* containing a counter and nodeID field.

Activity1AppC.nc is the configuration file where components are defined and the relationship between them is given. This file is almost identical to the one we had as reference (RadioCountsToLed).

Activity1C.nc is the module component where we have implemented the interfaces. For each event, a function with actions to do is defined:

- First, we start the radio of each mote
- Then we initialize the timer of each mote with the frequency given in constraints
- When a timer expires, a led is toggled and a message is sent with the status of the counter and the ID of the sender. The message is sent in broadcast to all the other nodes.
  Note: we have supposed that once a mote sends a message, he must toggle his leds according to his own message. Since motes does not receive messages that they have sent, right before sending a packet every mote will act accordingly to their nodeID

(E.G. if mote 1 sends a message, he will also toggle led0).

- When a message is received, we read the content and if the counter is divisible by 10, all the leds are turned off. Then we read the ID of the sender and we toggle the corresponding led (led 0, 1, 2 correspond to node 1, 2, 3)

Achieved results

After building the project for *telosb*, we had run the simulation in Cooja. Running at speed of 10% we had noticed that the motes start the radio in different times, causing an offsetting between the timers. There is also a little delay in led's power on from sender to receivers caused by the time of transmission of the message. Apart from these two things we had noticed, the project works as expected.