TinyOS Exercise
TinyOS Exercise

- Sensor network programming in a nutshell
  - Read the TinyOS tutorial
  - Solve two (simple) tasks on real hardware
  - Lab-style exercise
    - Teams of two to three students are ideal
    - One lab working place is available
    - Reservation system on the course website
  - Expected time needed for all tasks: 3-4 hours
TinyNode Platform

- Shockfish TinyNode 584
  - 8 MHz Texas Instruments MSP430 microcontroller
    - 10 KByte RAM, 48 KByte ROM, 512 Kbyte external flash
  - 868 MHz Xemics XE1205 ultra-low power wireless transceiver
  - Light sensor, temperature and humidity sensors (optional)
TinyOS Tutorial

- **Carefully** read the tutorial on the TinyOS website
  - [http://docs.tinyos.net/index.php/TinyOS_Tutorials](http://docs.tinyos.net/index.php/TinyOS_Tutorials)
  - The following chapters are important for the exercise:
    - Getting Started with TinyOS
    - Modules and the TinyOS Execution Model
    - Mote-mote radio communication

- The tutorial contains several exercise tasks
  - Think about them but **do not write code**

- We use an **Eclipse plug-in** to develop the applications which is not mentioned in the tutorial
Exercise 1

- **Exchange of a sensor data**
  - Two sensor nodes are used for this task
  - One node periodically samples its *light sensor* and broadcasts the sensor reading over its radio
  - The other node listens for radio messages and signals if it is getting brighter or darker
    - Brighter → The green LED of the receiver is set
    - Darker → The red LED of the receiver is set
    - No significant change → The yellow LED is set

Light sensor

value = 520
Exercise 2

- **Optical Communication using Morse Codes**
Exercise 2

- Optical Communication using Morse Codes
General Information

- Code Skeletons for both applications are provided
  - Exercise 1 only needs very little additional programming and should be solved by all groups
  - Exercise 2 is more challenging but is also more fun
- An Eclipse plug-in for TinyOS development is installed and configured. Check the following website for a quick start guide: http://tos-ide.ethz.ch/
Final Remarks

- The lab is in the ETL building. Hardware and keys must be fetched in our office ETZ G64.1
- If you get stuck come back to ETZ G64.1 and ask for help

Register for your lab time slot on the course website (login with your n.ethz username)