Bishop's University

CS 501 – Internet of Things

Assignment 2

Run Hello World in Cooja

Cooja is a network simulator that can emulate `Tmote Sky` (and other) nodes. The code executed by the node is the exact same firmware you may upload to physical nodes.

Start Cooja by using the desktop icon or running `ant run` from the directory `tools/Cooja`. Now that Cooja is up and running, you can try it out with anexample simulation. Click the File menu and click New simulation. Cooja now opens up the *`Create new simulation`* dialog. In this dialog, you may choose to give your simulation a new name, e.g., *`Hello-world`*.

After clicking the *`Create`* button, Cooja brings up the new simulation. The **Network** window, at the top left of the screen, shows all the motes in the simulated network - it is empty now, since you have no motes in your simulation. The **Timeline** window, at the bottom of the screen, shows all communication events in the simulation over time - very handy for understanding what goes on in the network. The **Mote output** window, on the right side of the screen, shows all serial port printouts from all the motes. The **Notes** window on the top right is where you can put notes for your simulation. And the Simulation **control** window is where you start, pause, and reload your simulation. Before you can simulate your network, you must add one or more motes. You do this via the *`Motes`* menu, where you click on *`Add motes`*. Since this is the first mote you add, you must first create a mote type to add. Click *`Create new mote type`* and select one of the available mote types. In this course, you click *`Sky mote`* to create an emulated Tmote Sky mote type.

Cooja opens the *`Create Mote Type`* dialog, in which you can choose a name for your mote type as well as the Contiki application that your mote type will run. Give a name to your mote type and click on the Browse button on the right-hand side to choose your Contiki application. Go to the directory `/home/user/contiki/examples/hello-`

`world` and select the `hello-world.c` source file. Now Cooja will verify that the selected Contiki application compiles for the platform that we have selected. Click the *`Compile`* button. The compilation output will show up in the white panel at the bottom of the window. If the compilation is fine, click the Create button. You will be asked to enter the number of motes of your simulation. Once you are done, click the Start button in the Simulation control window to start the simulation.

Cooja allows for saving and loading simulation configurations. When a simulation is saved, all active plugins are also stored with the configuration. The state of a current simulation is however not saved; all nodes are reset when the simulation is loaded again. To save your current simulation:

- Click menu item: **File, Save simulation.**

Simulations are stored with the file extensions ".csc". To later load a simulation:

- Click menu item: **File, Open simulation, Browse....** Select a simulation configuration.

When a simulation is loaded, all simulated Contiki applications are recompiled. A functionality like saving and loading simulations, is reloading a simulation. Reloading can be used to reset the simulation – to restart all nodes. More importantly, reloading a simulation will recompile all Contiki code, useful while developing Contiki programs. To reload your current simulation:

- Click menu item: **File, Reload simulation**, or **pressCtrl+R**.

Submission

Please, submit the pdf report that contains explanation of the stages to use Cooja Simulator, the .c file and csc file of the simulation. Do not submit in .zip or .rar file.