Button Programming Tutorial

Button Simulation Example

- The simplest way to open the simulation is to select “Button Simulation” in the IoTrain-Sim interface
- Alternatively, you can open it manually as follows
  - Open Cooja
  - Click File > Open simulation > Browse…
  - Go to the folder “iotrain-sim/database/fundamental_training/ single_node/actuation_control/button/simulation”
  - Select the file “button.csc”
  - Click Open
- Once the simulation control window appears, click the “Start” button to begin the simulation
  - Each time you click the button named “Click button”, you will get a ”Hello world!” output message
  - The logical running time for this simulation is set to 20 minutes

Source Code Commentary

- Prints the “Hello world!” message each time a button is pressed
  - Source code: iotrain-sim/database/fundamental_training/single_node/actuation_control/button/simulation/button.c

```
#include "contiki.h"
#include "dev/leds.h"
#include "dev/button-sensor.h" ❶
#include <stdio.h>
/*---------------------------------------------*/
PROCESS(button_process, "button process");
AUTOSTART_PROCESSES(&button_process);
/*---------------------------------------------*/
PROCESS_THREAD(button_process, ev, data)
{
  PROCESS_BEGIN();
  SENSORS_ACTIVATE(button_sensor);
/*-------------------------------------------------------------------------------------------------------*/
  while(1)
  {
    PROCESS_WAIT_EVENT_UNTIL((ev==sensors_event) && (data == &button_sensor));
    printf(”Hello world!\n");
  }
/*-------------------------------------------------------------------------------------------------------*/
 PROCESS_END();
}
```

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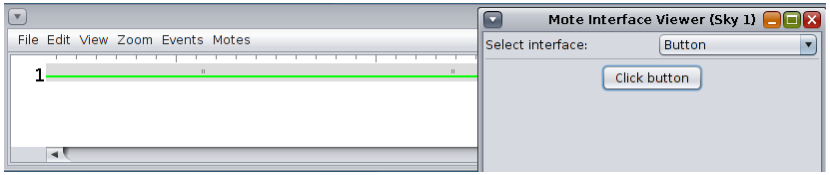
Source Code Commentary (cont.)

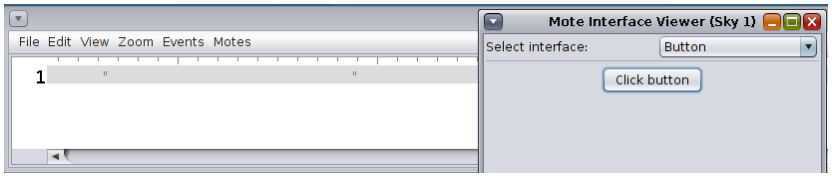
1. We add “dev/button-sensor.h”, which is used to manage the button (for details check the file “contiki/core/dev/ button-sensor.h”)
2. An infinite loop in which we wait for the button to be pressed
   - Two conditions have to be met: an event coming from a sensor AND that event data is the button being pressed
   - As soon as you press the button, the wait ends and the printf() call is executed, printing the string

Exercise

- Write a program that continuously behaves as specified below
  - A button is used to control the status of the green LED
  - The LED is switched on when the button is first clicked (a green line will appear in the Timeline window)



  - The LED is switched off when the button is clicked again (the green line in the Timeline window will disappear)



Exercise (cont.)

- Verify the program by running it in Cooja and checking the status of the green LED after repeated button clicks
- Hint
  - Remember to modify the Makefile by adding the new file name to “CONTIKI_PROJECT”

For a possible solution, see the file “iotrain-sim/database/fundamental_training/single_node/actuation_control/button/simulation/solution_button.c”