

ECGR4161/5196, MEGR4127 – Introduction to Robotics

Lab Assignment #2– Version 1.0

See Canvas for the due date/time

In this lab assignment has two parts and will be done in pairs or individually. The main objective is to load the Energia Toolchain on your computer and compile/run a simple program. We need to ensure ALL students have loaded and can run the tools. **This means BOTH students in a lab pair will need to demonstrate the tools working on their Laptop.**

Submission type: Live demonstration and lab report (Must include your name and all requirements mentioned below)

Part 1: Downloading/Installing/configuring the tools

We are going to be programming an embedded systems board using the tool “Energia” – it is an Arduino-like tool. This board, the TI MSP-EXP432P401R, has the MSP432P401R microcontroller as its main processor.

You should go to <https://energia.nu/download/> to download the Energia tool (Mac, Windows, and Linux!). On the page, below the link for the download are links for installing and setting up the tool.

Hint: When you extract the files – USE THE DEFAULT PATH OFFERED!

The general steps are:

1. Download the Energia software tool
2. Download the MSP432 board drivers
3. Unzip (extract) the MSP432 board drivers
4. Load MSP432 drivers (see Energia instructions)
5. Unzip (extract) Energia
6. I suggest you create a shortcut to the Energia tool on your desktop
7. Attach board
8. Open Energia application (IDE)
9. Download board package (MSP432P401R) (pull down from “Tools-> Board -> Boards manager”)
10. Set board to MSP432 (pull down from “Tools -> Board -> Red Launchpad w/msp432p401r EMT (48 MHz)”)
11. Set port (pull down from “Tools -> Port -> COMxx”)

Setup is complete and you are ready to program

Part 2: Programming the MSP432 board

In this part you will run the Energia tool and program it to repeatedly light the RGB LED with the following eight-state pattern:

Off -> red -> blue -> green -> red&green -> blue&green -> red&blue -> red&blue&green -> Off (repeat)

1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8 -> 1 -> ...

Each of these light patterns (or off) should take 0.5 seconds. See the file on Canvas “blink.txt” for an example of turning on/off one of the colors of the RGB LED.

The live demonstration should show:

1. the compile operation on BOTH lab partner laptops
2. at least two cycles of the changing LED colors

Lab Report - Submission Instructions:

1. Prepare a file, output to PDF that includes:
 - a. Your name and your “partner’s” name (if applicable)
 - b. What the general objective the robot / apparatus is expected to perform, and
 - c. Commentary on the lab (lessons learned, problems encountered).
 - d. Attach your code to the end of the report, as 9-point courier text. We want to see structure, indentation, and comments. Lots of comments.
2. Upload the PDF to Canvas, Lab 2 submission, one per lab group