Gravitropic induction of lateral root formation with an Arduino

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Summary

Lateral roots can be induced with a gravitropic stimuli. For in vitro growing seedlings, one just need to rotate the Petri dish, on which seedlings are, at an angle comprised between 90 and 180 degree. A new lateral root forms in the bend of the primary root. Such controlled induction can be used to enrich the number of occurences of one given developmental stage. To allow maximal flexibility on the timing of induction, we designed a device to rotate Petri dishes at 170 degrees after a countdown. A video and the Arduino code are available online.

Front: holder for two Petri dishes
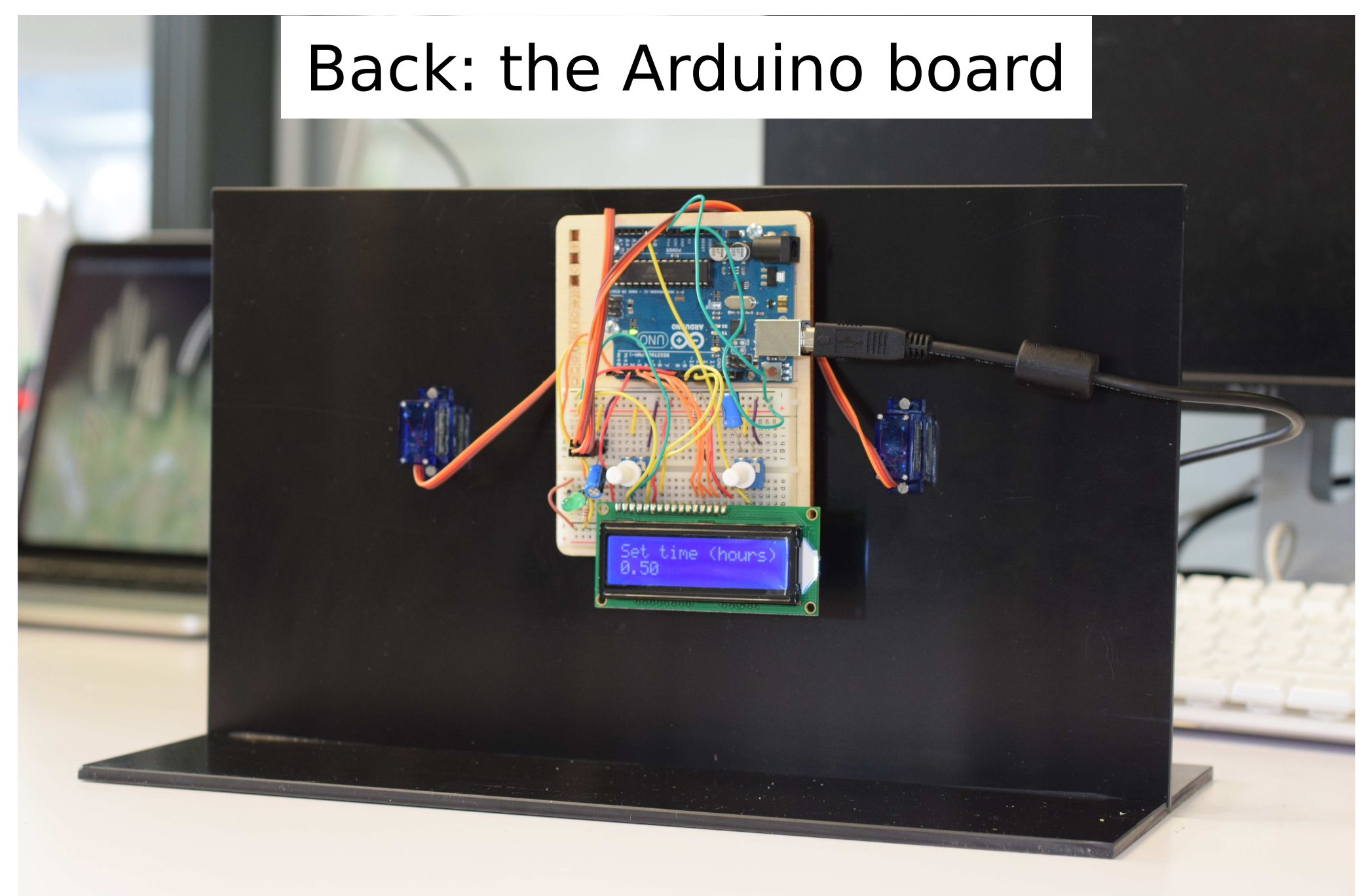
Back: the Arduino board

A

B

C
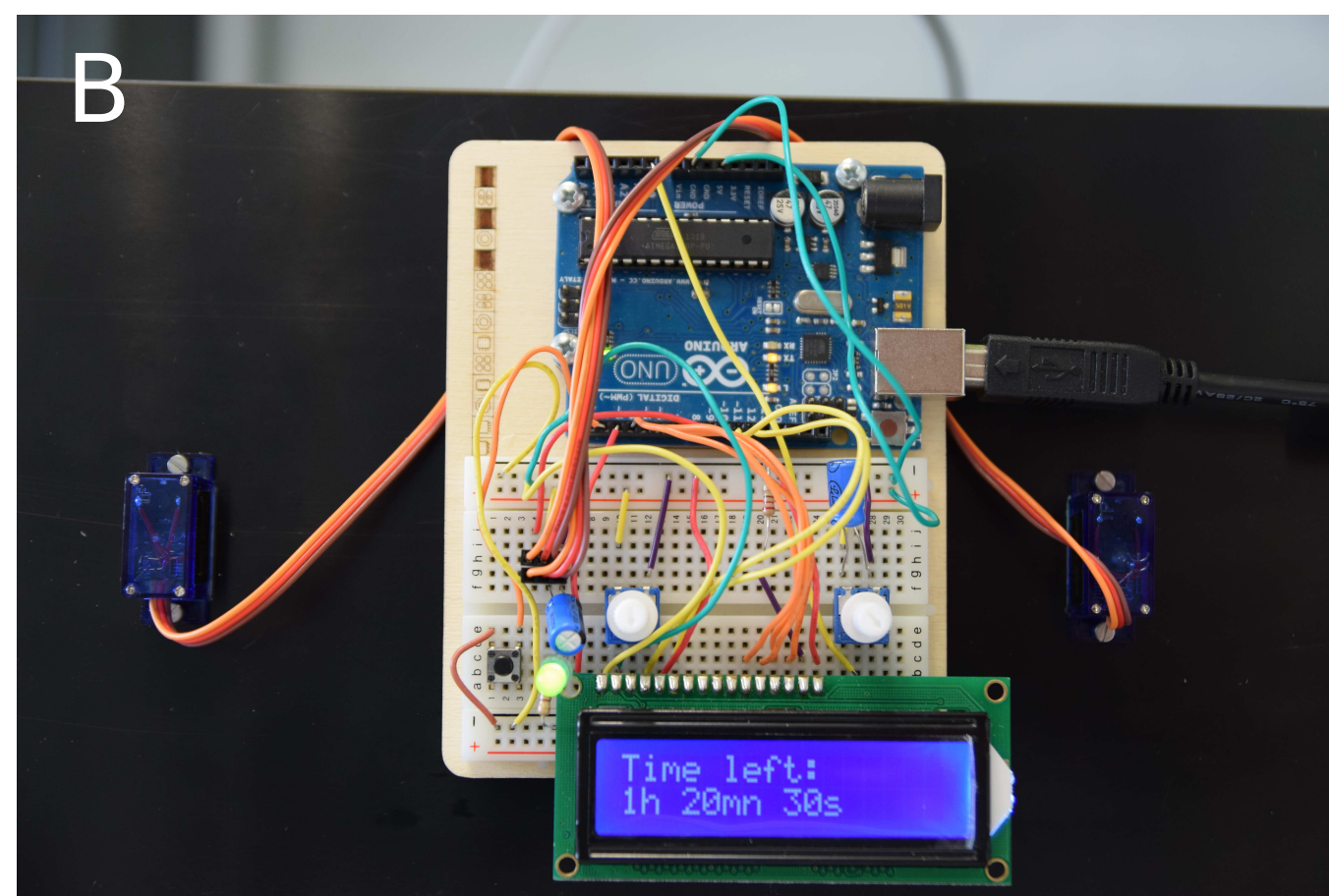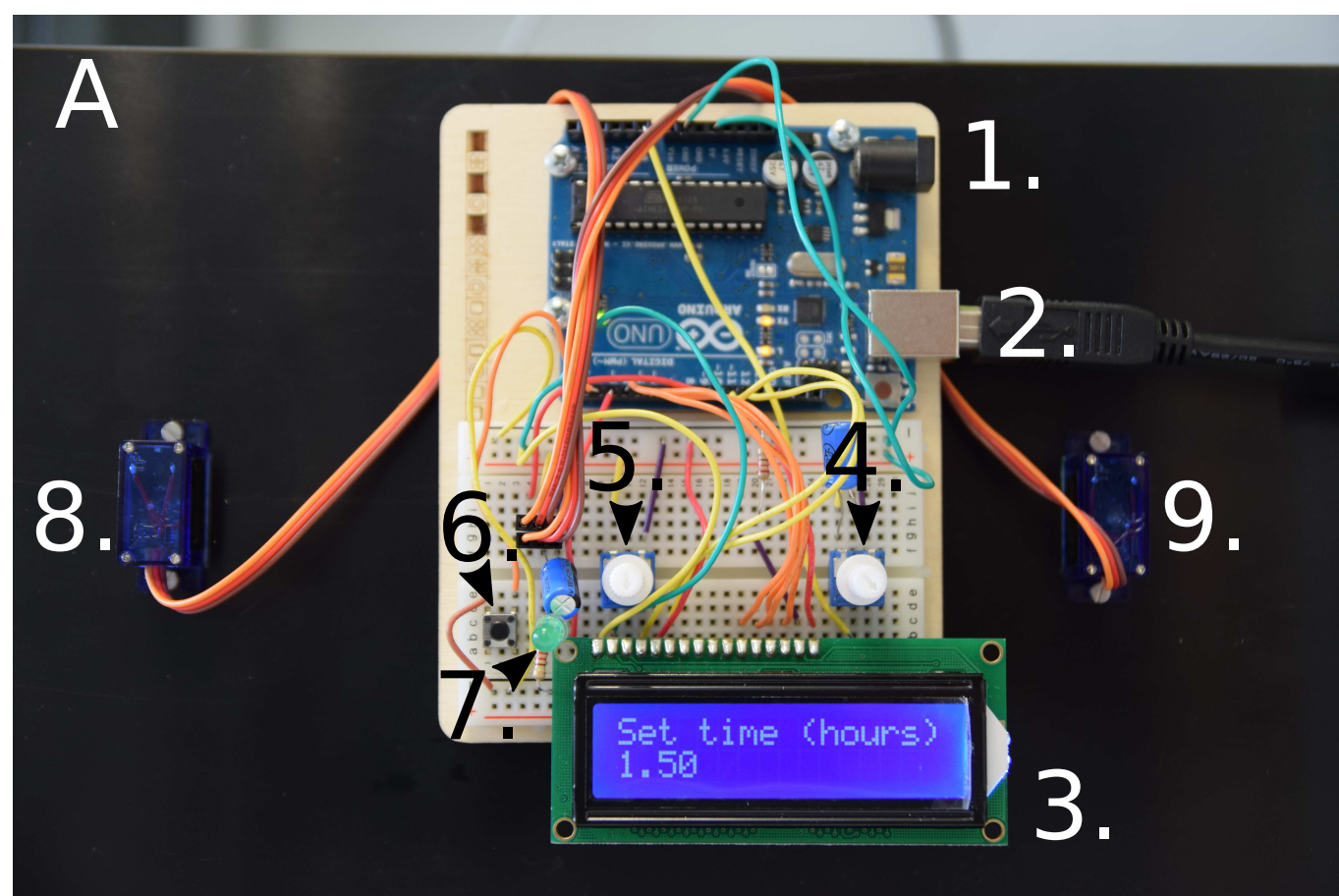
The Arduino gravistimulation device step by step

(1.) Electrical power plug, (2.) USB cable, (3.) LCD screen, (4.) Potentiometer to adjust the countdown, (5.) Potentiometer to adjust the LCD backlight, (6.) Pushbutton to start/stop countdown, (7.) LED. ON when countdown is ongoing or over, (8.-9.) Servos.
(A) Selection of countdown duration.
(B) Countdown.
(C) End of countdown and 170 degrees rotation of the Petri dishes.

Want to build one or just know more?

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Visit these webpages

https://github.com/marionlouveaux
http://marionlouveaux.free.fr

Online ressources used for this project

Servo and LCD screen
Project 5 "Mood cue", and 11 "Crystal Ball" from Arduino starter kit book

Button/light switch
https://openclassrooms.com/courses/programmez-vos-premiers-montages-avec-arduino/le-bouton-poussoir

Countdown
http://colin.pitrat.free.fr/?p=393