**LEGOLAS Protocol (after Summer 2024)**

Most recent date: 8/12/2024

Miller Gruen (7/29/24), edited by M. Lowe (8/12/24)

**Turning On:**

1. Ensure files are in order – see end of document for list
2. Ensure the acquisition plunger is all the way down
3. Ensure the pipet (syringe) is full up.
4. Ensure the y gears are aligned for the horizontal movement
5. Turn on the pis
6. Remove the cap from the pH sensor
7. Manually move pH sensor to full up
8. Place the base. Push base all the way back against the corner farthest from the buttons
9. Place well in position with notch in upper left corner
10. Calibrate pH sensor up/down using manual.py (see below)
    1. Ensure correct environment
    2. Ensure connection to Linksys
11. Fill the acid, base, and clean wells and place them into position
12. Place pH standards in wells (pH 7, green, well (3,0), (3,2); pH 4, pink, well (3,1), (3,3))
13. Calibration with pH standards is done within the code. Repeat 4x and ignore first time.
14. Ensure the pH sensor is full up before running

A close-up of a lab

Description automatically generated

**Environment: Legolas\_2024**

1. In anaconda prompt: “conda activate Legolas\_2024”
2. In Jupyter, set kernel

**Manual**

1. Move to the correct directory in Anaconda terminal window.
2. Ensure manual.py has the correct file directory for cell\_map.txt by checking config.yaml
3. Connect to linksys
4. Run manual.py (python manual.py)
5. Reset servers (192.168.1.11 and 192.168.1.14)
6. Connect via config.yaml
7. Send home
8. (can do rest of calibrations)
   1. For pH full down go until the sensor clicks against the bottom of the well
9. File > export
   1. Click on old config.yaml file
10. Just x out of manual to close

**Most recent full run file:**

* 1. LEGOLASGP.py
  2. LegolasDemo.ipynb
     1. Remember to set kernel in jupyter notebook
     2. Legolas\_2024-kernel
     3. A screenshot of a computer

        Description automatically generatedA screenshot of a computer

        Description automatically generated

**Turning off**

1. Ensure the plunger is fully down. Syringe should be full up.
2. Remove the base
3. Place the cap on the pH sensor
   1. Make sure there is 3.3M KCL with the pH sensor tip fully submerged
4. Turn off the pis

**Files Needed:**

1. core.py
2. utils.py
3. config.yaml
   1. contains calibrations for stage (acid, base, clean, blot), volume, device offset, pH device, syringe z, stage x offset, stage y offset
   2. check directory of cell\_map.txt
4. cell\_map.txt
   1. contains calibrations for the wells
   2. check if all of the positions are correct by testing whether pH sensor can go in the wells
5. manual.py (for calibration)
6. Main file (ex. LegolasDemo.ipynb or LEGOLASGP.py)
7. Make sure .\plots directory exists if needed

**IP addresses:**

1. 192.168.1.11 (horizontal)
2. 192.168.1.14 (vertical)

**Username and password for Pi’s:** greenleaf, raspberry