Robotics 311 : How to build robots and make them move

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ROB 311 – Lab 2

Materials for Today's Class – 9/7/22

Per Person

- 1x SD card
- 1x SD card reader
- 1x USB to USB Micro cable (green and white package)
- 1x USB to USB C cable (gold package)
- 1x Raspberry Pi
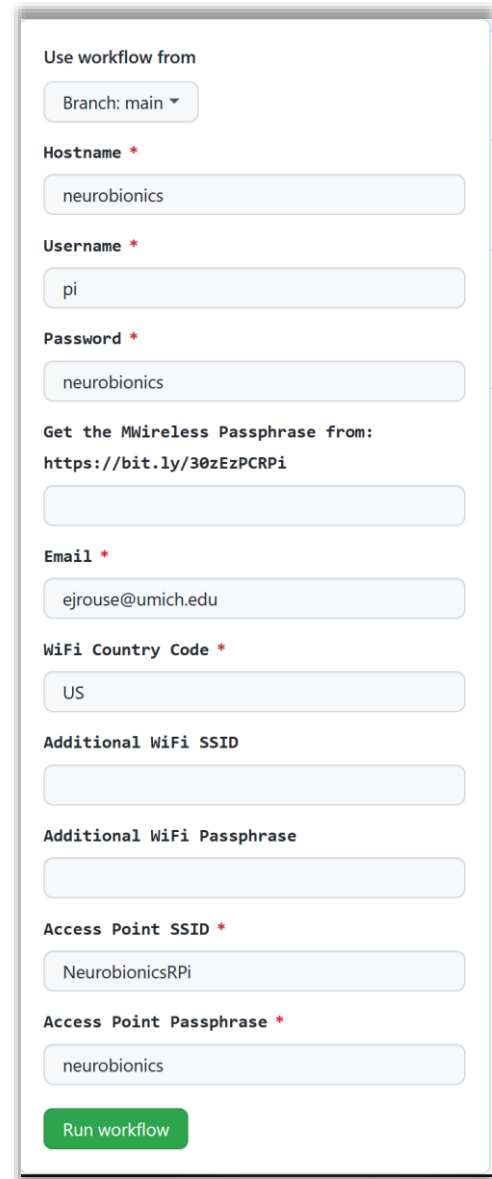- 1x Battery (to be returned after lab)

Per Team

- 1x Plastic Box

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- Today we will setup of your Raspberry Pi that will run your ball-bot
- We will:
  - Setup and build your image using Github Actions
  - Download software tools (Sublime Text, Win SCP and Putty or VSCode)
  - Boot your Raspberry Pi and log in with your credentials
  - Run raspi-config and enable SPI
  - Add your team name to WiFi email script / use Linux editor
  - Review Linux / bash commands

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- Setup and build your image using Github Actions

- Search Google for Neurobionics github

- Navigate to repositories – select ROB311pi

- https://github.com/neurobionics/rob311pi

- This page describes the image builder tool

- Navigate to the 'Actions' tab, and select 'Build' on the left side

- Select 'Run workflow'

- Enter your details – leave the username as 'pi'

- Select 'Run Workflow' at the bottom of the form

- This takes a few minutes

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- Install software tools
- For PC
  - Download Sublime Text
  - Download Putty
  - Download WinSCP
  - Set Sublime text as default editor in WinSCP
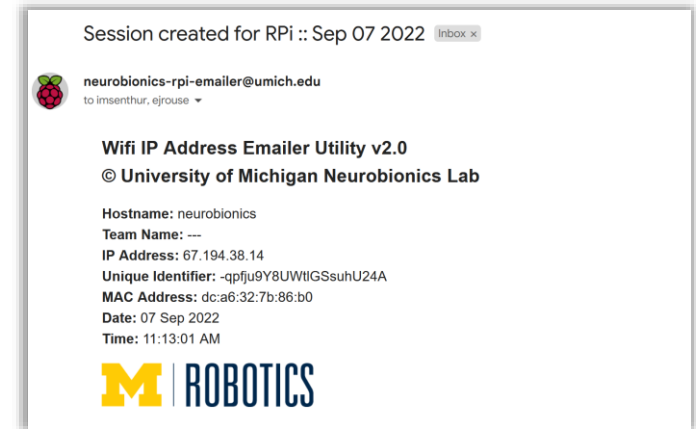- For Mac
  - Download VSCode – PC users can also use VSCode

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- Flash your SD card

- Following downloading of your image, unzip and locate the file (.img)

- Download the Raspberry Pi Imager

- https://www.raspberrypi.com/software

- Insert your SD card into the provided card reader

- Flash the SD card using the imager tool and your built image

- This takes a few minutes

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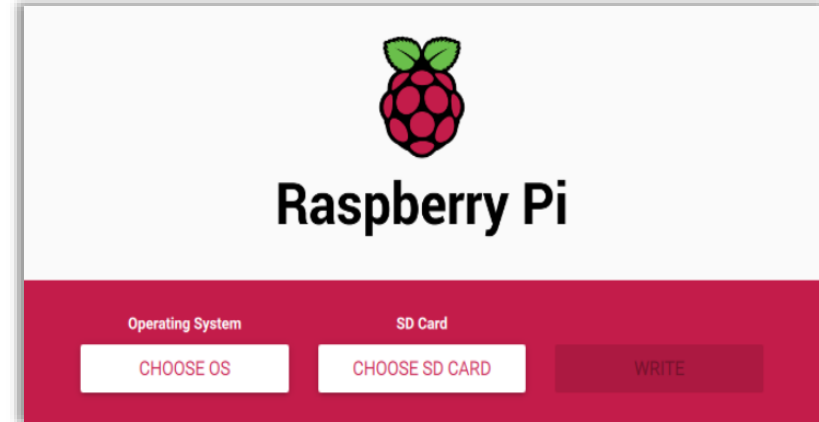
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- Boot up and log into your Raspberry Pi

- You should get an email with your IP address

- Enter the IP address as the hostname (port 22)

- Enter the credentials to log in

- Add your team name to the email sent on boot

  - Type `sudo nano /etc/startup_mailer.py`

  - Find where the team name is added, delete `'---'` and add your team name

  - Ctrl O to save

  - Exit

- Type `sudo python /etc/startup_mailer.py` and you should receive the email with your team name added

Session created for RPi :: Sep 07 2022 Inbox ×

neurobionics-rpi-emailer@umich.edu
to imsenthur, ejrouse

Wifi IP Address Emailer Utility v2.0
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Hostname: neurobionics
Team Name: ---
IP Address: 67.194.38.14
Unique Identifier: -qpfju9Y8UWtIGSsuhU24A
MAC Address: dc:a6:32:7b:86:b0
Date: 07 Sep 2022
Time: 11:13:01 AM

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- Test access point configuration
- If no known WiFi networks are in range, it will boot up in access point mode (like an Amazon Alexa)
- To test this, edit the WiFi network name here:

  ```
  /etc/wpa_supplicant/wpa_supplicant-wlan0.conf
  ```

- Type nano /etc/wpa_supplicant/wpa_supplicant-wlan0.conf
- Add a spelling error to MWireless, so it will not connect on boot
- Save by pressing ctrl O
- Exit and reboot
- You should see a new WiFi network with your access point network name
- This network is not connected to the internet—its local between your computer and the RPi
- Once connected, go back and change `wpa_supplicant` to remove the edit just made. This is how you will connect if not at U-M.

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- Linux terminal commands
- Cheat sheet provided Files>Labs>Lab 2