

Meeting #8 (2/17/23) - 1:55 PM - 2:20 PM

Goal: Plan day, understand Gantt Chart, plan items for purchase.

- Order parts by Wednesday
- Follow up w/ TA about touch screen display
- Find means for 3D printing
- Brainstorm high level diagrams for hardware network & microcontroller placement
- Find food safe material to use for device

My Role: Microcontroller Specialist & Hardware Networking

- Program Raspberry Pi, Arduino, Connect Components together.
- Find pin schematics/data sheets

Deadlines (soft):

Sketching Sunday

Wednesday - draft sketches done, potentially start CAD

General Sketch of UI

Block Diagram of Arduino

↳ Figure out how system will work together.

↳ Mess w/ TinkerCAD

↳ Possibly need additional parts

Research & Findings

Missing usb → HDMI cable to use Pi.

PI & Arduino can communicate via their usb ports.

GPIO pins can be used to establish communication instead of usb.

Communication between hardware is called Serial.

* Steps to Setup Communication:

1. Detect Arduino board on the Pi.

- Run "ls/dev/tty*" to find serial name of Arduino

2. Add permission on Ubuntu to avoid errors. [dialout]

- Sudo adduser username dialout

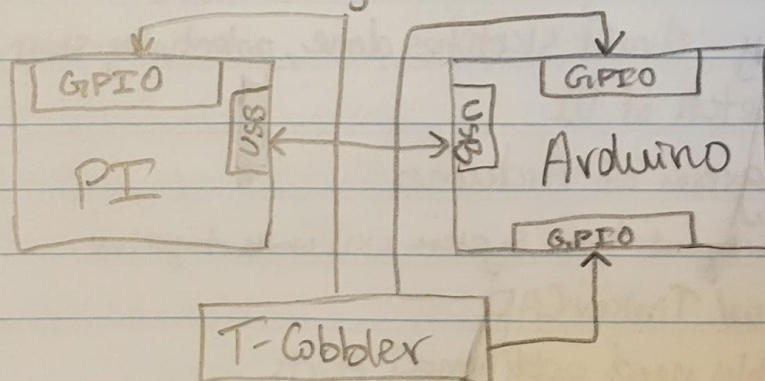
- Grants access to /dev devices.

3. Install pySerial library

- python3 -m pip install pyserial

4. Look up basic examples for sending & receiving data between devices.

PI to Arduino Diagram



Meeting #9 (2/20/23) - 8:00 AM - 9:30 AM

- Worked on finding parts to buy
- Determine motors to use
- Determine type of 3D printing material to use
- Design components

Meeting #10 (2/22/23) - 8:00 AM - 10:05 AM

Goals

- ☒ Finalize budget
- ☒ Meet w/ Prof & TA
- ☒ Order parts

Meeting Notes:

- Can cut housings in half to double container amounts.
- Have device take in multiple orders
 - ↳ Optimize rotation to minimize distance traveled.
- Adjust spin dispenser depending on spice
 - ↳ Diff. Spices are more potent than others, amt will vary.

Meeting #11 (2/25/23) - 10:00 AM - 10:31 AM

Notes: Meeting moved to Saturday due to time conflicts.

All parts will arrive Monday except turn table

↳ Ordered a different one

Sprint 2 Starts

Will get HDMI - micro HDMI from Carlos after meeting

Will get Arduino from Caleb on Monday

Begin physically connecting Pi & Arduino when possible

Frontend UI will be Java Swing or JavaFx

3D modeling will begin

↳ becomes easier when parts arrive

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Meeting #12 (3/1/23) - 8:00 AM - 10:00 AM

Goals prior to meeting:

- ☒ Acquire all hardware
- ☒ Configure Raspberry Pi
- ☒ Download Arduino IDE
- ☒ Learn & Configure Arduino
- ☒ Setup one way communication Arduino \rightarrow Pi
- ☒ Setup bi-directional communication Arduino \leftrightarrow Pi

Notes:

Bi-directional allows Arduino & Pi to receive data from each other.

Same port must be used on both devices (ex. 9600)

Writing/sending data must be converted to bytes

Last character in serial gets detected to stop reading

\rightarrow recommended to use newline "`\n`"

Meeting Notes:

- Figure out how to make motor-spiral connection airtight but free enough to spin w/o much friction
 - \rightarrow locking mechanism
- Will use cylindrical containers available @ HEB instead of original trapezoidal idea.

Meeting #13 (3/3/23) - 1:35 PM - 1:55 PM

L298N DC Motor Implementation:

- 2 means of control

↳ Pulse Width Modulation (PWM) for Control Speed

↳ H-Bridge for Spinning direction

- PWM

↳ Average Voltage Supplied \propto motor speed.

↳ Average Voltage = width of pulses = duty Cycle.

- H-Bridge

↳ Direction Controlled by polarity of input Voltage

- Pins

↳ V_{cc} Powers H-Bridge (5V-12V)

↳ +5V powers logic circuitry (5V-7V)

↳ Out 1 & 2 for motor 1, Out 3 & 4 for motor 2

↳ IN pins Control motor rotation. (0,0), (1,1) = OFF, (1,0) = Forward

(0,1) = Backward

↳ Only power V_{cc} when regulator is on. (Automatically sends power to +5V pin.)

↳ ENA & ENB Controls motor speed. (0,0) = OFF, (1,1) = ON

↳ To Control Speed with Code, remove jumpers & Connect to Arduino PWM-enable pins. Otherwise, default to OFF or Max Speed.

↳ * Might need stronger Voltage Supply.

Meeting #14 (3/8/23) - 8:00 AM - 10:00 AM

Meeting Notes:

- Utilize pin system to route wires to a central hub.
 - ↳ Electrical approach instead of the previously proposed idea which was more mechanical.
 - ↳ Ensure connection lines don't intersect, will cause problems.
- Find a way to measure spice levels on the software side.
 - ↳ How will website know how much spice is left for dispensing.
- Simpler design by having motors in all housings to reduce mechanical work.
- Will need more power to system.
 - ↳ Motors turn too slow.

Meeting #15 (3/20/23) - 9:30 AM - 11:00 AM

Goals

- ☒ Discuss progress over break
- ☒ Begin CDR

Notes:

- Tried a 9V battery supply instead of 5V.
 - ↳ Motor spins much faster - probably too fast
 - ↳ Will either reduce Voltage by powering more components, use resistors, or Control Speed via ENA & ENB with software.
- Updated design
 - ↳ Containers for spice will be Fiesta brand Spice bottles
 - ↳ Each housing will have its own distribution motor instead of a single motor system.
 - ↳ Bearing gear will be broken into 4 identical sections to 3D print properly.
 - ↳ Updated budget includes more motors & solder.
 - ↳ Frontend UI will use a database for recipes to remove need for a keyboard.

Notebook Check #2