

WATER WE WASTING???

**Members: Phu Nguyen,
Savannah Danger
Mentor: Francesca
Frattaroli**

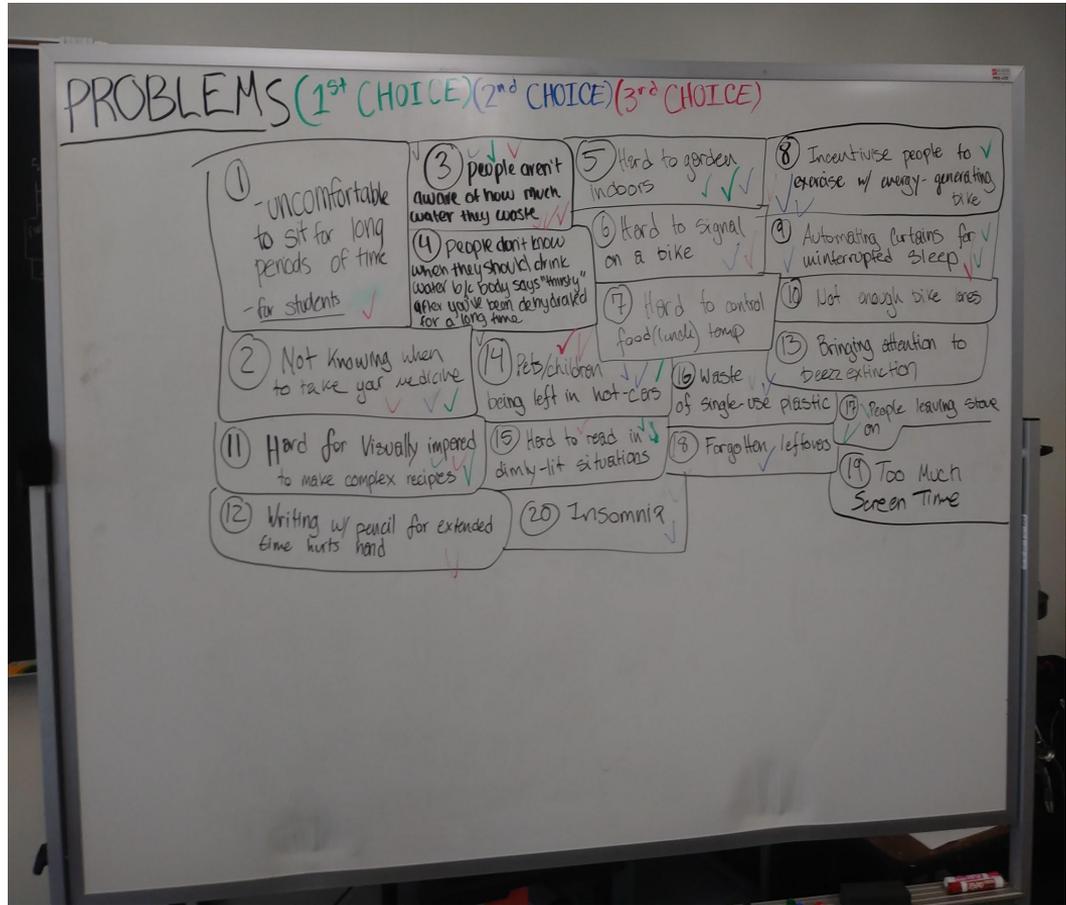
OUR PROBLEM:

For those who have easy access to clean water, it is hard to understand the effects of using too much water daily. A lot of people use well over the required amount and this is bad for the environment because, it removes water from the ecosystems.

User /Setting: Privileged people that have constant access to clean drinking water.

“Tune In” - Inventions that Alter Perception or Bring Attention

- Theme Connection: Bringing Attention to Water Waste.



HISTORY AND CONTEXT

- Bare minimum of water needed: 9 gallons per person per day
- Average amount of water used by American: 88 gallons per day

Effect of uses too much water:

- Colorado river feeds 30 million since 1920 and has shrunk 130 feet causing droughts and killing ecosystems. - Smithsonian
- “Much of the same is happening in California. From 2011 to 2016, the state suffered its worst drought in 1,200 years. Its major aquifers receded at a combined rate of 16 million acre-feet per year, and roughly 1,900 wells ran dry” - BBC
- Average household Carbon Footprint due to water usage: 4.5 metric Tons of CO₂



DESIGN PROCESS

- One way to address the problem of water waste, was to invent something to bring awareness to domestic water usage, allowing the user to connect behavior to water waste. This invention would allow the user to make a conscious choice to use less water.
- Our final design was a device that counted the amount of gallons coming from a faucet, displaying how many gallons should be used in a day (based off of national averages)
- Our design considers the user in the following ways:
 - It is a universal design that fits on many faucets
 - It accounts for different household sizes in calculating appropriate water usage
 - It is easy to understand and operate (only one knob and one button)
 - Everything is labeled



SOLUTION REQUIREMENTS AND GOALS

Minimum: (Requirements)

- Track gallons from single faucet using motion sensors/completing a circuit
- To display number of gallons on LCD module
- Knowing whether or not water is flowing from the faucet itself

Realistic: (Goals)

- How much water the household should be using vs. calculating how much they are using
- Being equipped with a fixed hose cap limiting the amount of water that comes out of the faucet
- Being able to alert the user when they are nearing the cap amount of gallons for the day
- The device will begin to beep at user if on for more than 10-20 seconds (if they are not there).

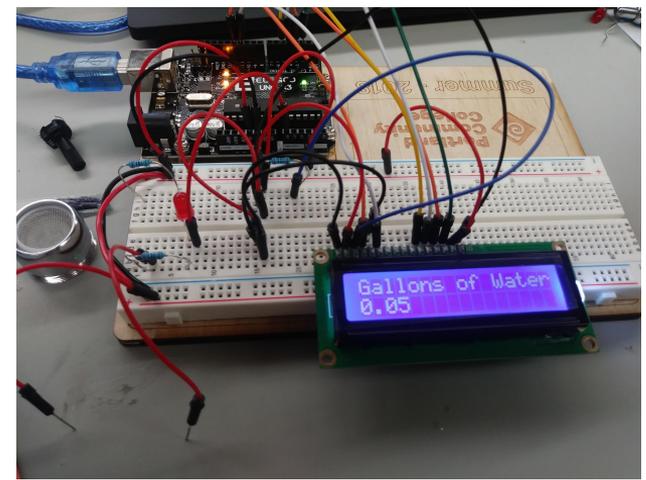
Reach: (Goals)

- The Arduino will log day data to read back after a month in order to allow the user to see whether or not the device is working in aiding them to save water
- Human sensor: if there's no user, then the water will automatically shut off.



TEAM ROLES

- Mechanical Lead: Savannah
 - Connecting the faucet device to the faucet
 - Making the faucet device slim enough to not bother user
 - Waterproofing both devices
 - Where the screen goes (mounted or on counters)
- Electronics Lead: Savannah
 - Allowing user to reset device in case of new members of family
 - Enter button or not depending on programming choices
 - Keeping everything compact for an easy use/storage
- Programming Lead: Phu
 - Transfer the amount of gallon from the water motion sensor to the LCD screen
 - Record data
 - How the user will finalise choice (with rotary encoder maybe)
 - Allowing user to reset number of people in the house in case someone new comes (number number to be multiplied)
 - Recommends the amount of water according to the amount of users (~90 gallons/person)
 - Keeping track of time (RTC module)



TECHNIQUES AND TOOLS

- Sketching out ideas in Notebooks - Generating Ideas and solving circuit problems
- Cardboard Mockups - How Everything fits together, size, connections, etc.
- Pseudocode - Wrote out fake code, to get ideas down
- Fabrication Tools:
 - Hot Glue Gun - Sealing/waterproofing
 - Soldering Gun - Wiring
 - Screwdrivers and Drill - Structure
- Adobe Illustrator /Laser cutter - Enclosure of Project
- Arduino.Create Programming - Controlling project



```
What is pseudocode:
Pseudocode is an english-like way to state an algorithm.

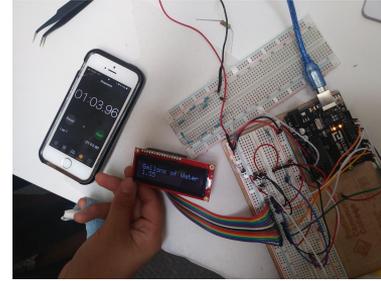
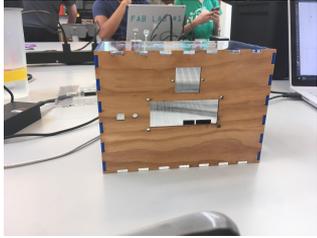
write a pseudocode solution for taking in two integer values and your
solution should output the sum and the product of those numbers.

prompt the user for number 1
save input to num1
prompt the user for number 2
save input to num2
sum = num1 + num2
product = num1 * num2
print sum
print prod

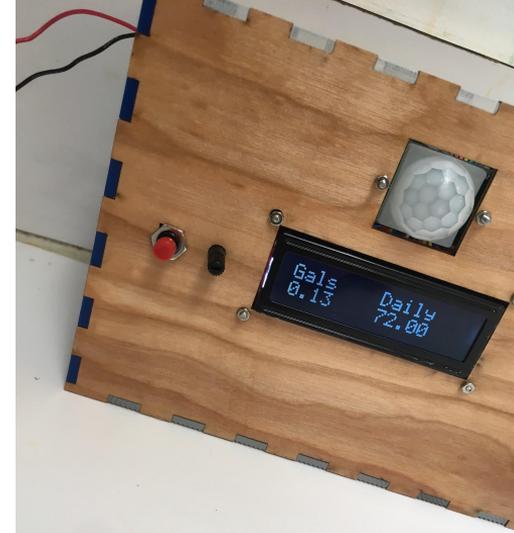
Write a pseudocode solution which will take in an integer value and
determine whether that value is odd or even.
```



SOME PHOTOS FOR OLD-TIMES SAKE



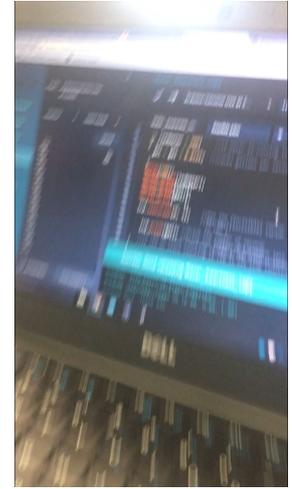
FINAL PRODUCT:



Our device takes inputs from user to determine the amount of gallons they should be using daily using

CHALLENGES:

- Sealing faucet device
- Coding (especially using a new programming language)
- Getting Motion Sensor to work
- Dimensioning Enclosure Box



<https://makeabox.io/>

FUTURE IMPROVEMENT

Describe what you would add to your project if you had more time/money/resources.

- Congratulates you when you save water/complains when you don't
- Bluetooth (wireless)
- Automatic Shutoff
- Faucet device could look more professional.



THINGS WE LEARNED

What did you learn about the invention process, group work, technical skills?

- It's better to start with a pseudo code
- Better to have a clear idea before you start working.
- Mockups are helpful to visualize project

Is there anything you would do differently for your project or approach differently while inventing now that you've been through the camp?

- To speak up when you do/don't like ideas
- Multitasked a little better
- Writing ideas out on paper and seeing what you want to do is easier than trying to guess what you should do with the idea in your head

PSEUDOCODE

```
set total to zero

get list of numbers

loop through each number in the list
  add each number to total
end loop

if number more than zero
  print "it's positive" message
else
  print "it's zero or less" message
end if
```

lynda.com

Deductive Reasoning: the top down approach

Starts with a general statement, theory, or hypothesis

Works it's way down to a conclusion based on evidence

THANKS
FOR
WATCHING



THANKS
FOR
LISTENING

THANKS
FOR
LISTENING

THANKS
FOR
WATCHING