# SDDEC19-21
Battery-less IoT Device
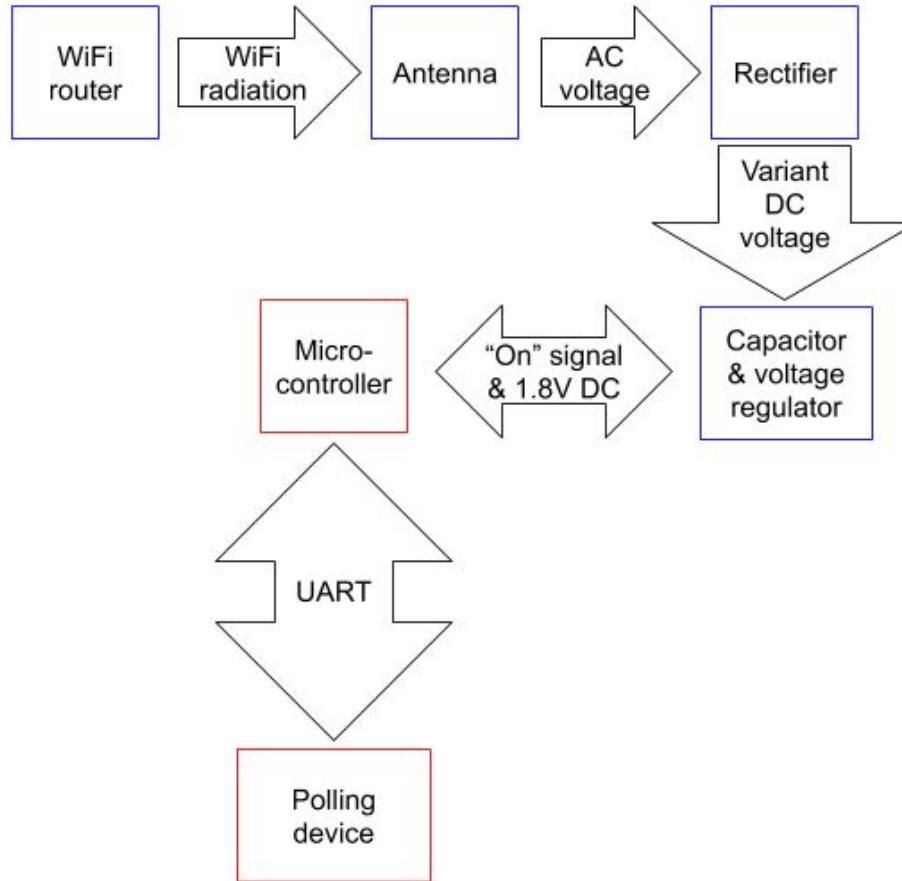
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Battery-Less IoT Device

- General Problem statement:
    - Harvest RF energy and convert it into a form useable by a microcontroller
- General Solution Approach:
    - Harvest and convert ambient RF waves into DC
    - Gradual charge and storage (capacitor bank)
    - Low Power Mode Microcontroller
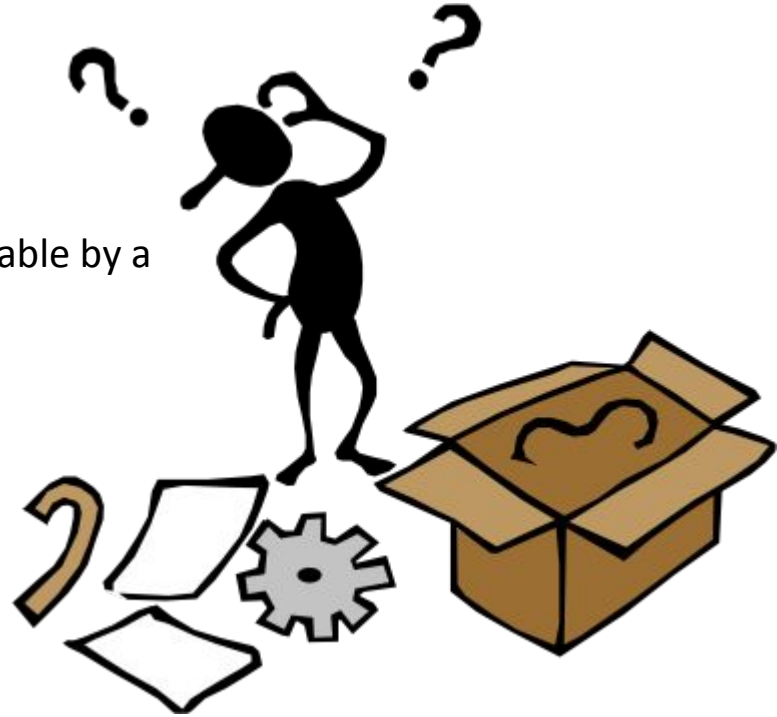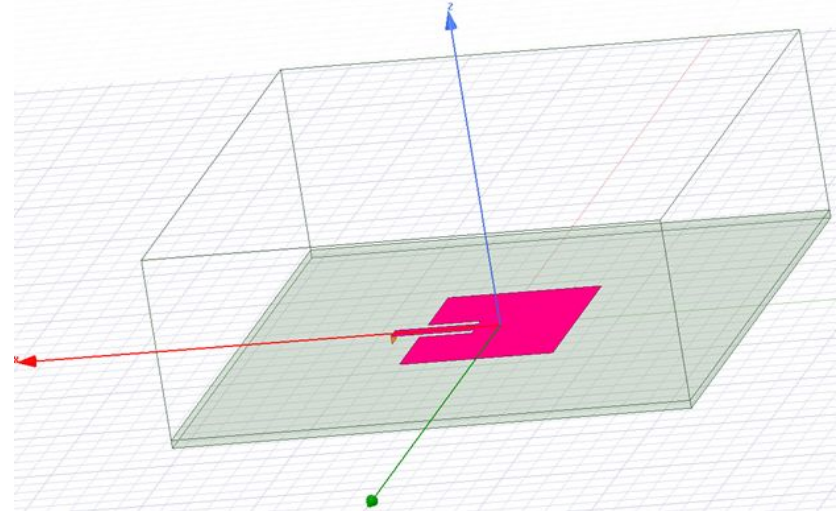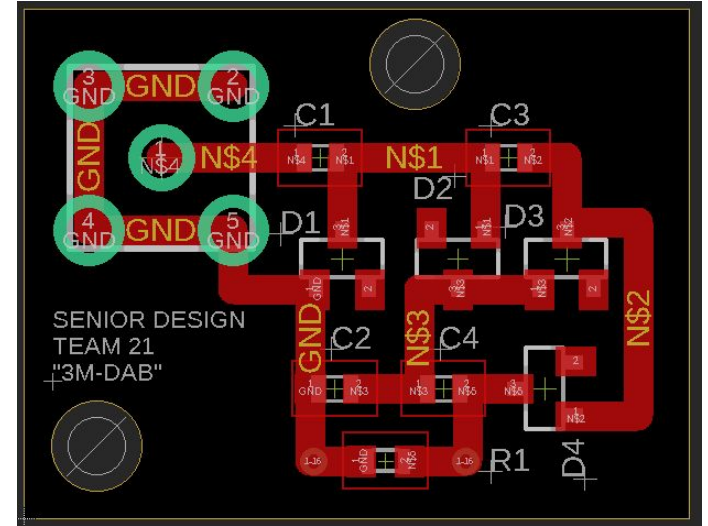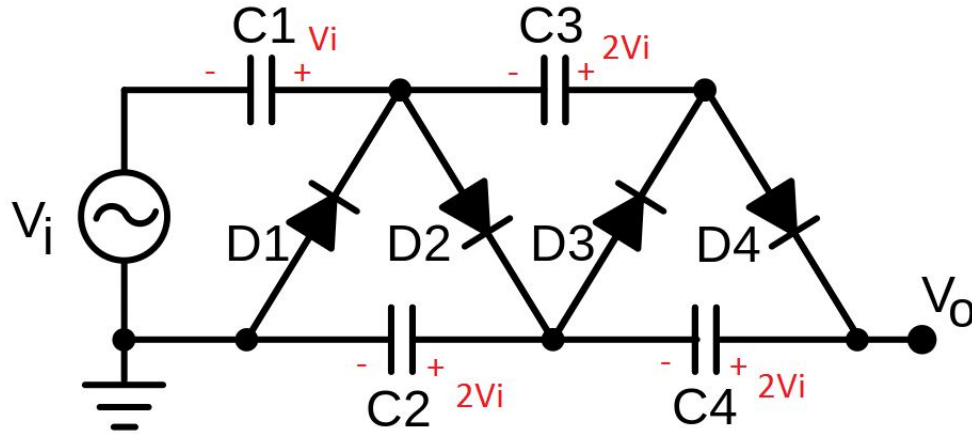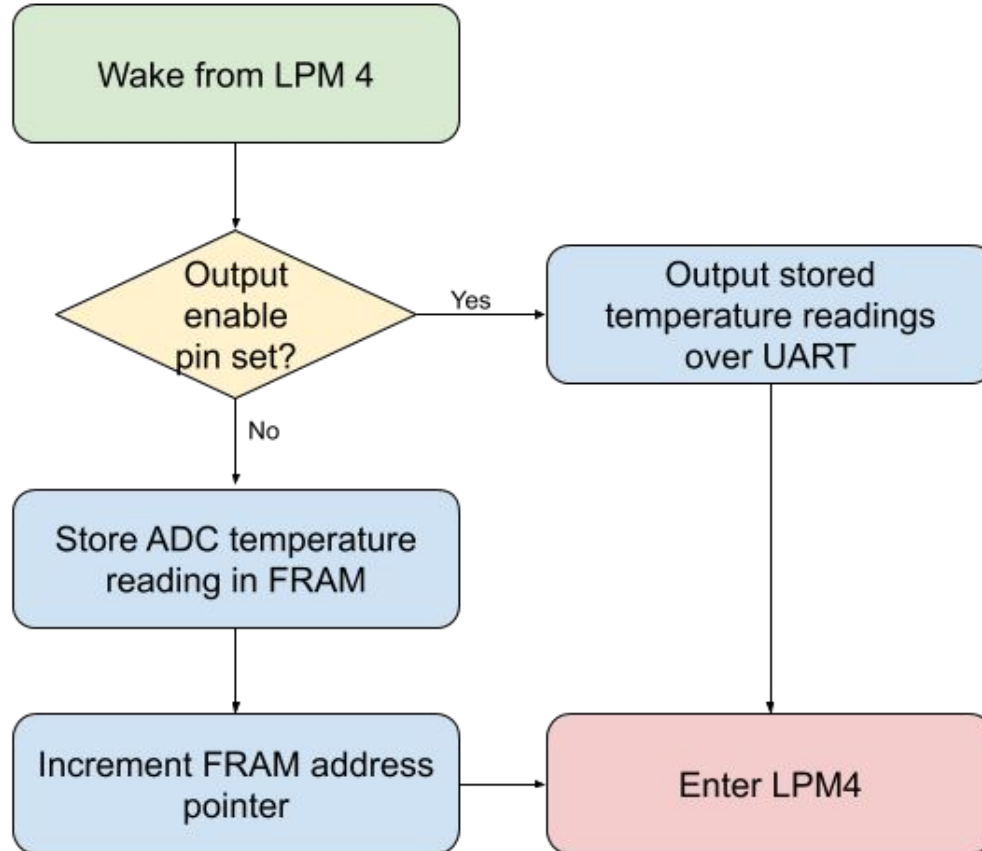
Conceptual Sketch

Antenna Circuit

Figure 01: 2.4 GHz Patch Antenna

Rectifier Circuit

Schematic and board of Cockroft-Walton voltage multiplier

Software Control Flow

Semester Goals

- Prototyping our design

- Testing the functionality of our end product

- Design and assembling our final product on a PCB board

- Create software that can perform a meaningful task with intermittent power.

- Delivering a device that harvests ambient RF waves and converts the power received

  into a usable form.

Technical Challenges

- Rectifier Circuit Design
  - Mitigating leakage current
  - Efficient voltage regulation and current
  - Fabricating compact circuits
- Antenna Design
  - Designing antenna that captures enough energy
  - Effect of parasitics and impedance matching after fabricating PCB board
- Software
  - Functionality between power loss
  - Efficiency
  - Data retention and delivery

Questions?

Thank you