# Project Management and Tracking Procedures

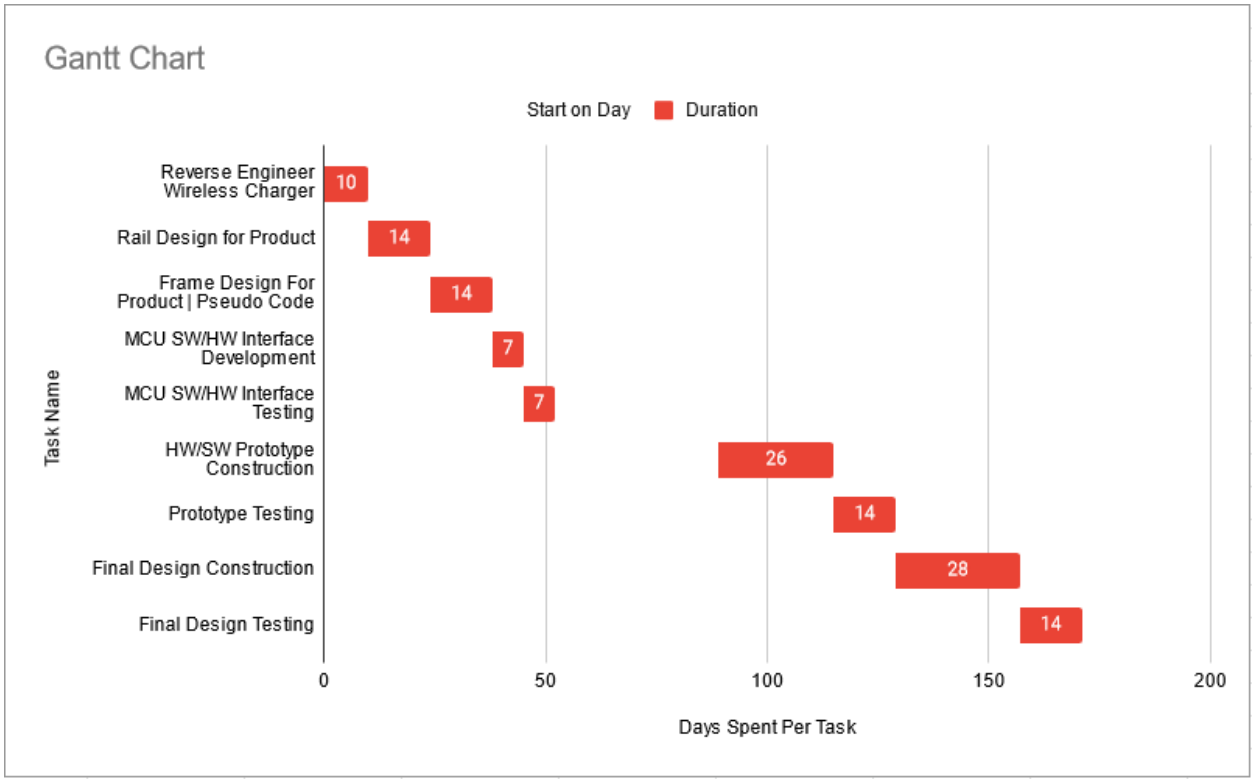
In the beginning, we are adopting a waterfall project management style as we are still in the planning/design stages of the project. Later on, after we establish a plan for designing the wireless charger and taking measurements, we will adopt a more agile style as there will be more moving pieces at the same time. We will use a few programs to coordinate within the group:

- Git for version control
- GitLab for a Git remote and for issue boards
- Discord for team communications and planning.

# Task Decomposition

- Reverse engineer a wireless charger
    - Understand the inner workings
    - Connect current sensor to the output of the coil inside the charger
    - Is the maximum current output directly correlated with the alignment of the coil?
- Design a mechanical 2D plane such that the coil in the charger can move to any position on the charger
    - Use two stationary motors to move the inner coil
        - This will allow the coil to move with the least amount of resistance due to the light weight of the moving parts.
    - Ensure that the coil is able to move the entire range of the charger (i.e. it can optimize charging no matter the phone orientation)
        - Could be difficult to get the coil oriented all the way to the outer limits of the physical charger.
- Develop a software that can find the optimal location of the charging coil.
    - Scan the 2D plane
        - Find the max. current output for the x-axis
        - Find the max. current output for the y-axis
    - Ensure the scan time is as fast as possible.
    - Figure out a way to initiate the program
        - Could we use the current sensor to know when a phone is placed on the pad?
        - Also could use IR sensors if necessary.
- Design an attractive case for the charger.
    - Utilize a design that can inadvertently get the user to align the phone to the charger.
        - This could be a way to mitigate the risk of the charging coil not being able to reach the extreme values of the 2D plane
            - We could put small edges around the perimeter of the charging pad so the user will naturally place their phone within those boundaries.

# Project Proposed Milestones, Metrics, and Evaluation Criteria



# Project Timeline and Schedule

1. Reverse Engineer Wireless Charger and Confirm Charging Current Measurability | 10/20/22
2. Rail Design For Product | 10/30/22
3. Frame Design and Pseudo Code | 11/13/22
4. MCU Software Interface Development | 11/27/22
5. MCU Software Interface Testing | 12/4/23
6. HW/SW Prototype Construction | 1/17/23
7. Prototype Testing | 2/12/23
8. Final Design Construction | 2/26/23
9. Final Design Testing | 3/26/23

# Risks and Risk Management and Mitigation

1. Reverse Engineer Wireless Charger and Confirm Charging Current Measurability | Misreading current values | 0.8 | Mitigation: confirm measurements with partner and remeasure
2. Rail Design For Product | No real risks | 0.0
3. Frame Design and Pseudo Code | No real risks | 0.0
4. MCU Software Interface Development | Misunderstanding how components work | 0.1
5. MCU Software Interface Testing | Misunderstanding how components work from previous step | 0.1
6. HW/SW Prototype Construction | Damaged part while building | 0.4
7. Prototype Testing | Damaged part while testing | 0.3
8. Final Design Construction | Damaged part while building | 0.4
9. Final Design Testing | Damaged part while testing | 0.3

# Personnel Effort Requirements

| | |
|---|---|
| Reverse Engineering Wireless Charger | Every person will spend 3 hours on average to complete this task. |
| Rail Design For Product | Every person will spend 5 hours on average to complete this task. |
| Frame Design and Pseudo Code | Every person will spend 5 hours on average to complete this task. |
| MCU Software Interface Development | Every person will spend 4 hours on average to complete this task. |
| MCU Software Interface Testing | Every person will spend 4 hours on average to complete this task. |
| Prototype Testing | Every person will spend 5 hours on average to complete this task. |
| Final Design Construction | Every person will spend 4 hours on average to complete this task. |
| Final Design Testing | Every person will spend 5 hours on average to complete this task. |

# Other Resource Requirements

- Testing materials
    - Wireless charger
    - Multimeter
    - A breadboard
    - Jumper cables
    - Resistors
- Design materials
    - Resistors
    - Qi charging coil
    - Arduino microcontroller
    - Wires
    - Solder
    - Motors (Servo or Stepper)
    - 3D printer to print
        - Frame
        - Rails