

- Goals
 - Minimal:
 - Our demonstration will show that:
 - the robot can move to the simulated elevator,
 - press a directional button on the elevator,
 - move into the elevator door when it is opened,
 - press the appropriate button to move to a different floor
 - Leave the elevator when the elevator door is opened
 - Lead its attendee to a pre-marked destination (e.g. another room on the same floor)
 - The actions taken by the robot will be preplanned
 - Realistic:
 - The actions taken by the robot will be dynamic based off its understanding of
 - What floor it is on
 - What floor it intends to move to
 - The above goal would entail some sort of user interface that allows it to receive commands dynamically
 - Reach goals:
 - The robot will change behavior accurately given response from the leash
 - Some pattern of tugs will stop it
 - Some pattern of tugs will increase its speed
 - Some pattern of tugs will lower its speed
- Implementation Plan
 - Week 1: Saving a plan
 - Build a reasonably large map of the 3rd floor of Sieg and save several landmarks using existing programming
 - Implement signs with AR tags to represent the elevator buttons (up/down) and elevator floor buttons (floors 1, 2, 3, 4)
 - Implement a sign with changing AR tags to represent a successful move to a different floor
 - Use either AR tags or object recognition to recognize an open or closed elevator door
 - Implement a script that saves an action
 - Action here is a combination of both navigation actions (i.e. moving) and gripper actions (i.e. manipulating a gripper relative to the environment)
 - Save and run the action to verify successful completion
 - The video of this will be our first intermediate milestone
 - Week 2: Implement dynamic path generation
 - Need to implement a way to communicate to the robot what floor it is on
 - Since this is a proof of concept, we can just fix an arbitrary starting floor
 - Need to implement a script that automatically generates the appropriate sequence of actions to move to a different floor

- Dynamically decide which elevator button to press and recognize when you reach the correct floor
 - Assumption: All floors have the same floor layout for simplicity
 - Video that shows use of a command line interface to tell robot where it is and which location it needs to go to will be our second intermediate milestone
- Week 3: Testing/extra functionality
 - Install the leash and test the following cases:
 - Move from a location on the current floor to a location on the same floor
 - Move from a location on the current floor to a location on a higher floor
 - Move from a location on the current floor to a location on a lower floor
 - For each of the above cases, try different combinations of floor locations (e.g. water fountain to water fountain, bathroom to neighboring capstone room, etc.)
 - Install leash speed-manipulating functionality:
 - Install functionality described earlier in this document for changing robot speed
 - Tests:
 - Robot moves and person holding the leash does not, leading to an immediate stop of the system
 - Double-pull on the robot incrementally increases the speed of the robot