This is a big project and like any big project we expect to see progress throughout the five weeks. The items presented here are the bare minimum you need to accomplish each week to get to the end and meet the design reviews. **Give this sheet to your most organized person.** Keep a second copy as well. We will happily check off items ahead of time. Generally we expect you to present them to us throughout the week to ensure you are on schedule and not going off the deep end.

Unlike the labs, we gladly accept updates to website with photos/documents as sufficient evidence of a check-off. Still, you should definitely come to the teaching staff in person for better feedback. The checkoffs will generally be your designs and experiments throughout the week. If you stick to the schedule they outline, you will complete the project in an admirable rate. Those dreaming of free beer should tighten this schedule significantly.
**Mini-Week 0:** Logistics and Design Review  
Monday, November 2 to Thursday, November 5  
Deliverables due at Midnight

- **Brainstorm,** meet with team to brainstorm and come up with 5 good ideas.
- **Team Name**
- **3 Team Designs,** sketched out and elaborated on (bring your 2 most interesting designs for design review on October 5, and present 1 of them).
- **Website:** Think of this website as an easier version of your lab reports. You will post your design and progress on the page there.
  - We recommend:
    - WordPress, which makes updating easy,
    - Google sites, which connects to Google docs, or
    - Trello, which is good for coordinating schedules and tasks.
    - You could also use another tool, or make your own.
  - On this website, you will:
    - Maintain the schedule of your project
    - Post pictures and videos of your progress
    - Document your project for future employers or grad schools

MAKE SURE your website is accessible to all teaching staff and your mentor!

<table>
<thead>
<tr>
<th>Staff initials:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Team Designs</td>
<td></td>
</tr>
<tr>
<td>Website and team name</td>
<td></td>
</tr>
</tbody>
</table>
Week 1: Design
Thursday, Nov 5 to Tuesday, Nov 10
Staff signatures due at 6pm

- **Personal Schedules:**
  - A calendar that shows the time you expect to be in lab and the tasks you plan to accomplish. We recommend averaging at least 6 hours a day per partner. Keep these where your partners can see them, like Dropbox or a Google doc.

- **Team Schedule:**
  - A Gantt chart or something similar that shows your team’s anticipated progress over the rest of the quarter. Break the project into daily goals, and try to estimate how much time each will take. This is worth spending a lot of time on!

- **Bill of Materials**
  - Come up with a thorough list of materials you need, from MDF to motors to screws.
  - Plan for mistakes and design revisions.

- **Order:**
  - Submit order for MPJA by Tuesday the 10th. There will be a link on the hallway.

- **System Block Diagram**
  - Like the diagrams of Lab 3, you will need a diagram showing all your connections and all your parts, from hardware to mechanical and software. See the example from Lab 3 or the one on the website for further explanation.

- **Mechanical Design Sketches:**
  - Dimensioned sketches of each aspect of your chosen design: Ball feeder/launcher, ammo collector, motor mounts, beacon detector, bump sensors, etc.

- **Working Beacon Detector:**
  - Ideally one person on your team has a good one. Make 1+ if you don’t. Post a picture and the schematic on the website.

- **Breadboard Tape Detectors:**
  - A photo or video of your tape detectors working on the breadboard.

- **Top two levels of your state machine:**
  - These should illustrate the general design of your state machine. Post the general strategy on your website.

- **PARTNER EVALUATIONS:**
  - Each member of your team must fill out the partner evaluation form on the website.

<table>
<thead>
<tr>
<th>Staff Initials:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bill of Materials</td>
</tr>
<tr>
<td></td>
<td>System block diagram</td>
</tr>
<tr>
<td></td>
<td>Mechanical design sketches</td>
</tr>
<tr>
<td></td>
<td>Breadboard tape sensors</td>
</tr>
<tr>
<td></td>
<td>Top 2 levels of State machine</td>
</tr>
<tr>
<td></td>
<td>Team Schedule</td>
</tr>
<tr>
<td></td>
<td>Personal Schedules</td>
</tr>
</tbody>
</table>
Week 2: Prototyping
Wednesday, Nov 11 to Tuesday, Nov 17
Staff signatures due at 6pm

- **Solidworks Mechanical Model**
  - Turn your mechanical sketches into a full model
  - Expect this to take a LONG time
  - Post a picture of it to your website
- **Foam Core Prototype**: Print out your full model in foamcore to debug any issues.
  - Post pictures to your website
- **Working Perfboard Sensors**
  - Breadboard all your sensors
  - Once they work, place them on perfboards
  - Expect to have at minimum: tape sensors, bump detectors, anything that outputs to motors, LEDs
  - Post pictures and schematics to your website
- **Drivers for hardware**:
  - Code up hardware drivers for each of your sensors. Like the bump and light sensors you saw for the cockroaches, these should give an arsenal of functions and macros that your main State Machine will use. Make sure to build yourself a series of test harnesses as well.
  - Demonstrate or take videos of test harnesses, post with code on website.
- **Breadboard Actuators**:
  - Your actuators should arrive at the end of this week. Make sure you have them all moving (almost a repeat of Lab 3).
  - Pictures or video on your website.
- **Partner Evaluations**:
  - Link will be on hallway.

<table>
<thead>
<tr>
<th>Staff Initials</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solidworks Model</td>
<td></td>
</tr>
<tr>
<td>Foamcore prototype</td>
<td></td>
</tr>
<tr>
<td>Perfboarded sensors</td>
<td></td>
</tr>
<tr>
<td>Hardware drivers</td>
<td></td>
</tr>
<tr>
<td>Breadboard actuators</td>
<td></td>
</tr>
</tbody>
</table>
**Check-off 3:** Integration  
Wednesday, Nov 18 to Tuesday, Nov 24  
Deliverables due at 6pm

- **Smarter than a roach bot**
  - Integrate Bump and tape detectors with Prototype
  - Get DC motors working
  - Write a simple state machine that can follow tape and react to bump events
  - Post pictures and video on website

- **Load And Fire Ammo:**
  - Integrate actuators with sensors to align your bot
  - Robustly collect and fire balls
  - Take video and pictures

- **Full State Machine Design**
  - Like Lab 0, create a full diagram of your state machine
  - Ideally begin coding as well.
  - Post it on your website.

- **Partner Evaluations**
  - Link is on hallway.

<table>
<thead>
<tr>
<th>Staff Initials</th>
<th>Date</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Smarter than a roach bot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Load and Fire Ammo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full HSM</td>
</tr>
</tbody>
</table>
Final Check-off:
Due December 1\textsuperscript{st}, Midnight

- Complete the minimum requirements as described in the project document.
  - Be sure to record a video, if not several. You’ll want to watch it over and over and over.
  - A TA or Gabe will oversee your checkoff, and record your success should you achieve it.
- Good luck!