

Period 3: Lessons Learned

Experience Gained:

This year both new and old members developed their coding, building, and overall teamwork/management skills. At the beginning of the year, we took on ten new members, none of which knew how to program in C or mount onto a servo. Over the course of the regional season, nearly all of them learned how to write basic C code with which they could operate motors/servos, analog and digital sensors. In addition to coding, new members learned fundamentals of building a solid robot build and worked on a robot from start to finish. By the end of the season instead of needing to be guided through attaching legos to metal with screws, new members were offering helpful advice for problems that senior builders were having. While new members gained more basic skills, senior members gained advanced ones and refined the old. Reluctant to use the camera in previous seasons, we are confident to say that all of our senior coders mastered the sensor this year. Coding was more organized this season as multiple versions of the code were saved and backed up to our github. Senior builders played around with new designs such as double motor arms and smaller motor-axle chassis. As we near the end of the regional season, our senior members have a better sense of what part of our schedule should be allotted more time and which should be allotted less. For instance, we put in an overly large amount of time into the testing phase and not nearly enough for the planning phase.

Documentation Process:

This year, all of the new members got a chance to work on the documentation process. The biggest benefit of having all the new members contribute to doc was that everyone was on the same page in terms of what our plan was. Any schedule that was made was included in our first period doc, and our new members got a chance to see it. As we wrote about our robots for the second period documentation, we became more aware of our robot flaws. Although one of our robots had multiple issues, we failed to do anything about it. When we reached the portion of the second period documentation that asked how we improved our build, this made us realize that we should probably change the build of the problematic robot for a better one.

Surprises:

Often simpler mechanisms ended up working a lot smoother than complex ones. Initially to get the frisbees into the upper bin, we constructed a complex multi servo claw that opened and closed around the frisbee and then opened at the bin. When this proved too hard to code, we switched to a very simple no servo, all rigid, claw design which proved very easy to code and operate. Another one of our robots was tasked with sorting the poms along the middle black line on the side of the board. First we had a two servo mechanism that involved cages and a stick

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that would swing to knock off the top pom, but this method proved overly slow and ineffective. After switching to a simple one servo double gear method, the entire mechanism was incredibly easier to code and had a much higher success rate of sorting poms. Overall, we learned from these surprises that simpler mechanisms were vastly superior for a number of reasons. The decreased number of servos and motors meant an easier time coding, and the smaller number of connections decreased the chance of anything breaking.

Advice for Future Teams:

Try to think outside of the box. Often the best plan or best build for your objective may not come to you instantly. At first look, most teams will think of an over complicated way to score points when a much simpler and much easier one could have been implemented. Take time and ask yourself, "could I build this with less servos or motors? Does the robot really need to make this many movements to reach _____. Does the number of points that we score from this justify its time duration or difficulty?" When our team followed this principle we were able to make very clean simple robots that had higher consistency rates than the ones from the previous season. We wish all teams the best of luck for the upcoming regional tournament!