

Thermonuclear Falcons

18-0288

Experience Gained

We learned that coordinating our schedules and managing our time well is essential to building, documenting, and coding. Due to schedule conflicts such as Christmas break, and a plurality of our team being unavailable to attend meetings during their mock exams, we were behind on building the mechanism to collect the blue poms and the mechanism to lift the FEMA director, which meant that the coders as well as the documenters were delayed. Even though we resolved this issue by assigning some of the coders to help with building, something we could have done was arrange more meetings before exams and before break in anticipation of the schedule conflicts so that we finished our tasks with more time to spare. Thus, we gained a lot of experience in managing our time and coordinating efforts with a large team that had varying schedules.

We also learned that one of our team's strengths is communication; even though we initially struggled to organize a team that was nearly double the size of our team last year, the range of systems we had in place, both online (Whatsapp groups, Google Drive, Google Classroom) and in person (weekly face-to-face meetings), allowed the entire team to communicate. It meant that we were able to come up with the best strategies and designs possible as each member of the team had a chance to suggest ideas, and everyone was receptive to hearing new perspectives. Our strength in communication is definitely something we'd like to maintain in future years.

A major experience gained was through the dedication and perseverance we had to show throughout the season. Falling behind due to schedule conflicts meant that a lot of our members came in even when there wasn't a scheduled meeting, such as during lunchtimes, after school, and on weekends. Also, conducting multiple trials and having to continually revise our designs took a lot of dedication as we had to work through our initial frustration in order to finally emerge with robots that functioned in a way we were happy with. Furthermore, a lot of our new members demonstrated an exceptional amount of perseverance as they had to work on their coding skills over Christmas break so they could come back and begin work with the necessary skills. Thus, we also gained a lot of technical experience. Many of our members were new, and they in particular learned a lot about coding, building, and documenting from our older members who were happy to give them assistance and share their experience as needed.

Documentation Process

Over the Botball season, our documentation team recorded our progress through a large quantity of photos, videos, and notes, as well as worked on project plans. P1 Project Plan allowed our team to manage our time efficiently so that we'd meet deadlines and complete smaller tasks in time, as well as ensuring that each member understood their tasks. P2 Mechanical Design helped the entire team understand the mechanisms we're incorporating, including the understanding of the effector, drivetrain, and sensor mount, as given our large team some members and subgroups did not have a detailed understanding of the mechanisms they weren't assigned to work on. The statistical analysis was also incredibly helpful, as it provided quantitative metrics of the performance of our robot that we were able to address after we analyzed our data; for example, our large standard deviation told us that our robot was not as precise as we needed it to be and ensured that we dedicated multiple meetings to improving its precision. Additionally, P2 Code Review helped beginner coders grasp the content and purpose of the coding aspect of the robots. Taking photos and videos

also gave us a record we could refer back to when making improvements so that old designs could be reverted back to if needed. Overall, the documentation process meant that we were able to continually evaluate and improve on our designs and code.

Surprises

One thing we were surprised by is how hard it is to find the most optimal yet simple mechanism to collect the blue poms, Botguy and the FEMA director. Although we began with an idea we were sure we wanted to implement, over the course of the next few weeks we realized that there were certain flaws in our design, mostly relating to its flimsiness and precision. We were surprised by how many factors go into the effectiveness of a robot that you can't discern from an initial design. We were also surprised by how hard it was to come up with a strategy we were happy with. Due to the multitude of ways to score points, and the different levels of difficulties of each task, it took us longer than we'd expected to decide on what points we wanted to try and get. Due to our schedule conflicts, we were also surprised by the overwhelming stress and work that came later on.

Advice for Future Teams

One thing we learned over the course of this season is that managing a larger team comes with its own unique struggles as well as benefits. Last year, we had 9 people on our team, which made communication and organization straightforward. Managing a team of 16 this year taught us that in the future, implementing measures such as sign in sheets and increasing communication through text group chats is integral to ensuring that each person is involved in the process. Spending time working together as a whole team, going through the guide together in order to understand the rules, and ensuring healthy and respectful communication is essential to boosting team morale as well as creating an environment where conflicts can be resolved efficiently. We would suggest to future teams that even when a large team size means that not all members are needed at the same time, whole-team meetings are needed in order to coordinate group efforts as well as work out conflicts of all kinds (interpersonal conflicts, working out the allocation of parts, organizing schedule conflicts, etc).

Also, assigning senior/more experienced team members to new members in order to train them and provide advice is something we highly recommend, as it ensures that lessons learned from previous years can be passed down. Another thing we would recommend to future teams is to manage their time through dividing up tasks into smaller microtasks with individual deadlines: this allows for time to evaluate your progress at periodic intervals and make changes, as well as making it easier to organize meetings so all members know what they can work on and when they have to complete it by.