Mock Kickoff Analysis

# What did we do?

Today, we focused on simulating the brainstorming and design phase after the kickoff. We watched the video of the 2009 competition (Lunacy), reviewed the rules, and brainstormed a strategy and robot design. The goal of today’s exercise was to practice the brainstorming phase, which is crucial to the success of the team. The robot design and strategy the team ultimately settles on is a key factor in determining our success during the competition.

I chose for us to play the 2009 competition because none of us were familiar with game, winning strategies, and winning robots. The first few weeks after kickoff are always filled with uncertainty – I wanted to mimic that as much as possible.

Our schedule went roughly in this order:

* Learn about the competition
* Come up with a strategy on the best way to maximize points. What are things we should have our robot do? What are some things that are not worth doing? Prioritize what is most important.
  + Break into individual teams to create strategies and priorities.
  + Each team will then present their strategy to the group. We then merged our strategy and came to a consensus to what we agreed on.
* Come up with a robot design.
  + Break into individual teams to design the robot.
  + Each team presented their design. I planned to have everybody merge their design, but at this stage, the group seemed tired, and we simply compared designs, similarities, and differences, and moved on to the next stage.
* Review the winning designs
* Conduct a postmortem on how we did today

# Analysis

We ultimately took each strategy (“Play offense”, “Play defense”, “Shoot balls”, “Dump balls”, etc) and listed them up on the whiteboard. There were about 20 priorities in all. Each team then prioritized what was most important, and ranked them from 1 to 10. Empty slots were assigned an automatic weight of 20. We then took the lowest-scored items, and developed those into our ultimate strategy.

What we did was have each team present their strategies, than spent some time writing them on the board. Instead, it would have been more efficient to write them as we went.

However, several of us did comment that the chart and ranking system turned out to be effective. It was a good way to quickly develop consensus, and weed out items which did not have too much popular support. Interestingly, the fact that we gave unweighted items a value of 20 caused the popular priorities to jump straight to the top of the list, while the less popular ones sank to the bottom.

These two stages took longer than I expected. Since the strategy phase is so crucial, in the future, I would place more emphasis on this stage and on coming up with the best strategy possible.

I also noticed that there was some confusion on the rules. I had shown the videos, and created a summary packet outlining unusual rules, dimensional constraints, details about the game, and other information, but this proved to be insufficient. Specifically, there was a degree of confusion on how exactly the game was allowed to be played. For example, many people had not realized that the players were allowed to throw balls when stationed at the outposts.

These were the strategies the team ultimately came up with

* Go fast, and be maneuverable
* Focus on getting the empty cells to the fueling stations
* Dump balls, don’t shoot
* Push balls to the fueling stations
* During autonomous, move around to be difficult to score against

Most of these strategies turned out to be not optimal. The general assumption was that we would be able to move around easily, and that our point score could be maximized by focusing on the Super Cells. We correctly assumed that the human shooters would be a key factor in this match, and that dumping the balls was better than shooting them.

However, the optimal strategy was to collect a large amount of balls, via scooping, and rapidly dumping them into opposing trailers. Teamwork proved to be critical. Despite having sophisticated drive systems, the top-scoring robots proved incapable of overcoming momentum and maneuvering nimbly. Because it was difficult for robots to approach other ones, robots would deliberately try to pin opposing robots to prevent them from moving, allowing a teammate to approach them and regurgitate their balls.

# Takeaways

* Create a chart of priorities and strategies and rank them by priority. Score them to obtain a consensus
* Our instincts were wrong.
  + Even our collective instincts were wrong
  + It may be worth assigning people to deliberately create contrary strategies and robot designs
  + We need to rapidly prototype and test designs to reach an optimal solution
  + Doing another iteration of the strategy and design processes may have been better
  + Come up with a larger variety of ideas, and extensively critique each one.
  + Appoint a devil’s advocate
* We emphasized obtaining supercells – this turned out to be inefficient
* We should look at previous robots and games
  + They often contain similar elements (ball elevator, shooter, etc)
* We need to simplify our strategies and design
  + Keep it simple, we don’t have time for complex maneuvers
  + Try to avoid making a special part or component for everything. Try and combine the function of parts (using a funnel/roller to scoop up balls lying on the floor and ones dropped by human shooters, for example, rather than coming up with a separate part for each)
* Assess the weaknesses of each design
  + Evaluate the how realistic each design is. Do we have the experience and skill to produce it in 6 weeks?
* People need to attend robotics club more frequently. Bring homework and work in shifts.