

Learning the Ropes

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1 Introduction

Both the regional and global competitions of Botball tend to induce mass chaos as the competition dates creep closer and closer. Arguments break out among some teammates, while others begin filling in gaps in the documentation and changes to robots and programs are made without the knowledge and/or approval of some members. Rifts within the team are created; rifts that the team cannot afford at such a critical time. Botball is a team effort, with every single role making a difference. However, in Botball, there are multiple opinions in a team as to how the robots should be built, or what strategy the team should follow to fulfill a given task. These different thoughts almost guarantee that conflicts will be created and the team will be sent spiraling downward. Having been a member of a Botball team that has attended both the regional and global competitions multiple times, I have a few suggestions to make the road slightly easier. See Figure 1 below for a visual representation of the different elements of preparation for Botball.

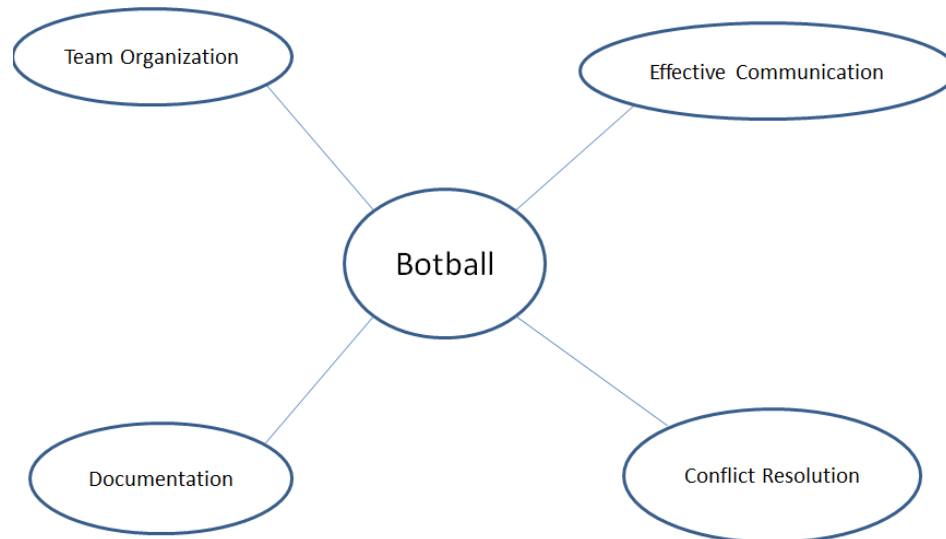


Figure 1: Preparation Elements of Botball

2 Team Organization

Botball is a team effort. Many ideas, strategies and suggestions are thrown back and forth between members. There are three steps to organizing a team. a) establish leadership. b) set expectations. c) gather contact information.

a) establish leadership: a team leader must be chosen to bring everyone together, facilitate discussions and help the team arrive at a common strategy. Subsequently, the team should be divided into groups responsible for building, programming and documentation. Each category should also have a leader who will instigate discussions similar to that of the team leader.

b) set expectations: when creating expectations, form a contract. The contract should simply state all the expectations and the consequences if it is not followed. Have every team member sign the contract showing that he or she understands and accepts the terms. The following is a sample excerpt:

“Every team member is expected to complete their job to the fullest. You are not required to attend every meeting, but if you are absent, it is your responsibility to learn what has been done in your absence. You may not return and attempt to return the team back to their old strategy. If you have any issue, quietly speak to a team leader, and they will take action as they see fit. There is a three-step consequence plan if you are unable to follow the expectations set by the team in this contract....”

c) gather contact information: recording everyone’s contact information will help make team communication more efficient.

3 Effective Communication

In my experience, team communication is a vital part of Botball. Unfortunately, due to the fast paced nature of the competition, it can sometimes be overlooked. When a member is absent for a meeting, progress – in strategy, building, programming and/or documentation – is made without him or her. Amidst all the work, it is difficult for a peer to find the time to explain all the modifications made in his or her absence. For example, I experienced a similar situation one year with unfortunate consequences. One of the objectives for that year’s competition was to get a number of plastic ping pong balls into a several-inch high PVC holder. On my team, we were using an arm on the Create (a robot base with some basic functions built in) to fulfill the task. During a particular practice, there was one member missing from the Create team. And in that practice it was decided that the arm needed to be reconfigured so that the delivery of the balls would be easier. As it so happened, the only Create team member at our next practice was the one who had missed the previous one. To him, it looked like the arm had been attached the wrong way. The other teammates were preoccupied with their respective tasks and so he had no idea that there had been a new strategy and design established. He therefore spent the majority of his time returning the arm to its former build. Only after the next meeting when the entire team was available did everything get sorted out. By that time, valuable time had been wasted returning the arm to the original idea, and hours more were spent to recreate the new design. In order to avoid these situations, I would suggest having a two-step communication plan. First,

have a roster of who went in to work for each practice. This will help team leaders communicate better with team members who weren't at the meeting. Questions that those members may have about practice do not have to be sent out to the whole team. Second, using the contact information that everyone gave, team leaders should send a daily email summarizing the day and explain any significant events. An organizing tip for each person is to have a separate folder for robotics because, as we all know, it is not very difficult to lose an email among the other 600 unread ones. Having all the daily emails in one folder will give you a day by day account of the team's course.

4 Documentation

One of the most crucial aspects of Botball is documentation. Positions have been lost when a team let their documentation fall below par. Many teams, especially the new ones, believe that the only important part of Botball is the robotics portion. Obviously, the robotics is very important, but documentation is the portion of the competition that not only shows that teams know what they are doing, but that they are organized and can adjust and tweak their concepts when things begin to fall apart. The team's entire process is written down and presented to the judges. Two huge problems that my teams have faced are planning and procrastination. A tip for these issues is actually something that Botball already required teams to submit – a project plan. A project plan is a day by day outline of what the team plans to accomplish and when. See Table 1 for an illustration of two days of an outline.

Groups	05.02.2012	05.04.2012
Programming	Start on Skeleton Code	Add basic functions to program
Building Robot 1	Study board and create first strategy	Build the base
Building Robot 2 (Create)	Study board and create first strategy	Build a LEGO base on the Create
Documentation	Create first project plan	Begin recording team's progress (with pictures)

Table 1: Example Project Plan

However, people get caught up in the excitement of building and programming and drag their feet when it comes to documentation which can be dull in comparison. Everyone knows that the documentation has to be done at some point, but it is pushed further and further back until the last minute. At the last minute, the team realizes how much needs to be done so assignments are handed out to everyone available, people begin typing furiously, and documents are pulled out of the printer just in time. Admittedly, the job does get done in the end, but it would be far more efficient if the documentation could be done at a normal pace and be completed alongside the robots. In the case of documentation, the key is to keep all your deadlines in mind. With robots malfunctioning and programs running awry almost on a daily basis, the team may need as many

hands as possible helping. Documentation can fall to the side in times like this, so the best advice that I can offer you is to simply try your best to update all your documentation as your robots progress.

5 Conflict Resolution

A major problem in any high tension team situation is making unanimous decisions and trying to reach compromises. Not everyone will think that a certain course of action is the best, and people will not refrain from expressing their opinions. You cannot stop people from having their own ideas, but you can select team leaders who will be able to bring the team together and begin sifting through all the opinions. This does not mean leaders should take control and simply overrule all ideas with the one they think is the best. They should bring about order and a compromise. If they see that compromise is not the best action, then they should persuade everyone to follow along with one idea. Nevertheless, leaders can be wrong, and when it looks like the decision that was made wasn't necessarily the best, you need someone who can admit to his or her mistakes. Otherwise there is a much higher chance that the members will get hot-headed and frustrated with the leader. Therefore when choosing a leader, be sure to select someone who can take the best parts from each idea, try and create an all-encompassing strategy, and calm the group down. You need someone who will be authoritative enough to control any chaos, but not so overpowering that he or she becomes the only voice that matters.

6 Conclusion

The issues in team organization, effective communication, documentation and conflict resolution cannot always be completely avoided, but based on three years of experience I have suggested a few tips on how to handle them. If you can follow these tips, it should be relatively smooth sailing. Other than the inevitable malfunctions in programs and mechanical failures of robots, the rest of the journey is under your control. Create expectations, select good leaders, make sure all team members know what is going on and when, and manage your time – you'll be able to focus on getting your robots to be competition worthy. However, always remember that Botball isn't an 'all work and no play' experience. Along with the long hours, heated arguments and tedious detailing comes a journey full of rewards, joy and excitement.