

Introduction

For Botball teams, documentation is an integral part of their success, as it is one-third of the total score. Thus, for teams to be successful, documentation must be taken seriously and done in a manner that will merit a good, if not a perfect score. As a person who has been in charge of my team's documentation for two years and has received perfect online documentation scores in each of these years, I want to share my techniques and give advice to the Botball teams. Based on my experiences, I have formulated certain steps needed to ensure success in documentation. This paper details my specific advice, underscoring useful techniques and strategies, needed to achieve a perfect score in documentation.

Adhere to the Rubric

Minimum Requirements

Your submission will score 0 points if it does not meet the following requirements.

- The submitted file must consist of a single file.
- The submitted file must be a PDF document.
- The submitted file must be named according the pattern **00-0000_P2_ProjectPlan.pdf**.
- The submitted file must be original work completed solely by students on the submitting team.

Scoring

Overall Requirements	Pts
The submitted document meets all minimum requirements.	5
The submitted document uses standard punctuation and grammar.	5
Completing the Template	Pts
All major goals have been filled in on the template	15
All tasks related to the major goals have been filled in on the template	15
Group or member assigned to each goal and/or task has been filled in	15
Deadline for each goal and/or task has been filled in	15
Using the color key on the template, indicate the status for each goal and/or task within the body of the template	15
Using the color key on the template, indicate days your team will not meet within the body of the template	10
Fill in your team code and team name where indicated on the template	5

The table above is the 2011's rubric for the project plan, which clearly states that a template must be used for the project plan. I specifically used the rubric above because it reminds me of a particular event. As you may know, Explorer Post 1010 had four teams in the regional tournament. One of these teams, thankfully not mine, decided not to use the template required for the project plan. Instead, they used their own. Clearly, this team did not adhere to the rubric and it is no surprise that this team received a very low score of twelve points. Although, this team's project plan may have been excellent, it did not follow the rubric, resulting in a horrible score. From this experience, I stress the importance of reading the rubric and following the guidelines

exactly as they are written. The judges look for the criteria in these rubrics and points are lost if the rubric is not followed completely. Please do not follow the path of the team aforementioned; instead, follow the rubric.

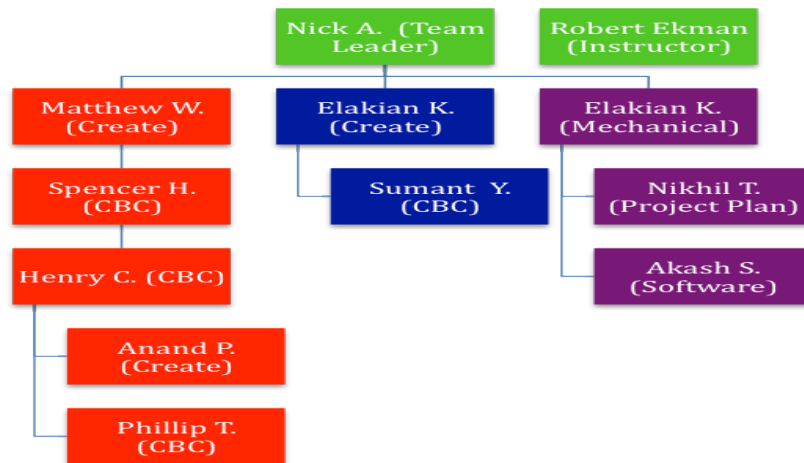
Involvement

Documenters often are excluded from other team activities such as building and coding. From experience, I think that the documenter or documenters of a team should have some involvement in the team's coding and design/building. This involvement does not need to be huge. For example, the documenter does not need to code, build, or design the entire robot. Only minor involvement is needed. The documenter should understand the code and programs of his/her robot. Knowing and understanding the code of the robot is essential for documenters because a portion of documentation includes the software of the robot. The documenter also should be aware of the robot design; he/she must know the functions of the various actuators and sensors. If the documenter has at least some involvement in the coding and building of the robot, this will better prepare the documenter to complete tasks on either the software or mechanics of the robot.

Organization

There are many ways to organize documentation; however, it is evident that organization is needed for successful documentation.

Leaders	
Build Group	
Code Group	
Documenters	



Color-coding is a good way to show organization. The image above is my team's hierarchy. As you can see it is color-coded. The distinctions of the many roles of the team members and the association of these distinctions to a color make the document more readable and thus more appealing. In my experiences, the teams that used some type of color-coding got higher scores in documentation.

TEAM 10-0162 PROJECT PLAN

Status Key:

Completed	
On Task	
Behind Schedule/ Completed Late	
Fixed Dates	
Tasks Not Started	

WEEK 1 - (3/1, 3/3, 3/6)				
Task	People Responsible	Expected Due Date	Date Completed	Picture Synopsis
1. Meet and introduce team	ALL	3/1	3/1	 TEAM 10-0162
2. Divide team into groups	ALL	3/1	3/1	
3. Brainstorm ideas, strategy, and, design	ALL	3/1	3/1	
4. Find/get roles for new members and fix roles for old members	ALL	3/3	3/3	
5. Build chassis on CBC Bot	Nick A, Matthew W	3/6	3/6	

Comments: This week was the first time our team met to start the Botball season. We got to meet each other and exchange ideas. We were able to settle on multiple designs and game strategies and even started building on our CBC bot. It looks like we have a great team this year; success is forthcoming if we maximize our potential.

The table above is a portion of my team's project plan last year. Apart from the color-coding, you can see the structure. The table is, although very basic, organized well. It has a region for the various requirements such as the task, people responsible, and the dates. It is important to come up with a plan that identifies and records the status of the tasks outlined in the rubric. The project plan above is an example of how to organize while also keeping the guidelines of the rubric in mind.

Organization is also very important in the less technical aspects of documenting. It is vital that the documenter follows a routine every meeting. I strongly recommend that pictures of the robot be taken every meeting and that pictures be organized by date. This approach will help when pictures are needed of the various changes to the robot. Instead of taking fictitious pictures of changes that never occurred (the ethics of this will not be discussed), genuine pictures can be taken if one is organized and works under a daily routine.

Be Creative/Go Beyond the "Call of Duty"

I will use the project plan in the previous section (Organization) to illustrate the importance of creativity. The project plan includes a section for the "picture synopsis," which is a picture that summarizes the weekly activities. I would strongly encourage this type of creativity as it goes beyond the "call of duty," showing the judges you take documentation seriously.

I would encourage all teams to make a cover page. The cover page should include the names of the team members and a short description of your team. The cover page can be appended to any piece of documentation. I usually attach a cover page to the mechanical and software parts. A cover page allows the judge to become more familiar with your team and is also a way to gain “brownie” points. Below is an example of a cover page that my team has used over the past two years.



10-0162

Team Members:

Steven C. (Team Lead)
 Nick A.
 Elakian K.
 William G.
 Katherine K.
 Alex Y.
 Arvand H.
 Matthew W.
 Kevin L.
 Spencer H.
 Sara S.
 Katie D.
 Gurpreet S.

Profile:

We, Team 10-0162 belong to the Explorer Post 1010. We meet every Monday, Wednesday, and Saturday at the Gaithersburg, Maryland Lockheed Martin facilities. We have a very diverse group of members. Diversity is a key component to our success. Our team consists of very well rounded individuals. Each individual will contribute to the successes of the group. We will use our resources to the fullest extend to be able to reach our ultimate goals. Our determination, perseverance, and tenacity will put us on the top come the Greater DC Botball Tournament.

Tips for the Presentation

All the strategies and techniques mentioned before should also be used for the presentation. Unlike online documentation, the onsite documentation requires more preparation because one is only given one attempt and there is no changing and altering after your presentation is over. I will outline two approaches to achieving a good presentation score; I like one more substantially better than the other.

In the first approach, the presentation is formulaic and is entirely produced beforehand. Basically, the presentation is fully choreographed. This approach will have little deviation, meaning each time a presentation under this approach is practiced there will be little to no

change. While, this approach is safe and the most consistent, a sense of ingenuity and artisanship is taken away.

The second approach includes some aspects of the first approach, but is mostly different. Using this approach, one must first make an outline of the presentation. In the outline, organization is key. The two people presenting must decide who is to speak at what time. How this method differs from the previous one is in improvisation. This method does not follow a specific script. Instead, the presenters using this approach add their own “spin” each time they present. The presentation will follow the same organization every time, but will change in the execution. It should be stressed that this type of extemporaneous speech must only be used if the presenters know the systems and the design of their robots well. If the presenters are not comfortable with talking in depth about the robot, then the first approach should be used. I favor the second approach because using this approach reveals your true knowledge of the robots and is much more genuine than the first approach. I would strongly encourage the second approach if the appropriate steps that I mentioned throughout this paper were followed. However, I do have to caution presenters using the second approach; over-running the time limit is a danger. For the second approach to work the “Involvement” section must be adhered to the fullest extent and the duration of the presentation must be taken into consideration.

Parting Words

I truly believe that using the strategies and taking the advice in this paper will substantially improve documentation scores for all Botball teams. This advice is based on my experiences as a documenter in the past two years. I think that my expertise will prove to be beneficial to any adherents. Moreover, documentation has real world significance as it is a part of any career path and is especially instrumental in the science and engineering fields. Thus, it is essential that the participants in Botball learn to become successful documenters in order to fulfill their aspirations to become engineers and scientists.