

Project Technical Report

Basketball Statistics Website: <http://basketballstats-web.appspot.com/>

GitHub Repo: <https://github.com/461L-morning-11/BasketballStats>

Team Information:

Morning-11 Canvas Group

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Motivation:

We decided upon this project topic after discussing each team member's individual intake of entertainment and identifying sports, specifically basketball, as a common factor. Consequently, we decided a website dedicated to the fetching, organization, and presentation of basketball related statistics, media, and news was not only an adequate choice for this project's requirements, but also a useful tool for basketball fans of all ages and occupations. Additionally we felt this project concept, with its interconnected instances that can link between pages, would be a challenging and useful learning experience.

Models:

The three models included in our website consist of NBA players, teams, and games from seasons 1979 to current. The Player model consists of the player's name, position, height, weight, and team. The Team model consists of the team's city, conference, division, and name as well as a logo for the given team. The Game model has the game's two teams, the date of the game, the final score, the season the game was played in, and whether or not the game was a postseason game.

Users:

The users of this website will primarily be people that are interested in basketball, related matches, teams, and individuals. Individuals include NBA players both past and present. Users

will be able to acquire detailed statistics on each team, their members and coaches, as well as any pertinent news, both recent and old. This site is intended to be used by a spectrum of people from those with little knowledge to those with more advanced knowledge about basketball.

User Stories:

Phase I – User Stories Provided by Customer Team:

1. *As a user, I would like the ability to view historical data of teams so that I can see how the team has developed overtime.* – This user story is based on users that may desire to view past statistics of teams and compare them with more recent statistics in order to make decisions or estimate outcomes of matches, as well as gauge team improvement over time. The estimated time to implement is between 5 to 12 hours, depending on the level of detail that is to be added to the statistics portion of the project.
2. *As a user, I would like to be able to view live updates on scores of games that are ongoing when I access the website so that I never miss a game.* – The ability to project live scores as a match is ongoing is paramount in any website regarding sports statistics, and would also attract more user traffic as people will come to the website in order to find the match statistics if they are unable to access a method to watch the game itself. Estimated time to implement is 4 hours.
3. *As a user, I would enjoy a Fantasy sports function embedded in the website so that I could bet and compete against other users without actual money involved* – This feature was suggested as it would allow more user interaction on an otherwise static website which would normally have no direct user interaction. Fantasy sports would allow users to frequently visit the website in order to play, as well as generate additional user traffic on top of people that simply come to view statistics and information. Estimated time to implement is 25-30 hours.
4. *As a user, I would like to be able to login with my gmail to the website so that I can personalize the content I see.* – The integration of the Google Authentication API would allow users to login without providing their own credentials to the website, and use their existing Google accounts, which are ubiquitous enough that it is presumable that most users will have one. Estimated time to implement is 10-14 hours.
5. *As a user, I would like a video feed that displays match highlights or other basketball sports-related videos in a reel fashion so that I can quickly access popular videos related to the NBA from within the website.* – Being able to quickly access videos of highlights or matches. Estimated time to implement is 10 hours.

Phase I – User Stories We Created:

1. *As a user, I would like for there to be individual pages for teams, playoffs, and rankings so that the data and statistics are easily accessible.* – Having separate pages for different teams, playoff information, and team rankings. Estimated time to implement is 12 hours (3 per page).
2. *As a user, I would like for the website to be responsive and resource efficient so that it is easy to use.* – The React JavaScript library can be used to make the website more responsive and resource efficient. Time to implement is approximately 30-40 hours, as it would require a full overhaul of the website's frontend.
3. *As a user, I would like to be able to see player stats and scores upon entering the website so that information is easily accessible.* – Allows a user to quickly view statistics of their choice upon arriving at the website, with predetermined settings. Time to implement is approximately 15 hours.
4. *As a user, I would like to be able to view an inactive player list so that I know who is injured or benched and for how long.* – Displays a list of players that are no longer active in basketball matches. Assume the data is provided by the API. Time to implement is approximately 15 hours.
5. *As a user, I would like the statistics to be represented visually (i.e. graphs) so that it's easy to determine changes over time within player and team statistics.* – Allows a user to quickly view statistics over a set time window in one glance, instead of sifting through large amounts of numbers. Estimated time to implement is 20 hours.

Phase II – User Stories We Created (No longer have customer team requirement):

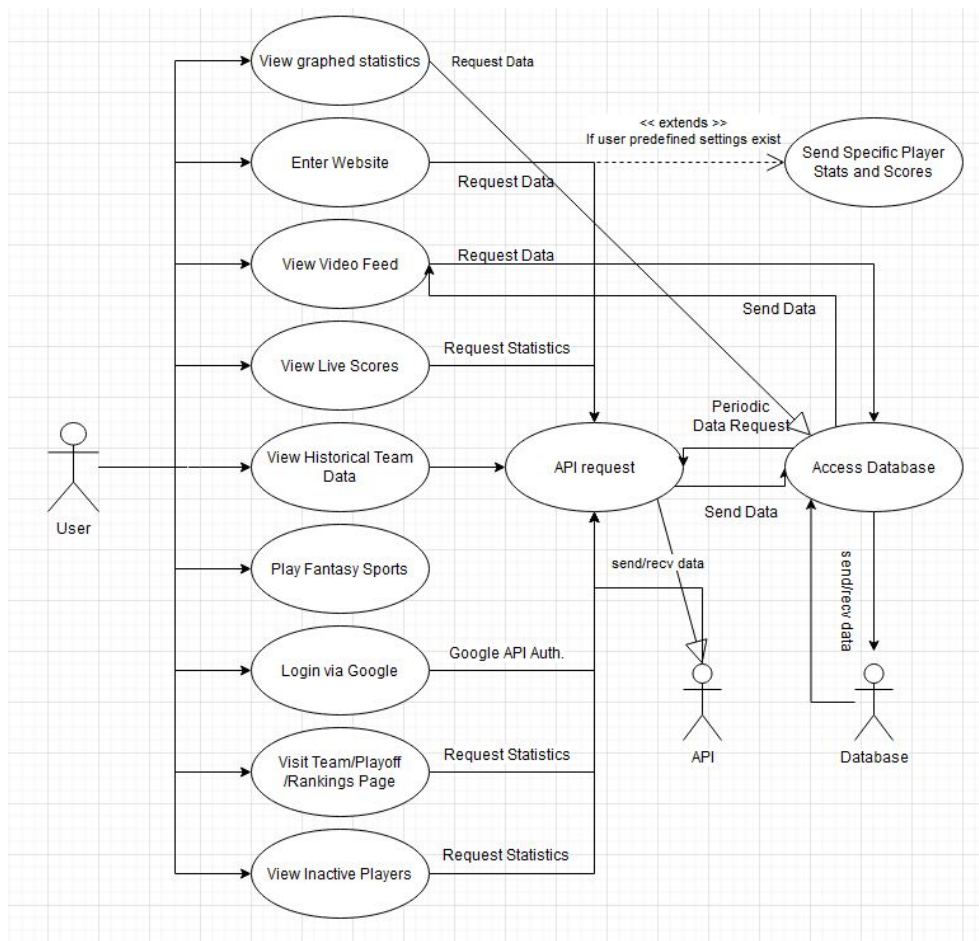
1. *As a user, I would like to see a more exciting home page with images and graphics so that the website is more visually appealing.* – Adding images and graphics to the home page will add to the website's visual appeal and increase the likelihood of a user returning to it. Estimated time to implement was 1 hour. Actual time to implement was 1 hour.
2. *As a user, I would like to see an image of each player when I click on their name so that they are more recognizable.* – It is important that users are able to see an image of each player alongside their name and stats. This enables users to more easily recognize players that they are searching for. Estimated time to implement was 2 hours. Actual time to implement was 2 hours.
3. *As a user, I would like to be able to click through pages of players, teams, and games rather than scrolling so that I can more easily access the end of the list.* – Adding pagination to each model page will make it easier for users to go through the large collections of players, teams, and games. Having all instances on one

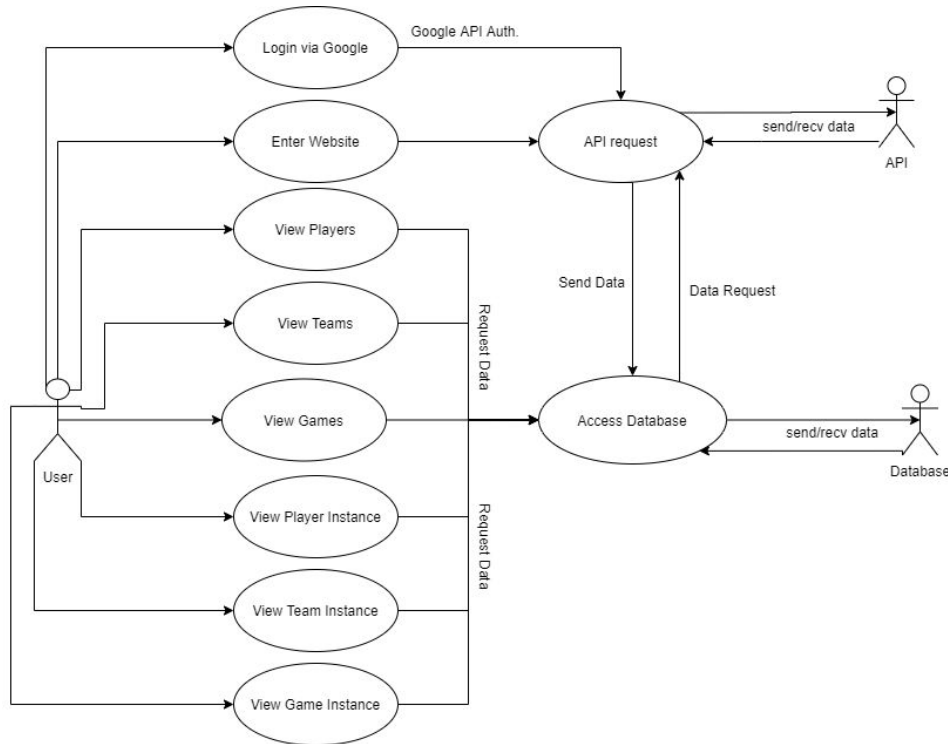
page could be overwhelming to a user. Estimated time to implement was 2 hours. Actual time to implement was 1 hour.

4. *As a user, I would like to see more in-depth stats on each player such as season averages and minutes played so that I can more easily judge their performance.* – Users who visit the site want to be able to view in-depth data on their favorite players. The website should provide more than just basic statistics and information. Estimated time to complete was 1 hour. Actual time to implement was 1 hour.
5. *As a user, I would like to see a short summary on the history of each team when I view their page so that I can find out information such as when they began, how many championships they've won, etc.* – Adding a short summary/background on each team's page would provide users with historical data about their favorite teams. Estimated time to complete was 2 hours. Actual time to complete was 2 hours.

Use Case Diagram

Based on the user stories added in Phase I and Phase II, the case diagrams are as follows:

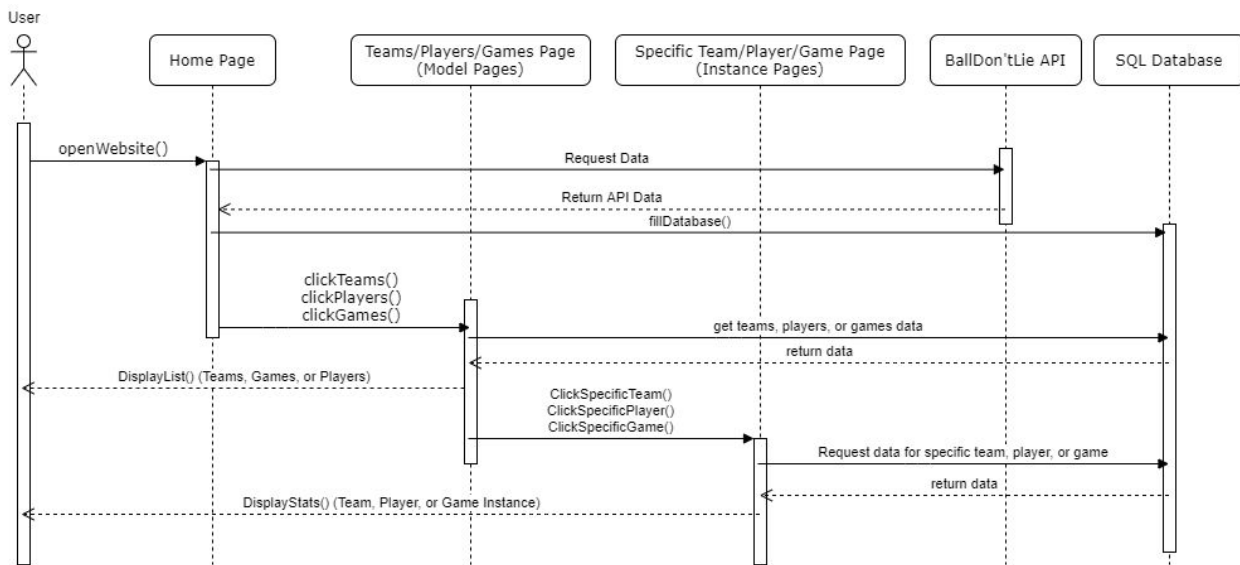


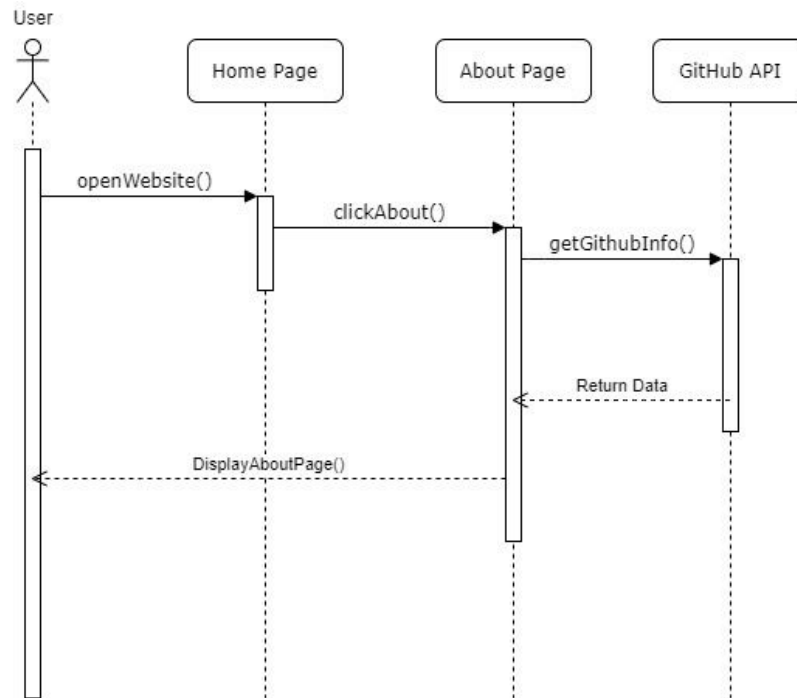


Design:

Phase I – Currently, the design of the website uses Bootstrap, with pages created using JSP (JavaScript Pages) and the backend being Java 8. At this stage, the design does not use a database, but instead fetches data as-is from the API itself. The website is hosted on Google Cloud, using the GC Platform as a basis.

Phase 2 – The general design of the website has remained mostly consistent with the design in Phase I. A few new images and graphics were added to improve the general aesthetic of the site. We anticipate the design having more of a change going into the next phase, as we update our models to include more info about each instance and include more images to the models.





Testing:

Phase I – We tested our design on our own machines using the local Google Cloud server, accessible via the Google Cloud SDK and Eclipse. For frontend testing, we viewed the website on the browser, and for the backend, verified API calls by reading their serialized JSON output, then compared it with desired results.

Phase 2 – We did unit testing for the API, making sure the connection could be established and we could get the data we needed. We also included unit testing for the Github API to make sure our calls were working. Unit testing was also done for all the pages of the site, testing for functionality. Lastly, we did unit testing on our database and making calls and puts to it. All of which were done using jUnit for backend testing and Selenium for frontend testing.

Tools, Software, Frameworks:

We used the Ball Don't Lie API (www.balldontlie.io) to populate our pages in Phase I, and transition to using it to populate our database in Phase II. We also used the standard Github API links to get data about each members' commits and issues. The standard CloudSQL was used to store data during phase II, but we plan to migrate to hosting the site ourselves and using a different datastore in the next phase.

Reflection:

Phase I – We were able to organize and create the project efficiently as all team members were dedicated to the project. Everyone gathered at meetings and worked diligently to fulfill the requirements for this phase and was able to complete the work.

Phase 2 – Due to the extreme circumstances and sudden transition to remote communication, completing this phase was much harder than we anticipated. We ran into a lot of unknown errors associated with transitioning to a database, and communicating through these issues was far more difficult without face-to-face interaction. However, by the end of the phase we started to become more accustomed to using Zoom for our meetings. We are hopeful that this adjustment will continue to improve over the next couple of phases.