

Tennis

FOR

DUMMIES



*Discover the basics of
tennis and learn
about your favourite
players' careers!*

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OVERVIEW

The goal of this project is to create an interactive website that serves both newcomers and seasoned tennis enthusiasts. It begins with a “Learn Tennis Basics” section, introducing users to essential concepts like court surfaces, scoring systems, and major tournaments. From there, it offers a global overview of the sport through rankings, national performance, and key statistics across surfaces and time. Finally, the “Find Your Player” feature allows users to search for players by name or filter criteria, leading to detailed player profiles with insightful data. The site aims to educate, inform, and engage users at all levels of tennis knowledge.

DATASETS

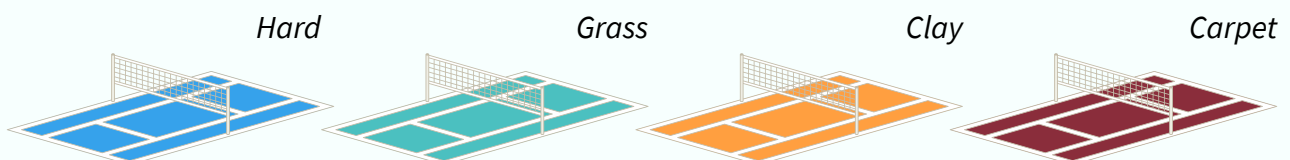
For our datasets, we use Jeff Sackmann’s extensive GitHub data files on players, historical rankings, and tennis matches from the Association of Tennis Professionals (ATP) and Women’s Tennis Association (WTA) from 1991.

DESIGN

Styling

For our website design, we used pastels as our primary colors, with a focus on green and blue, both as a reminder to tennis courts and for a calming visual experience. Indeed, we prioritized a clean and modern aesthetic such that our content is easily readable while maintaining visual harmony. Specifically, our pages follow a consistent visual design system through shared layout patterns, color, and animation complexity. Each page uses the same foundational structure: a gradient hero section (tennis-blue to tennis-green) with large white typography and drop shadows, followed by a card-based content layout with white backgrounds, rounded corners (xl radius), and consistent shadow depths.

The “tennis-themed” color palette is applied across all pages - tennis-green (#7ED4AD) for primary elements, tennis-blue (#87CEEB) for secondary features, tennis-yellow (#FFE066) for highlights and interactive states, and tennis-dark (#2C3E50) for typography, creating visual continuity. Across visualizations, the color scheme for court surfaces remains consistent and was chosen to echo the real-life colors:



Lastly, we decided to use fonts that are similar to those used in the “For Dummies” instructional book series, reinforcing the educational tone and familiarity of the content.

Final Layout

The structure of our final layout was intentionally designed to support a progressive and intuitive user experience. By starting with the basics with points, court surfaces, and foundational concepts, we establish a common understanding that ensures all users, regardless of prior knowledge, can navigate the site with confidence. Placing global statistics next provides broader context and invites exploration of the sport’s scope and competitive trends. We positioned the “Find Your Player” section last to allow users to apply their understanding in a more personalized, data-rich way. This sequence mirrors a narrative flow: from learning, to understanding the bigger picture, to engaging with detailed insights—supporting both usability and deeper engagement through structured information layering.

VISUALIZATIONS

Learn Tennis Basics

1

Learn Tennis Basics is where the user can come and learn about the game of tennis. This section is aimed at beginners but is also informative for people already familiar with tennis



Scoring

Learn about tennis points



Tournaments

Grand Slams and more



Court

Court zones and lines



Equipment

Rackets and gear



Vocabulary

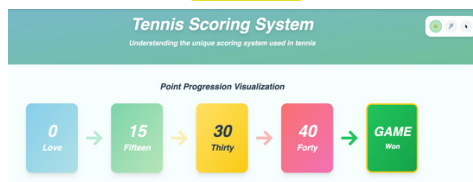
Tennis statistics

2



Scoring

Learn about tennis points



This section is an introduction to scoring in tennis. We combined colors, animations and graphs to make the information as interesting as possible to avoid boring the user. We also implemented a small 5 question quiz at the end to keep the user engaged

What does 'Love' mean in tennis?

15 points

0 points

Winning the game

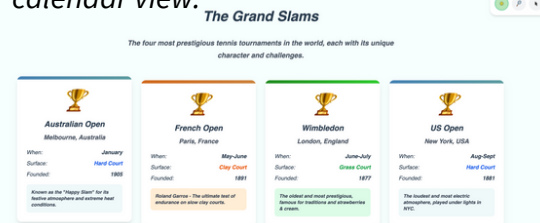
40 points

Correct!

Next Question

3

The main aim of this page was to introduce the "Grand Slams", the pinnacle of tennis since it is the metric we mostly focus on in the "Find your Player" section. In this section we have a "Hero" section with 4 cards for each of the slams. We also made sure to keep with our colors schemes for the court's surface. Then we introduce the other tournaments and when they are played through a calendar view.

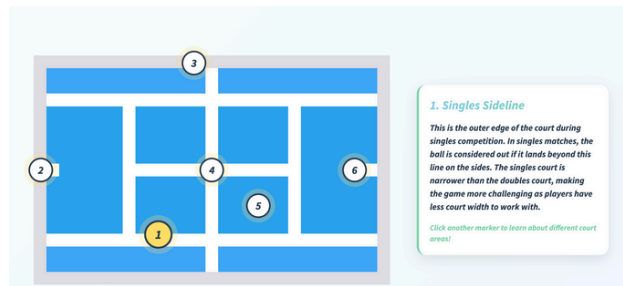


Tournaments

Grand Slams and more

4

In the Court section, we wanted to add an interactive court to allow users to click on sections of a court to get the definition.



Court

Court zones and lines

5



Equipment

Rackets and gear

Footwear & Apparel

Court-Specific Shoes

Hard Court Shoes

- Shockable midsole
- Shock-absorbing patterns on sole
- Extra toe protection
- Good cushioning

Clay Court Shoes

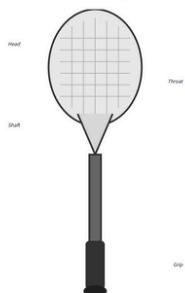
- Push-through sole pattern on sole
- Enhanced grip traction
- Lateral support
- Protective court surface
- High-top ankle brace

Grass Court Shoes

- Padded heel midsole
- Better grip traction
- Protective court surface
- Extra cushioning at heel

Tennis Racket Fundamentals

Racket Anatomy



Click on any part of the racket to learn more!

Inspired by the Court section, we aspired to make an interactive tennis racket. This proved to be a bit difficult but we believed the end result made the website a bit more fun and less serious. Here we wanted to inform the users about all the different equipment that goes into tennis and how it can differ on each surface.

6

Lastly, we wanted users to learn how to interpret match statistics. This meant introducing key terms and giving a concrete example.

Player A 6-4, 7-6	Final Score	Player B 4-6, 6-7
12	Aces	8
28	Winners	22
15	Unforced Errors	24
68%	First Serve %	61%
4/7	Break Points Won	2/5

Key Insight: Player A won by serving better (more aces, higher %), playing cleaner tennis (fewer errors), and converting more break point opportunities. The player also shot more winners.



Vocabulary

Tennis statistics

This was done by describing a fake, static example score card

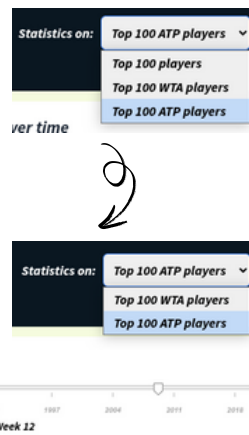
Tennis Overview

1 The Overview should give novices a broad idea on who the most famous players are, their playing style, and from where the top players come from over time. It should also give novices and experts alike the possibility to browse the dataset more freely than what is possible in the "Find your player" section.

2 First the user has to choose on which data to compute the statistics on. We planned to let the player choose between top 100 ATP (men), top 100 WTA (women) and top 100 mixed all-time best.

But finally we decided that it would be more interesting and give more insights to use the official ranking and let the user slide through the history of these rankings using a time slider. As a side effect we dropped the idea to also show mixed rankings as there are no official mixed rankings.

While the ATP / WTA selector is in the header, the time slider is rather repeated under every graph that makes use of it to make it easier to browse through time while watching the graph change.



3 The "Top 100 players" box let's the user see which are the top 100 players as well as their ranking. It's content changes based on the "statistics on" dropdown and the time slider.

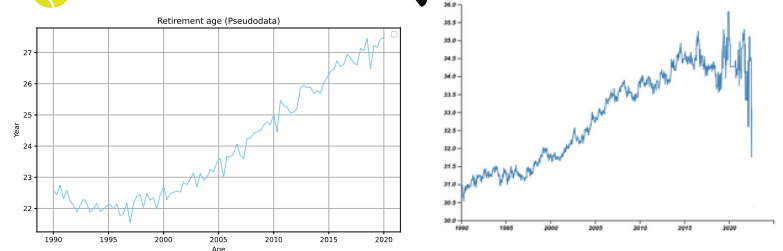
The table matches our sketches, but it now reacts to mouse clicks and redirects to the corresponding "Player Profile".

Top 100 players

Type a keyword...

Rank	Name
1	Rafael Nadal
2	Roger Federer
3	Novak Djokovic
4	Andy Murray

4



These graphs give insights about some attributes like "Retirement age" (calculated based on last match played) for the top 100 ATP / WTA players over time. The design didn't change from the initial sketch.

5



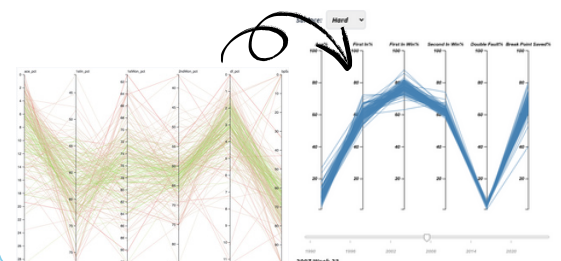
The world map shows countries as bubbles, where the size shows the number of the top 100 players native to that country.

The bubbles animate when dragging the time slider. Clicking on a country shows all players from that country, and clicking on a player opens its player profile.



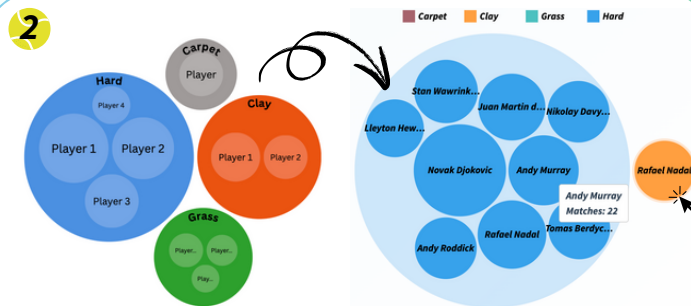
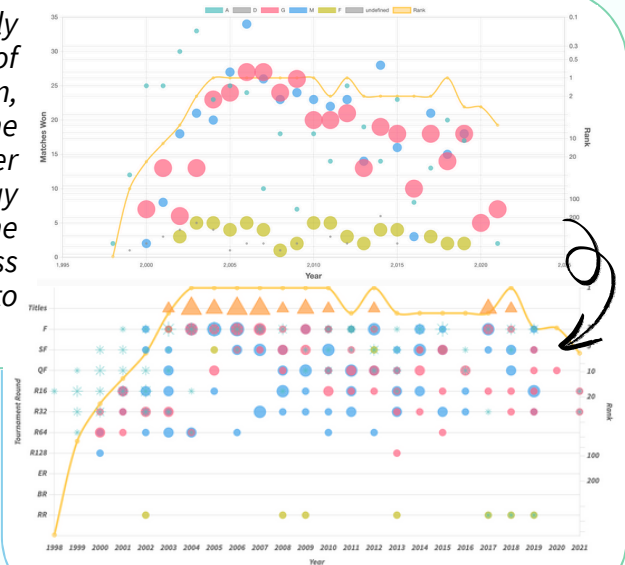
6

The last graph is a parallel coordinates chart with (at most) 100 lines (1 for each of the top 100 players). This graph allows users to compare player statistics, e.g. % of aces, by surface and across time.

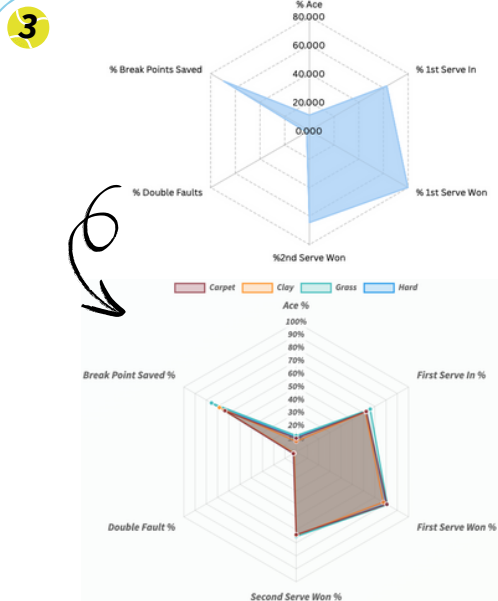


Player Profile Section

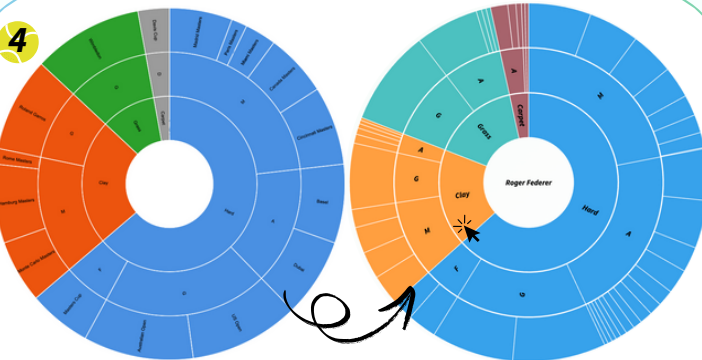
1 To provide an overview of a player's career, we initially wanted to display a timeline chart with the number of games won per tournament level (e.g. Grand Slam, Masters, etc) and as well as the evolution of the player's rank in ATP/WTa rankings. To provide a clearer overview, we decided to change this chart to display the final round reached for each tournament the player participated in across time and across tournament levels. Furthermore, we added a row to display Grand Slam titles won.



Then, we wanted to display the biggest rivals of the current player, with a distinction per court surface. In a circle packing graph, the size of the bubble corresponds to the number of matches played against the rival. For this, we reused our initial sketch and simply added interaction such that clicking on the rival's bubble opens the corresponding player profile.



To display a player's key statistics such as percentage of aces or first serves in, we wanted to use a radar plot. For our final design, we decided to separate statistics by court surfaces since the latter can have an impact on the speed and bounce of the ball. We added interaction such that clicking on a surface in the legend can remove/add the corresponding data from the graph.



Lastly, through a sunburst chart, we aimed to provide a breakdown of matches won per player through proportions by surface, tournament level, and tournament name. We updated our initial sketch to add a zoom functionality to the graph, such that users can click on a segment to zoom in and explore deeper levels of the hierarchical data, and click in the center to zoom back out.

TECHNICAL IMPLEMENTATION

First, we leveraged Python, especially the pandas library, and Node.js to join dataset files, clean the data, and compute different statistics. Then, the website was built through a combination of HTML, CSS, and JavaScript code, while leveraging the TailwindCSS framework. Using TailwindCSS Framework, we ensured to make our website responsive to different screen sizes, including mobile. For the various graphs, we used several libraries:



D3.js:

- For all graphs of the “Overview” (bubble world map, line and parallel coordinates charts)
- For the time sliders in the “Overview” (using the d3-simple-slider addon)
- For the sunburst and circle packing charts of “Player Profile”



Chart.js: for career overview timeline and statistics radar charts of “Player Profile”



Grid.js: To display the tables in the “Overview” (The top 100 table as well as the tables in the world map popups)

CHALLENGES

For the “Learn Tennis Basics” section, a challenge point was drawing an accurate tennis court. After many trials and errors, we imported the court from a SVG library and added the proper definitions on the side instead of a static image.

Another of key challenge was determining who were the best players given certain filtering criteria for the “Find Your Player” section. Indeed, we could not simply rely on the provided player “ranking” field from the datasets since this would not necessarily provide accurate information depending on the selected criteria. For instance, if a user wants to find the best ATP player on carpet courts from the 2010s, the raw player rankings would highlight Roger Federer, who actually has won few games on carpet. Therefore, we had to compute our own metric to evaluate players’ performance accounting for the win rate, weighted by the number of matches played and the player’s ranking:

$$\text{score} = \frac{\text{win rate} \times \ln(\text{total \# matches played} + 1)}{\ln(\text{best player rank} + e)}$$

Furthermore, all the visualizations in the “Player Profile” section required joining different datasets and computing data differently, resulting in initially unexpected heavy preprocessing.

The visualizations in the “Overview” also required more preprocessing than expected to calculate new statistics, averages, and adding geographical information like country names and coordinates for the world map. The “Overview” section also has some non trivial UI elements, like the time slider who must react to user interaction but also to the other time sliders so that all time sliders agree on a time, so it can be tricky to not enter an infinite loop.

PEER ASSESSMENT

Charlotte Meyer

Charlotte Meyer focused on the “Learn Tennis Basics” section of the project and was principally responsible for the website design decisions. She took care of implementing the individual “pages” on the Learn the Basics. Finally, she contributed to the milestone reports and process book, and recorded the screencast.

Jérémie De Faveri

Jérémie focused on the “Overview” section of the project. This involved data processing to compute statistics and rearrange the data for easier processing by the frontend, as well as implementing all graphs and UI interaction in the frontend using JavaScript. Finally, he contributed to the milestone reports and process book.

Charlotte Sacré

Charlotte Sacré focused on the “Find Your Player” and “Profile Player” sections of the project. This involved data processing to compute statistics and extract relevant player information from the ATP and WTA datasets in different ways, as well as developing all the JavaScript code for dynamic graph rendering and page content loading. Finally, she contributed to the milestone reports and focused on the process book.