



Project Report

TDS 3401
(Data Visualization)

Prepared By

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Introduction

In this project, we have chosen FIFA 18 Football Player Statistics dataset to perform visualization on. There are two main visualization choices for users, Players Comparison or Overall Statistics. The visualization is coded in Javascript, D3, HTML, and CSS. Various D3 libraries such as chart.js and Datamap is utilized to complete this visualization project. This visualization is built for football-maniac or FIFA 18 game player. The user may observe some insights from the visualization.

Dataset Description

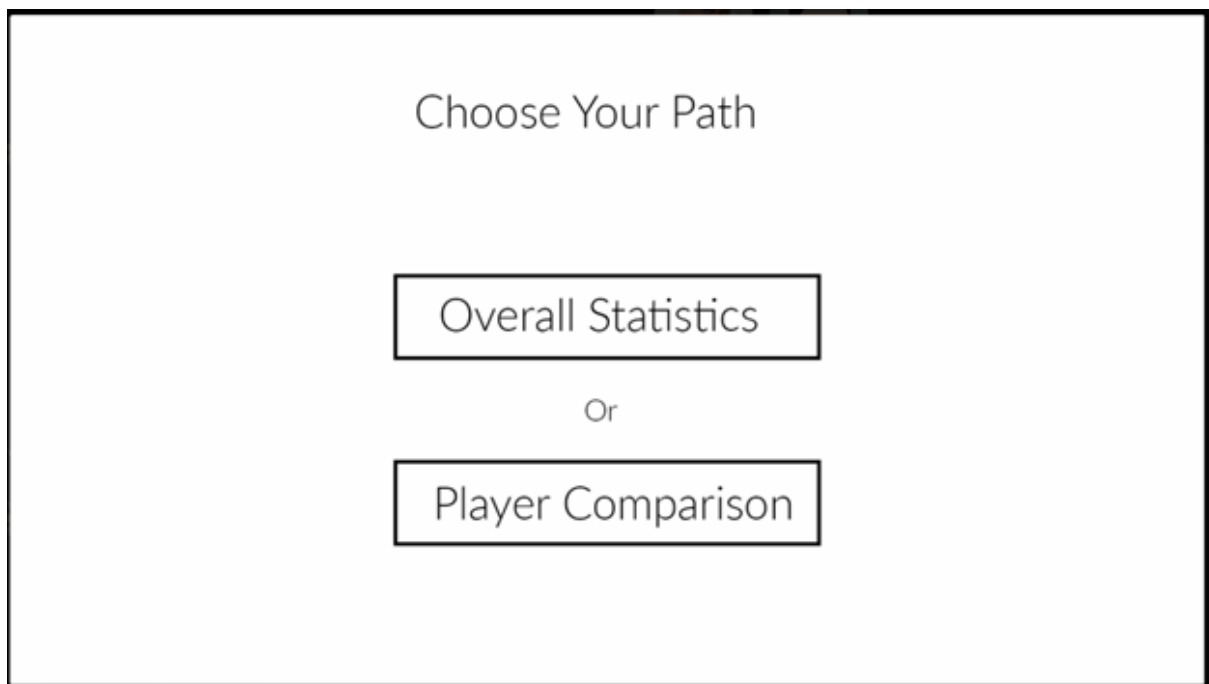
No.	Header	Description
1.	Name	The name of the football player. <ul style="list-style-type: none">E.g.: Cristiano Ronaldo
2.	Age	The age of the football player in 2018. <ul style="list-style-type: none">E.g.: 32
3.	Nationality	The current nationality of the football player. <ul style="list-style-type: none">E.g.: Portugal
4.	Country	The ISO code of the country of the football player. <ul style="list-style-type: none">E.g.: PRT
4.	Club	The football club/team that the football player is currently belongs to. <ul style="list-style-type: none">E.g.: Real Madrid CF
5.	Value	The value of the football player in the market. (Million) <ul style="list-style-type: none">E.g.: 95.5M
6.	Wage	The weekly wage earned by the football player. (K) <ul style="list-style-type: none">E.g.: 565K
7.	Role	The best playing position of the football player on the field. <ul style="list-style-type: none">E.g.: Attacker, Midfielder, Defender, Goalkeeper
8.	Overall	The main/overall rating of the football player in his best playing position. (0 - 99)
9.	Potential	The potential growth of overall rating of the football player in the future. (0-99)

10.	Pace/Diving (GK)	The rating of the football player's movement speed. (0-99)/ The rating of the Goalkeeper's diving skill. Diving is GK's ability to make a save whilst diving through the air. (0-99)
11.	Shooting/Handling (GK)	The rating of the football player's shooting skill. (0-99)/ The rating of the Goalkeeper's ball handling skill. Handling used to measure how cleanly he catches the ball and does he hold on to it. (0-99)
12.	Passing/Kicking (GK)	The rating of the football player's passing skill. (0-99)/ The rating of the Goalkeeper's kicking skill. Kicking used to measure the length and accuracy of goal kicks, from out of the hands or on the ground. (0-99)
13.	Dribbling/Reflexes (GK)	The rating of the football player's dribbling skill. Dribble an act of taking the ball forward with repeated slight touches or bounces. (0-99)/ The rating of the Goalkeeper's kicking skill. Reflexes is the agility of the goalkeeper when making a save. (0-99)
14.	Defense/Speed (GK)	The rating of the football player's defending skill. (0-99)/ The rating of Goalkeeper's speed. Speed is the ability to close down an opponent in one-on-one situations. (0-99)
15.	Physical/Positioning (GK)	The rating of Goalkeeper's positioning. Positioning is the ability to position himself correctly when saving shots. (0-99)

Storyboard

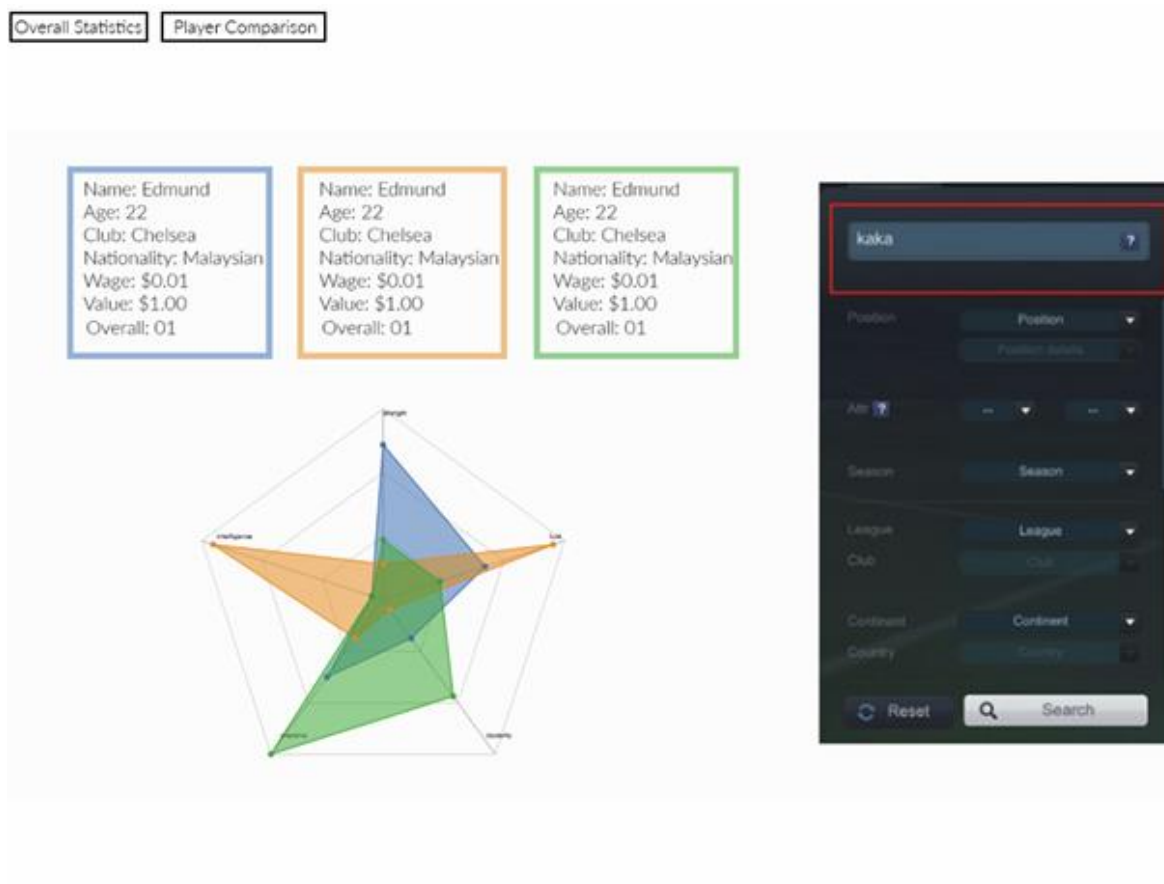
Landing Page

In the first interface, known as the landing page, the user is able to choose between Overall Statistics and Player Comparison. After clicking on either option, they will be redirected to the respective page. The user can switch between the visualizations anytime. Figure 1 is the image of the resulting landing page.



Player Comparison

The user is allowed to choose at most 3 players for comparison. On the right is the search engine that allows the user to customize the filter that the user wants to apply. When the user clicks on the Search button, it will pop up a list of football players that fulfill the filters. Then, the user can select the football players he/she wanted. Once the player is selected, the player's profile and rating will display in the text boxes and radar chart. Contents in the photo are for illustration purposes, it will not be 100% similar to the end product.

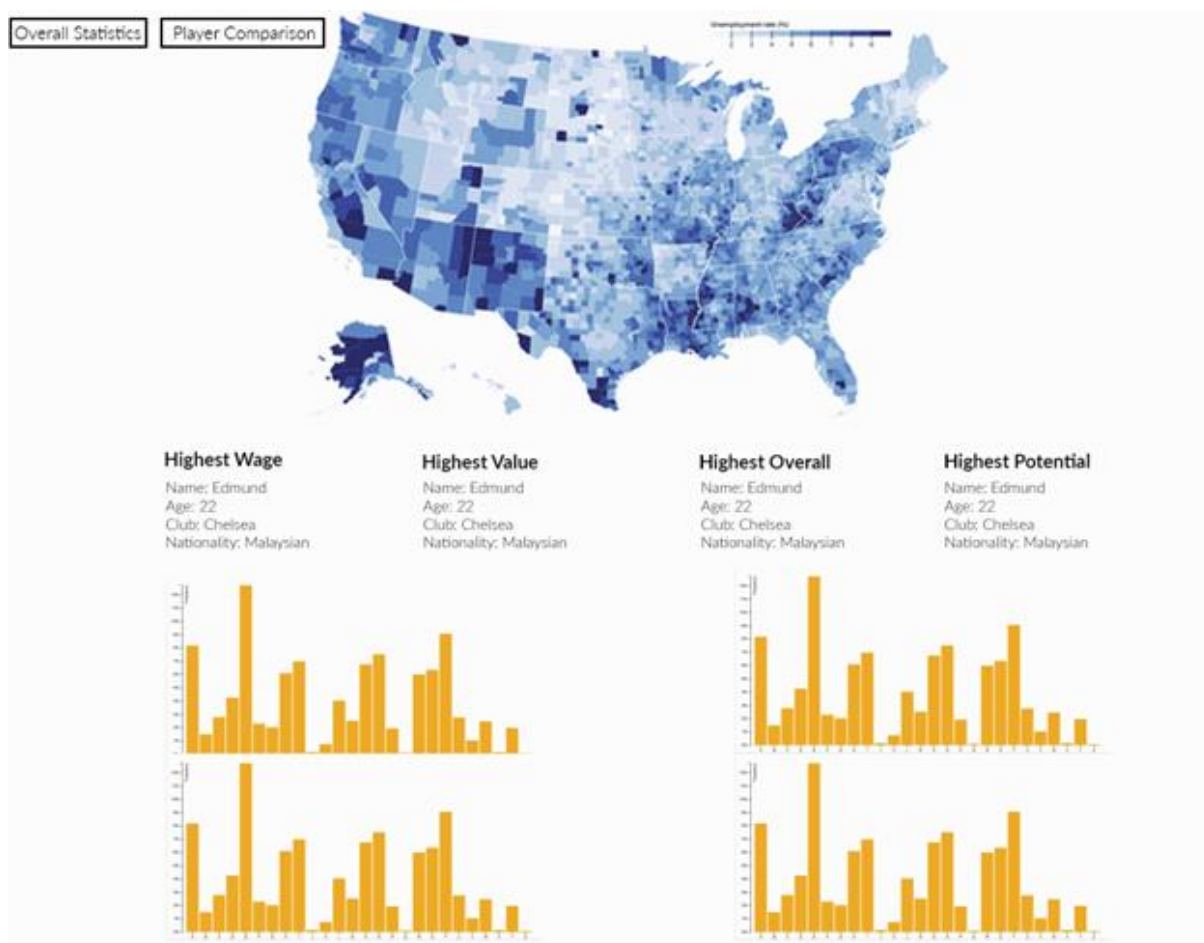


Features:-

- When user hover the mouse on to one of the player's card or rating inside the radar:-
 - The opacity of the other cards will reduce
 - The fill of the shape in radar of the other player will become transparent while the selected player's fill will remain

Overall Statistics

There will be a choropleth map, 4 text boxes, and 4 bar charts. The color of the choropleth map represents the number of players in each country. Below the map, there will be 4 text boxes that show the data of the players who have the highest wage, highest value, highest overall & highest potential. The data of the players includes the name, age, club and nationality. Below the text boxes will be the 4 bar charts. The bar charts represent the average wage for each position, the average value for each position, the average age for each position and average overall & potential rating for each position. As below is an illustration of the visualization: -



When the user selects a specific country or two countries, the data in the text boxes and bar charts will change accordingly. If two countries are selected, the bar charts will change into a dual axis bar chart to show comparison.

Features:-

- When user hover through a specific country on the choropleth map:-

- There will be a black border around the country to show focus on it.
- The country's name & number of players in that country will be shown in a tooltip popup
- When user click on a specific country on the choropleth map:-
 - The color of other countries will turn white
- When user hover through the bar charts :-
 - The color of other bar chart will be lighter to show focus on the hovered bar
 - The value of the bar will be shown above the bar

Final Implementation

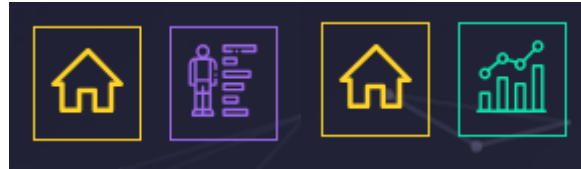
Landing Page

There are no changes for landing page other than designs and styling.



Navigation

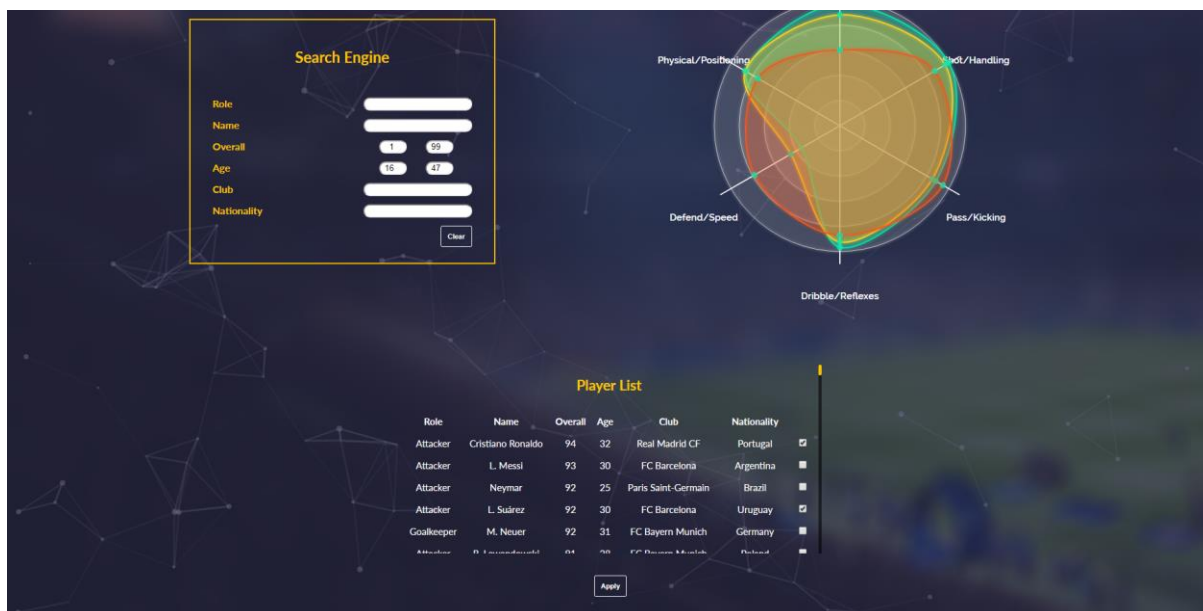
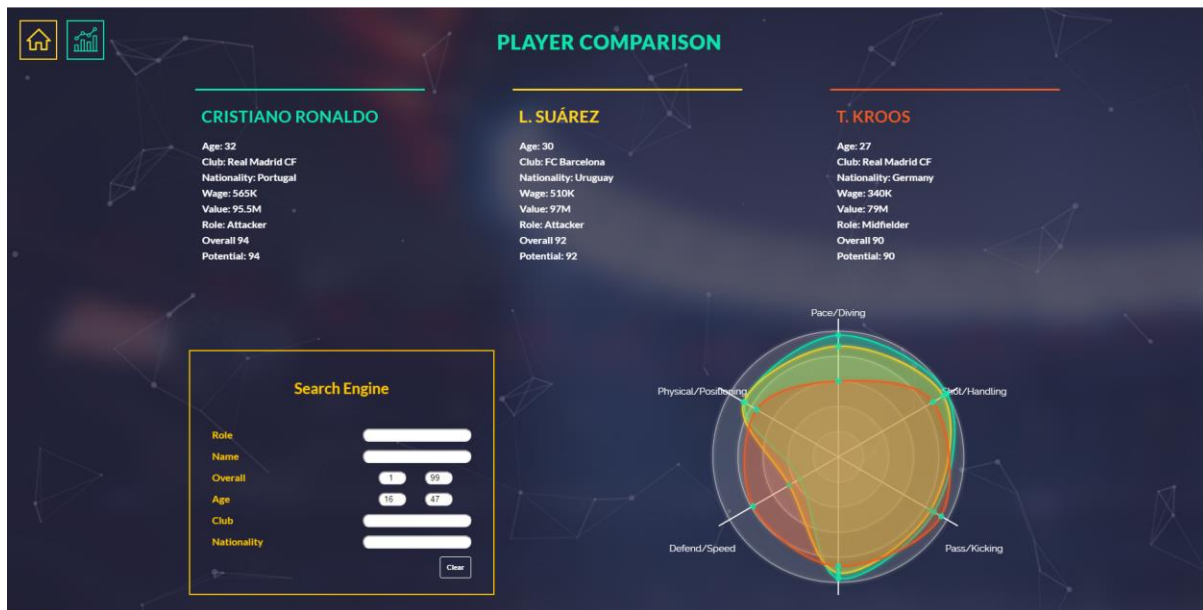
In Player Comparison and Overall Statistics Page, user can navigate to any page by clicking the icon on top left of the interface. When user hover over the buttons, a tooltip will be displayed for clarification. The navigation also has a hover state for user feedback.



Player Comparison

Firstly, the user is allowed to compare up to 3 players. More than 3 players will affect the cleanliness of the visualization. There are 3 cards at the top, a “Search Engine”, an empty Radar Chart beside the Search Engine and a Player List in the main interface of player comparison. The explanation for each item is as below: -

Item	Explanation
Cards	A total of 3 cards that will display the details of selected players. The color maps against the color in the radar chart.
Search Engine	This is a search engine that allows the user to apply the filter they want. The result will display in Player List. The Clear button will clear all the filters once it is triggered.
Player List	The result from the Search Engine will be displayed here. The user can choose up to 3 players by ticking the player. The function of the Apply button is to publish the players’ details to Cards and Radar Chart. So, the user can click the Apply button after finish selecting the players.
Radar Chart	This is the main part of the visualization. The 5 main attributes of the player will be displayed in this Radar Chart for comparison purpose.



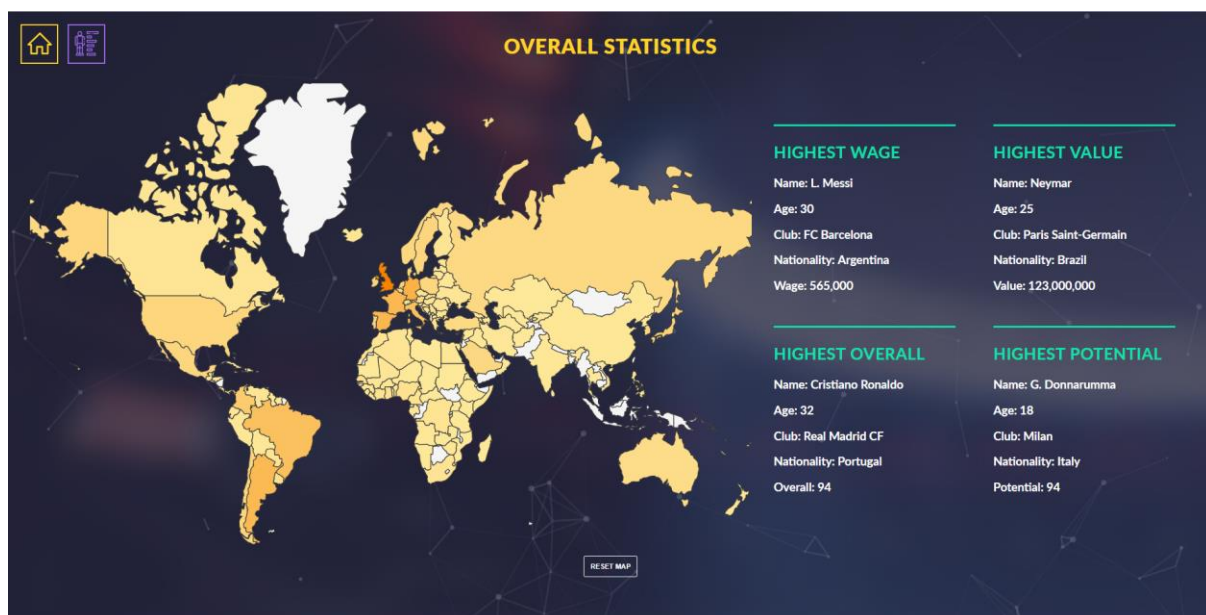
The main changes are: -

- No button needed to apply the filters.
- The result of search engine will show in the Player List table instead of a popup box.
- The position of each item is redesign for better visualization.

Overall Statistics

When user first land at this page, a choropleth map with color intensity representing the number of players in that country is presented. When the user hover over the map, the name of the country and the number of players will be shown in a popup tooltip. Next, the details of the player with the Highest Wage, Highest Value, Highest Overall and Highest Potential in the world will be shown. Below that, the Average Value, Average Wage, Average Overall and Average Potential for each football position is visualized with four bar charts. When the user hovers over the bars, the respective details will be displayed in a popup tooltip

The user can then choose a country from the map to visualize country-specific details. The Highest Wage, Highest Value, Highest Overall and Highest Potential will be displayed for that particular country. The bar charts will also be country-specific. When two countries are chosen, an additional bar is generated to allow comparison between both countries. The user can then reset the data and compare between countries indefinitely. Attached below is the final output of our work.





As written in our proposal, all proposed functions are implemented. The only difference is in the UI design and styling which is greatly improved to ensure attractiveness and ease of use.

Development Process

Since we have two main pages for the visualization tool, one of the group member handle one page. Meanwhile, the landing page is handled by one of the group members voluntarily. The detail are as below:-

- Landing Page - Gabriel Lim Kee Chai
- Player Comparison - Lim You Qian
- Overall Statistics - Gabriel Lim Kee Chai

Due to the final year project, we have limited time to complete this project. The project took us around 1 week (105 hours) to complete. In the Player Comparison development process, we spent most of the time in solving the logical issues of the backend code.

For the Overall Statistics page, the most challenging part was the map filter function as it involves many data passing and storing. At first, we faced a hard time generating the choropleth world map as from our lab exercises, we only experienced generating US map with spoon-fed topojson files. Fortunately, we are able to utilize a library named DataMap that sped up the process. Due to our lack of experience, generating the dual-bar bar charts

was also another challenge. We managed to overcome the challenge by performing a lot of research and trial-and-error.

Conclusion

In a nutshell, this project has greatly improved our d3 language knowledge. We have also brought what we learnt from the lectures into practical use. In addition, we have learnt the beauty of data visualization while completing this project. In short, this was a great experience.