OPTUM

Web Application for BestPrep Career Day

Documentation

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Business Use

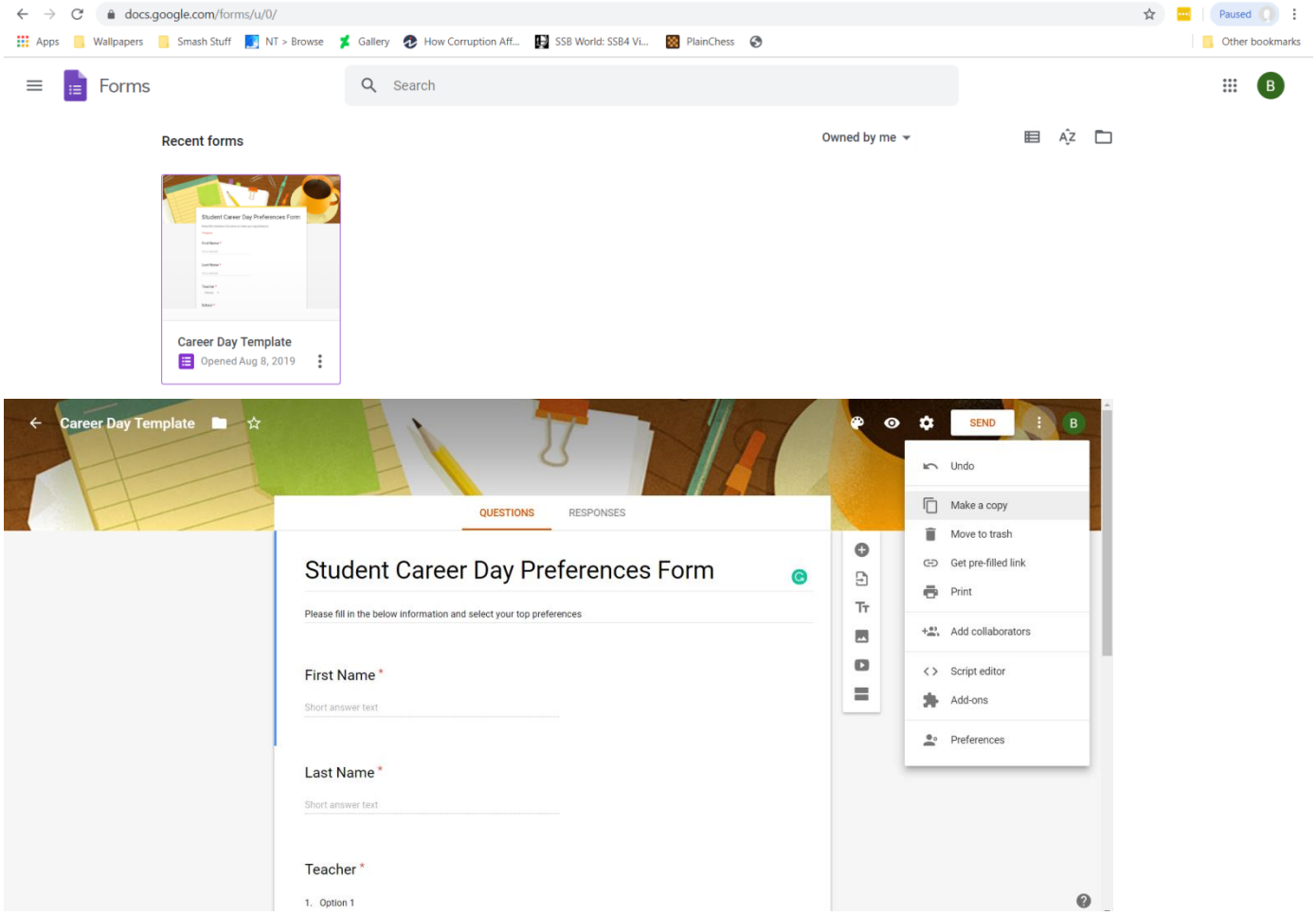
This web application is designed to streamline the process of preparation for BestPrep's Career Days, events at which students from different schools come together to attend sessions to learn about different careers. With this application, the process of getting students signed up for breakout sessions is no longer a tedious, manual process. The application takes in information about the Career Day and the attending students' preferences and uses a matching algorithm to assign the students to breakout sessions according to their preferences and based on the seats allotted per session per that student's classroom. The algorithm ensures that each student will be signed up for a breakout session during each of the time periods for the Career Day and each of those breakout sessions will be on different careers. The results from the matching algorithm being run on each of the participating classrooms can be viewed both on the web application and on an Excel file which is generated by the application and which can be downloaded at the press of a button.

Technology

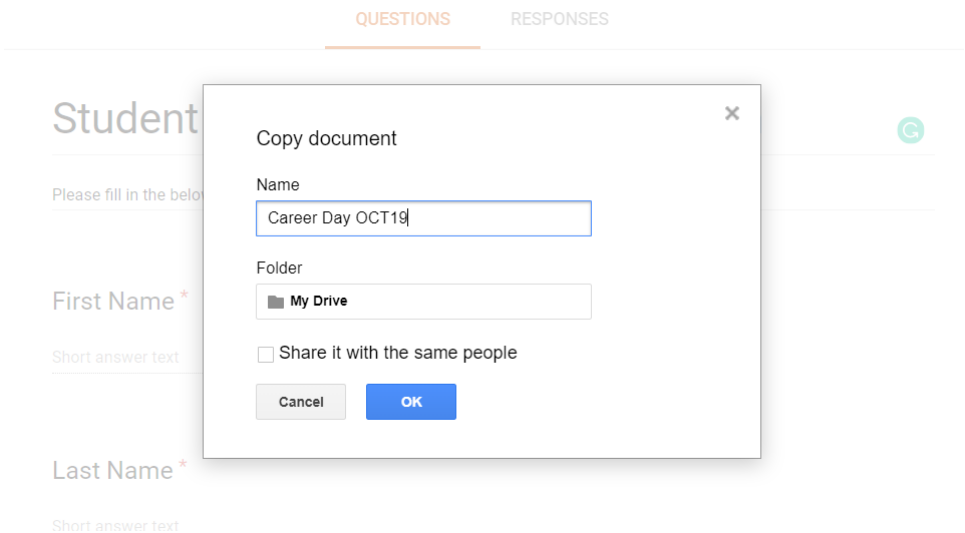
This project is a full stack web application. The application was made using a variety of layers. Moving from backend to frontend, the whole application is hosted on Azure, a cloud computing platform created by Microsoft. Our database for storing and retrieving data such as student information is Cosmos DB (Mongo DB API through Azure). Proceeding through the stack, the backend was written within JavaScript. Using the React framework, the frontend was created through components and the jsx language. Node.js was used for running/managing and interacting with the application through the user interface.

Usage Walkthrough

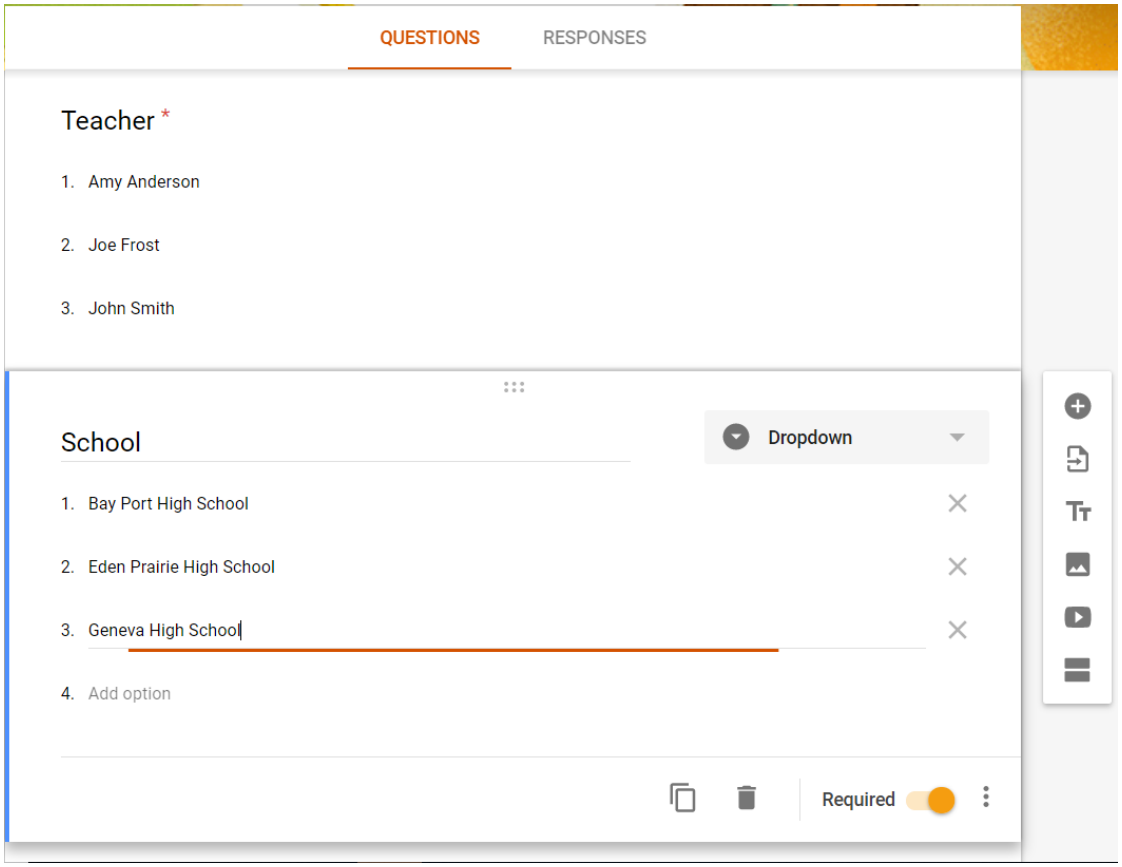
1) Make a copy of the provided Google Form template in the *REDACTED* Google account by going to Google Forms, clicking on the “Career Day Template” form, clicking the three dots in the top right corner, and clicking “Make a copy”.

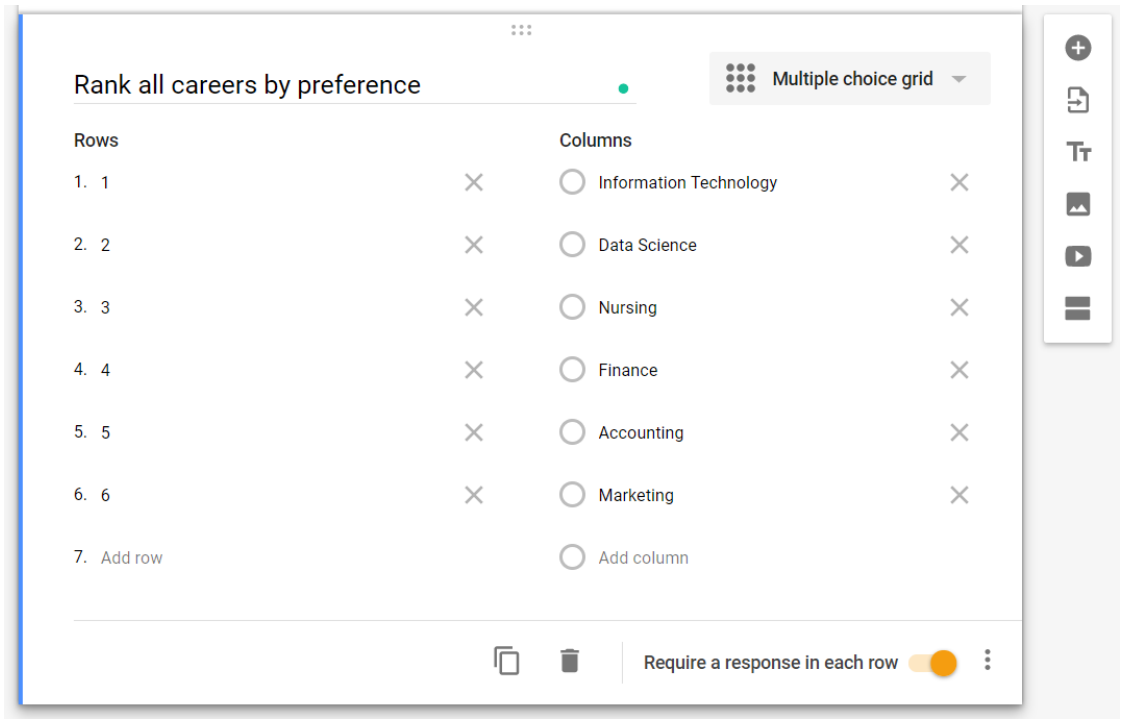


Name the form for the specific Career Day.

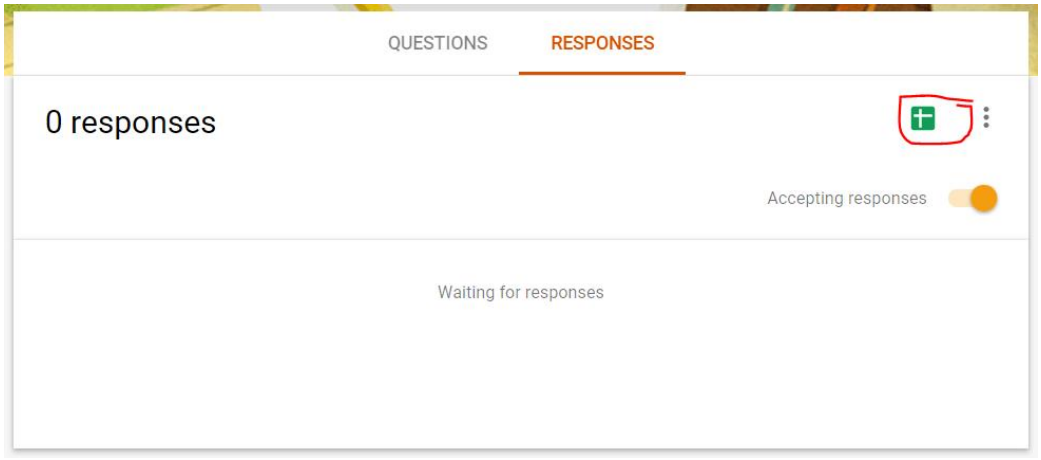


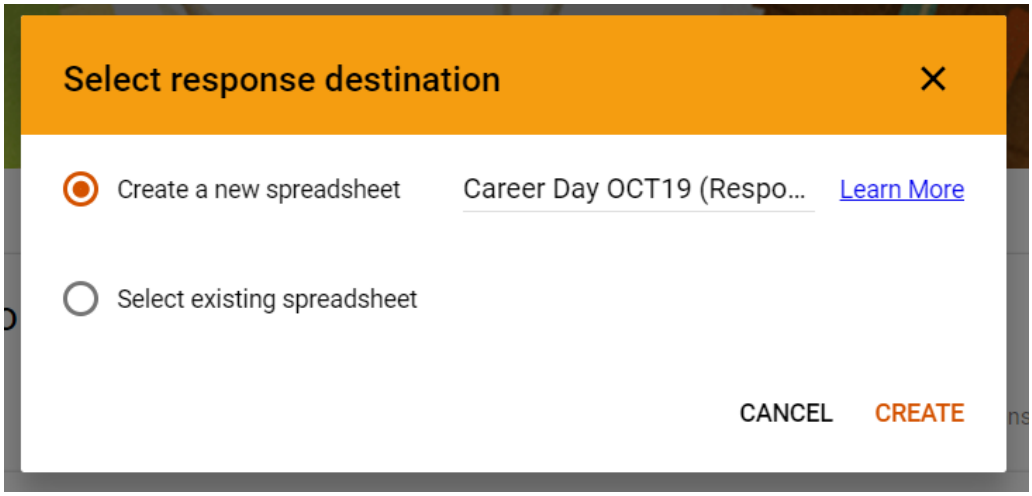
Edit the drop-down answer options for Teacher and School, and edit the career ranking by adding each of the N careers for the given Career Day in the right-hand column and having 1, 2, 3, … N in the left-hand column, so that the students will be ranking each of the careers according to their personal preferences. The changes will save automatically.



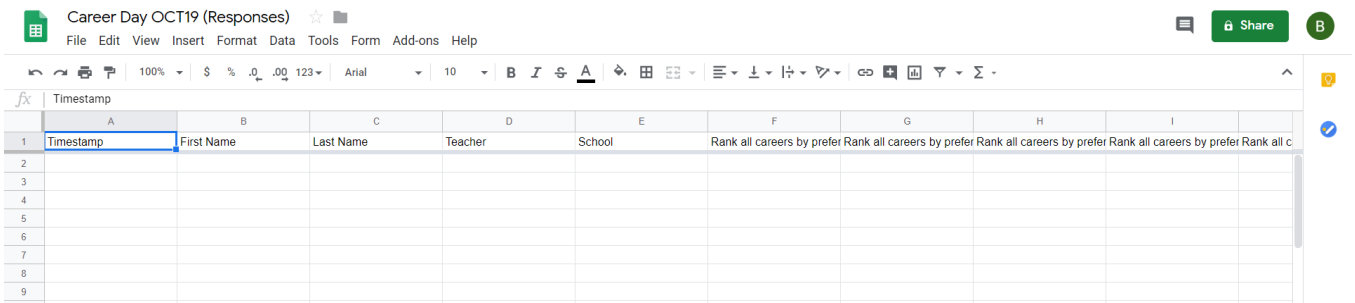


2) Once you finish updating the form, click on “Responses” and then click the green icon and then “CREATE” to create a new spreadsheet for the form.

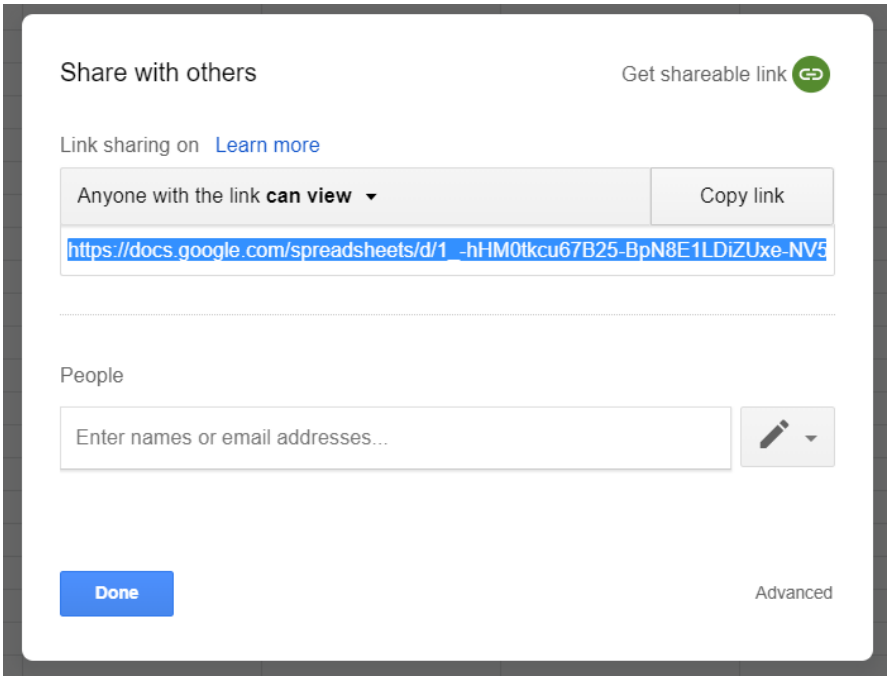




The generated Google Sheet will open in a new tab, and this sheet will be automatically filled in with the responses from the students as they fill out and submit the form.



3) Next, make the spreadsheet viewable by anyone with the link, to ensure that the teachers of classrooms registered for the Career Day can view the spreadsheet to keep track of if all of his/her students have filled out the form and also that they cannot edit the spreadsheet. To do so, view the spreadsheet and click on the "SHARE" button in the top right corner. Then, click "Get shareable link" in the window that pops up. The link that appears is the link which you can share with the teachers.



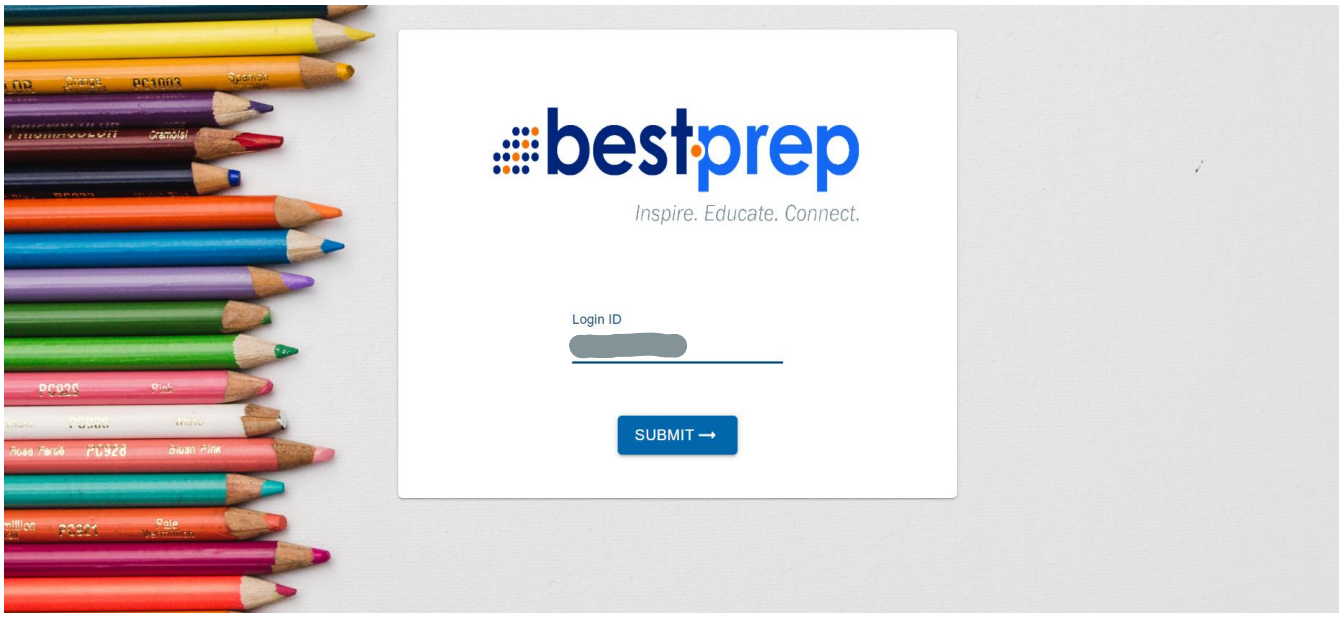
4) After creating the Google Form and Sheet, email the participating teachers the link to the Google Form, instructing them to send it to all of their students and have them fill it out by a designated time, and include the shareable link to the Google Sheet so that the teachers can email BestPrep if any of their students did not fill out the form in time. BestPrep could then enter the student's information directly into the spreadsheet before running the matching algorithm, making sure to carefully fill out the student's information such that they have all the careers ranked and such that the teacher and school fields match the options exactly (i.e. no extra spaces). Once the spreadsheet starts getting responses, it will look something like below.

fx Timestamp

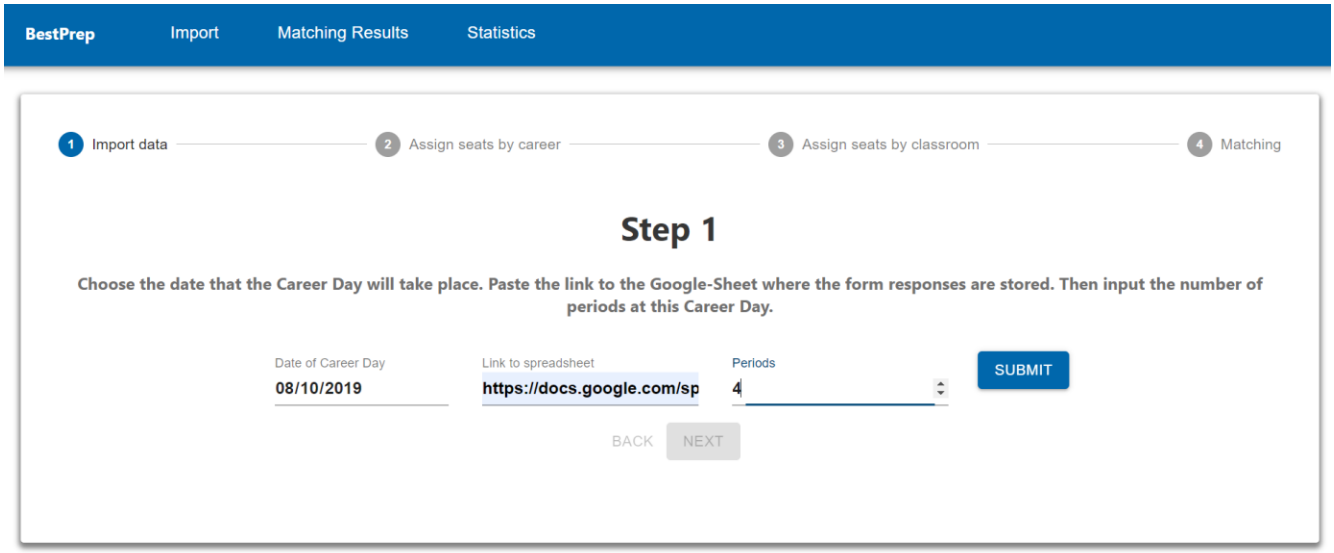
	A	B	C	D	E	F	G	H	I	J	K
1	Timestamp	First Name	Last Name	Teacher	School	Rank all careers	Rank all careers	Rank all careers	Rank all careers	Rank all careers	Rank all careers t
2	8/21/2018 8:57:0	Brooke	Davis	Amy Anderson	Bay Port High School	Information Techi	Accounting	Data Science	Finance	Marketing	Nursing
3	8/22/2018 8:57:0	Sunny	Cat	Amy Anderson	Bay Port High School	Finance	Information Techi	Nursing	Marketing	Data Science	Accounting
4	8/23/2018 8:57:0	Jack	Kurtz	Amy Anderson	Bay Port High School	Accounting	Finance	Information Techi	Data Science	Marketing	Nursing
5	8/24/2018 8:57:0	Kathryn	Woods	Amy Anderson	Bay Port High School	Finance	Accounting	Information Techi	Data Science	Nursing	Marketing
6	8/25/2018 8:57:0	Morgan	Ambourn	Amy Anderson	Bay Port High School	Information Techi	Finance	Data Science	Accounting	Marketing	Nursing
7	8/26/2018 8:57:0	Ericka	Hinners	Amy Anderson	Bay Port High School	Accounting	Nursing	Finance	Marketing	Information Techi	Data Science
8	8/27/2018 8:57:0	Jessi	Krause	Amy Anderson	Bay Port High School	Data Science	Information Techi	Accounting	Finance	Nursing	Marketing
9	8/28/2018 8:57:0	Swechha	Ghimire	Amy Anderson	Bay Port High School	Data Science	Finance	Marketing	Accounting	Information Techi	Nursing
10	8/29/2018 8:57:0	Nicholas	Battani	Amy Anderson	Bay Port High School	Finance	Data Science	Accounting	Marketing	Nursing	Information Techr
11	8/30/2018 8:57:0	Chad	White	Amy Anderson	Bay Port High School	Accounting	Finance	Information Techi	Data Science	Marketing	Nursing
12	8/31/2018 8:57:0	Caryn	Soulberg	Amy Anderson	Bay Port High School	Finance	Accounting	Information Techi	Data Science	Nursing	Marketing
13	9/1/2018 8:57:07	Ellie	Van	Amy Anderson	Bay Port High School	Information Techi	Finance	Accounting	Nursing	Data Science	Marketing
14	9/2/2018 8:57:07	Carol	Peters	Amy Anderson	Bay Port High School	Accounting	Information Techi	Finance	Data Science	Nursing	Marketing
15	9/3/2018 8:57:07	Axl	Rose	Amy Anderson	Bay Port High School	Nursing	Finance	Information Techi	Data Science	Marketing	Accounting
16	9/4/2018 8:57:07	John	Denver	Amy Anderson	Bay Port High School	Marketing	Information Techi	Nursing	Data Science	Accounting	Finance
17	9/5/2018 8:57:07	Taylor	Swift	Amy Anderson	Bay Port High School	Information Techi	Accounting	Data Science	Finance	Nursing	Marketing
18	9/9/2018 8:57:07	David	Dee	Amy Anderson	Bay Port High School	Information Techi	Accounting	Data Science	Finance	Marketing	Nursing
19	9/10/2018 8:57:0	Holly	Parker	Amy Anderson	Bay Port High School	Finance	Information Techi	Nursing	Marketing	Data Science	Accounting
20	9/11/2018 8:57:0	Jimmy	Jungle	Amy Anderson	Bay Port High School	Accounting	Finance	Information Techi	Data Science	Marketing	Nursing

5) Once the spreadsheet has been fully filled out, go to https://*REDACTED*

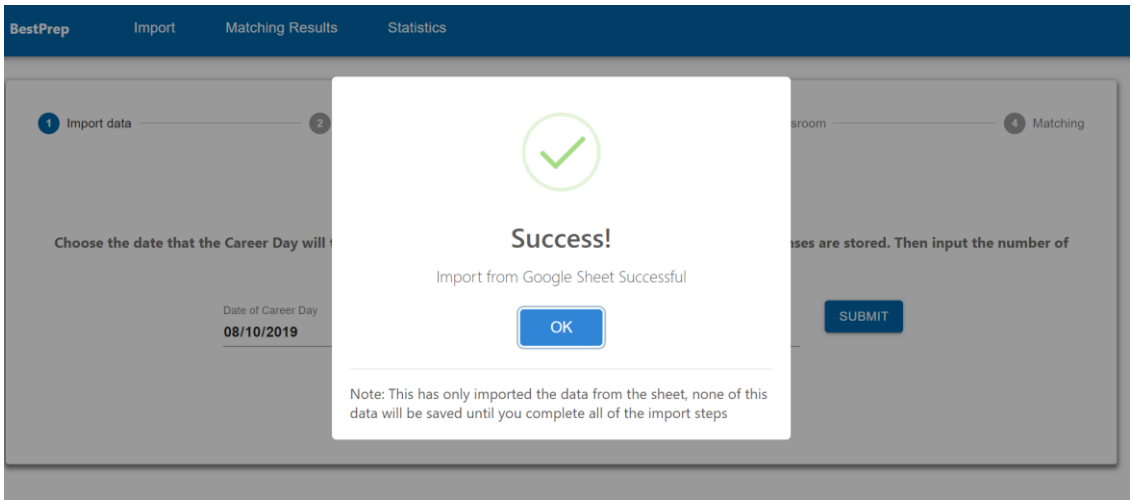
Enter "*REDACTED*" into the login box and click the "SUBMIT" button.



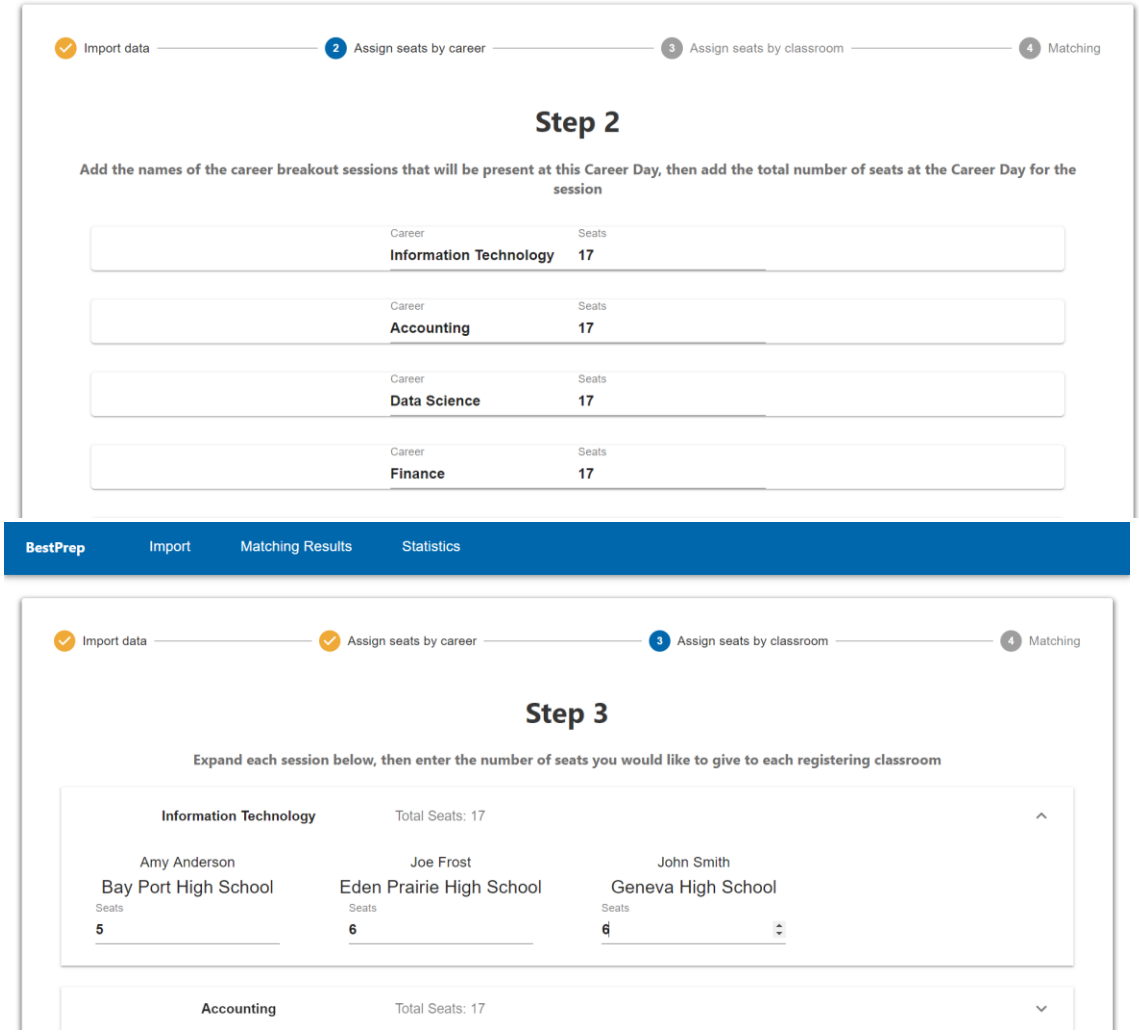
6) Select the date on which the Career Day will be happening, paste the link to the Google Sheet in the designated box, and enter the number of time periods for the Career Day (aka the number of sessions each student will be attending).



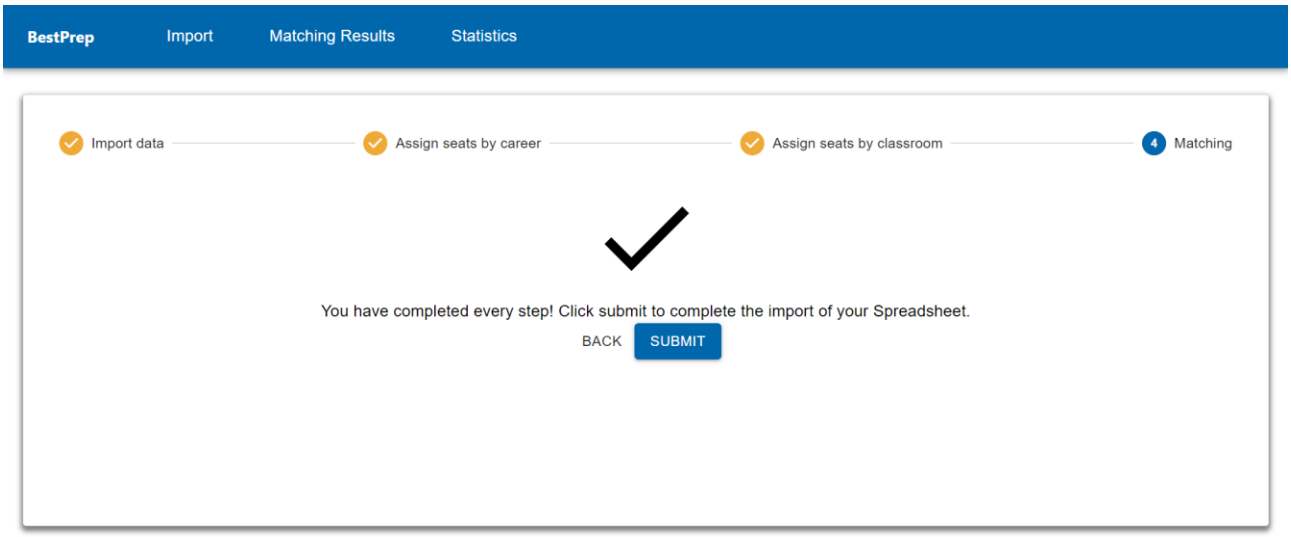
7) Click the “SUBMIT” button and wait for the message of success once the sheet has been imported. Once it has been, click the “OK” button.



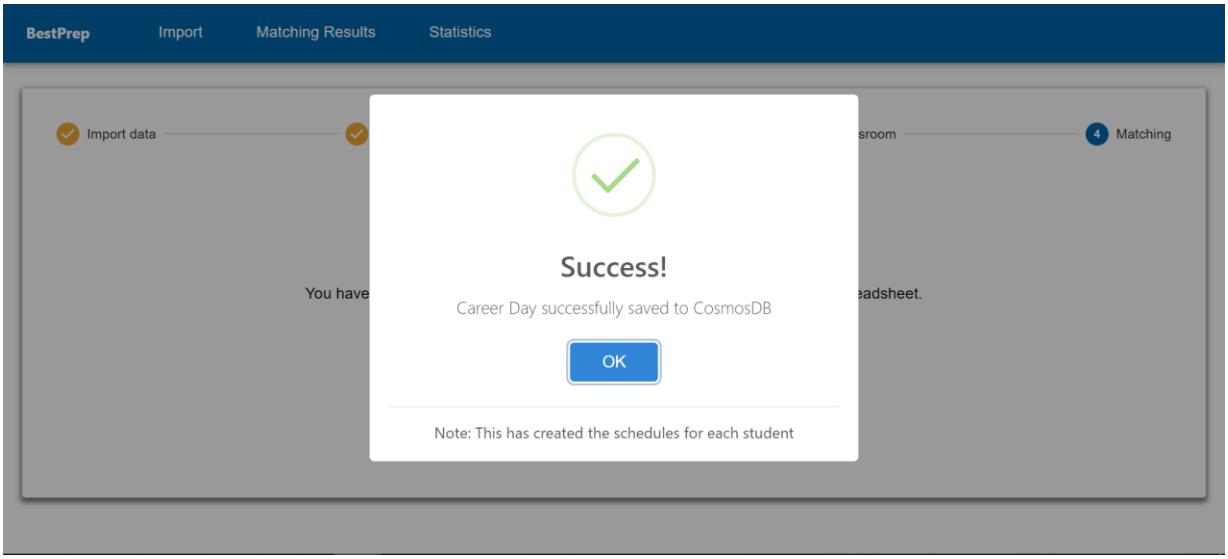
8) Assign the seats per career and per classroom per career by filling out Step 2 and Step 3, clicking the “NEXT” button after each. An explanation of the seat assignment process can be found on the last two pages of this document.



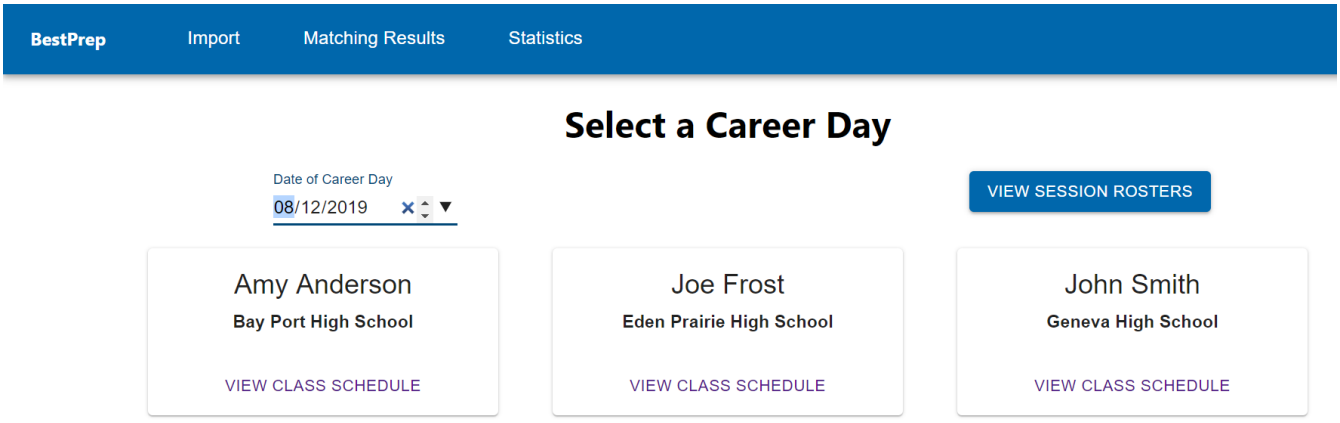
9) Now that all the data has been imported and entered, click the “SUBMIT” button to run the matching algorithm on the data.



10) If the matching succeeds, click the “OK” button.

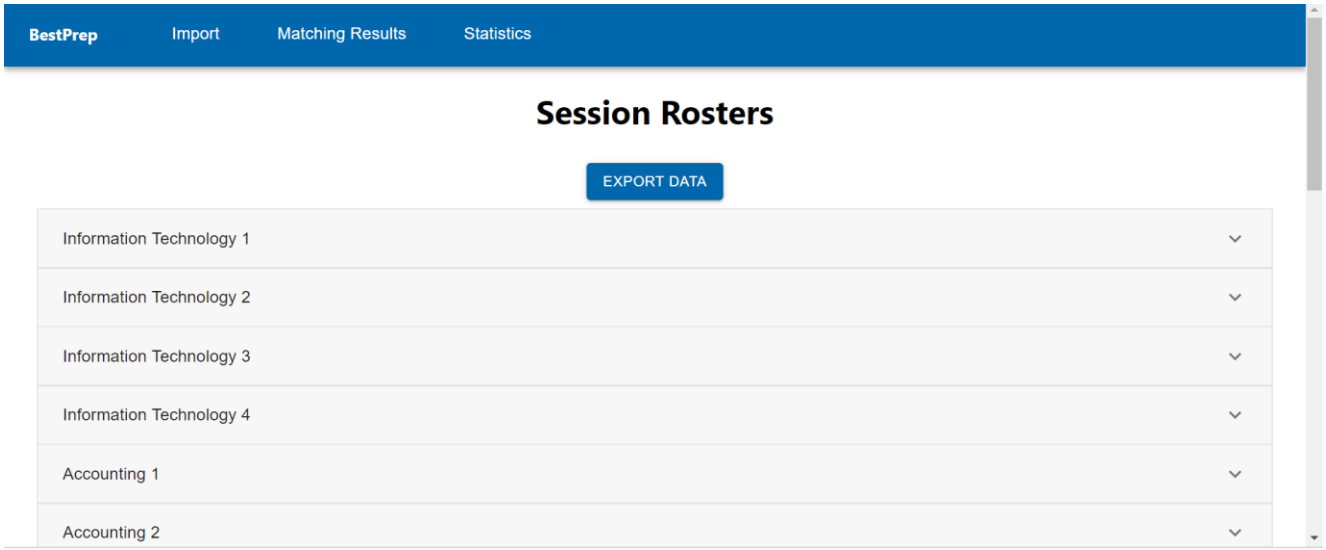


Select the desired Career Day date by clicking on the dropdown arrow.



After selecting the date, the matching results can be viewed in two ways. By clicking “VIEW CLASS SCHEDULE” on one of the classrooms, the schedules created by the algorithm for each of the students in that class can be viewed. By clicking the “VIEW SESSION ROSTERS” button, any of the sessions for the Career Day can be clicked to view all the students attending that session across all of the participating classrooms.

To export all of the data to Excel, click the “EXPORT DATA” button on the Session Rosters page.

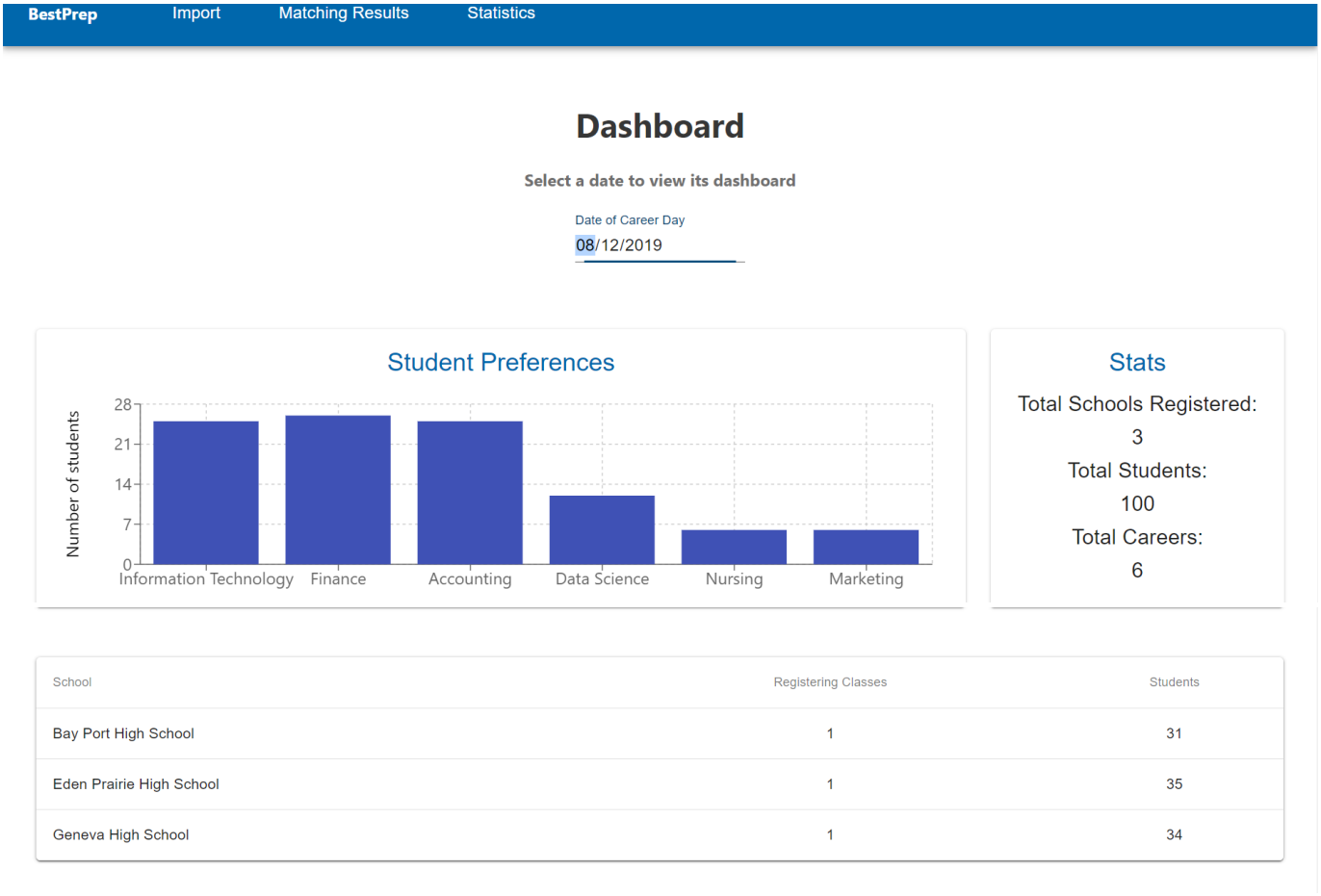


The file will be automatically downloaded, and this Excel file can be modified in any way without affecting any of the data on the application. The first sheet of the file stores all of the students, their schools, and their schedules. The following sheets each represent one of the sessions for the Career Day and each store that session’s roster of students, as well as their schools and a blank box for the students to check off if they are present at the session.

A1 fx First Name

	A	B	C	D	E	F	G
1	First Name	Last Name	High School	Period 1	Period 2	Period 3	Period 4
2	Brooke	Davis	Bay Port High School	Marketing	Information Technology	Accounting	Data Science
3	Sunny	Cat	Bay Port High School	Nursing	Finance	Information Technology	Marketing
4	Jack	Kurtz	Bay Port High School	Accounting	Marketing	Nursing	Finance
5	Kathryn	Woods	Bay Port High School	Marketing	Accounting	Data Science	Nursing
6	Morgan	Ambourn	Bay Port High School	Marketing	Nursing	Data Science	Finance
7	Ericka	Hinners	Bay Port High School	Accounting	Nursing	Marketing	Information Technology
8	Jessi	Krause	Bay Port High School	Data Science	Information Technology	Marketing	Accounting
9	Swechha	Ghimire	Bay Port High School	Data Science	Marketing	Information Technology	Finance
10	Nicholas	Battani	Bay Port High School	Marketing	Finance	Data Science	Accounting
11	Chad	White	Bay Port High School	Accounting	Marketing	Nursing	Finance
12	Caryn	Soulberg	Bay Port High School	Marketing	Nursing	Accounting	Information Technology
13	Ellie	Van	Bay Port High School	Information Technology	Marketing	Finance	Accounting
14	Carol	Peters	Bay Port High School	Nursing	Accounting	Marketing	Data Science
15	Axl	Rose	Bay Port High School	Nursing	Data Science	Finance	Information Technology
16	John	Denver	Bay Port High School	Finance	Nursing	Information Technology	Marketing
17	Taylor	Swift	Bay Port High School	Information Technology	Data Science	Accounting	Nursing
18	David	Dee	Bay Port High School	Information Technology	Data Science	Accounting	Nursing
19	Holly	Parker	Bay Port High School	Finance	Information Technology	Nursing	Marketing
20	Jimmy	Jungle	Bay Port High School	Accounting	Marketing	Nursing	Finance

To view statistics about any Career Day which has made use of this application, go to the “Statistics” page and select the correct date by clicking on the dropdown arrow.



11) If the matching fails, an error message will pop up, and this means that either not enough seats were assigned or there is an issue with the information on the Google Sheet, like someone having the same career twice in their preference list or having an empty cell, so check for those errors and then you can try the process again by clicking “Import” on the navigation bar and starting the process over.

Seat Assignment Information and Example

When assigning the seats for the Career Day sessions, the numbers entered are the total number of seats for a single time period, as the entered seat numbers will then be applied to each of the corresponding sessions during all time periods for the Career Day. At each time period, **the total number of seats must be equal to the total number of students**, and **the total of the seats per career per classroom must be equal to the number of students in that classroom**.

The following is an example of how to fill out the seat assignment form when using the BestPrep Career Day web application.

STEP 1

After all the student information has been entered, look at the spreadsheet and find that there are 100 total students for this Career Day. Count how many students there are from each registered classroom, which is a teacher at a school – in this case there are three schools and one teacher per school.

Calculate a breakdown per classroom to find what percentage of the total students each classroom makes up:

BPHS: 31 students (31 students/100 students = **31%**)
EPHS: 35 students (35 students/100 students = **35%**)
GHS: 34 students (34 students/100 students = **34%**)

STEP 2

There are 6 different careers for this Career Day, so the 100 students need to be divided over 6 careers:

100/6 = 16.6667, so some careers will get 17 seats and some careers will get 16 seats
17*6 = 102, so 2 careers will get 16 seats and the remaining 4 careers will get 17 seats

You can assign the 17 seats to the careers you see as being the most popular. So, your seat assignment could look like this:

IT: **17**
Accounting: **17**
Finance: **17**
Nursing: **17**
Marketing: **16**
Data Science: **16**

STEP 3

Now, the seats per career need to be divided proportionally over the participating classrooms, using the percentages calculated in Step 1.

Since 4 careers have the same number of seats and 2 careers have the same number of seats, calculate the seats proportionally for the 4 careers and then divide up the seats over the remaining 2 careers based on how many seats each of the classrooms still need.

IT, Accounting, Finance, and Nursing:
BPHS: 0.31*17 = 5.27, so round to **5**
EPHS: 0.35*17 = 5.95, so round to **6**
GHS: 0.34*17 = 5.78, so round to **6**
Affirm that 5 + 6 + 6 = 17, which it does, so no adjustments need to be made.

Now, calculate how many seats each classroom still needs. BPHS has 20 of their 31 seats accounted for, EPHS has 24 of their 35 seats accounted for, and GHS has 24 of their 34 seats accounted for. So, BPHS needs 11 more seats, EPHS needs 11 more seats, and GHS needs 10 more seats from the remaining two careers. To make this

happen, distribute the seats as follows:

Marketing:	Data Science:
BPHS: **6**	BPHS: **5**
EPHS: **5**	EPHS: **6**
GHS: **5**	GHS: **5**

STEP 4

Double check that the two aforementioned requirements are fulfilled by the seat assignments, that the total number of seats must be equal to the total number of students and that the total of the seats per career per classroom must be equal to the number of students in that classroom.

1) 17 + 17 + 17 + 17 + 16 + 16 = 100 ✔
2) BPHS: 5 + 5 + 5 + 5 + 6 + 5 = 31 ✔
   EPHS: 6 + 6 + 6 + 6 + 5 + 6 = 35 ✔
   GHS: 6 + 6 + 6 + 6 + 5 + 5 = 34 ✔