Title: Asians Migration Rate Increase In USA

Link:
https://cos30045ass2.netlify.app/homepage/

Team Name: Pray for HD

Student Name and ID:

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Tutorial day and time: Monday 2pm-12pm

Year & Sem: Year 3, Sem 6 & Sem 8

Word Count: 2319

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1. Introduction

1.1 Background and Motivation

This project will apply a structured iterative design process to research design and build an interactive data visualisation and present it on a website. The website is related to the project topic which is Global Issue: Migration. Our project title is Asians migration rate increase in USA and the main factor is about job.

We designed and built different visualisations to help us understand the context and patterns of human migration such as, patterns of migration between one or more countries, displacement due to conflict, natural disasters, migration and climate changes like rising in sea levels, extreme weather events, food security or attitudes towards migration, population growth and decline.

The motivation we have that pushed us to do and complete our project would be the thought of achieving High Distinction for this subject.

1.2 Visualisation Purpose

Our project's visualisation purpose is to transform raw, complex data into clear, relevant charts and graphs that can be easily comprehended and digested. This will let people see patterns or trends in data by visually portraying it. This can enhance effective transmission of findings, allowing people to easily comprehend and absorb information. Furthermore, providing visualisations can help in decision-making by giving a visual framework for analyzing options and outcomes.

1.3 Project Schedule

About our project schedule, we would meet up at Discord as the place for discussion for the project. The day for discussion is usually on Wednesday and Saturday because both of us have no classes on Wednesday and Saturday is a weekend. For the time, we start at 3pm on both Wednesday and Saturday, but it's not fixed.
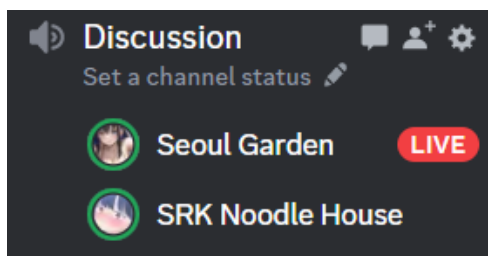
Seoul Garden: Lam Mun Swee

SRK Noodle House: Wan Zhen Yao

2. Data

2.1 Data Source

The main source of us getting our data are from multiple websites from Google. The primary source we checked will be the link provided below. The rest of the links provided in the reference section were also used by us on either getting our datasets or to use it to compare with the datasets we are using.

Primary Source:

- United Nations. (2023). *International migration | United Nations*.

 https://www.un.org/en/global-issues/migration

2.2 Data Processing

All the data cleanup processes were mostly all done manually at Microsoft Excel. The reason for this is because we had a hard time searching for our datasets and the datasets we have needs to be modified from our original dataset to be used in other charts and graphs. Due to this, all the data had to be manually marked down and modified using Microsoft Excel's formatting. This is to ensure we remember which datasets are modified by how many percent, rounded up or down or untouched.

We used the function showed in the images above to split the all the data in separate columns because some of the datasets have their data clumped into one column.
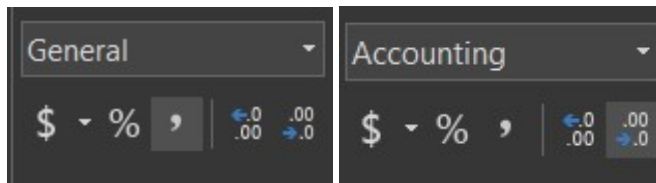
We have also used the General and Accounting settings in Excel to transform our values in the data set into whole number. This will allow us to show our number of Asians. To state an example, there is no such thing as 1.7 Chinese, because of this, we rounded it up to 2 Chinese.

We believe data processing is an essential component of data visualisation, acting as the foundation for transforming raw data into useful visual representations. This critical process entails gathering, cleaning, and manipulating data in order to obtain useful insights. The process of data visualisation often begins with the collecting of diverse datasets, which can come from a variety of sources. Following that, the data is cleansed to correct inconsistencies, eradicate errors, and assure accuracy. After cleaning, the data is processed and organised to produce a systematic foundation for visualisation. Aggregation, filtering, and transformation techniques are used to extract essential patterns, trends, and correlations.

3. Requirements

3.1 Must-Have Features

There are a few must-haves features we agreed on using to make all our charts, graphs, map interactive. Features such as Mouseover, Mouseleave and Zooming were used in our Heat Map. We also added a slider for our Heat Map to show the different years. Next, for our line graph, we used features such as Mouseover and Mouseleave for the dots in the line graph. There is also a drop-down list for our line graph to show each line. Furthermore, for our bar chart, we create 3 different bar charts. Each of the bar chart contains Mouseover and Mouseleave features that are used on the bars. There are also 2 buttons which are for the Male and Female bar charts. We used Radio Button feature to display them. Lastly, for our pie chart, we applied Mouseover and Mouseleave on the pie chart to display the data when the cursor is hovered over a pie and disappear when the cursor leaves the pie.

3.2 Optional Features

There was an optional feature we wanted to use for our line graph. It is called brushing. We did try using it but we ended up agreeing to not use it, because it was very complicated to apply to our line graph to display our data and it was too time consuming to code.

4. Visualisation Design

4.1 Low Fidelity Sketches

Heat Map

The idea we had for our heat map is to show the population of Asians in the USA. Since our title is about the Asian migration in the USA, each piece of land in the heat map will be the states in the USA. When the heat map comes alive, we want each pieces of land to show the details by letting us know the exact numbers of different Asian races living in that state.

Line Graph
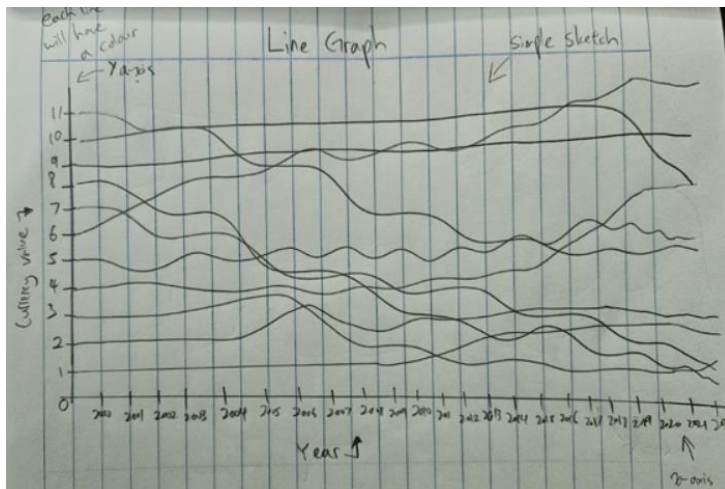
The idea we had for our line graph is to show the currency rate of Asian countries compared to the USA. Each line in the graph will indicate different Asian country and it will also show the increasement and decrement of the currency throughout the years.

Bar Chart
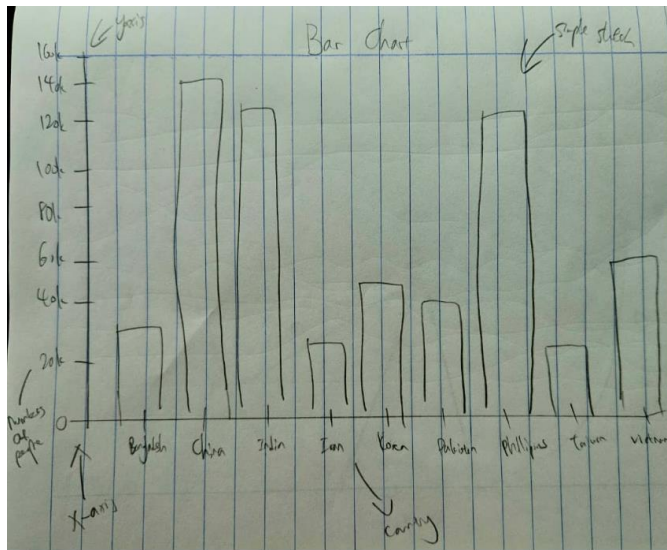
The idea we had for our bar chart is to show the different Asian races migrate to USA for their education in order to get hired for a better paying job. On the X-axis will show the different Asian races and, on the Y-axis, will show the number of Asians. We will make 3 different bar charts to show the total number of Asians of each Asian country and a male and female bar chart separately.

Pie Chart
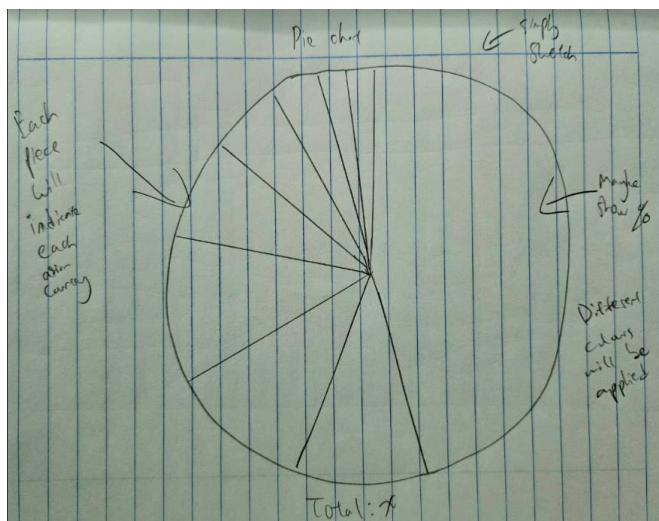
The idea we had for our pie chart is to show Asians migrate to USA due to getting promoted from their jobs to work in USA. The pie chart will display the percentage of each pie out of 100 percent in the pie chart. It will also display the number of Asians on each pie once the pie chart comes alive in our website.

4.2 Data Visualisation

Heat Map

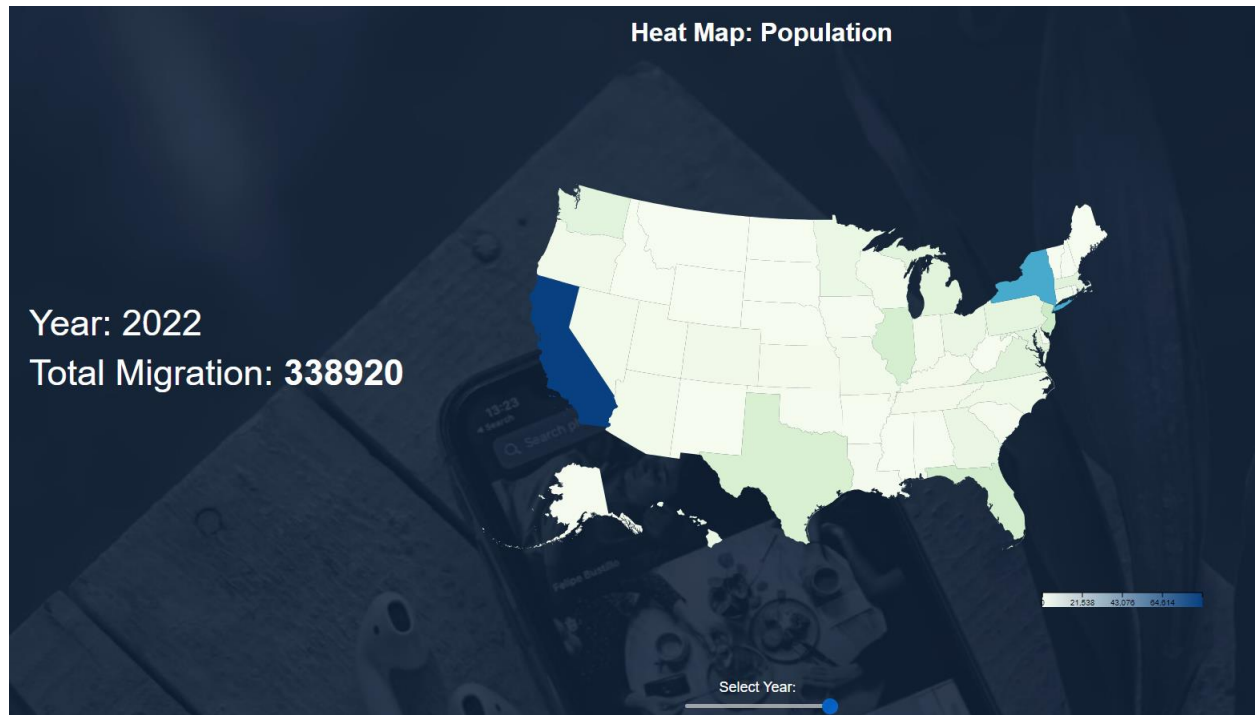The heat map showed above is to present the population of Asians migrate to USA. We used different colors in the heat map to indicate different states in the USA. By hovering over each state of our heat map, the total number of Asians will appear on that states. Each state is clickable, by clicking on a state, it will zoom in and show us the specific number of each Asian race in that state.

There is a slider as well which is to show us different population data on different years.

Each year have a different dataset that was modified from the original dataset (2022 dataset). For year 2018 and 2019, the dataset was increased by 20% and 30% from the original dataset. As for year 2020 and 2021, due to the pandemic, the dataset was decreased by 10% and 20% from the original dataset. To simplify, for our heat map, we created 4 different datasets based on modification from 1 original dataset.

Line Graph

The line graph shows our first factor of Asians migrate to the USA. This is to present the currency of Asians countries compared to USA. On the X-Axis we have the years and, on the Y-Axis, we have the currency value. A variety of colors were used for each of the lines in the line graph. This to help us indicate different countries currency rate compared with the USA. When hovered over the dots on the line graph, we are able to show the details such as country, year and value. There is also a drop-down list for the line graph to show the specific Asian country currency.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Asian Country	Unit of Measure	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	20
Afghanistan	10 National Currency Unit per US Dollar	4.735757473	4.750001452	4.7263	4.876275358	4.78453125	4.94945975	4.992533083	4.996201777	5.024961474	5.0325	4.6452461	4.674700774	5.092
Sri Lanka	100 National Currency Unit per US Dollar	0.770051167	0.893830133	0.95662065	0.965209508	1.011944575	1.004980517	1.039144458	1.106232333	1.083337627	1.149447833	1.130644804	1.105652079	1.2760335
Turkmenistan	National Currency Unit per US Dollar	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	2.287258065	2.85	2.850191667	2.85	2.
Azerbaijan	National Currency Unit per US Dollar	0.89483075	0.931316667	0.972164167	0.982146	0.9826955	0.945421	0.893445	0.858123808	0.821619579	0.803783333	0.80265	0.789686389	0.7856453
Georgia	National Currency Unit per US Dollar	1.976166667	2.073016667	2.195675	2.14565	1.91665	1.812675	1.780433333	1.670491667	1.490791667	1.670487097	1.782341667	1.68649543	1.6512583
Pakistan	100 National Currency Unit per US Dollar	0.536481865	0.619271617	0.597237817	0.577519967	0.582578633	0.59514475	0.60271335	0.607385158	0.704080333	0.817128917	0.851938163	0.863433833	0.9339519
Tajikistan	National Currency Unit per US Dollar	2.07625	2.372191667	2.764133333	3.061366667	2.970508333	3.116566667	3.298408333	3.442483333	3.430725	4.142708333	4.378966667	4.610183333	4.7377083
Hong Kong, China	National Currency Unit per US Dollar	7.791166667	7.79875	7.798916667	7.78675	7.788	7.777333333	7.767833333	7.801416667	7.786833333	7.75175	7.769166667	7.784	7.7564166
Korea	1000 National Currency Unit per US Dollar	1.1303625	1.29079	1.2516025	1.191645833	1.146249167	1.024328333	0.955340833	0.929375833	1.100125833	1.277245833	1.15646	1.108233333	1.1268066
Bangladesh	10 National Currency Unit per US Dollar	5.214166667	5.580666667	5.7888	5.815004	5.951265833	6.4327475	6.893323333	6.8874875	6.8598275	6.903906667	6.964929167	7.41524	8.1862658
India	10 National Currency Unit per US Dollar	4.4941605	4.718641417	4.861031917	4.658328417	4.531646667	4.4099975	4.530700833	4.134853333	4.350518333	4.840526667	4.572581212	4.667046667	5.3437233
Nepal	100 National Currency Unit per US Dollar	0.710937958	0.7494925	0.778766192	0.761414475	0.736735967	0.713675	0.727556058	0.664150275	0.69761695	0.775734307	0.73262359	0.7402	0.852257
Brunei Darussalam	National Currency Unit per US Dollar	1.723963333	1.7917225	1.790588333	1.742183333	1.690228333	1.6643975	1.588933333	1.507101667	1.417166667	1.454569273	1.363509474	1.25791302	1.2495670
Cambodia	1000 National Currency Unit per US Dollar	3.84075	3.916333333	3.912083333	3.973333333	4.01625	4.0925	4.10325	4.056166667	4.054166667	4.139333333	4.184916667	4.0585	4.0
Indonesia	10000 National Currency Unit per US Dollar	0.8421775	1.026085	0.931119167	0.857713333	0.893885	0.970474167	0.915931667	0.9141	0.96989625	1.03939375	0.909043333	0.877043333	0.9386629
Malaysia	National Currency Unit per US Dollar	3.8	3.8	3.8	3.8	3.8	3.787091667	3.668176958	3.437569382	3.335833333	3.524502911	3.221086915	3.060003011	3.0888008
Philippines	10 National Currency Unit per US Dollar	4.419225	5.099265	5.160356667	5.420333333	5.603991667	5.508549167	5.13142725	4.614839118	4.432328761	4.767968845	4.510966418	4.331313692	4.2228794
Singapore	National Currency Unit per US Dollar	1.723963333	1.7917225	1.790588333	1.742183333	1.690228333	1.6643975	1.588933333	1.507101667	1.414860833	1.454514713	1.363508333	1.257775877	1.2496762
Thailand	10 National Currency Unit per US Dollar	4.011180333	4.44319	4.296008333	4.148461667	4.022241492	4.022013021	3.788198322	3.451818059	3.331330064	3.428577412	3.1685705	3.049173333	3.1083091
Viet Nam	10000 National Currency Unit per US Dollar	1.416775	1.472516667	1.52795	1.550958333	1.5746	1.585891667	1.599425	1.6105125	1.630225	1.706508333	1.861291667	2.050975	2.08
Japan	100 National Currency Unit per US Dollar	1.077654983	1.215289475	1.253080192	1.159334642	1.081925692	1.102182117	1.162993117	1.177535292	1.03359494	0.935700891	0.87779875	0.798070198	0.7979045

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The image showed above is the dataset we used for our line graph. It is another dataset that we found. The years stretches out from 2000 to 2022. This is to show the currency of the Asian countries compared to USA throughout the years. For example, 1 US Dollar equals to 10 x 4.736 of Afghanistan currency in the year 2000.

Bar Chart
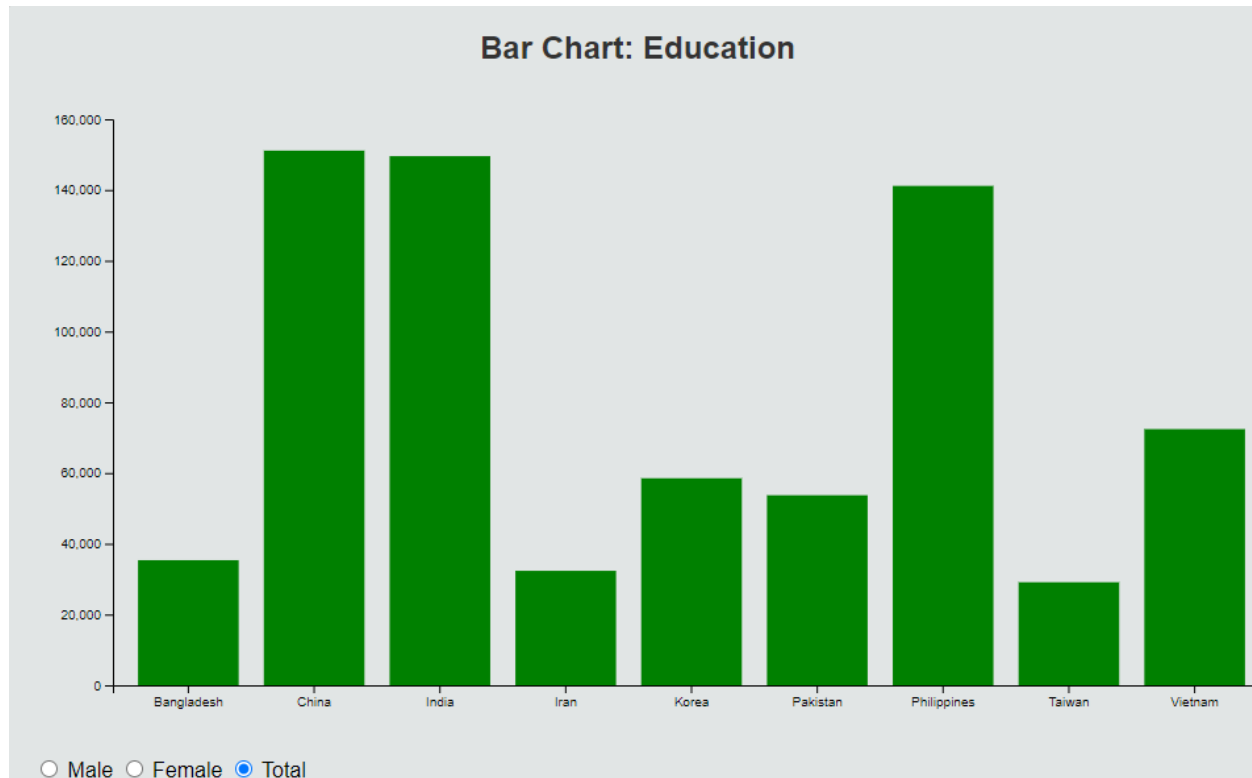
The bar chart above shows our next factor of Asians migrate to the USA. The number of Asians migrate to USA for their education in order to be able to get hired in the USA with higher pay and better working environment. There are 3 different buttons for our bar chart. The total button will show the total number of Asians migrated to USA from their country. The male button will show the number of males migrated from their country and the female button will show the number of females migrated from their country. The details can be displayed when we hover over the bars in the bar chart. The dataset for our bar chart was also taken from the original dataset (2022 dataset). We modified the dataset by summing up the total of each Asian country for the total bar chart. Then we split the total sum of each Asian country to create the male and female bar chart. The splitting isn't always fixed 50% for both genders. There are some data that are split 50% for both male and female, but there are also data that are split like 20%/80%, 70%/30%, vice versa and so on.
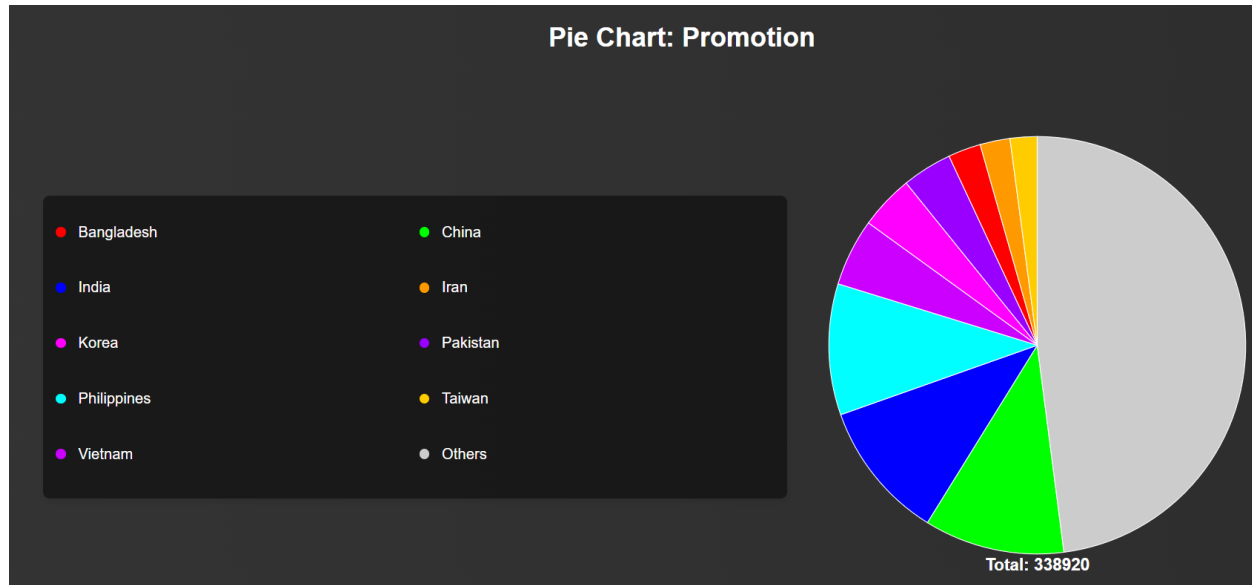
Images of Male and Female bar chart

Male
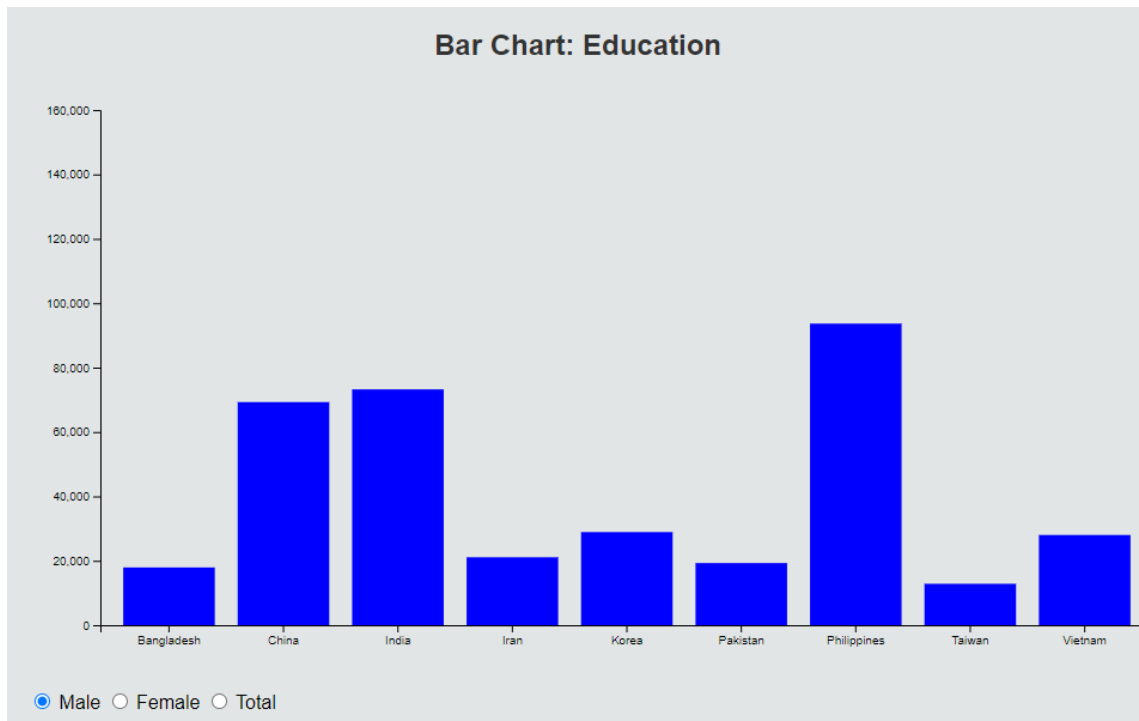
Female
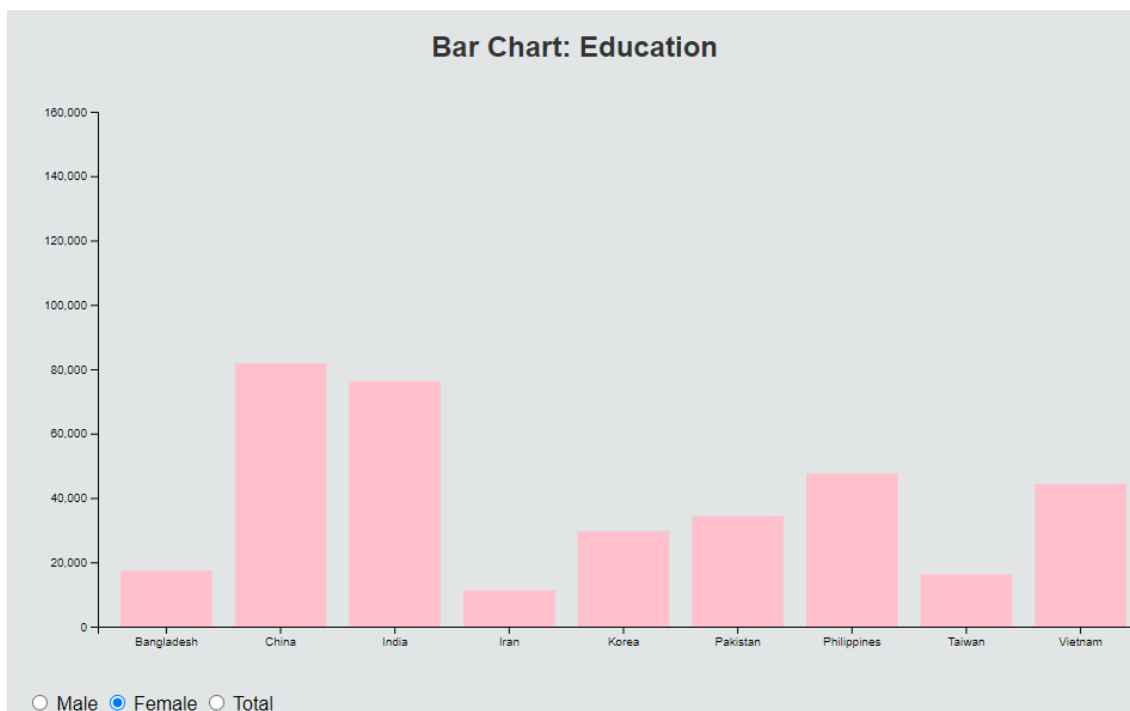
Pie Chart

The pie chart above shows our last factor of Asians migrate to the USA. The number of Asians worker from different Asian countries in their company getting promoted to work in the USA. Each color in the pie chart indicates different Asian countries. By hovering over the pie chart, the total count of each Asian race will show in numbers. The percentage out of 100% for the pie chart will also appear for each country stated in the pie chart. The dataset we used for our pie chart is also modified from the original dataset (2022 dataset). We modified it and then sum up to have a total for each Asian country to be display in the pie chart. We also added up the total of the totals and we gotten 338920 as the total of the totals. The number 338920 is 100% of the pie chart and every single other Asian country total are a percentage of the pie chart.

Few images of the data in the each of the pie
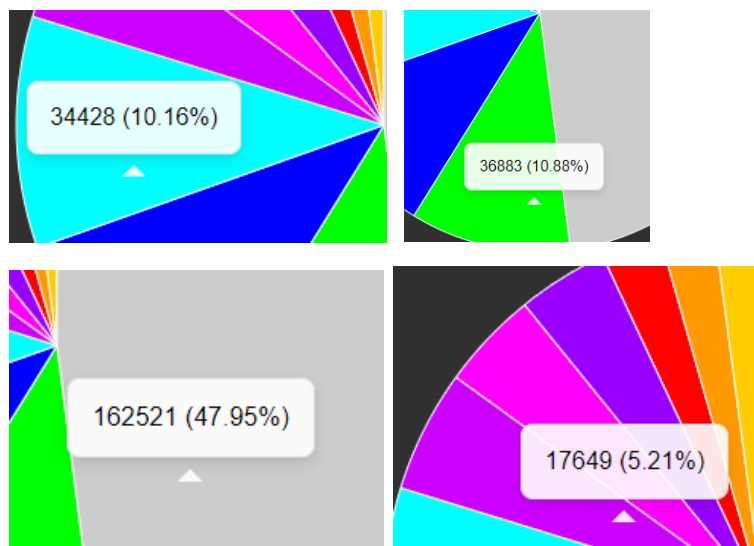
5. Validation

Based on our website, we have conducted a System Usability Scale (SUS) survey among 10 students in the campus. There were total of 10 questions in the survey regarding our website, 5 were positive questions and the remaining 5 were negative.

Below were the (SUS) questions we asked:

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

No	Positive	Negative	Total (P+N) x 2.5
Student 1	15	20	87.5
Student 2	14	20	85
Student 3	20	20	100
Student 4	15	20	87.5
Student 5	20	20	100
Student 6	14	20	85
Student 7	15	20	87.5
Student 8	5	20	62.5
Student 9	14	20	85
Student 10	15	20	87.5

The average: 867.5/10 = **86.75**

The average indicates our website is good.

6. Conclusion

To conclude, a successful data visualisation project requires precise preparation, careful selection of relevant visualisation techniques, and a thorough grasp of the target audience. We believe we achieved all the of the stated goals on the previous sentence while doing this project. Regular project planning demonstrations gave us feedbacks and to improve our projects to be a successful one. The success of the project is defined not only by its aesthetic appeal, but also by its ability to impart valuable insights and aid comprehension.

References (APA)

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3. Batalova, J. B. R. R. a. J. (2023, July 17). *Chinese immigrants in the United States*.

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   021&view=map

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