Monash University: Assessment Cover Sheet

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School/Campus	IT	**Student's I.D. number**	32189117
Unit name	FIT3179 Data visualisation - S2 2021		
Lecturer's name		**Tutor's name**	Dr. Grace Ting Chai Wen
Assignment name	Data Visualisation I Report	**Group Assignment: No** **Note, each student must attach a coversheet**	
Lab/Tute Class: Tute 1	**Lab/Tute Time: Thursday 12pm**	**Word Count: 990**	
Due date: 06-09-2021	**Submit Date: 6/9/2021**	**Extension granted** □	

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Extension granted until (date): ...../...../..... Signature of lecturer/tutor: .....

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URL : https://public.tableau.com/app/profile/kent7032/viz/Project1_16308242232920/Project1?publish=yes
Word Count : 990 WORDS
Where and What it Pays to Attend College.

FIT 3179 Project 1

Who?

The domain that I choose is the diversity of universities and undergraduate majors from tuition fees, regions and school types and why they affect starting and mid-career median salary. The target audience for this project would be students to help clear their doubts regarding tertiary education and guide them their career path. It also acts as a guide for tertiary students to educate them on what to expect in terms of salary in the workforce. Hence, students can easily lookup, locate and explore the diversity of universities that will help them in determining their path of tertiary education.

What?

The data used was obtained from two sources, the first one Kaggle, which was from Wall Street Journal (Needleman, 2008) based on data from Payscale Inc. PayScale excluded survey respondents who reported having advanced degrees, including M.B.A.s, M.D.s and J.D.s. The data obtained here relates to students finding out the starting and mid-career median salary based on different school types, majors and region of schools.

The second source is the National Centre for Education Statistics, where students can observe how tuition fees evolved throughout the years based on different type of institutions. According to the study (NCES, 2019), data are for the entire academic year and are average charges for full-time students. Fees were weighted by the number of full-time-equivalent undergraduates but were not adjusted to reflect student residency. I decided to use the current price for each year to include inflations.

Why/How ?

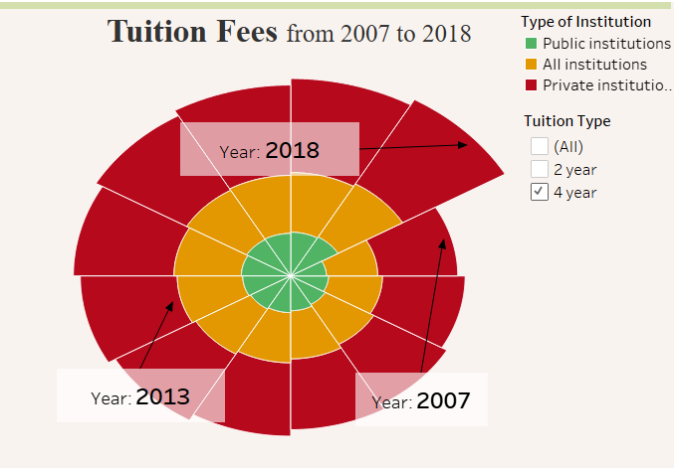


Figure 1 : Tuition Fees from 2007 to 2018

A rose chart (combination of donut chart and pie chart) as seen in Figure 1 was used to display the history of tuition fees for public, private and all institutions from year 2007 to 2018. A rose chart will illustrate the three categorical data better than a line chart. The size channel manipulates the area mark to showcase different fees for the three institutions, and they are differentiated by colour hues. Annotations guide the users on the year of the area section of the chart. The colour scheme green signifies positive/ cheaper while red means negative/ expensive.

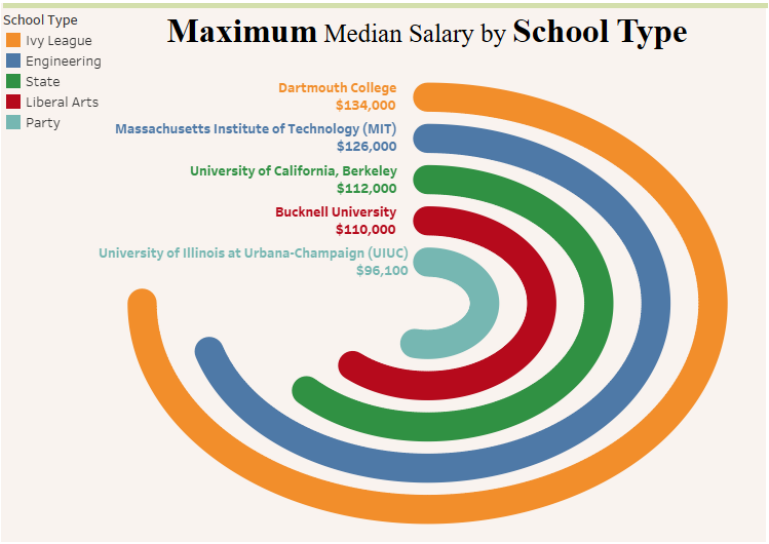


Figure 2 : Maximum Median Salary by School Type

Salary is a key metric used when comparing schools, so it is relevant to compare mid-career median salary of different school types and show which school has the best. A bar chart can achieve this, but a spiral bar chart like Figure 2 can tell the story better, as we can compare the maximum median salary (length of charts) clearer. Colour hue represents different school types, and the labels are colour-coded to represent the same colour as the legend.

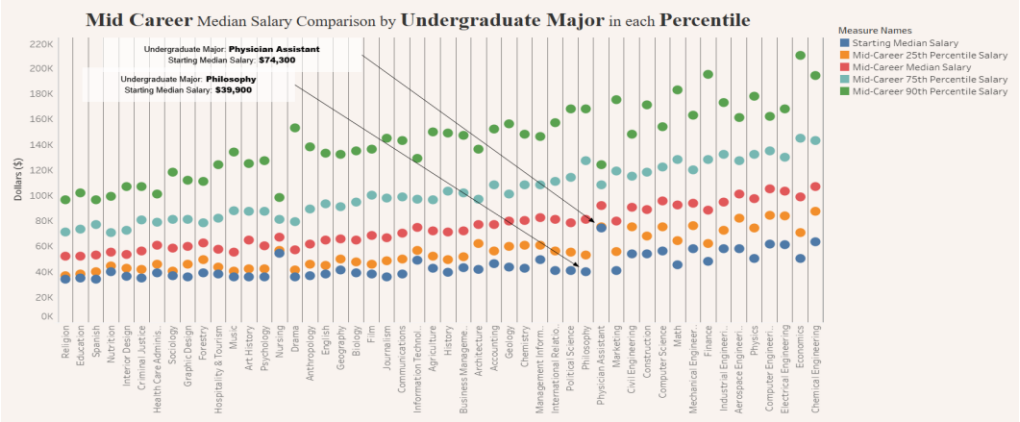


Figure 3 : Mid-Career Median Salary Comparison by Undergraduate Major in Each Percentile.

Majors are also important when comparing starting and mid-career salaries. Essentially, we aim to look at how well each major does in each percentile of their career. The dot plot in Figure 3 clearly compares this, from starting to the 90th percentile. Users can easily deduce the salary value from the vertical position of each dot. Distinct colours are used to show each percentile, treating them as quantitative attributes.

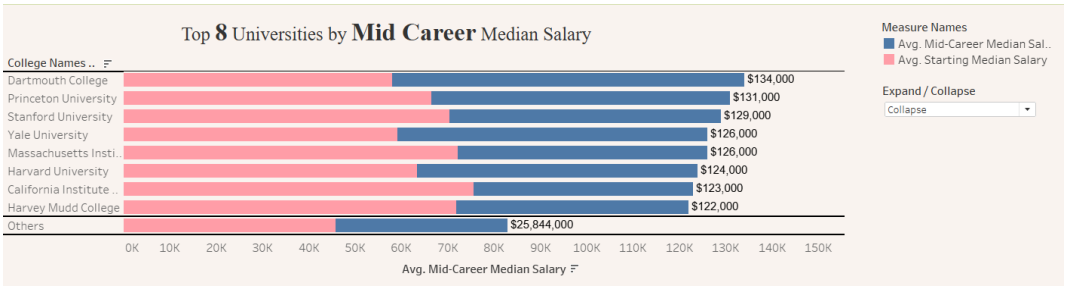


Figure 4 : Top Universities by Mid-Career Median Salary

We also want to know which are the best schools in terms of salary. By using a stacked bar chart in Figure 4, not only we can deduce which are the best schools with high mid-career salary, we can also see the correlation between starting and mid-career salary, deducing starting salary does not affect mid-career salary at all. Users can choose the top N universities they would like to find out and expand the other universities below the N value. A lighter colour was used to depict the starting median salary in contrast with the mid-career median salary.

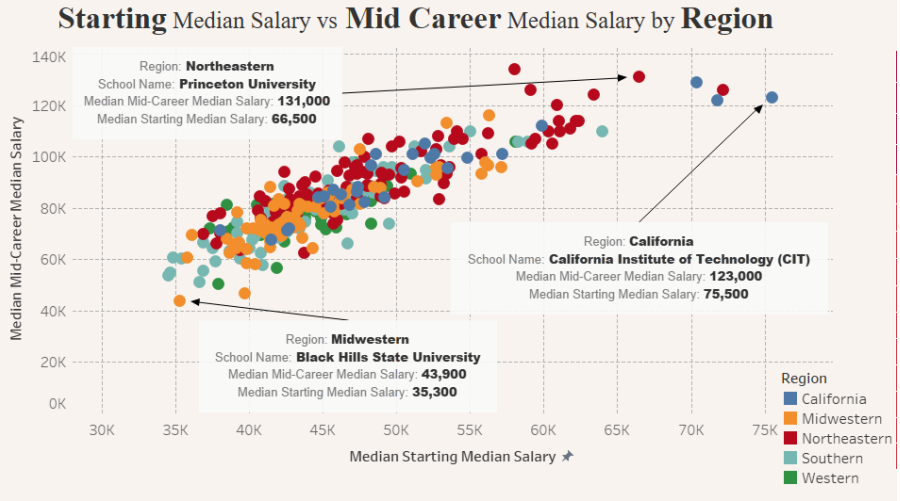


Figure 5 : Starting Median Salary vs Mid-Career Median Salary by Region

Schooling regions can affect salaries too, and a scatter plot in Figure 5 is best to compare all salaries of different schools by regions. With different colours representing different regions, users can deduce which region will have the highest starting median and mid-career median easily. They can also highlight regions they desire to observe how each region pays.

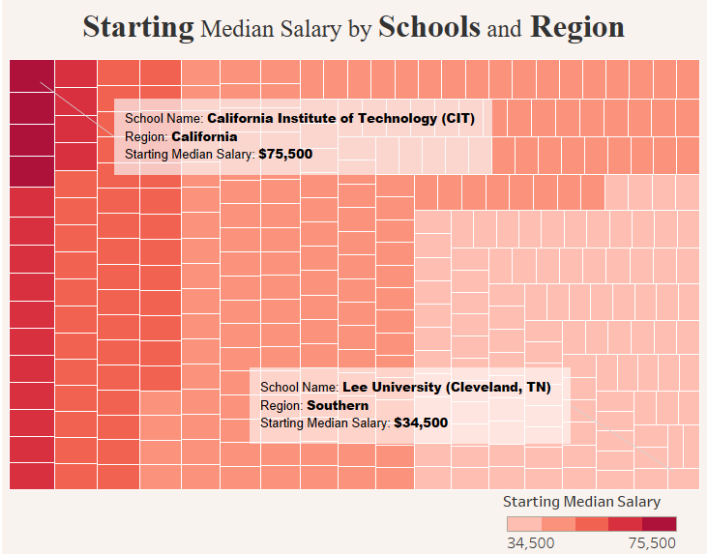


Figure 6 : Starting Median Salary by Schools and Region

A heat chart as in Figure 6 will be ideal to rank schools and regions by starting median salary, since the luminance channel is used to differentiate quantitative data. The colour scheme used fades from dark to light, indicating highest salary to lowest.

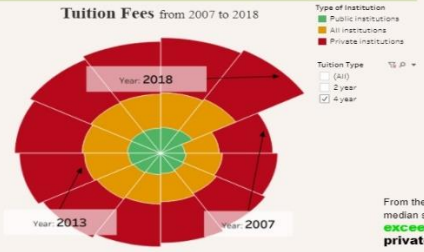
Design

WHERE and WHAT it $ Pays $ to Attend College

An analysis on **Starting** and **Median Salary** in America based on **Academic Major, College Types** and **College Regions.**

How much should I pay ?

Tuition Fees from 2007 to 2018



From the two graphs observed, the **highest** mid-career median salary from an **Ivy League School** far **exceeds** the tuition fees for a 4 year tuition at a **private insitution**, by **three** times!

Regardless of school type, tuition fees are **worth it** in terms of mid career median salary.

Are tuition fees worth it ?

Maximum Median Salary by School Type

A notable fact about the data used is that **current prices** are used instead of constant prices. Hence, factors such as **inflation** and **changes in market shares** could also affect the currency, causing a decrease/increase in tuition fees.

At 2007, the price for a 2 year tution at private institutions averaged a cost of **$21686**, and showed an **increase** at year 2009, with a cost of **$24463**, only to **decrease** the next year to **$23101**. Only private institutions show this change throughout the years.

Ten years out, graduates of **Ivy League schools** earned **99% more** than they did at graduation. **Party school** graduates saw an **85% increase**. **Engineering school** graduates fared worst, earning **76% more** 10 years out of school.

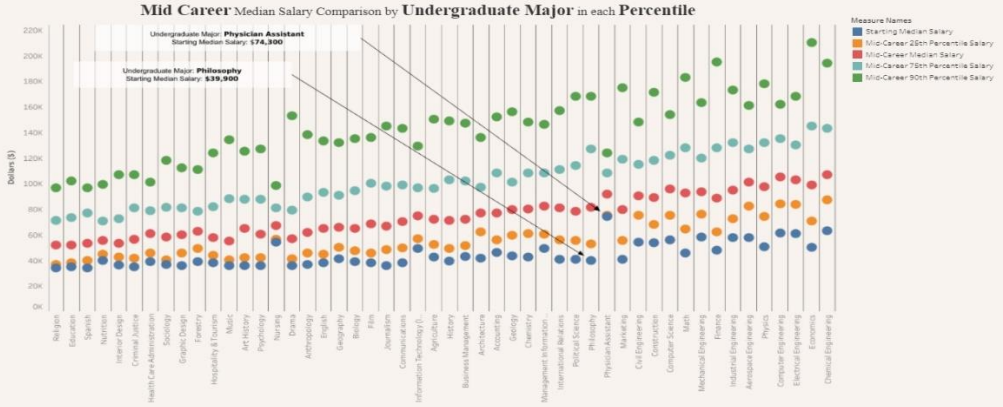
One reason why **Ivy Leaguers** outpace their peers may be that they tend to choose roles where they're either **managing** or providing advice, says David Wise, a senior consultant at Hay Group Inc.

What should I Major in ?

Choose a Major and Find Out !

Highlight Undergraduate Major

Mid Career Median Salary Comparison by Undergraduate Major in each Percentile



Not all low starting salaries are bad. **Philosophy** & **International Relations** as a major earned up to **double** of their starting median salary, about 10 years post commencement. Majors that didn't show as much salary growth include **Nursing** and **Physician Assistant**, although they have high starting median salary.

Students should take into account what is in demand, and what will eventually be left out in the workforce as we march into the digital era. Despite this, it is also worth noting that **Economics** and **Finance** has **higher** mid career 90th percentile than **Engineering** and **IT** majors, because more **Ivy League** graduates go into **Finance** roles than graduates of other schools, and employers pay a premium for them, says Peter Cappelli, a professor of management and director of the Center for Human Resources at the Wharton School of the University of Pennsylvania.

Where should I attend College ?

Top Colleges

8

Top 8 Universities by Mid Career Median Salary

Choose a Region and Find Out !

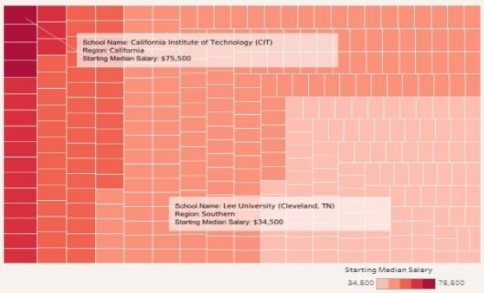
Highlight Region

Choose a School and Find out !

Highlight School Name

Starting Median Salary vs Mid Career Median Salary by Region

Starting Median Salary by Schools and Region



Out of the 8 highest mid-career median salary schools, **4** were **Ivy Leagues**. **Dartmouth** has the **lowest** starting median salary among the other 7 but the **highest** mid-career salary.

Attending college in the **Midwest** leads to the **lowest** salary both at graduation and at mid-career, according to the graph. Graduates of schools in the **Northeast** and **California** fared best, with the highest mid-career median salary school bring from **Northeast**.

English majors who graduate from **Harvard** earn a median starting salary of **$44,500**, compared with **$35,000** for those with English degrees from **Ohio State University** -- a **27%** difference. And that disparity widens even more after 10 years.

Based on the chart above, although **CIT** has the **highest** starting median salary, it is notable that **Dartmouth exceeds** CIT's mid-career median salary.

Lee University has the **lowest** starting median salary among all schools, but it's mid career median salary **exceeds** a few schools as well.

It depends on what career path you choose to pursue with that degree. **History-majors-turned-business-consultants** earn a median total compensation of **$104,000**, similar to their counterparts who pursued a business major like economics -- whose grads earn about **$98,000** overall at midcareer, the PayScale study shows.

The visualisation has two columns, and when two idioms are placed aside, a middle column will be used for comparison purpose. Extra annotations and texts are placed below each idiom, and a clear sightline can be seen that separates them. The rows are separated by sightlines as well. The most important idiom was placed in the centre, which was the salaries for different majors. The layout is symmetrical and balanced top scroll down, with no idioms tilting at one side.

Colour coding was applied (Spiral Bar Chart) and distinct colour hues were used for qualitative data, due to the nature of my data, which has many qualitative attributes. A different colour was used to emphasize the title and other sub-titles of the visualisation.

I used serif fonts for both titles and sub-titles, and sans-serif fonts for annotations as serif fonts captivates the viewers better, while sans-serif fonts convey the message better.

To create visual hierarchy, users can highlight specific attributes that they desire (example the region scatter plot) and only the highlighted region will show colour. Weights and colours were also added to emphasize on important annotations and the main point of the title (example majors in green wordings have higher salaries than those in red).

Users can view the visualisation easily (top-down) as they view through, there is a sub-title above the idiom, thus viewers are guided by each sub-title, then idiom, then sub-title again.

Reference List:

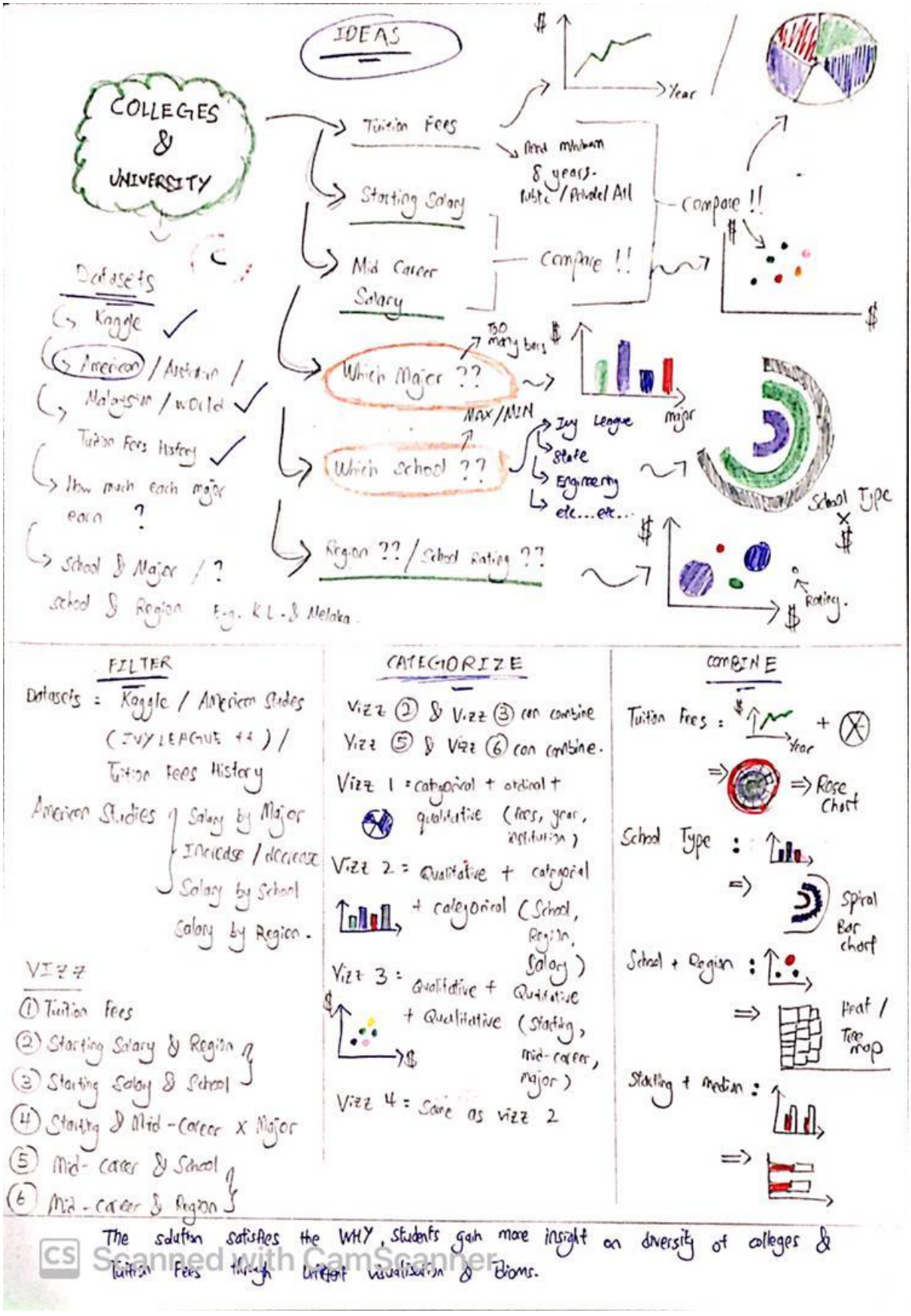
National Centre for Education Statistics(NCES). (2019). *Tuition costs of colleges and universities* [Data File]. Retrieved from https://nces.ed.gov/fastfacts/display.asp?id=76

Sarah E. Needleman. (2008). *Ivy Leaguers' Big Edge: Starting Pay.* Retrieved from https://www.wsj.com/articles/SB121746658635199271

The Wall Street Journal (Kaggle). (2017). *Where it Pays to Attend College* [Datafile]. Retrieved from https://www.kaggle.com/wsj/college-salaries?select=degrees-that-pay-back.csv

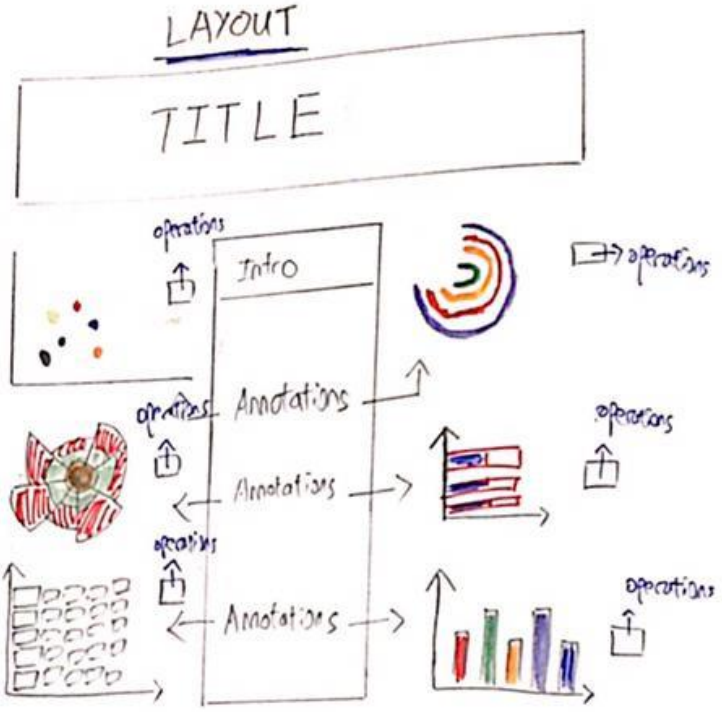
The Wall Street Journal (2017). *Salary Increase By Type of College* [Datafile]. Retrieved from http://online.wsj.com/public/resources/documents/info-Salaries_for_Colleges_by_Type-sort.html

Appendix



Title : Brief Layout	
Author : FONG CHUN KENT	
DATE : 16th August	Sheet : 1
TASK : First Layout	

LAYOUT



operations : highlights the region / school users want to view, due to nature of the data with large ~~quality~~ qualitative data.

FOCUS / ZOOM :

 : Rose Chart

→ Highlights 3 categorical data

→ Pay attention to area, different area for qualitative data.

 : Spited Bar chart

→ Better than normal bar chart

→ emphasize on length of bar.

 : Stacked Bar chart

→ Highlights total

→ use less idiom

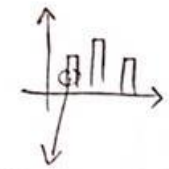
DISCUSSION :

+ve : clear title, good storytelling, data ink ratio ↑, white space ratio ↑

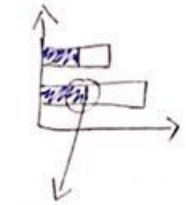
−ve : Less interactivity, too packed, readability ↓

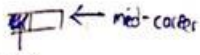
Title : Interactive Layout	
Author : FONG CHUN KENT.	
DATE : 17th August	SHEET : 2
Task : Second new Layout	

FOCUS



Each dot highlights a persentle for comparison purposes.

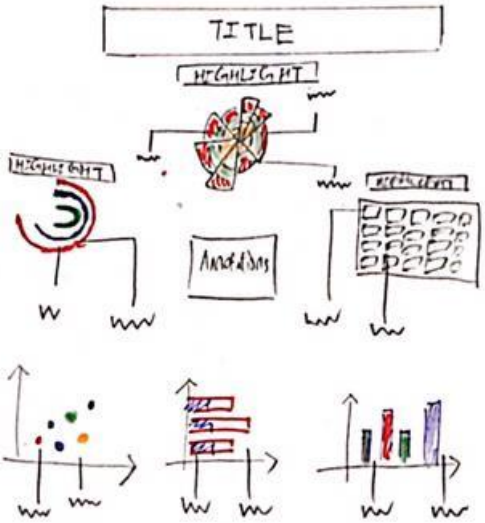




← mid-career median salary.

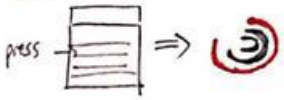
Starting median salary

LAYOUT



OPERATIONS

The highlight banner will show which qualitative data user wants to highlight, and make other data go grey.



DISCUSSION :

+ve : visualisation are good, too wide, scrolling left to right = bad storytelling.

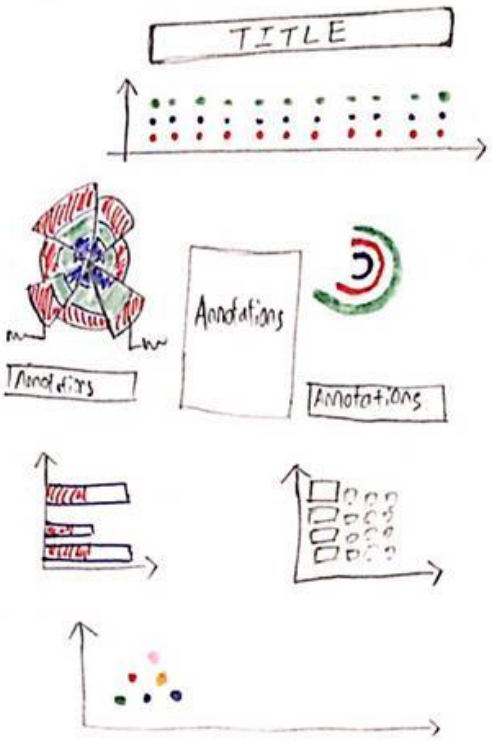
− ve : less annotations.

Title : Fds Final	
Author : FONG CHUN KENT.	
Date : 21st August	Sheet : 3
Task : Final Sheet 3	

Focus

Colour Fades from Dark to pale

LAYOUT



operations : Tooltip

: Expand / Collapse Bar

Discussion :

+ve : good operations to show more/ less data, helpful layout to allocate more annotations.

- Ve : too lengthy display, if idioms are too huge then reduce readability.

Title : Realization Design

Author : FONG CHUN KENT

Date : 22nd August | Sheet : 5

Task : Realization Sheet

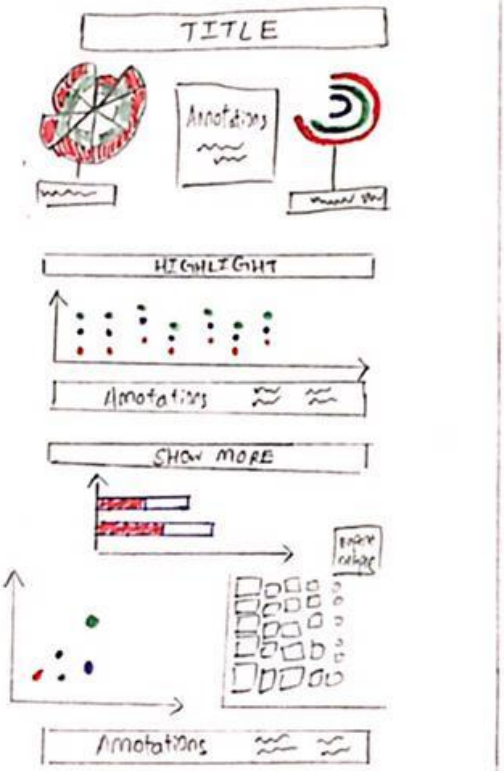
OPERATIONS

- HIGHLIGHT
  - ↳ Shows certain qualitative data only
- Show more
  - ↳ shows N more qualitative & quantitative data
- Expand / collapse
- HIGHLIGHT two views with same qualitative data

DETAIL

- algorithm for rose chart cited from tableau community.
- algorithm for spiral chart cited from tableau community.
- algorithm for expand / collapse cited from tableau community.
- Stacked bar total = mid range median salary.
- 2-3 weeks
- not too wide viz, ≈ 1500 pixels
  high viz, ≈ 2500 pixels.

LAYOUT



FOCUS/ZOOM

- → median for each percentile
- → different size means different value.
- → different length means different value
- → different size and luminance.
- → stacking median