

College tuition, diversity, and pay

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College tuition, diversity, and pay

- ▶ Many people are interested to know about the tuition, costs, diversity and potential salary when searching for college.
- ▶ In this project, we want to analyze:
 1. diversity among schools across US
 2. tuition costs across different states
 3. historical trends of tuition
 4. average potential salary for graduates from different universities
- ▶ We have 4 datasets with 23 variables and more than 50000 observations.

Diversity dataset

```
diversity_school %>% glimpse()
```

```
## Rows: 50,655
```

```
## Columns: 5
```

```
## $ name      <chr> "University of Phoenix-Arizona"
```

```
## $ total_enrollment <dbl> 195059, 195059, 195059, 195059,
```

```
## $ state      <chr> "Arizona", "Arizona", "Arizona"
```

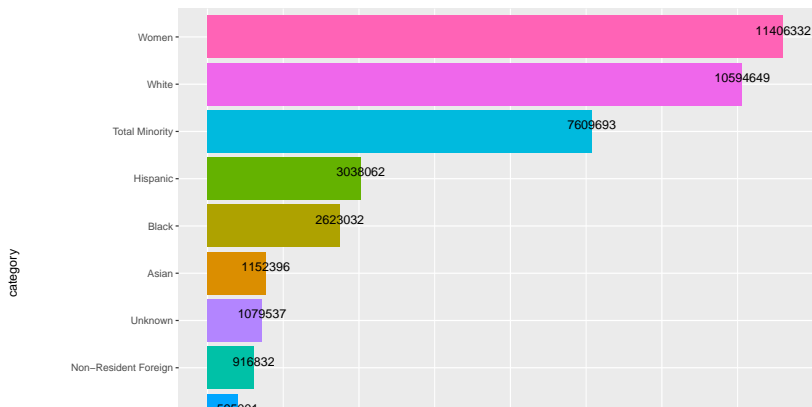
```
## $ category   <chr> "Women", "American Indian / Ala
```

```
## $ enrollment <dbl> 134722, 876, 1959, 31455, 13984
```

| name | total_enrollment | state | category |
|-------------------------------|------------------|---------|-----------------|
| University of Phoenix-Arizona | 195059 | Arizona | Women |
| University of Phoenix-Arizona | 195059 | Arizona | American Indian |
| University of Phoenix-Arizona | 195059 | Arizona | Asian |
| University of Phoenix-Arizona | 195059 | Arizona | Black |
| University of Phoenix-Arizona | 195059 | Arizona | Hispanic |
| University of Phoenix-Arizona | 195059 | Arizona | Native Hawaiian |

Diversity categories

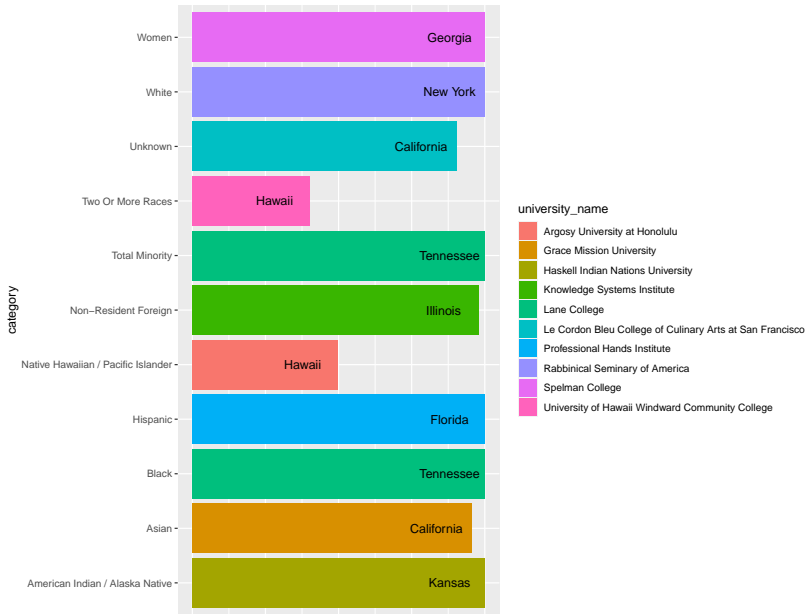
```
## [1] "Women" "American Indian or Alaska Native"  
## [3] "Asian" "Black"  
## [5] "Hispanic" "Native Hawaiian or Other Pacific Islander"  
## [7] "White" "Two Or More Races"  
## [9] "Unknown" "Non-Resident Foreign Born"  
## [11] "Total Minority"
```



Finding the most diverse campus per each diversity categories

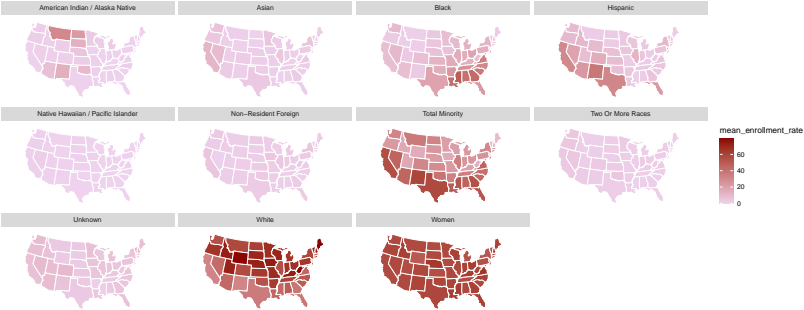
| category | university_name |
|------------------------------------|------------------------------------|
| American Indian / Alaska Native | Haskell Indian Nations University |
| Asian | Grace Mission University |
| Black | Lane College |
| Hispanic | Professional Hands Institute |
| Native Hawaiian / Pacific Islander | Argosy University at Honolulu |
| Non-Resident Foreign | Knowledge Systems Institute |
| Total Minority | Lane College |
| Two Or More Races | University of Hawaii Windward Con |
| Unknown | Le Cordon Bleu College of Culinary |
| White | Rabbinical Seminary of America |
| Women | Spelman College |

Finding the most diverse campus per each diversity categories

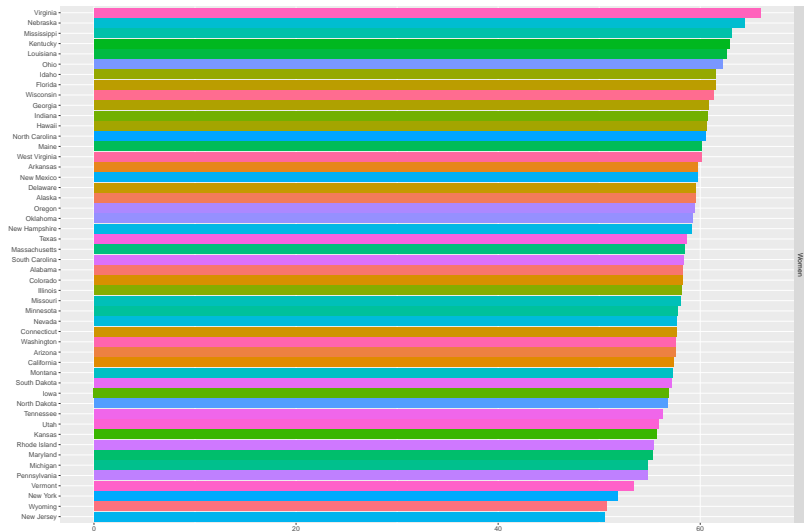


Diversity map of the US for each diversity Group

Diversity categories across the US



Women enrollment rate across the US



Tuition cost dataset

```
tuition_cost %>% glimpse()
```

```
## Rows: 2,973
## Columns: 10
## $ name      <chr> "Aaniiih Nakoda College", "
## $ state     <chr> "Montana", "Texas", "Georgi
## $ state_code <chr> "MT", "TX", "GA", "MN", "CA
## $ type      <chr> "Public", "Private", "Publ
## $ degree_length <chr> "2 Year", "4 Year", "2 Year
## $ room_and_board <dbl> NA, 10350, 8474, NA, 16648
## $ in_state_tuition <dbl> 2380, 34850, 4128, 17661, 2
## $ in_state_total  <dbl> 2380, 45200, 12602, 17661,
## $ out_of_state_tuition <dbl> 2380, 34850, 12550, 17661,
## $ out_of_state_total <dbl> 2380, 45200, 21024, 17661,
```

merge tuition cost dataset and diversity dataset

- ▶ we are interested to know whether there is any correlation between enrollment rate and each diversity group

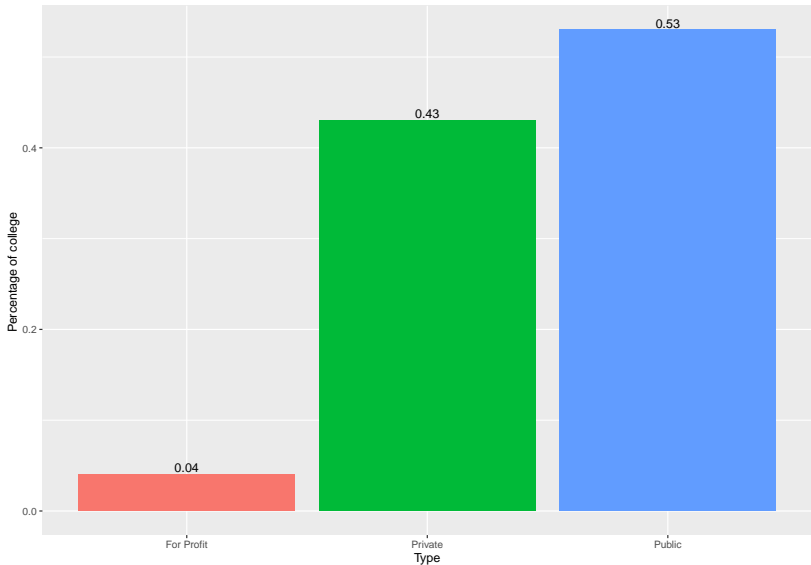
Relationship between enrollment rate and in state tuition per each diversity group



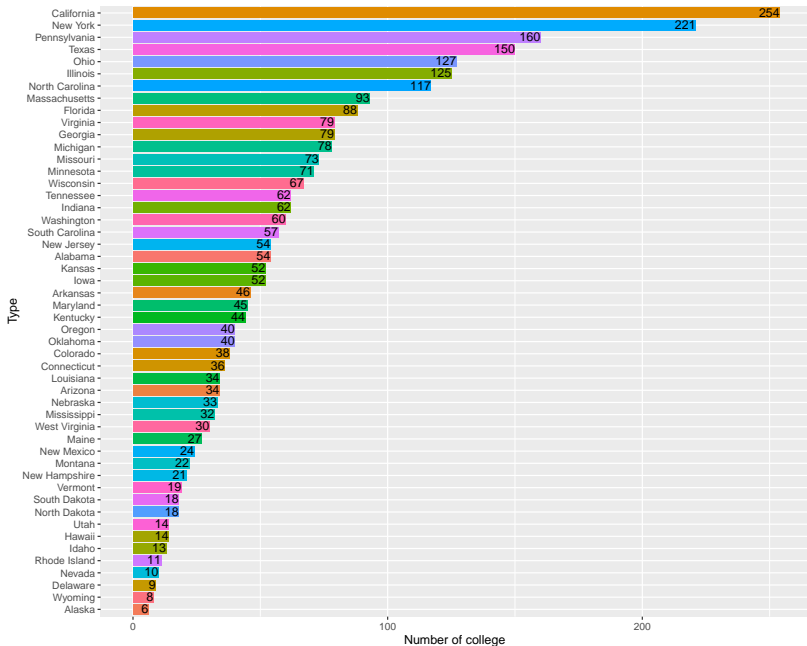
Relationship between enrollment rate and out of state tuition per each diversity group



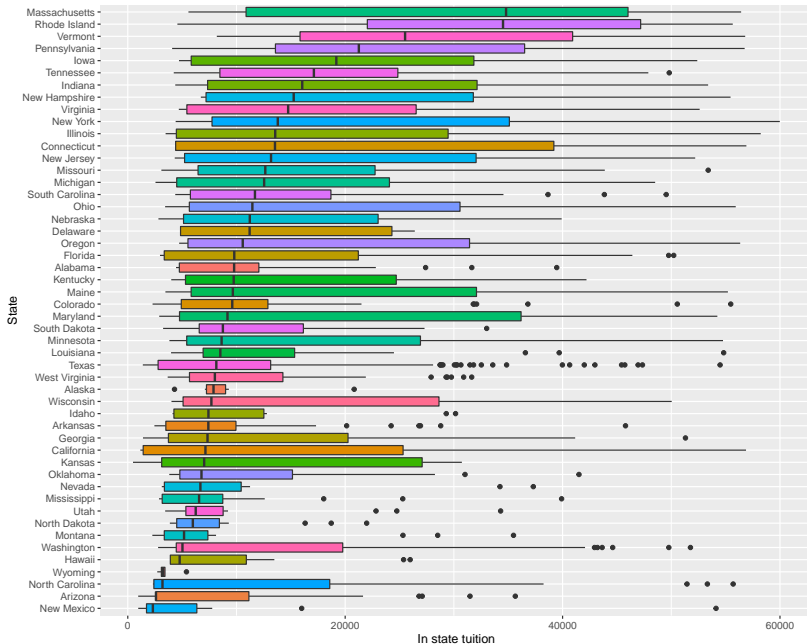
Different types of colleges in US



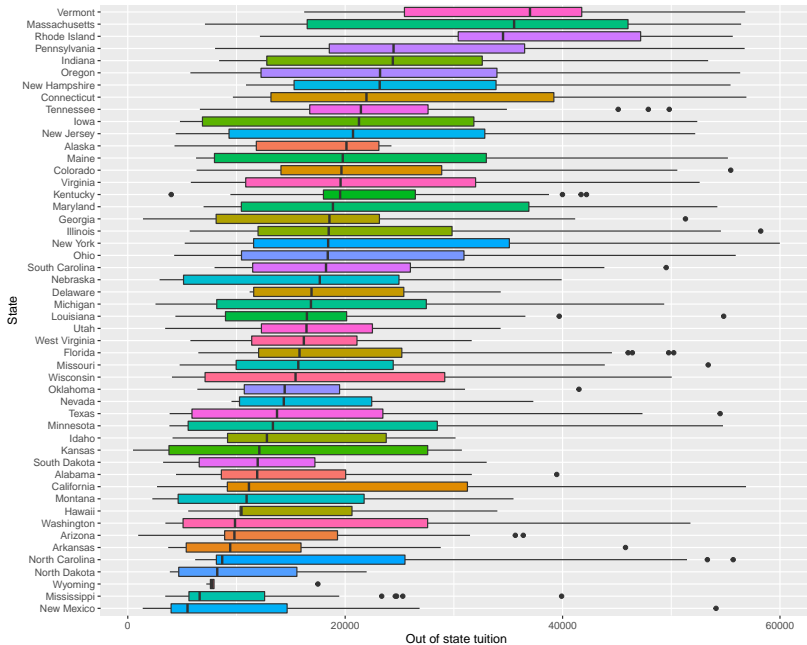
How many collages are there in each state?



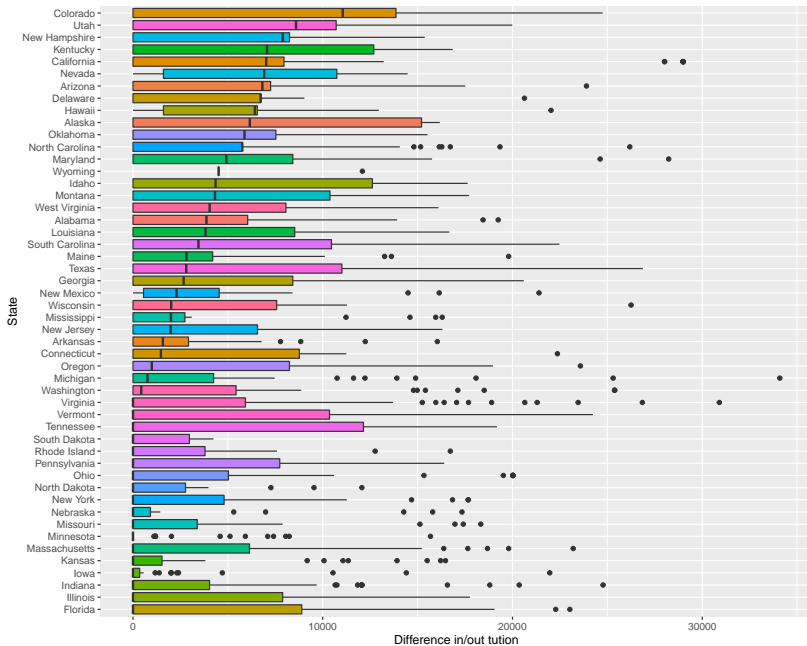
Comparing different states in terms of in state tuition



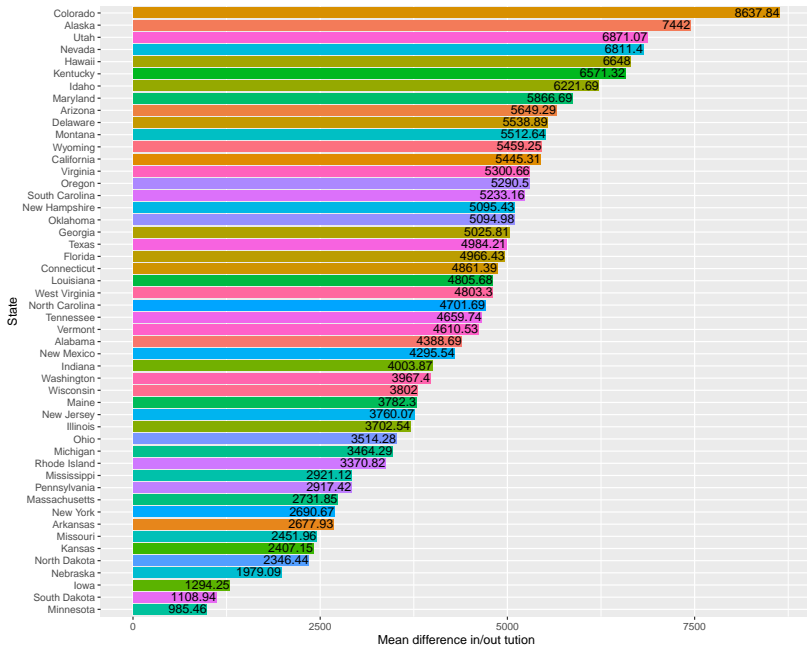
Comparing different states in terms of out of state tuition



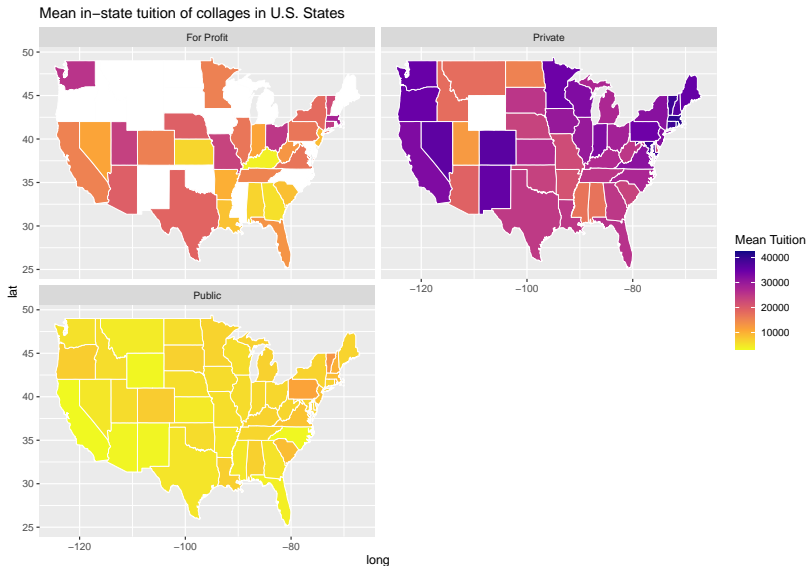
Comparing in/out of state tuition (1/2)



Comparing in/out of state tuition (2/2)

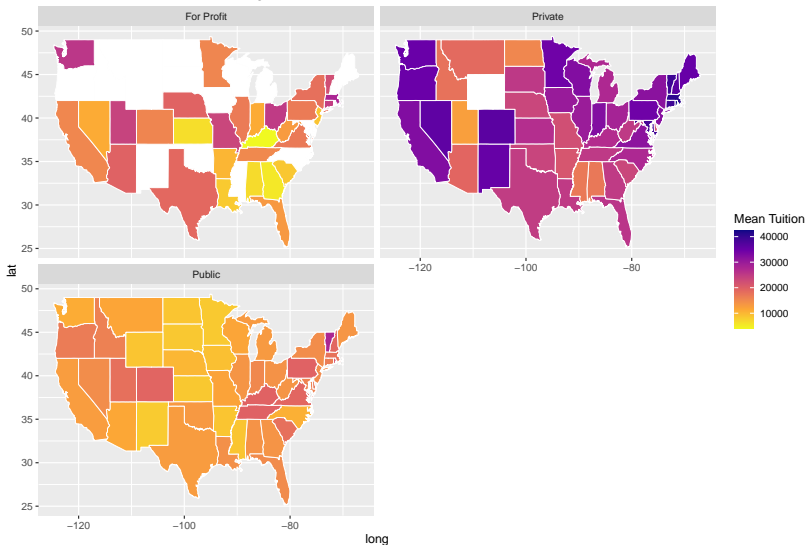


In state tuition; different type of colleges; What is the relationship?



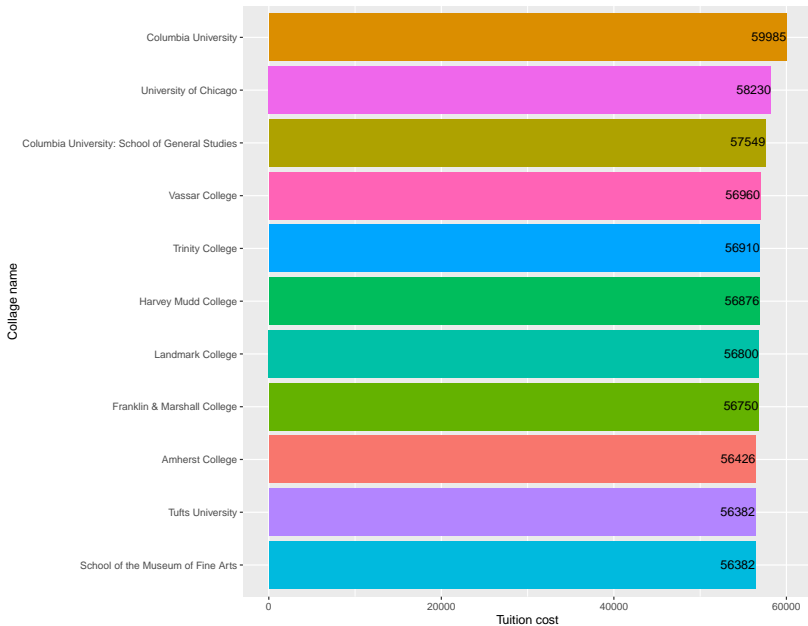
Out of state tuition; different type of colleges; What is the relationship?

Mean out-of-state tuition of colleges in U.S. States



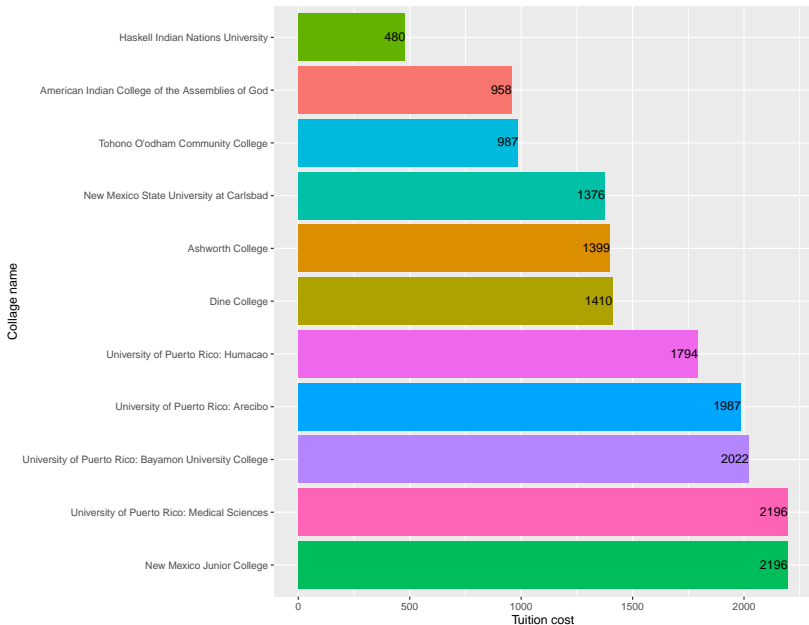
Most expensive collages with out of state tuition

Top 10 most expensive collages with out of state tuition



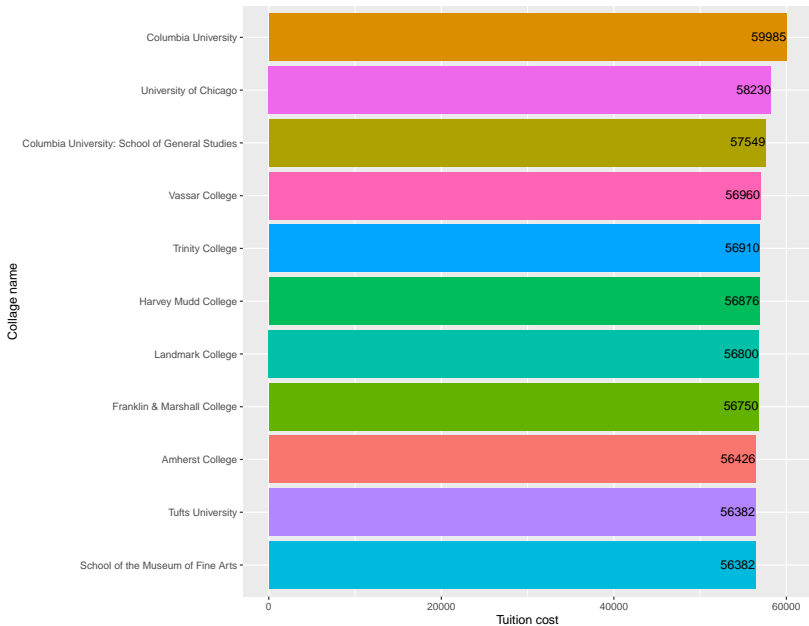
The cheapest Colleges in terms of out of state tuition

Top 10 cheapest colleges with out of state tuition



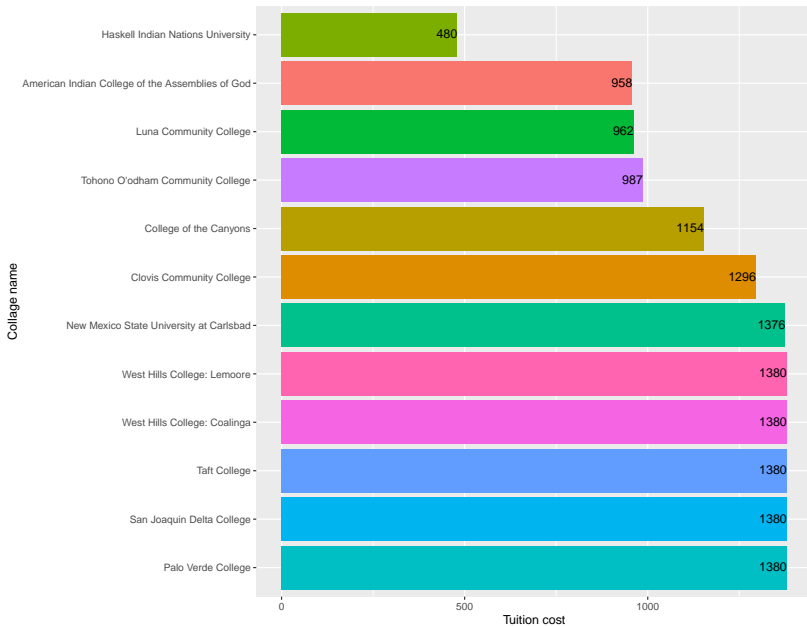
Most expensive collages with in state tuition

Top 10 most expensive collages with in state tuition



The cheapest collages in terms of in state tuition

Top 10 cheapest collages with in state tuition



The historical tuition dataset

270 observations and 4 variables

| type | year | tuition_type | tuition_cost |
|------------------|---------|-----------------|--------------|
| All Institutions | 1985-86 | All Constant | 10893 |
| All Institutions | 1985-86 | 4 Year Constant | 12274 |
| All Institutions | 1985-86 | 2 Year Constant | 7508 |
| All Institutions | 1985-86 | All Current | 4885 |
| All Institutions | 1985-86 | 4 Year Current | 5504 |
| All Institutions | 1985-86 | 2 Year Current | 3367 |

The historical tuition dataset

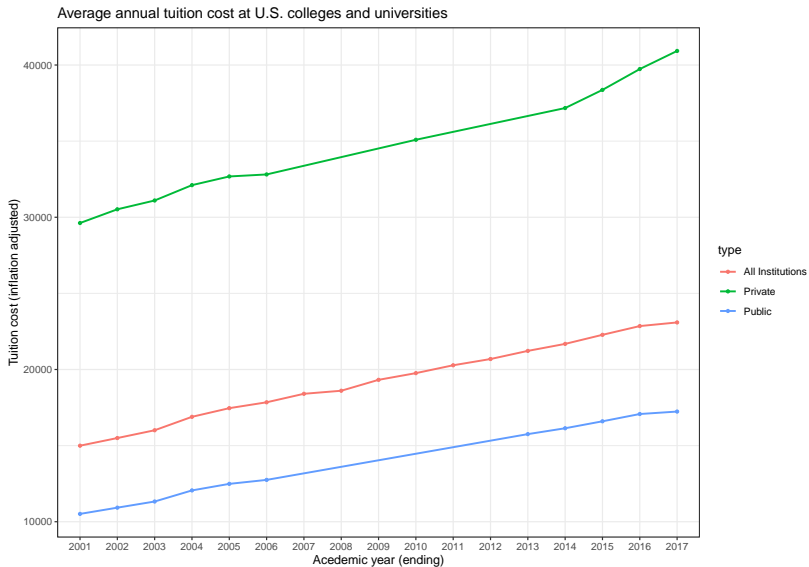
We observe that the data is available consistently from 2000 till 2017.

```
## [1] "1985-86" "1995-96" "2000-01" "2001-02" "2002-03" "  
## [8] "2005-06" "2006-07" "2007-08" "2008-09" "2009-10" "  
## [15] "2012-13" "2013-14" "2014-15" "2015-16" "2016-17"
```

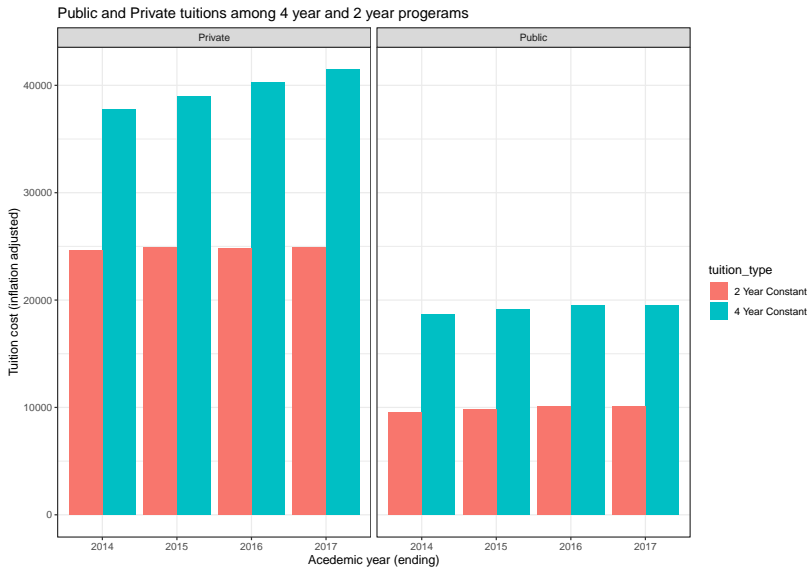
For convenience, we will consider the end of year.

```
## [1] 1986 1996 2001 2002 2003 2004 2005 2006 2007 2008 2  
## [16] 2014 2015 2016 2017
```

Average tuition cost over time



Tuition comparison between 2 year and 4 year programs

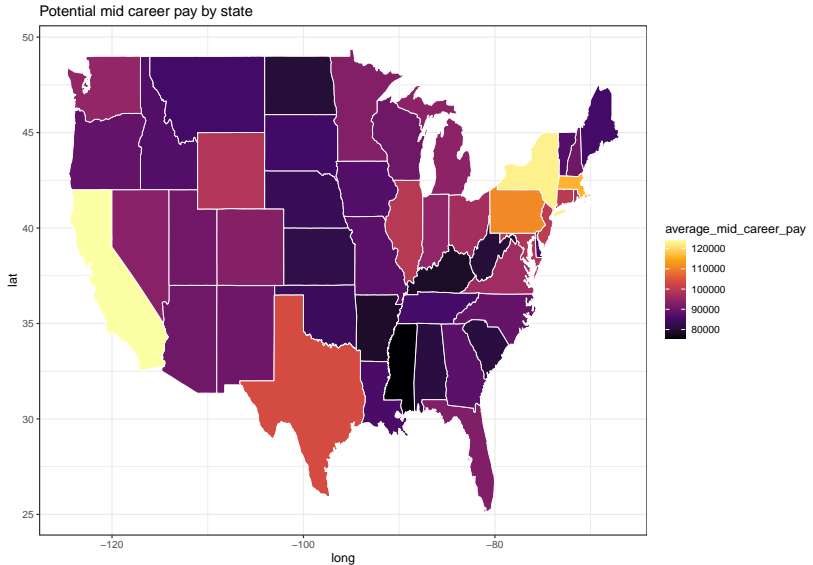


Salary potential dataset

935 observations and 6 variables including:

| rank | name | state_name | early_career_ |
|------|-------------------------------------|------------|---------------|
| 1 | Auburn University | Alabama | 54 |
| 2 | University of Alabama in Huntsville | Alabama | 57 |
| 3 | The University of Alabama | Alabama | 57 |
| 4 | Tuskegee University | Alabama | 54 |
| 5 | Samford University | Alabama | 44 |
| 6 | Spring Hill College | Alabama | 44 |

Which states have the highest/least potential salary?



Top 5 states

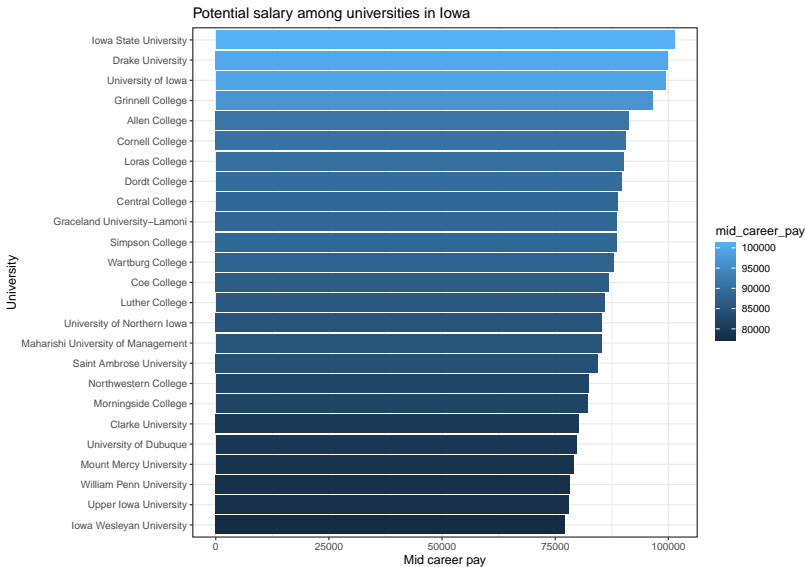
| state_name | average_mid_career_pay |
|---------------|------------------------|
| California | 123976 |
| New-York | 122328 |
| Massachusetts | 115712 |
| Pennsylvania | 110884 |
| Texas | 103476 |

| state_name | average_early_career_pay |
|---------------|--------------------------|
| California | 67232 |
| New-York | 66688 |
| Massachusetts | 63100 |
| Pennsylvania | 60644 |
| Texas | 57468 |

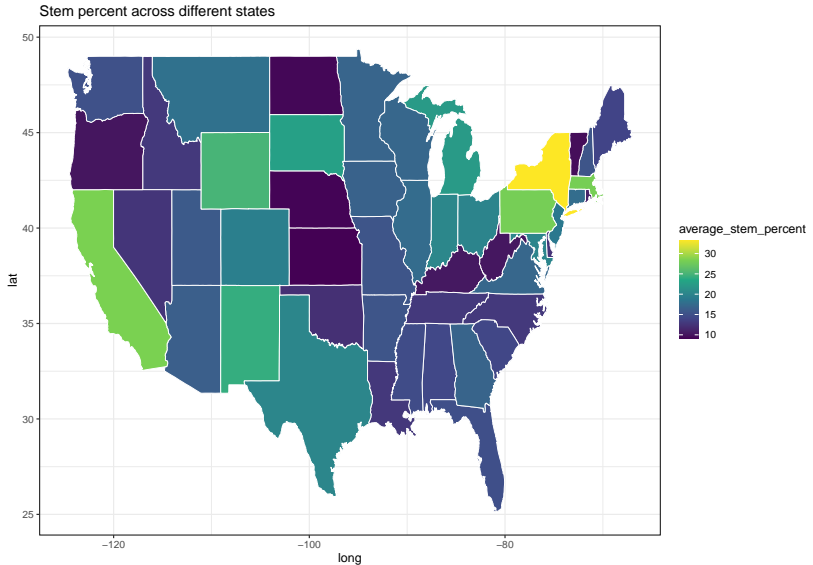
Let's take a closer look at Iowa

| rank | name | state_name | early_career |
|------|------------------------------------|------------|--------------|
| 1 | Iowa State University | Iowa | |
| 2 | Drake University | Iowa | |
| 3 | University of Iowa | Iowa | |
| 4 | Grinnell College | Iowa | |
| 5 | Allen College | Iowa | |
| 6 | Cornell College | Iowa | |
| 7 | Loras College | Iowa | |
| 8 | Dordt College | Iowa | |
| 9 | Central College | Iowa | |
| 10 | Graceland University-Lamoni | Iowa | |
| 11 | Simpson College | Iowa | |
| 12 | Wartburg College | Iowa | |
| 13 | Coe College | Iowa | |
| 14 | Luther College | Iowa | |
| 15 | University of Northern Iowa | Iowa | |
| 16 | Maharishi University of Management | Iowa | |

In Iowa, ISU has the highest potential salary



What is average stem percent across different states?



Conclusions

- ▶ Virginia has the highest women enrollement rate across different states
- ▶ Massachusetts has the highest in state tuition
- ▶ Private schools cost more than public schools
- ▶ Historical trend of tuition showed that tuition is increasing over time
- ▶ Califirnia and NewYork have the highest potential salaries