

# School Finder

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# Audience

- Prospective students and their parents who are looking for colleges based upon their cost effectiveness.
- Would visit the site when choosing which schools to apply to
- Would return to the site when choosing between schools after application results
- Would like to visually distinguish good schools from not so good schools and compare them to the average
- Have a scoring system based upon how cost-effective the school is

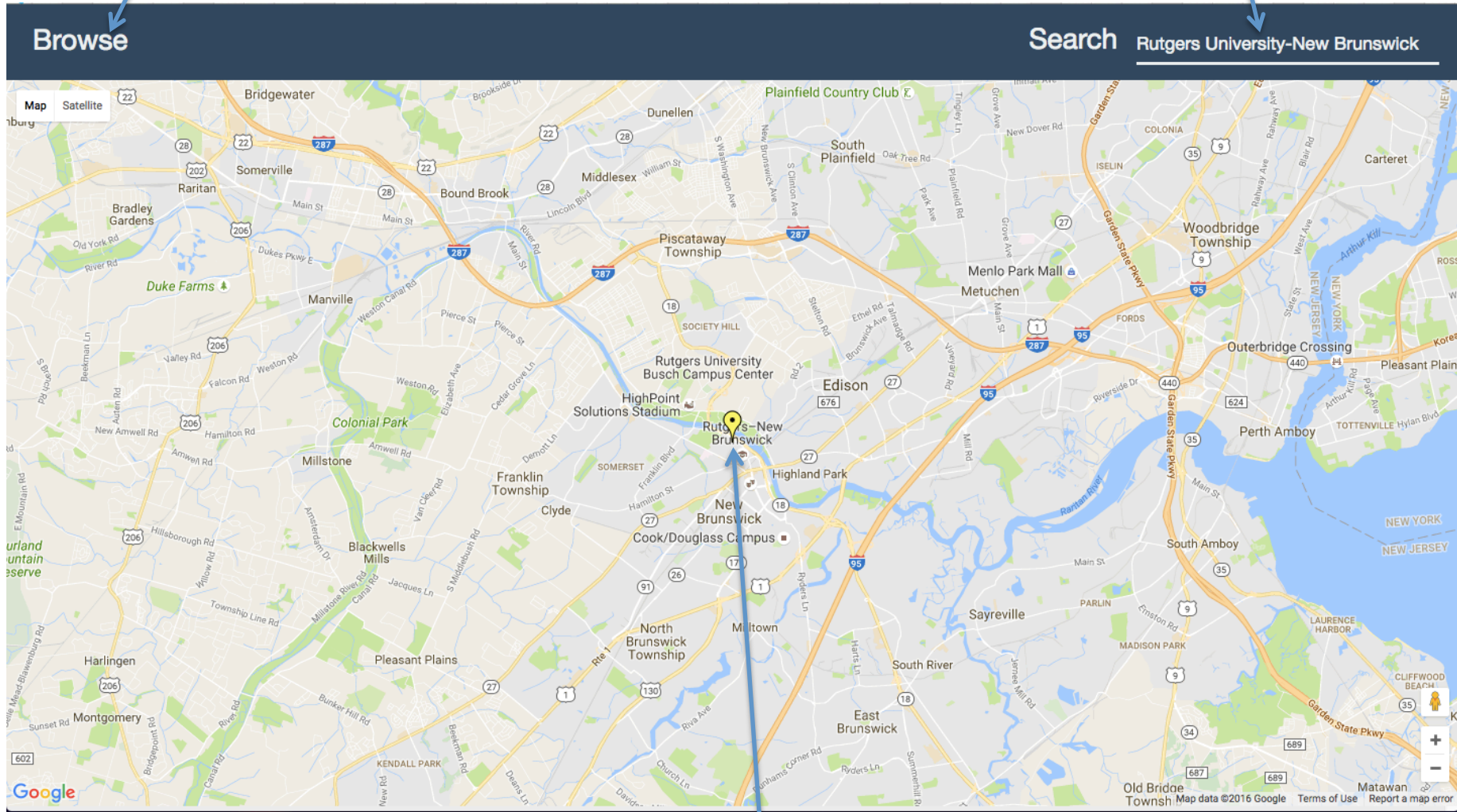
# Walkthrough

- There are two main pages
  - Map page
  - Browse page
- Map page for getting in-depth information about the school
- Browse page for getting information about many schools in a table for comparison

Button to the  
browse page

# Map page

Search box



Clickable marker for the school

# Map page notes

- To open up the sidebar, click on the marker for the school.
- Depending on the score for the school, the marker will have a different color
- The best schools will have a green marker, worst schools will get orange, red etc.

# Side bar

Overall score

Button to compare school

To close the side bar, click on the map

## Harvard University

Overall

Overall score: 93.01

Compare Close

Individual score

Return on investment

Retention rate

Cost and debt

Graduation rate

Location

### About

**Location:** Cambridge, Massachusetts

**Locale:** Midsize City (population of 100,000 or more)

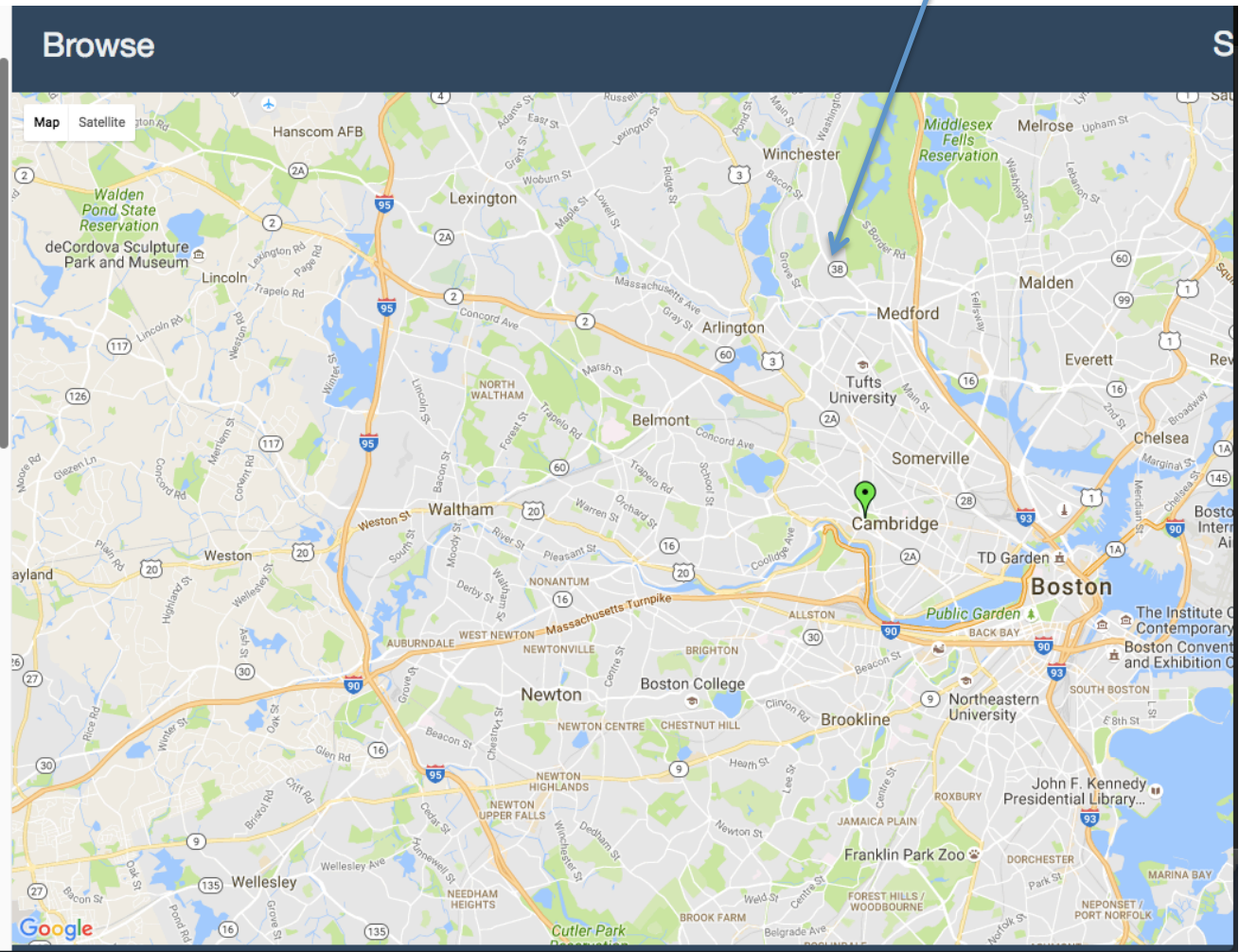
**Type:** Private Non-Profit University

**Admission rate:** 5.84%

**Retention rate:** 97.06%

**Graduation rate:** 97.47%

**Homepage:** <http://www.harvard.edu>





# Side bar continued

Hover over to see comparisons to the average

Dynamic colors

## About

**Location:** Washington, District of Columbia

**Locale:** Large City (population of 250,000 or more)

14.62% higher than the national average.

**Retention rate:** 95.98%

**Graduation rate:** 92.45%

**Homepage:** <http://www.georgetown.edu>

## Costs

**In-state tuition and fees:** \$44,805

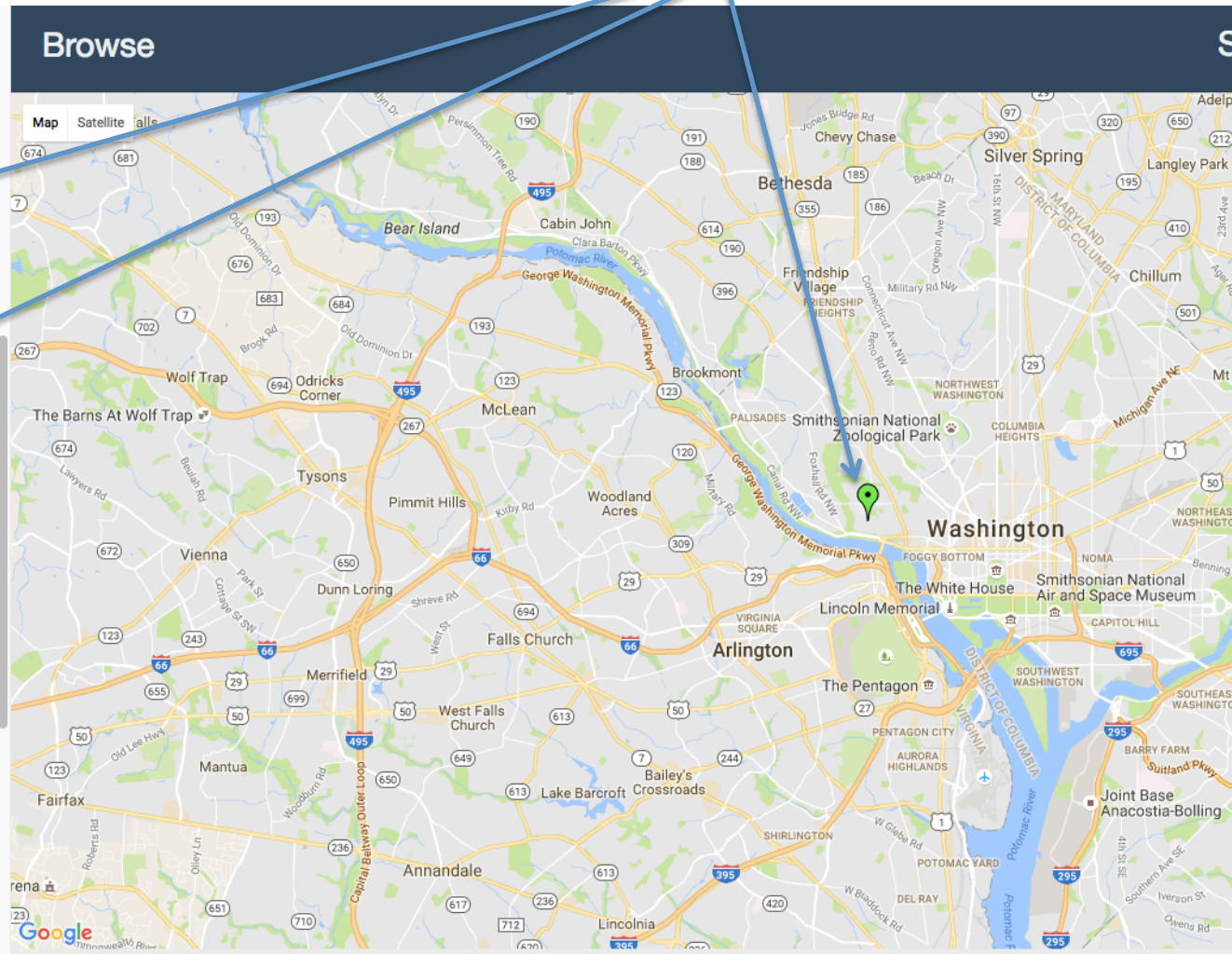
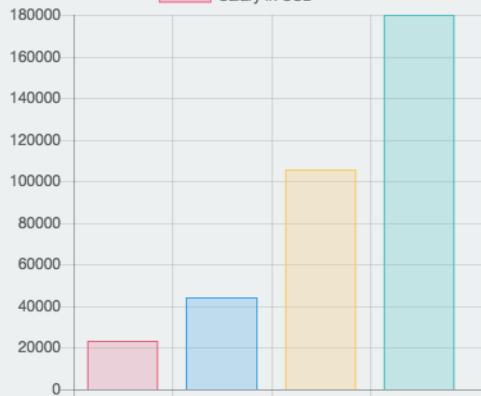
**Out-of-state tuition and fees:** \$44,805

**Average student debt after graduation:** \$17,500

## Statistics

Salary 6 years after entry by percentile

Salary in USD

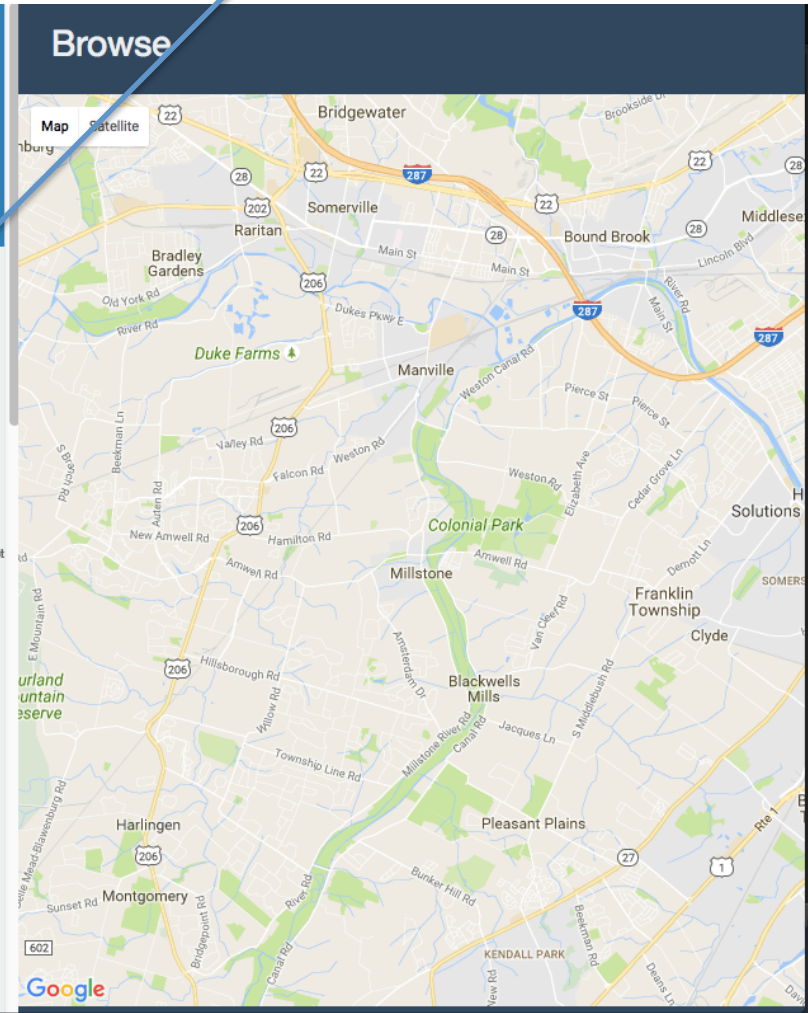
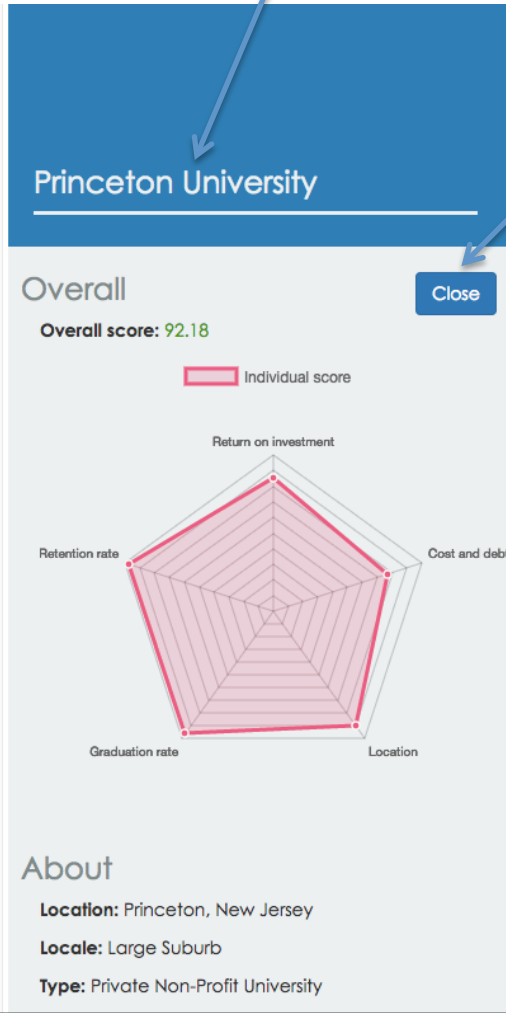


# Compare

Button to toggle compare tab

Search schools

Close compare tab





# Browse Page

Clickable links to map

Filters

Browse by school name or state

Back								Search	
Browse									
Browse by name									
Browse by state									
New Jersey									
All in-state tuitions									
All out-of-state tuitions									
All average incomes									
Sort by score									
No limit								Submit	
#	School	Score	City	State	In-state tuition	Out-of-state tuition	Average Income		
1	<a href="#">Princeton University</a>	92.18	Princeton	New Jersey	\$40,170	\$40,170	\$55,750		
2	<a href="#">The College of New Jersey</a>	88.42	Ewing	New Jersey	\$14,730	\$25,135	\$43,150		
3	<a href="#">Rutgers University-New Brunswick</a>	86.13	New Brunswick	New Jersey	\$13,499	\$27,523	\$41,550		
4	<a href="#">Stevens Institute of Technology</a>	84.96	Hoboken	New Jersey	\$44,490	\$44,490	\$59,800		
5	<a href="#">Ramapo College of New Jersey</a>	83.09	Mahwah	New Jersey	\$13,388	\$22,038	\$39,050		
6	<a href="#">Rowan University</a>	81.61	Glassboro	New Jersey	\$12,380	\$20,186	\$37,250		
7	<a href="#">The Richard Stockton College of New Jersey</a>	81.05	Galloway	New Jersey	\$12,322	\$18,715	\$33,650		
8	<a href="#">Montclair State University</a>	79.99	Montclair	New Jersey	\$11,318	\$20,196	\$35,350		
9	<a href="#">New Jersey Institute of Technology</a>	78.24	Newark	New Jersey	\$15,218	\$28,274	\$48,900		
10	<a href="#">Rutgers University-Newark</a>	77.54	Newark	New Jersey	\$12,998	\$27,022	\$41,550		
11	<a href="#">Seton Hall University</a>	76.97	South Orange	New Jersey	\$35,820	\$35,820	\$44,750		
12	<a href="#">Rider University</a>	75.43	Lawrenceville	New Jersey	\$35,270	\$35,270	\$36,150		
13	<a href="#">Rutgers University-Camden</a>	74.95	Camden	New Jersey	\$13,348	\$26,908	\$41,550		

# Browse by state

Filters

Back

Search

## Browse

Browse by name

Browse by state

All states ▾

Sort by location score ▾

No limit ▾

Submit

#	State	Location score	Average school score	Average in-state tuition	Average out-of-state tuition	Average state income
1	District of Columbia	97	81.4	\$37,523	\$37,523	\$45,877
2	Connecticut	94.76	79.23	\$29,465	\$34,162	\$39,373
3	New Jersey	90.559	77.43	\$25,083	\$29,826	\$37,288
4	Massachusetts	89.151	79.23	\$31,225	\$33,294	\$36,593
5	Maryland	88.633	78.87	\$29,418	\$33,455	\$36,338
6	New Hampshire	85.272	76.24	\$25,967	\$29,026	\$34,691
7	Virginia	83.961	76.95	\$21,708	\$29,447	\$34,052
8	New York	81.99	77.92	\$27,839	\$30,310	\$33,095
9	North Dakota	81.94	72.08	\$11,221	\$18,177	\$33,071
10	Minnesota	81.045	75.89	\$26,370	\$27,181	\$32,638
11	Colorado	80.464	78.22	\$22,789	\$31,714	\$32,357
12	Washington	79.393	78.19	\$23,671	\$30,373	\$31,841
13	Rhode Island	77.286	79.49	\$34,443	\$36,389	\$30,830

# Sample Workflow

- Student wants to gather a list of schools to apply to.
- Lives in New Jersey
- Has a budget of \$30,000 a year and wants to go to school in New Jersey
- Wants a salary of at least \$40,000 a year after graduation
- Goes to the browse page to get a list
- Can see how the cost for each school compares by inspecting the colors
- Wants to find the list of schools that are the best value

# Sample Workflow

The student should apply to these schools.

Back

Search

## Browse

Browse by name

Browse by state

New Jersey ▾

At most \$30,000 in-state tuition ▾

All out-of-state tuitions ▾

\$40,000+ average income ▾

Sort by score ▾

No limit ▾

Submit

#	School	Score	City	State	In-state tuition	Out-of-state tuition	Average Income
1	<a href="#">The College of New Jersey</a>	88.42	Ewing	New Jersey	\$14,730	\$25,135	\$43,150
2	<a href="#">Rutgers University-New Brunswick</a>	86.13	New Brunswick	New Jersey	\$13,499	\$27,523	\$41,550
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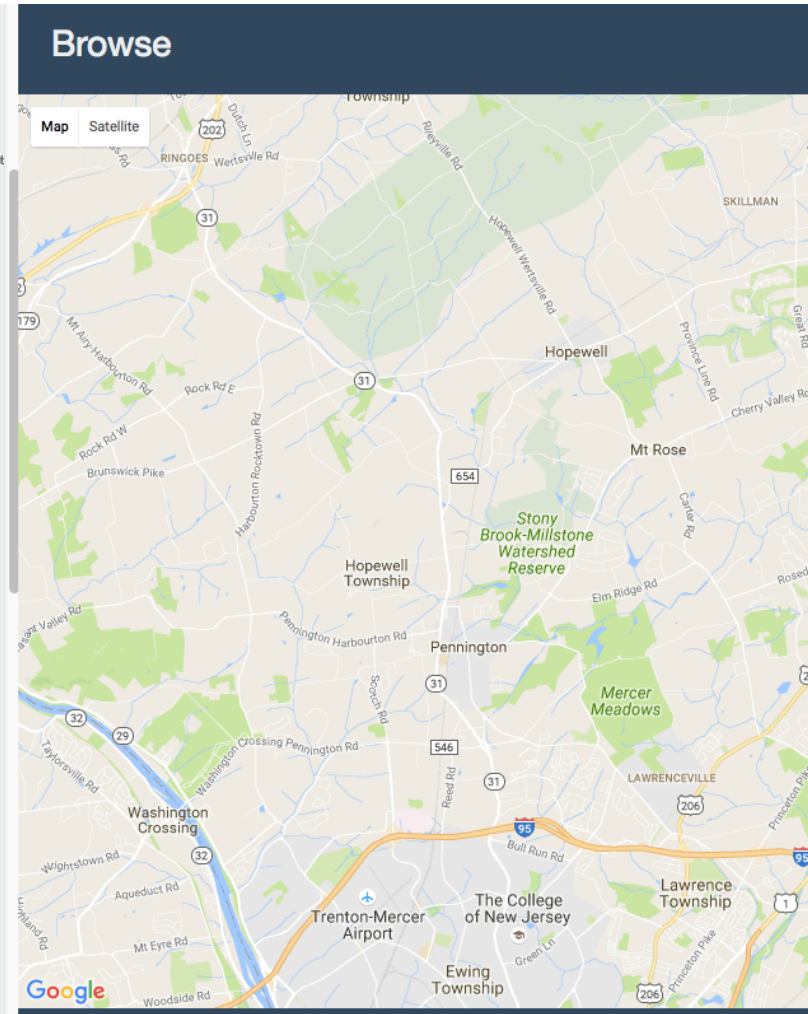
# Another sample workflow

- A student just got back application results
- Wants to choose between schools (Yale and Princeton)
- Can go to the map and check the surrounding area and get specific information about their schools
- Can compare schools that the student is accepted to
- Help the student make a decision



# Another sample workflow

Yale is more expensive than Princeton



# Scoring formula

- Return on investment score =  $1 - 1 / ((\text{school.salary\_twentyfive} + \text{school.salary\_seventyfive}) / 2 / ((\text{school.in\_state\_tuition} + \text{school.out\_of\_state\_tuition}) / 2)) / 5$
- Cost score =  $1 - 1 / (100000 / ((\text{school.in\_state\_tuition} + \text{school.out\_of\_state\_tuition} + 2 * \text{school.average\_student\_debt}) / 4))$
- State score is calculated based upon the average salary
- Graduation score =  $\text{school.graduation\_rate}$
- Retention score =  $\text{school.retention\_rate}$

# Scoring formula continued

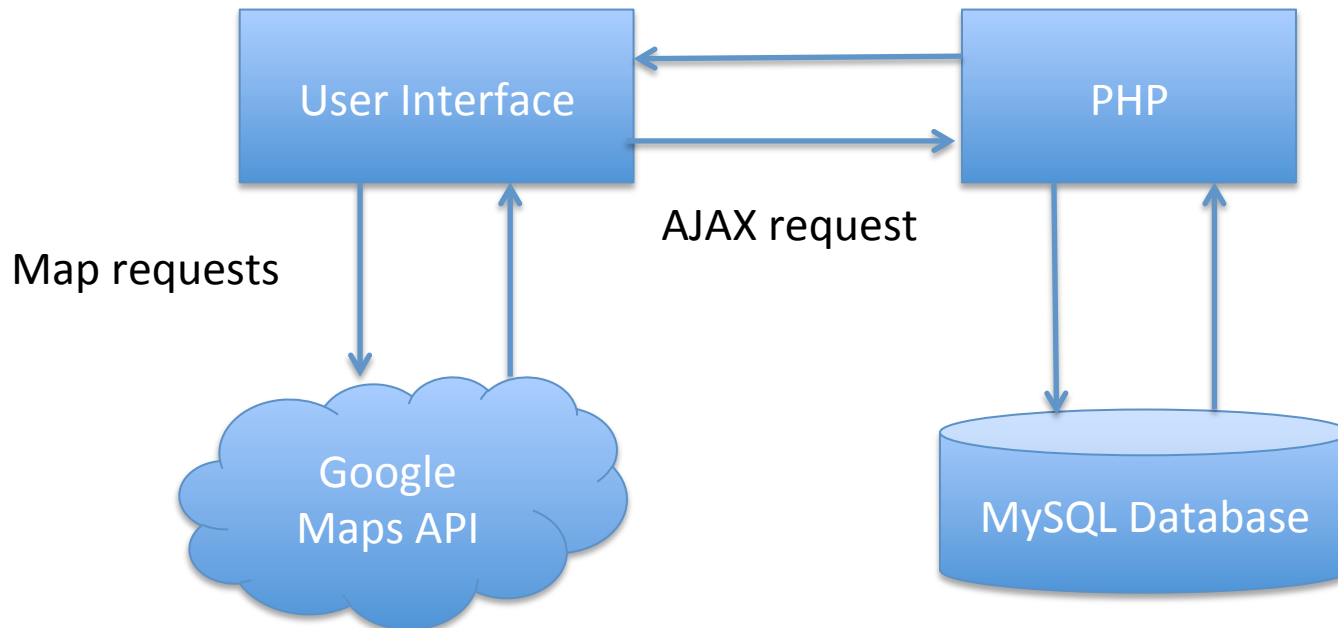
- Total score =  $.2 * \text{return on investment score} + .1 * \text{cost score} + .1 * \text{state score} + .3 * \text{graduation score} + .3 * \text{retention score}$
- The graduation and retention scores are weighted highly.
- This prevents cheap but low quality schools (low graduation and retention rate) from rising to the top.
- Takes into account average cost of the school, average student debt, average income of graduates, average income of location, retention rate, graduation rate

# Architecture

- Standard HTML/CSS, Javascript front end
- AngularJS as a front end framework
- Bootstrap, Chart.JS for UI elements
- JQuery animations
- Google Maps API
- AJAX requests to PHP backend which communicates with MySQL database

# Platform and Design

- Hosted on AWS using EC2
- MySQL instance run on AWS using RDS
- Simple design





# Data Sources

- School data:  
<https://catalog.data.gov/dataset/college-scorecard>
- State data:  
[https://en.wikipedia.org/wiki/List\\_of\\_U.S.\\_states\\_by\\_income](https://en.wikipedia.org/wiki/List_of_U.S._states_by_income)
- State codes:  
[https://www.census.gov/geo/reference/ansi\\_statetables.html](https://www.census.gov/geo/reference/ansi_statetables.html)

# Database Schema

- SCHOOLS[name, latitude, longitude, city, locale, in\_state\_tuition, out\_of\_state\_tuition, type, homepage, graduation\_rate, retention\_rate, admission\_rate, average\_student\_debt, salary\_ten, salary\_twentyfive, salary\_seventyfive, salary\_ninety, drr\_oneyr, drr\_threeyr, drr\_fiveyr, drr\_sevenyr]
- LOCATED[school, state\_code]
- STATES[name, code, avg\_salary, score]

# Queries

- To prevent SQL injection vulnerability, we use prepared queries
- '?' gets replaced with input

# Some Queries

- To get information about a school:
  - `SELECT * FROM schools WHERE name = ?;`
- To get the state of a specific school:
  - `SELECT * FROM located, states WHERE located.school = ? AND located.state_code = states.code;`
- To calculate averages:
  - `SELECT AVG(retention_rate) AS retention_rate,  
AVG(graduation_rate) AS graduation_rate,  
ROUND(AVG(in_state_tuition), 2) AS in_state_tuition,  
ROUND(AVG(out_of_state_tuition), 2) AS out_of_state_tuition,  
ROUND(AVG(average_student_debt), 2) AS  
average_student_debt, ROUND(AVG((salary_twentyfive +  
salary_seventyfive) / 2), 2) AS average_income FROM schools;`

# More Queries

- Browse schools:
  - ```
SELECT s.name, .2 * (1 - 1 / ((s.salary_twentyfive +
s.salary_seventyfive) / 2 / ((s.in_state_tuition +
s.out_of_state_tuition) / 2)) / 5) + .1 * (1 - 1 / (100000 /
((s.in_state_tuition + s.out_of_state_tuition + 2 *
s.average_student_debt) / 4))) + .1 * st.score / 100 + .3 *
s.graduation_rate + .3 * s.retention_rate AS 'score', s.city,
s.in_state_tuition, s.out_of_state_tuition, (s.salary_twentyfive +
s.salary_seventyfive) / 2 AS 'average_salary', st.name AS 'state'
FROM schools s, located l, states st WHERE s.in_state_tuition
>= ? AND s.in_state_tuition <= ? AND s.out_of_state_tuition
>= ? AND s.out_of_state_tuition <= ? AND (s.salary_twentyfive
+ s.salary_seventyfive) / 2 >= ? AND (s.salary_twentyfive +
s.salary_seventyfive) / 2 <= ? AND s.name = l.school AND
l.state_code = st.code AND l.state_code = ? ORDER BY " .
$sort_by . " ASC LIMIT ?;
```



# More Queries

- Browse by state:
  - ```
SELECT st.name, st.score, AVG(.2 * (1 - 1 / ((s.salary_twentyfive
+ s.salary_seventyfive) / 2 / ((s.in_state_tuition +
s.out_of_state_tuition) / 2)) / 5) + .1 * (1 - 1 / (100000 /
((s.in_state_tuition + s.out_of_state_tuition + 2 *
s.average_student_debt) / 4))) + .1 * st.score / 100 + .3 *
s.graduation_rate + .3 * s.retention_rate) AS
'average_school_score', ROUND(AVG(s.in_state_tuition), 2) AS
'average_in_state_tuition',
ROUND(AVG(s.out_of_state_tuition), 2) AS
'average_out_of_state_tuition', st.avg_salary FROM schools s,
located l, states st WHERE s.name = l.school AND l.state_code =
st.code AND st.code = ? GROUP BY st.name ASC ORDER BY " .
$sort_by . " DESC LIMIT ?;
```