School Finder

Vincent Xie

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

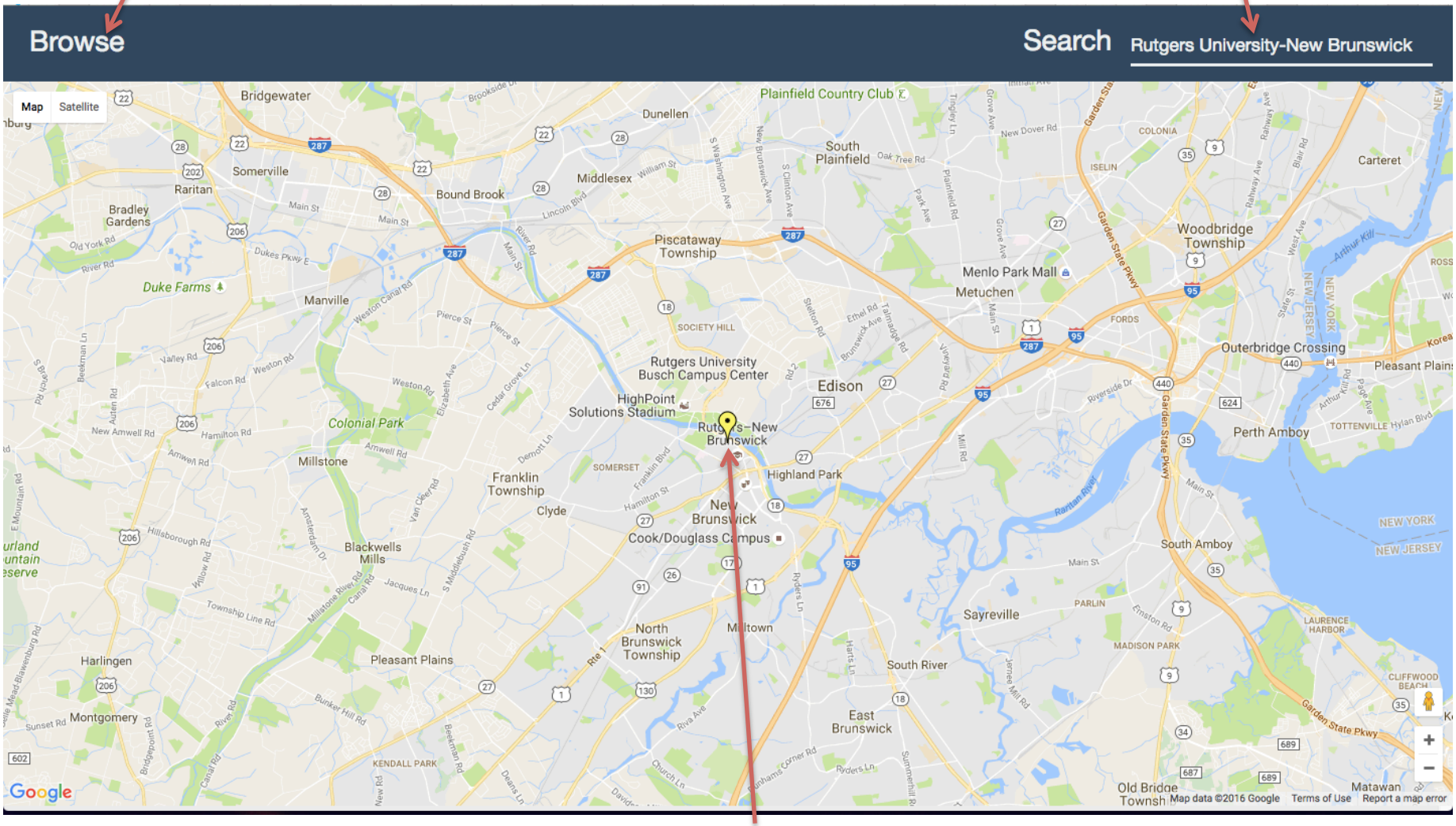
Walkthrough

- 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

Map page

Button to the browse page

Search box



Clickable marker for the school

Map page notes

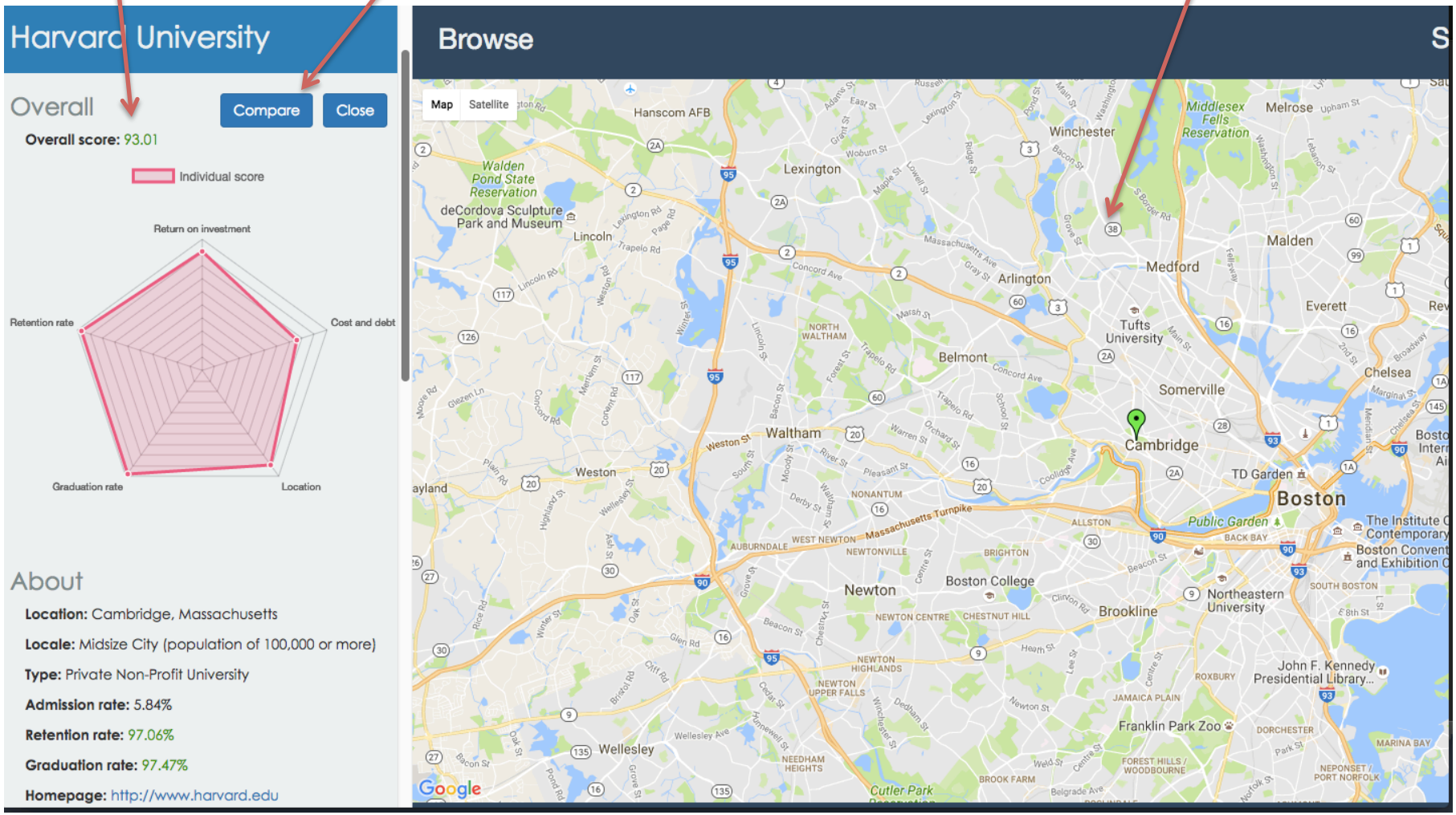
- To open up the sidebar, click on the marker for the school.
- Depending on the score for the school, the marker will have a different color
- The best schools will have a green marker, worst schools will get orange, red etc.

Side bar

Overall score

Button to compare school

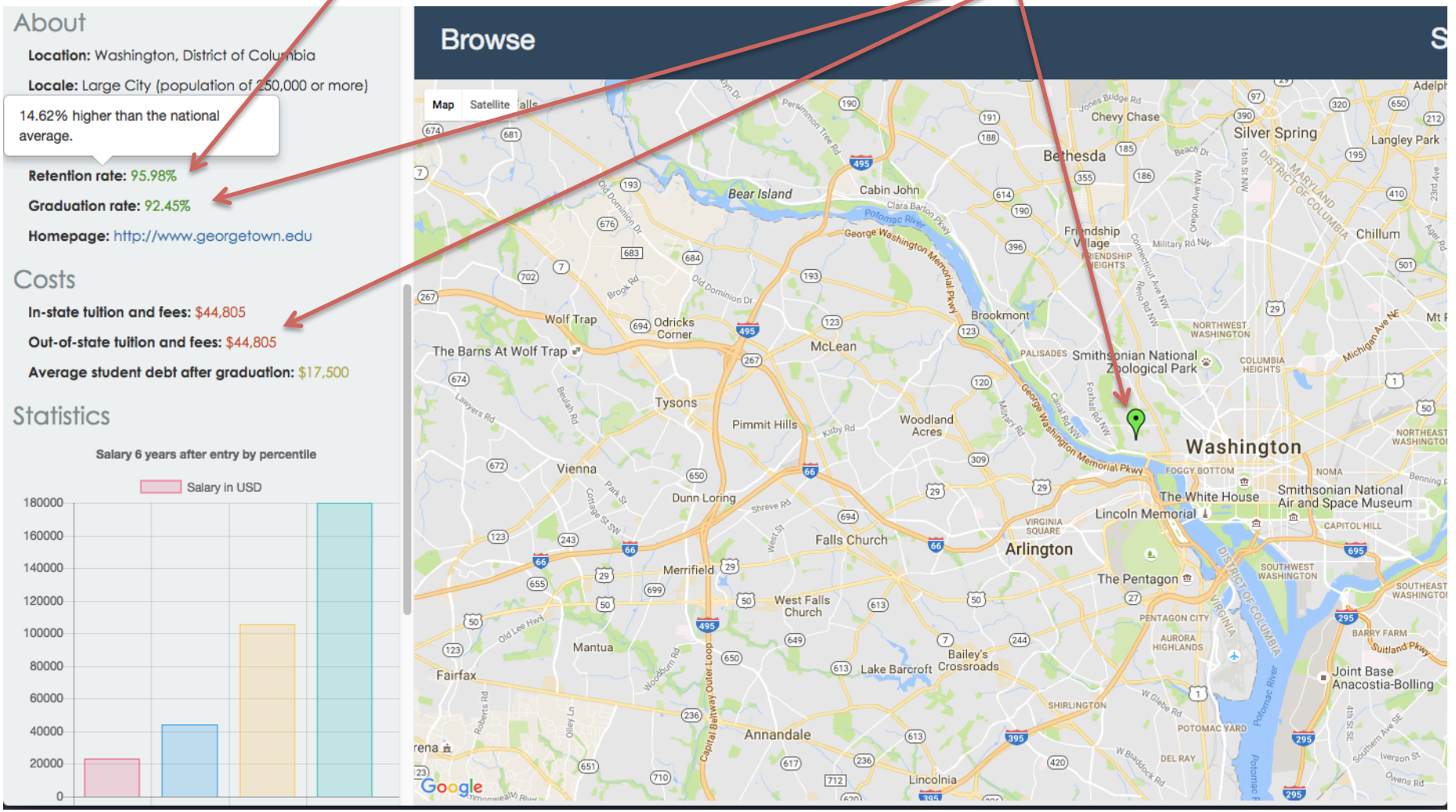
To close the side bar, click on the map



Side bar continued

Hover over to see comparisons to the average

Dynamic colors

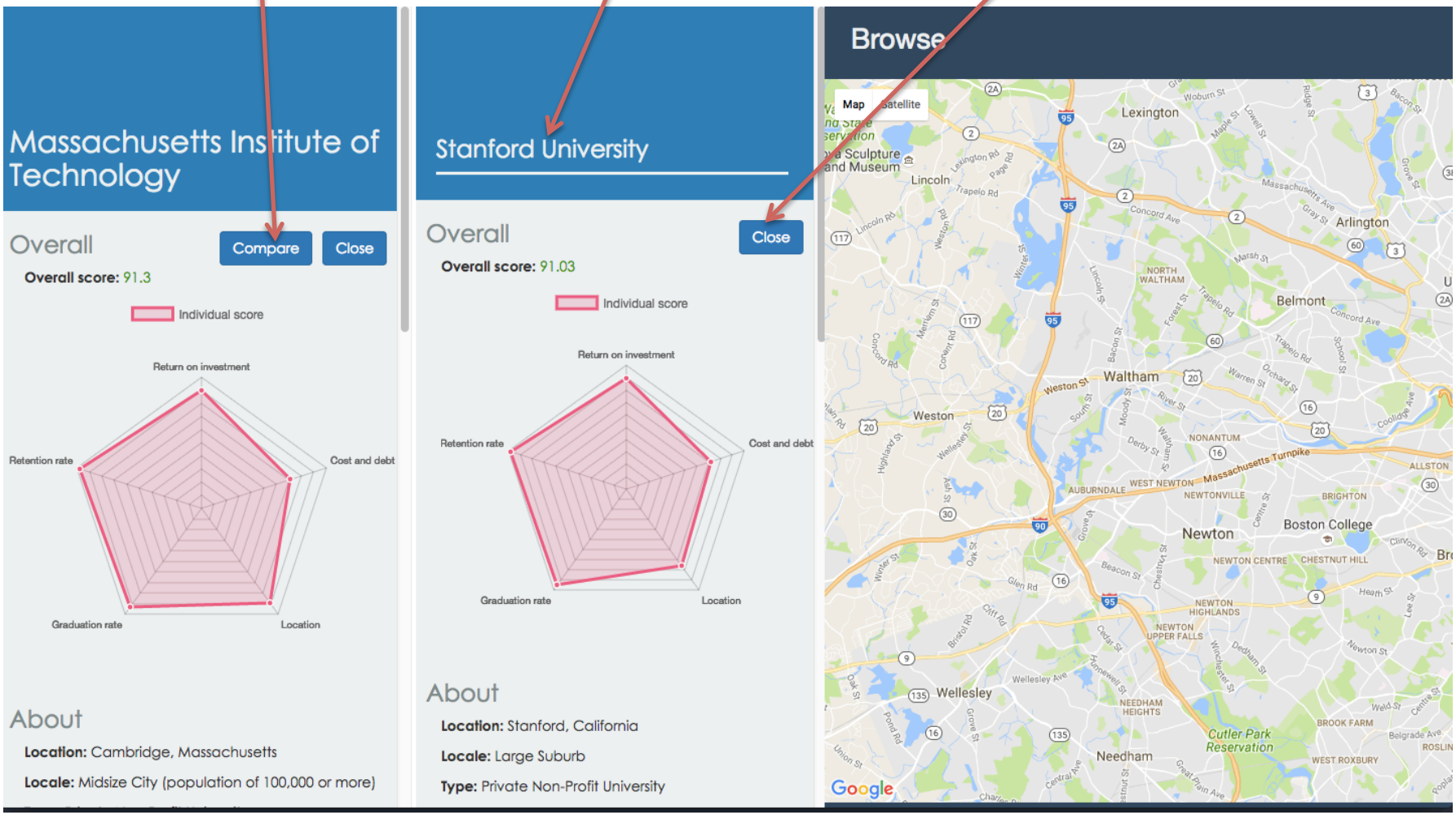


Compare

Button to toggle compare tab

Search schools

Close compare tab

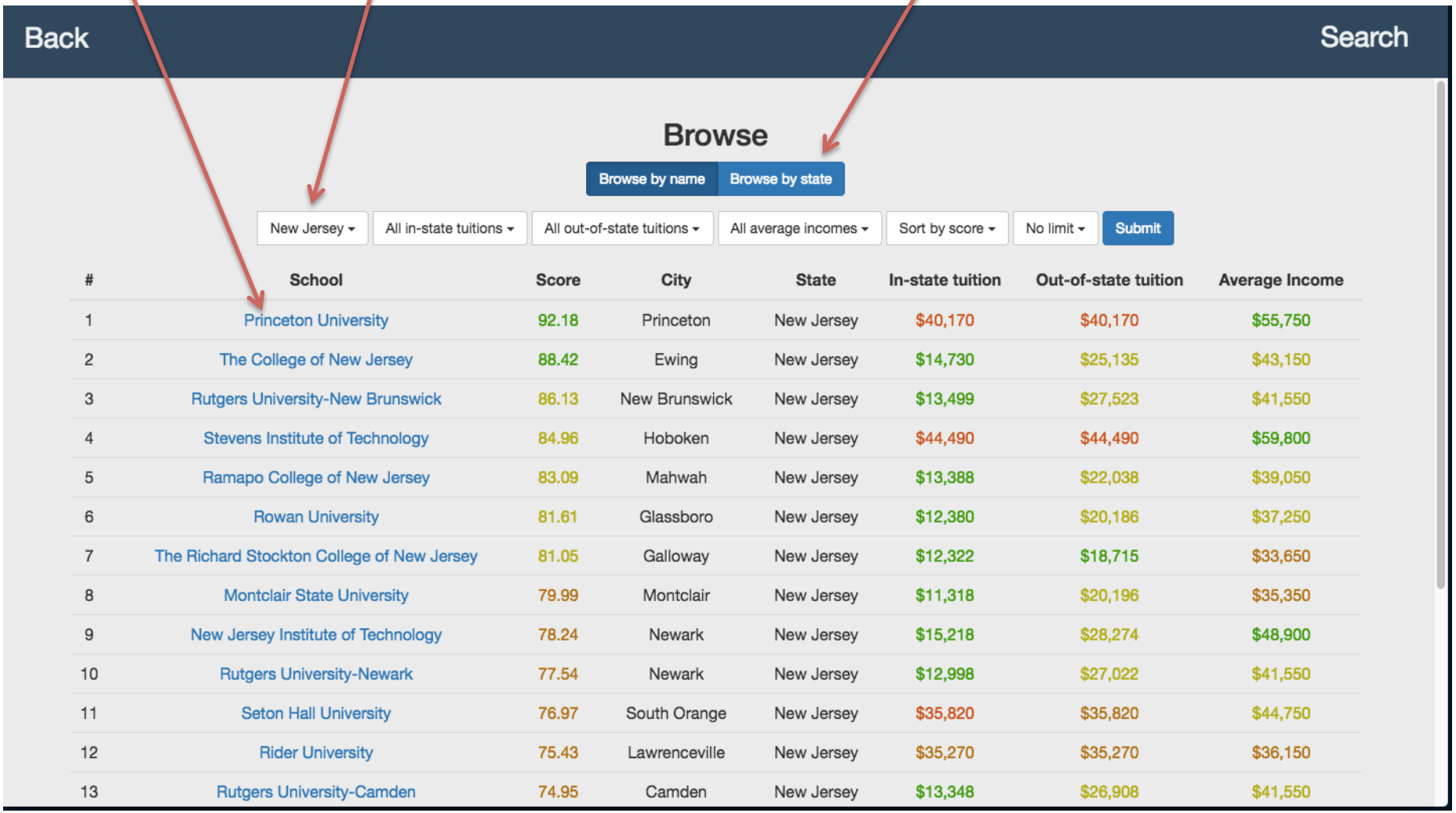


Browse Page

Clickable links to map

Filters

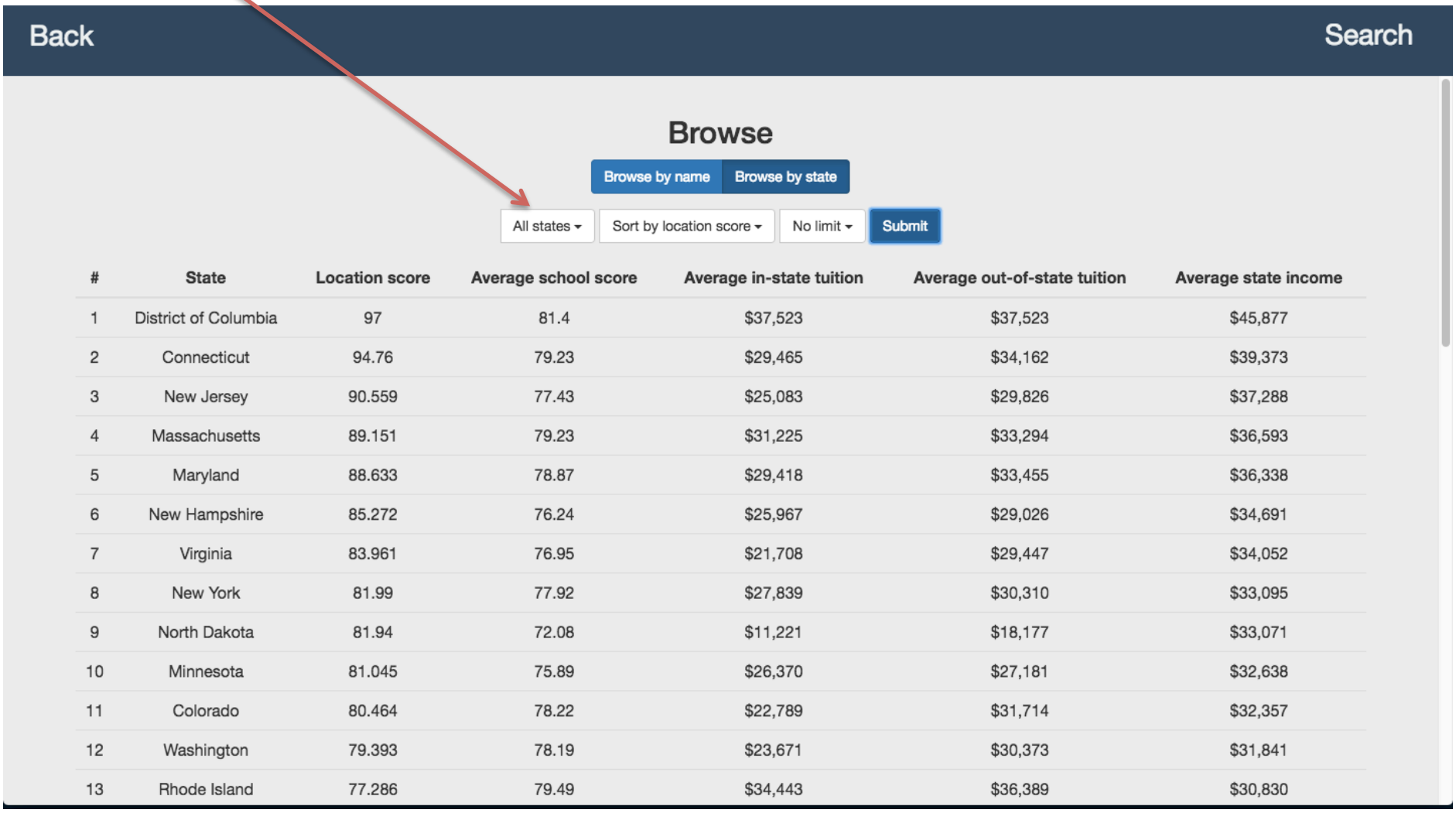
Browse by school name or state



#	School	Score	City	State	In-state tuition	Out-of-state tuition	Average Income
1	Princeton University	92.18	Princeton	New Jersey	$40,170	$40,170	$55,750
2	The College of New Jersey	88.42	Ewing	New Jersey	$14,730	$25,135	$43,150
3	Rutgers University-New Brunswick	86.13	New Brunswick	New Jersey	$13,499	$27,523	$41,550
4	Stevens Institute of Technology	84.96	Hoboken	New Jersey	$44,490	$44,490	$59,800
5	Ramapo College of New Jersey	83.09	Mahwah	New Jersey	$13,388	$22,038	$39,050
6	Rowan University	81.61	Glassboro	New Jersey	$12,380	$20,186	$37,250
7	The Richard Stockton College of New Jersey	81.05	Galloway	New Jersey	$12,322	$18,715	$33,650
8	Montclair State University	79.99	Montclair	New Jersey	$11,318	$20,196	$35,350
9	New Jersey Institute of Technology	78.24	Newark	New Jersey	$15,218	$28,274	$48,900
10	Rutgers University-Newark	77.54	Newark	New Jersey	$12,998	$27,022	$41,550
11	Seton Hall University	76.97	South Orange	New Jersey	$35,820	$35,820	$44,750
12	Rider University	75.43	Lawrenceville	New Jersey	$35,270	$35,270	$36,150
13	Rutgers University-Camden	74.95	Camden	New Jersey	$13,348	$26,908	$41,550

Browse by state

Filters



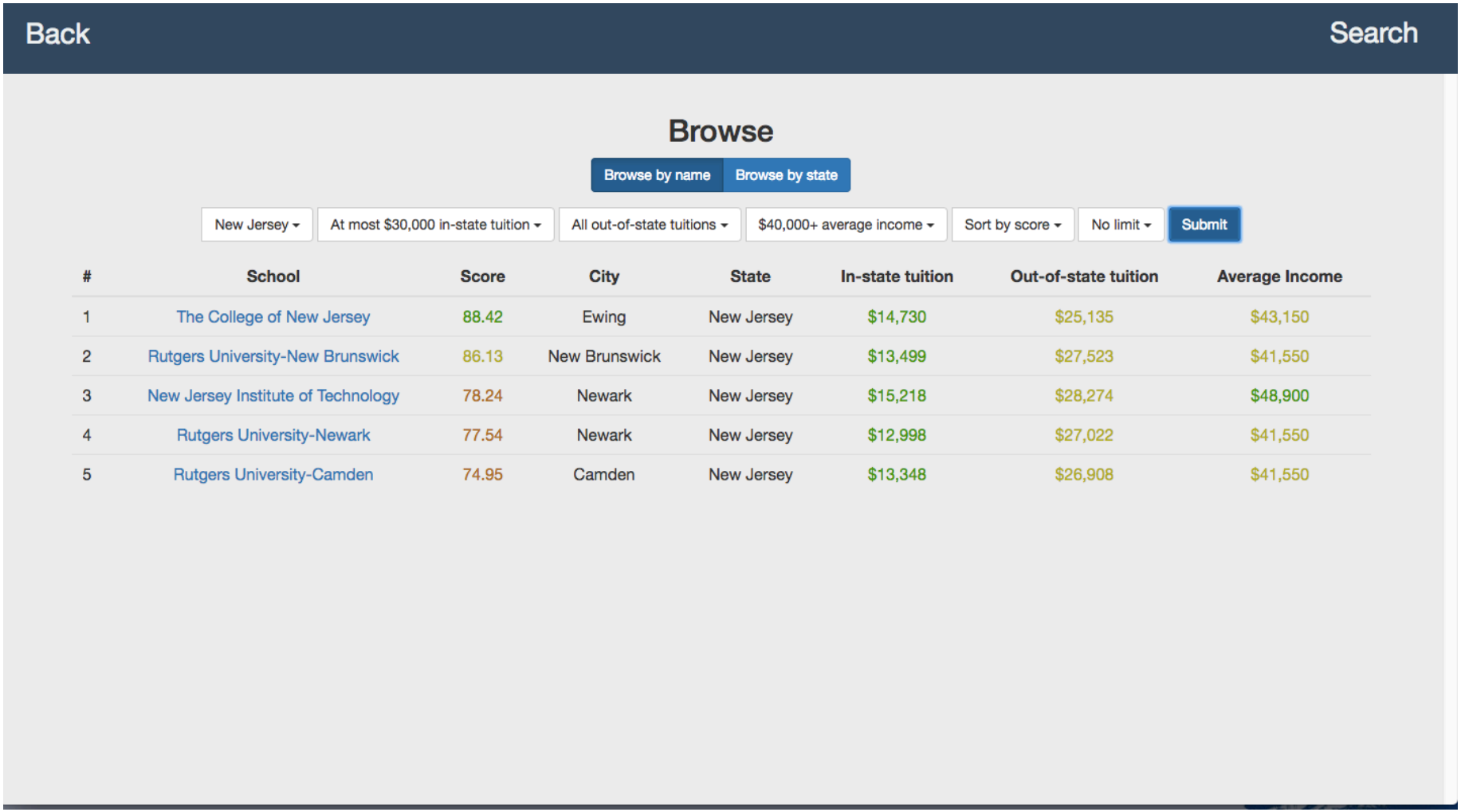
#	State	Location score	Average school score	Average in-state tuition	Average out-of-state tuition	Average state income
1	District of Columbia	97	81.4	$37,523	$37,523	$45,877
2	Connecticut	94.76	79.23	$29,465	$34,162	$39,373
3	New Jersey	90.559	77.43	$25,083	$29,826	$37,288
4	Massachusetts	89.151	79.23	$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.



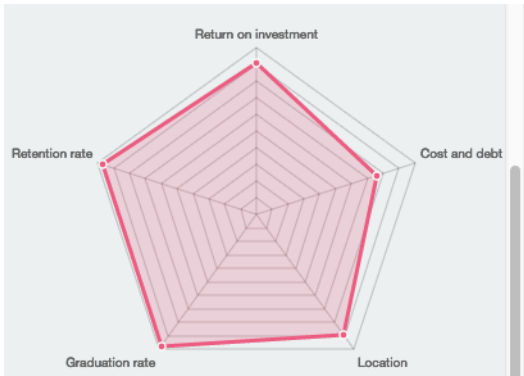
#	School	Score	City	State	In-state tuition	Out-of-state tuition	Average Income
1	The College of New Jersey	88.42	Ewing	New Jersey	$14,730	$25,135	$43,150
2	Rutgers University-New Brunswick	86.13	New Brunswick	New Jersey	$13,499	$27,523	$41,550
3	New Jersey Institute of Technology	78.24	Newark	New Jersey	$15,218	$28,274	$48,900
4	Rutgers University-Newark	77.54	Newark	New Jersey	$12,998	$27,022	$41,550
5	Rutgers University-Camden	74.95	Camden	New Jersey	$13,348	$26,908	$41,550

Another sample workflow

- A student just got back application results
- Wants to choose between schools (Yale and Harvard)
- 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 Harvard



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

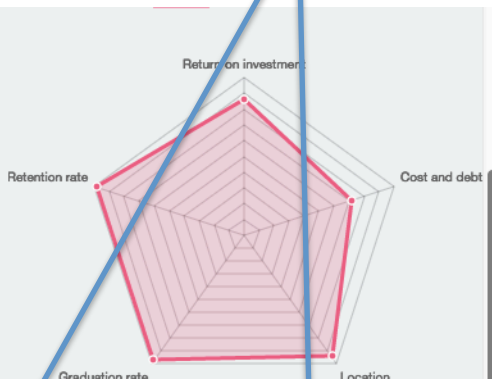
Costs

In-state tuition and fees: $42,292

Out-of-state tuition and fees: $42,292

Average student debt after graduation: $6,000

Statistics



About

Location: New Haven, Connecticu

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

Type: Private Non-Profit University

Admission rate: 7.05%

Retention rate: 98.67%

Graduation rate: 97.79%

Homepage: http://www.yale.edu

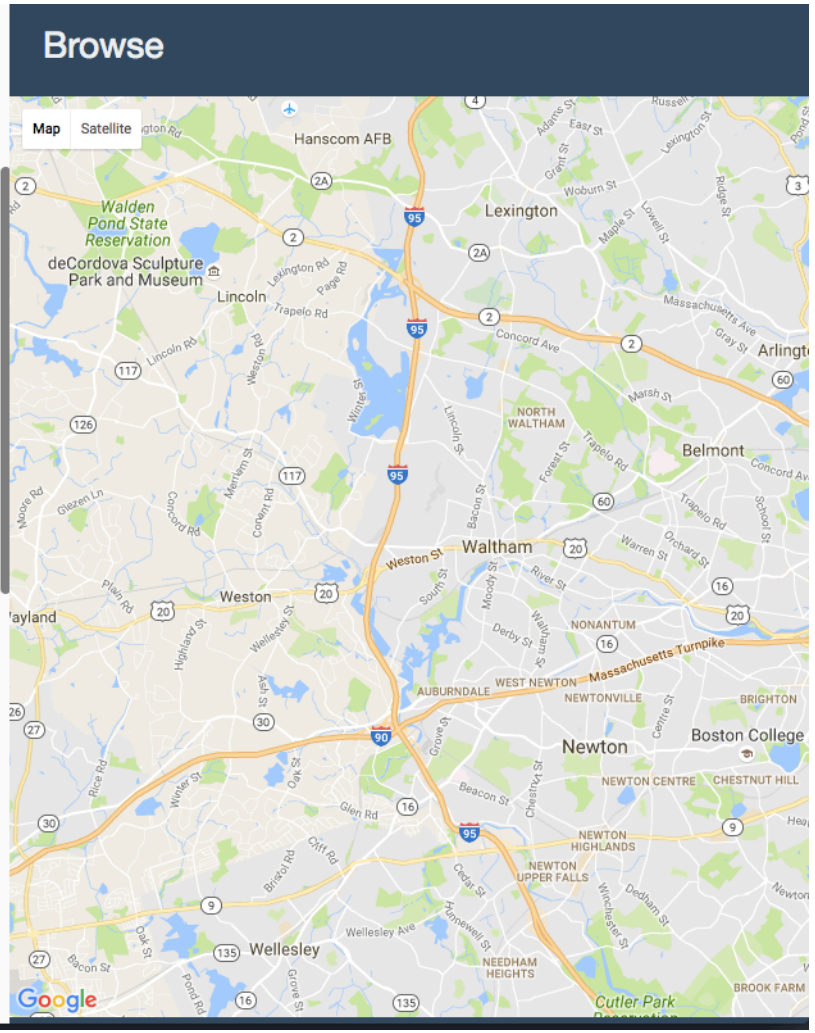
Costs

In-state tuition and fees: $44,000

Out-of-state tuition and fees: $44,000

Average student debt after graduation: $12,000

Statistics



Scoring formula

- Return on investment score = 1 - 1 / ((school.salary_twentyfive + school.salary_seventyfive) / 2 / ((school.in_state_tuition + school.out_of_state_tuition) / 2)) / 5
- Cost score = 1 - 1 / (100000 / ((school.in_state_tuition + school.out_of_state_tuition + 2 * school.average_student_debt) / 4))
- State score is calculated based upon the average salary
- Graduation score = school.graduation_rate
- Retention score = school.retention_rate

Scoring formula continued

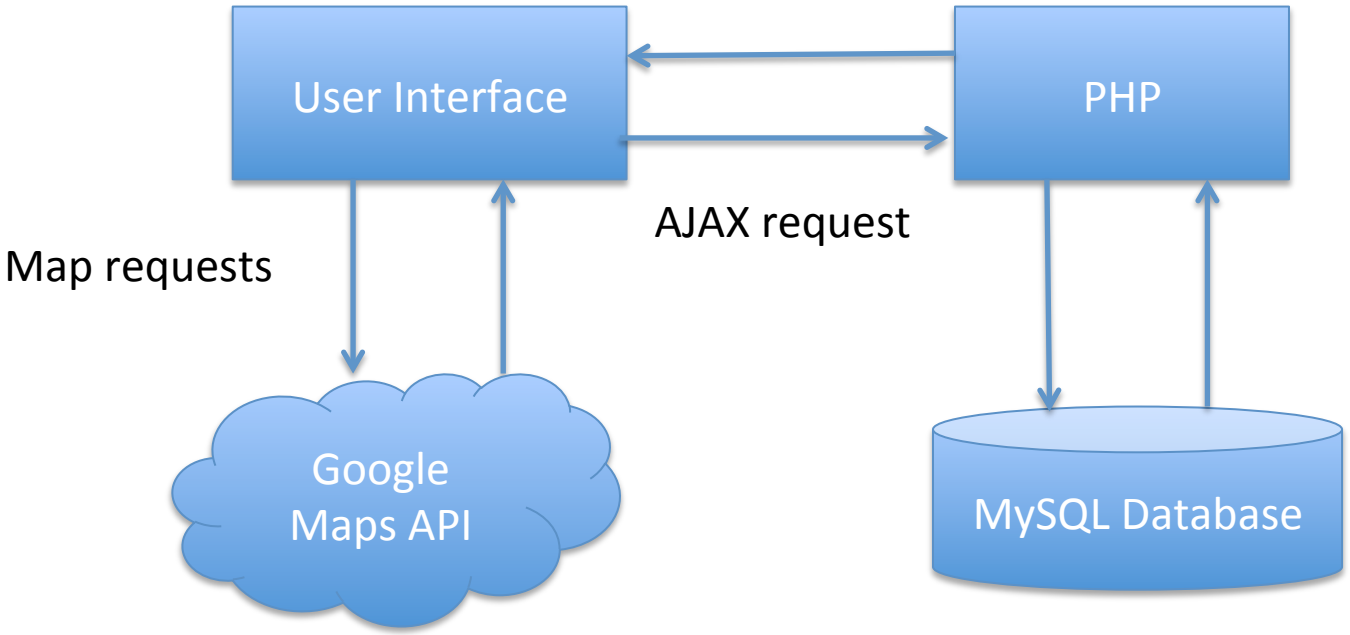
- Total score = .2 * return on investment score + .1 * cost score + .1 * state score + .3 * graduation score + .3 * retention score
- The graduation and retention scores are weighted highly.
- This prevents cheap but low quality schools (low graduation and retention rate) from rising to the top.
- Takes 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
- State codes: 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, graudation_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 ?;