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To: Professor Ryan
Date: 3/26/21
Subj: Databases & Data Visualization Proposal

Section 1:
Question: How do college's out-of-state tuition affect graduation rates?

We searched through Kaggle and found observational data on 777 colleges around the country. It included the college name followed by 18 additional variables about each college. The main variables we focused on were out-of-state tuition costs, graduation rate, and student faculty ratio. The data was collected in 2018, but based on the tuition costs and the use of Allentown Coll. of St. Francis de Sales, rather than DeSales University, the actual date may be dated by a couple years.

Hypothesis: The higher the out-of-state tuition, the higher the graduation rate.

Section 2:

	Name	Private	Apps	Accept	Enroll	Top10perc	Top25perc	F.Undergrad	P.Undergrad	Outstate	Room.Board	Books	Personal	PhD	Terminal	S.F.Ratio	perc.alumni	Expend	Grad.Rate
1																			
2	Abilene Christian University	Yes	1660	1232	721	23	52	2885	537	7440	3300	450	2200	70	78	18.1	12	7041	60
3	Adelphi University	Yes	2186	1924	512	16	29	2683	1227	12280	6450	750	1500	29	30	12.2	16	10527	56
4	Adrian College	Yes	1428	1097	336	22	50	1036	99	11250	3750	400	1165	53	66	12.9	30	8735	54
5	Agnes Scott College	Yes	417	349	137	60	89	510	63	12960	5450	450	875	92	97	7.7	37	19016	59
6	Alaska Pacific University	Yes	193	146	55	16	44	249	869	7560	4120	800	1500	76	72	11.9	2	10922	15
7	Albertson College	Yes	587	479	158	38	62	678	41	13500	3335	500	675	67	73	9.4	11	9727	55
8	Albertus Magnus College	Yes	353	340	103	17	45	416	230	13290	5720	500	1500	90	93	11.5	26	8861	63
9	Albion College	Yes	1899	1720	489	37	68	1594	32	13868	4826	450	850	89	100	13.7	37	11487	73
10	Albright College	Yes	1038	839	227	30	63	973	306	15595	4400	300	500	79	84	11.3	23	11644	80
11	Alderson-Broaddus College	Yes	582	498	172	21	44	799	78	10468	3380	660	1800	40	41	11.5	15	8991	52
12	Alfred University	Yes	1732	1425	472	37	75	1830	110	16548	5406	500	600	82	88	11.3	31	10932	73
13	Allegheny College	Yes	2652	1900	484	44	77	1707	44	17080	4440	400	600	73	91	9.9	41	11711	76
14	Allentown Coll. of St. Francis de Sales	Yes	1179	780	290	38	64	1130	638	9690	4785	600	1000	60	84	13.3	21	7940	74
15	Alma College	Yes	1267	1080	385	44	73	1306	28	12572	4552	400	400	79	87	15.3	32	9305	68
16	Alverno College	Yes	494	313	157	23	46	1317	1235	8352	3640	650	2449	36	69	11.1	26	8127	55
17	American International College	Yes	1420	1093	220	9	22	1018	287	8700	4780	450	1400	78	84	14.7	19	7355	69
18	Amherst College	Yes	4302	992	418	83	96	1593	5	19760	5300	660	1598	93	98	8.4	63	21424	100
19	Anderson University	Yes	1216	908	423	19	40	1819	281	10100	3520	550	1100	48	61	12.1	14	7994	59
20	Andrews University	Yes	1130	704	322	14	23	1586	326	9996	3090	900	1320	62	66	11.5	18	10908	46
21	Angelo State University	No	3540	2001	1016	24	54	4190	1512	5130	3592	500	2000	60	62	23.1	5	4010	34
22	Antioch University	Yes	713	661	252	25	44	712	23	15476	3336	400	1100	69	82	11.3	35	42926	48
23	Appalachian State University	No	7313	4664	1910	20	63	9940	1035	6806	2540	96	2000	83	96	18.3	14	5854	70
24	Aquinas College	Yes	619	516	219	20	51	1251	767	11208	4124	350	1615	55	65	12.7	25	6584	65
25	Arizona State University Main campus	No	12809	10308	3761	24	49	22593	7585	7434	4850	700	2100	88	93	18.9	5	4602	48
26	Arkansas College (Lyon College)	Yes	708	334	166	46	74	530	182	8644	3922	500	800	79	88	12.6	24	14579	54
27	Arkansas Tech University	No	1734	1729	951	12	52	3602	939	3460	2650	450	1000	57	60	19.6	5	4739	48
28	Assumption College	Yes	2135	1700	491	23	59	1708	689	12000	5920	500	500	93	93	13.8	30	7100	88
29	Auburn University-Main Campus	No	7548	6791	3070	25	57	16262	1716	6300	3933	600	1908	85	91	16.7	18	6642	69
30	Augsburg College	Yes	662	513	257	12	30	2074	726	11902	4372	540	950	65	65	12.8	31	7836	58
31	Augustana College IL	Yes	1879	1658	497	36	69	1950	38	13353	4173	540	821	78	83	12.7	40	9220	71
32	Augustana College	Yes	761	725	306	21	58	1337	300	10990	3244	600	1021	66	70	10.4	30	6871	69
33	Austin College	Yes	948	798	295	42	74	1120	15	11280	4342	400	1150	81	95	13	33	11361	71
34	Averett College	Yes	627	556	172	16	40	777	538	9925	4135	750	1350	59	67	22.4	11	6523	48
35	Baker University	Yes	602	483	206	21	47	958	466	8620	4100	400	2250	58	68	11	21	6136	65
36	Baldwin-Wallace College	Yes	1690	1366	662	30	61	2718	1460	10995	4410	1000	1000	68	74	17.6	20	8086	85

Variables:
- Name
    - The name of each college
- Private
    - Data shows up as "Yes" or "No" in relationship to if it is a private school or not, with the alternative being public
    - i.e. Yes = private; No = public
- Apps
    - Number of applications for the year
- Accept
    - Number of acceptances for the year
- Enroll
    - Number of enrollments for the year
- Top10perc
    - Number of new students who were in the top 10% of their high school class
- Top25perc
    - Number of new students who were in the top 25% of their high school class
- F.Undergrad
    - Number of full-time undergraduates
- P.Undergrad
    - Number of part-time undergraduates
- Outstate
    - Tuition cost for out-of-state students
- Room.Board
    - Cost for room and board
- Books
    - Estimated cost of books
- Personal
    - Estimated personal costs
- PhD
    - Percentage of faculty with PhDs
- Terminal
    - Percentage of faculty with terminal degrees
- S.F. Ratio
    - Student/faculty ratio
- Perc.alumni
    - Percentage of Alumni who donate
- Expend
    - Expenditures made by the college per student
- Grad.Rate
    - Graduation Rate

Section 3:

Main Variables:

      X: Out-of-State tuition

      Y: Graduation rate

- Other Focused on Variables: Private, Student Faculty Ratio

Summary Statistics:

Graduation rate average, Student/Faculty ratio average, Student/Faculty ratio minimum, Student/Faculty ratio maximum, graduation rate minimum, graduation rate maximum

```python
grad_rate=College['Grad.Rate']
grad_rate.mean()
```

65.46332046332046

```python
Student_Faculty=College['S.F.Ratio']
Student_Faculty.mean()
```

14.089703989703986

```python
Student_Faculty.min()
```
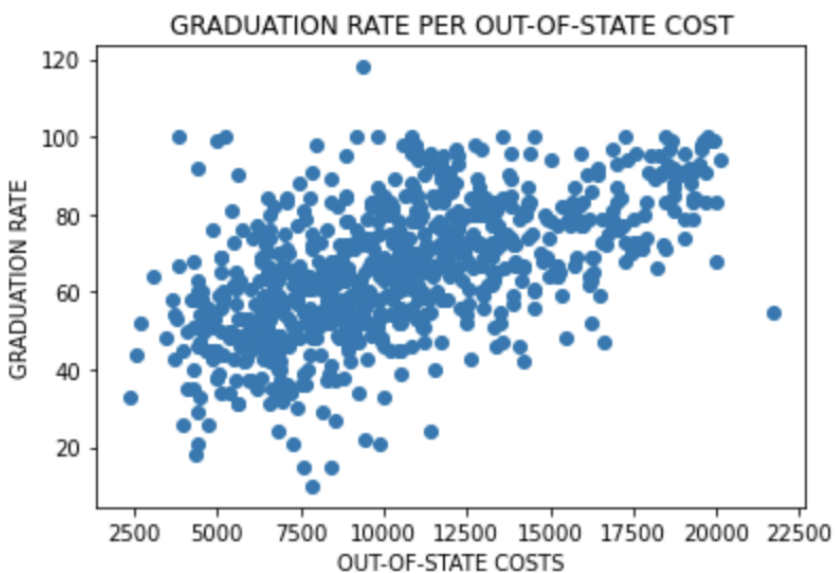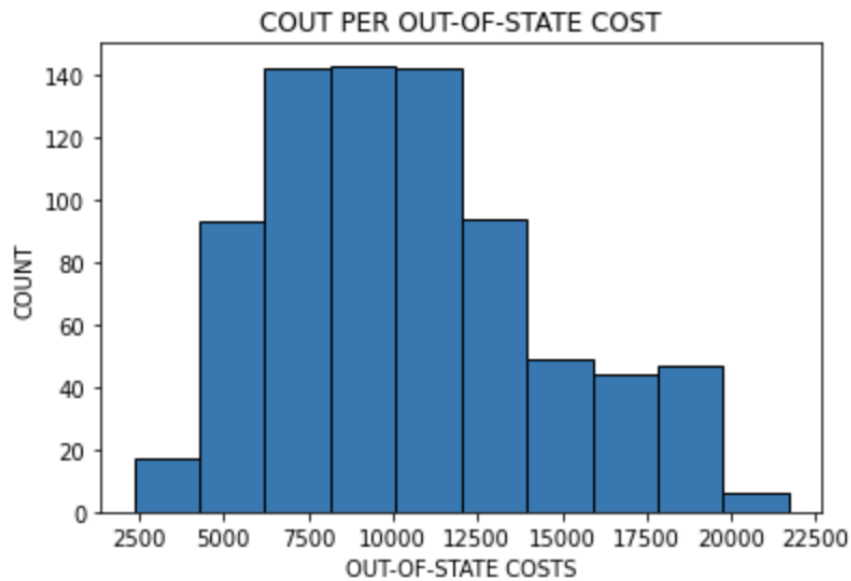
2.5

```python
Student_Faculty.max()
```

39.8

```python
grad_rate.min()
```

10

```python
grad_rate.max()
```

118

Visualizations (2):

GRADUATION RATE PER OUT-OF-STATE COST

COUT PER OUT-OF-STATE COST

- Scatter plot:
  - The scatter plot above presents the relationship graduation rate and out-of-state tuition cost in a clear and easily consumed way.
  - The plot directly relates to our hypothesis, showing a positive correlation between graduation rate and out-of-state tuition cost.
- Bar chart:
  - The bar chart above shows how many colleges had a given out-of-state tuition cost. It makes it easier to see what range the majority of costs fall into.
  - The chart helps to show if the data may be skewed with a significant number of colleges only taking up a small range of the costs. While this data does appear to be skewed to the left, it will take more analysis to determine if it will affect the accuracy of our hypothesis.