Explore a hypothesis in tax revenue data & Tufte Principles

Information Visualization - Homework2

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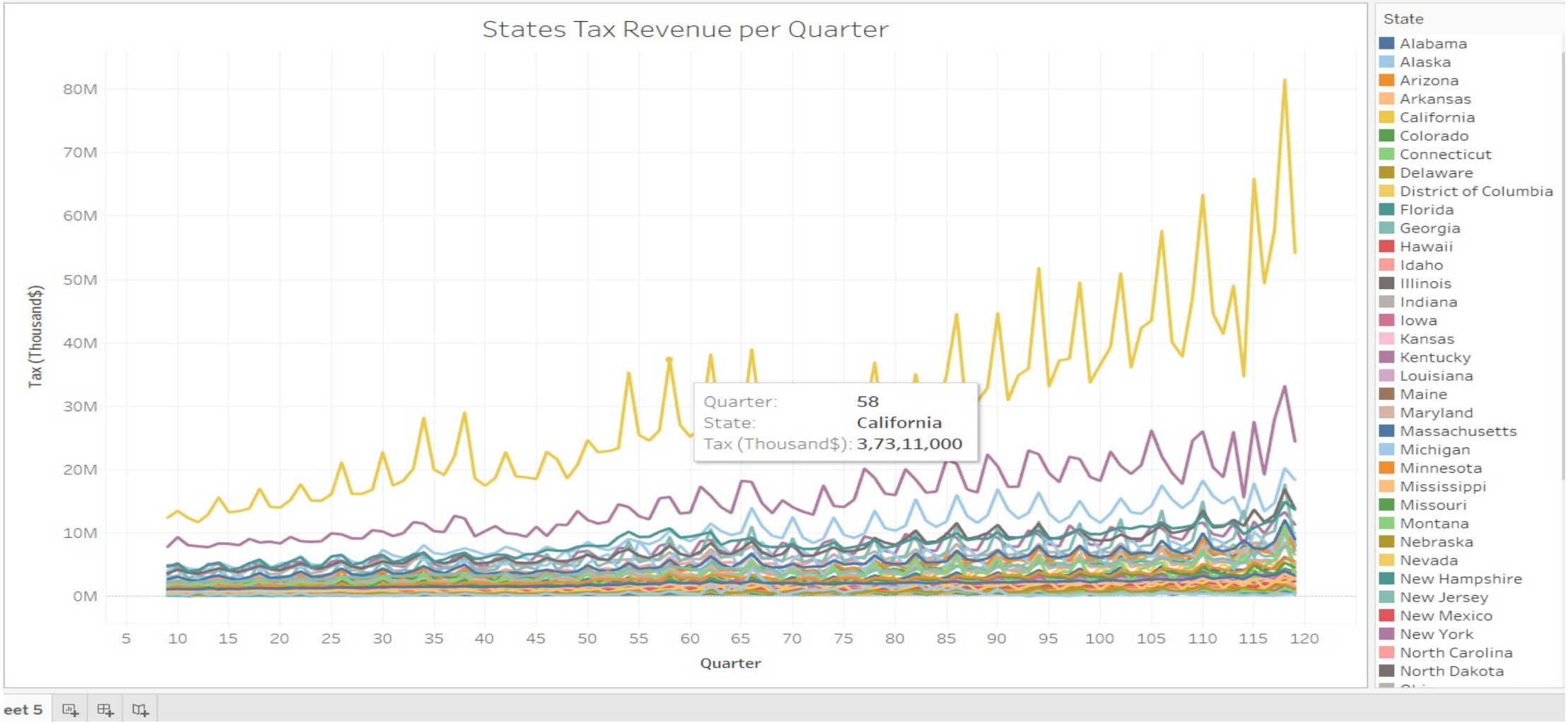
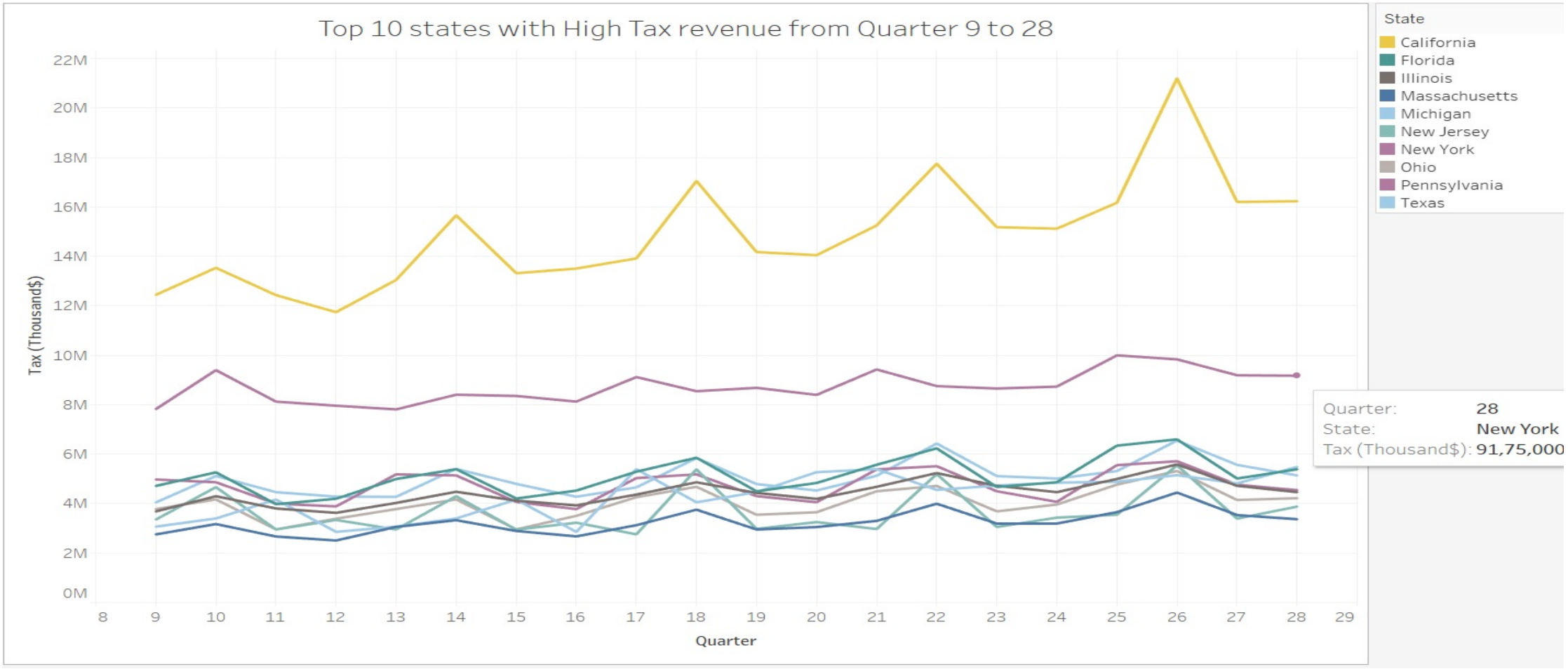
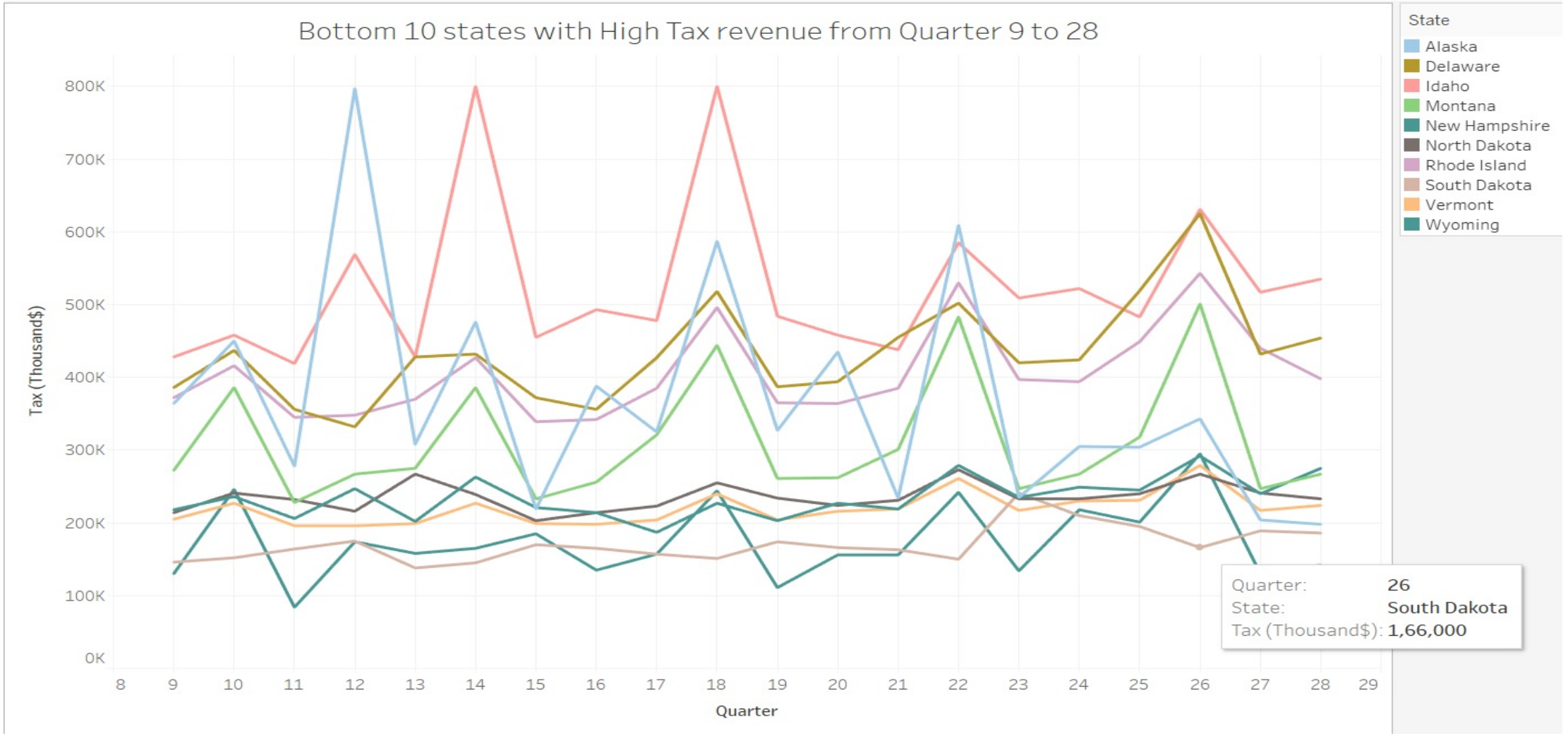


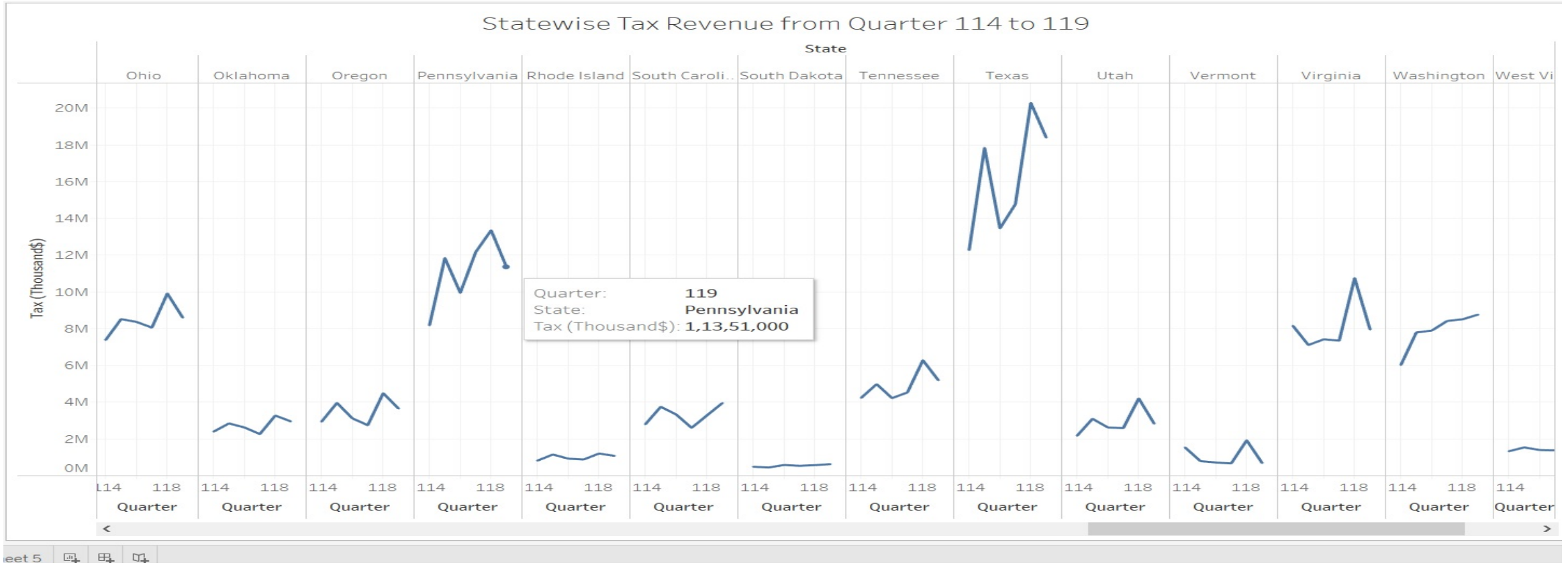
- The above is a graph that shows tax revenue from quarter 9 to 119 for all the 51 states in USA.
- Since it violates Tufte's principles and also the values are overlapping we will take top 10 and bottom 10 states in terms of overall tax revenue so that we can figure out some periodicity in the pattern.



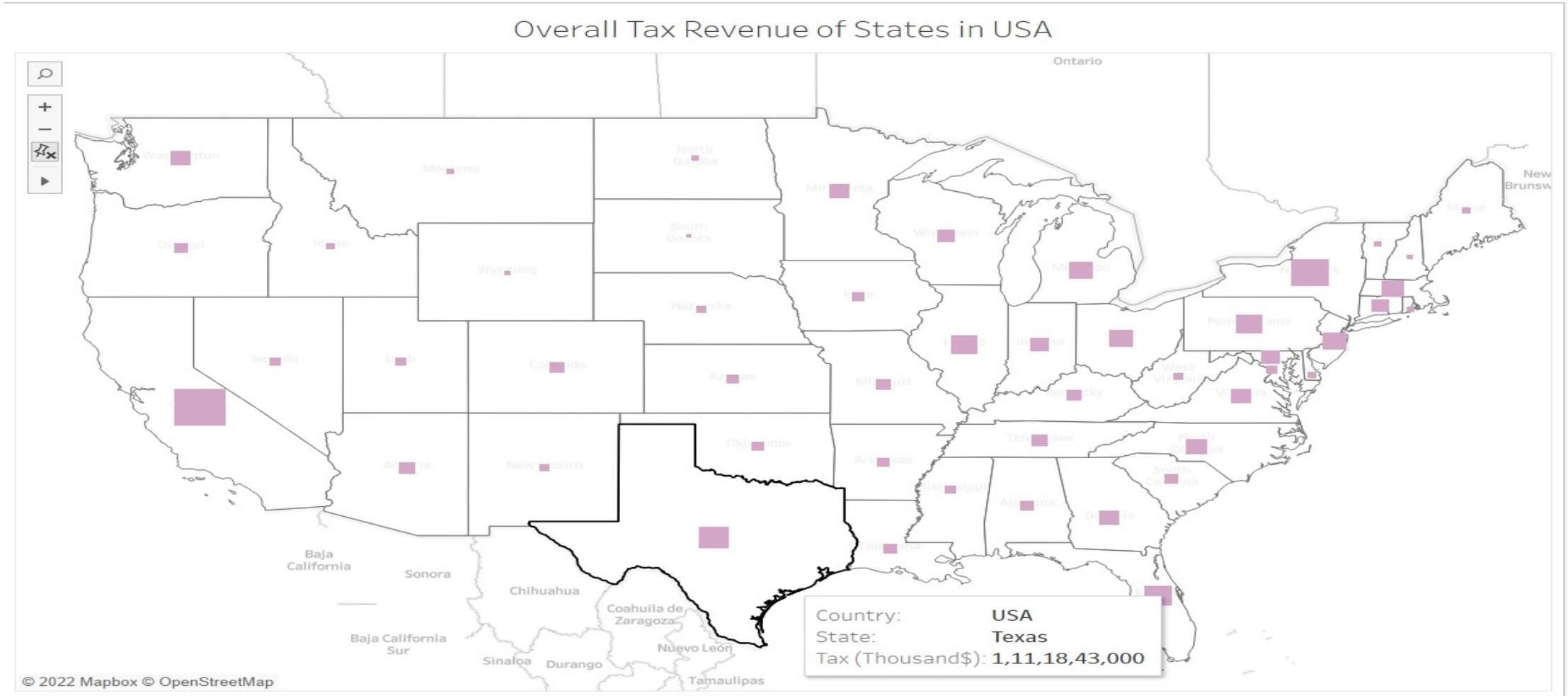
- From this chart we can see that for Quarter 10 there is increase in Tax revenue for all the states and then decrease in revenue for 11th and 12th quarter and again there is an increase in the 13th quarter.
- Similarly, there is an increase in the 22nd quarter after the decrease in 21st except for New York.



- In the lowest performing states in terms of tax revenue we can see that for even numbered quarters there is a rise in revenue especially on **14,18,22,26 ie. in terms of four year gap** there is significant rise in tax revenue.
- This similar trends can also be found in top performing states as well. Kindly take a note on 14,18,22,26 quarter in previous page. We can see a similar trend.



- This chart follows the below Tufte's principle
  - Avoid Chart Junk
  - Use small multiples
  - Maximize data-ink ratio
  - Use multi-functioning graphical elements
- This above chart display tax revenue for all the states for the quarters 114 to 119.
- We can use the scroll bar at the bottom to navigate to other states.
- We can see for all the states there is a huge rise in terms of tax revenue in the quarter 118.



- The above geopraphic chart just show us the overall tax revenue in terms of states for all the quarters from 9 to 119.
- The tooltip will help us navigate and will provide required information.

Given Data

	A	B	C	D
	per_idx	geo_code	Tax (Thousand$)	
	9	AK	364000	
	9	AL	1180000	
	9	AR	782000	
	9	AZ	1309000	
	9	CA	12445000	
	9	CO	885000	
	9	CT	1634000	
	9	DC	609000	
	9	DE	386000	
	9	FL	4716000	
	9	GA	2289000	
	9	HI	839000	
	9	IA	1066000	
	9	ID	428000	
	9	IL	3684000	
	9	IN	1842000	
	9	KS	851000	
	9	KY	1377000	
	9	LA	1048000	
	9	MA	2755000	
	9	MD	1875000	
	9	ME	394000	
	9	MI	3070000	
	9	MN	2137000	
	9	MO	1455000	
	9	MS	773000	
	9	MT	272000	
	9	NC	2464000	
	9	ND	214000	
	9	NE	533000	
	9	NH	218000	

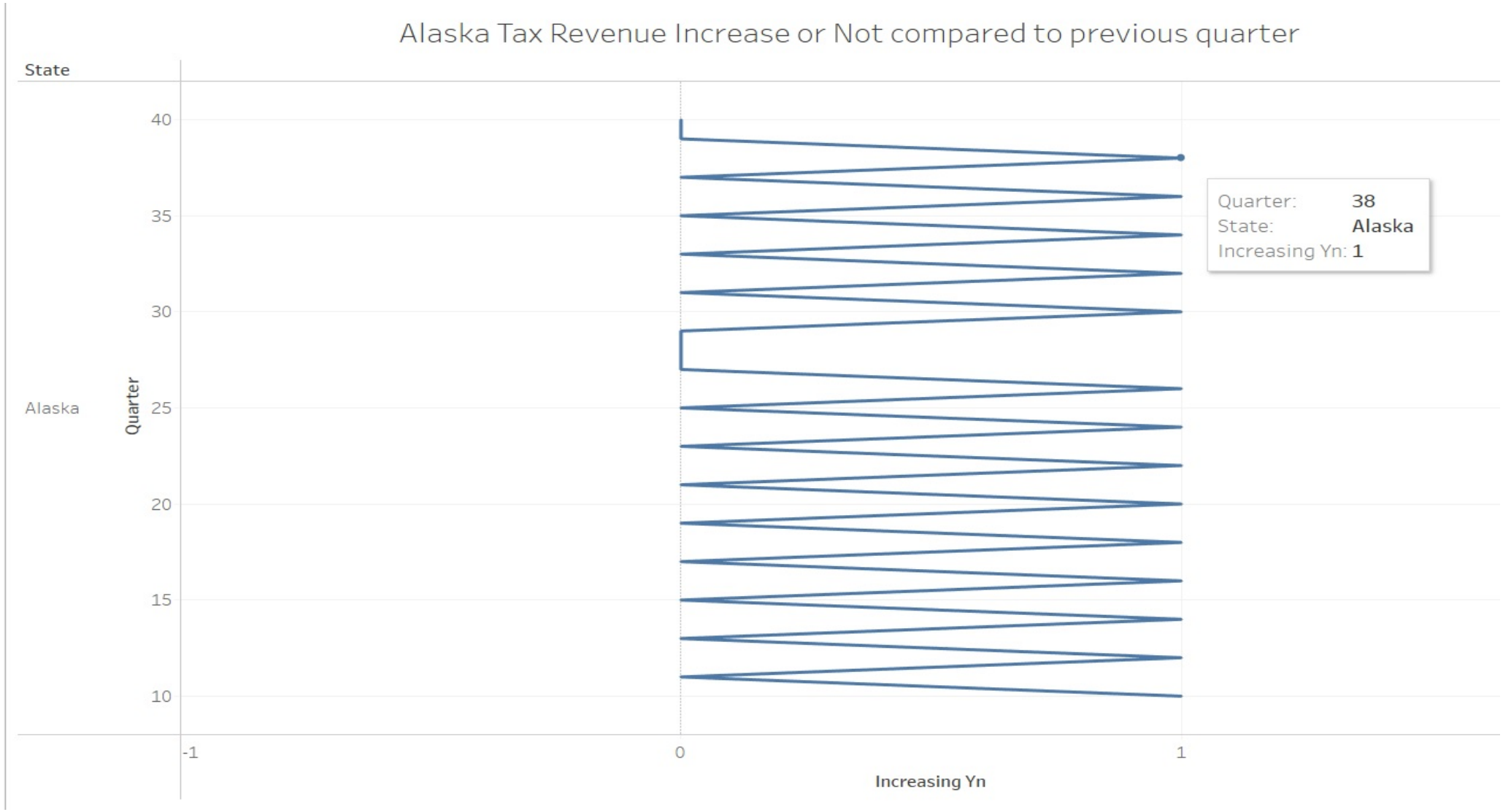
Modified Data

Script Output × | Query Result × | Query Result 1 × | Query Result 2 ×

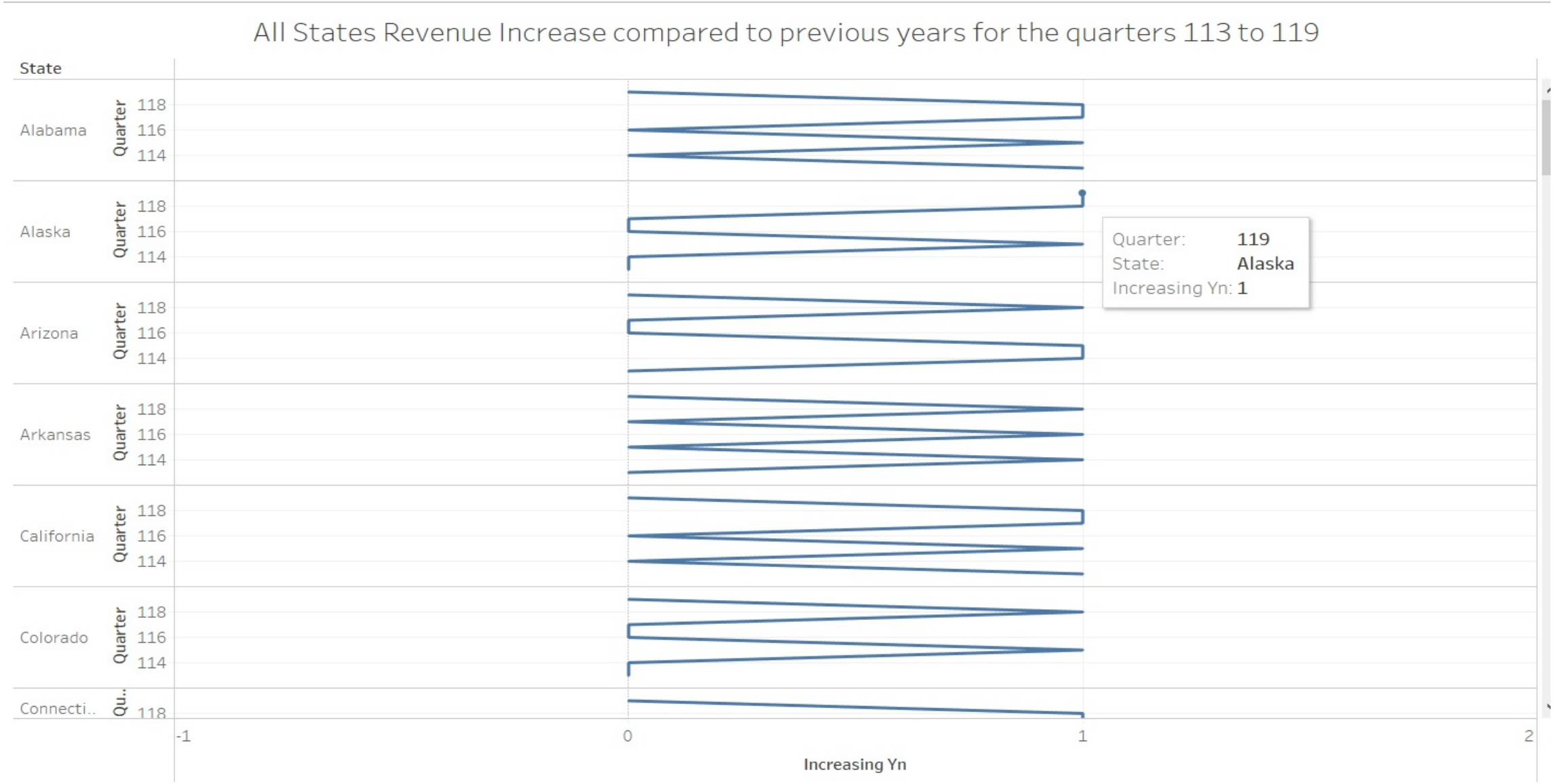
SQL | Fetched 250 rows in 0.013 seconds

	STATECODE	STATE	QUARTER	TAX_THOUSAND	INCREASING_YN
100	AL	Alabama	108	2686000	1
101	AL	Alabama	109	2916000	1
102	AL	Alabama	110	3290000	1
103	AL	Alabama	111	2839000	0
104	AL	Alabama	112	3018000	1
105	AL	Alabama	113	3100000	1
106	AL	Alabama	114	2752000	0
107	AL	Alabama	115	3597000	1
108	AL	Alabama	116	3211000	0
109	AL	Alabama	117	3394000	1
110	AL	Alabama	118	4053000	1
111	AL	Alabama	119	3315000	0
112	AK	Alaska	9	364000	(null)
113	AK	Alaska	10	450000	1
114	AK	Alaska	11	278000	0
115	AK	Alaska	12	797000	1
116	AK	Alaska	13	308000	0
117	AK	Alaska	14	476000	1
118	AK	Alaska	15	219000	0
119	AK	Alaska	16	388000	1
120	AK	Alaska	17	325000	0
121	AK	Alaska	18	587000	1
122	AK	Alaska	19	327000	0
123	AK	Alaska	20	435000	1
124	AK	Alaska	21	234000	0
125	AK	Alaska	22	609000	1
126	AK	Alaska	23	235000	0
127	AK	Alaska	24	305000	1
128	AK	Alaska	25	304000	0
129	AK	Alaska	26	343000	1
130	AK	Alaska	27	204000	0
131	AK	Alaska	28	198000	0
132	AK	Alaska	29	158000	0
133	AK	Alaska	30	301000	1
134	AK	Alaska	31	255000	0
135	AK	Alaska	32	356000	1

- In the Modified data, the Increasing_YN column has value **"1"** if the Revenue of the state has increased compared to the previous year and it has **"0"** if the Revenue is decreasing and for all the 9th quarters the value is null since there are no previous values to compare.
- The value also has been sorted state_name wise, quarter wise to get a clear picture.

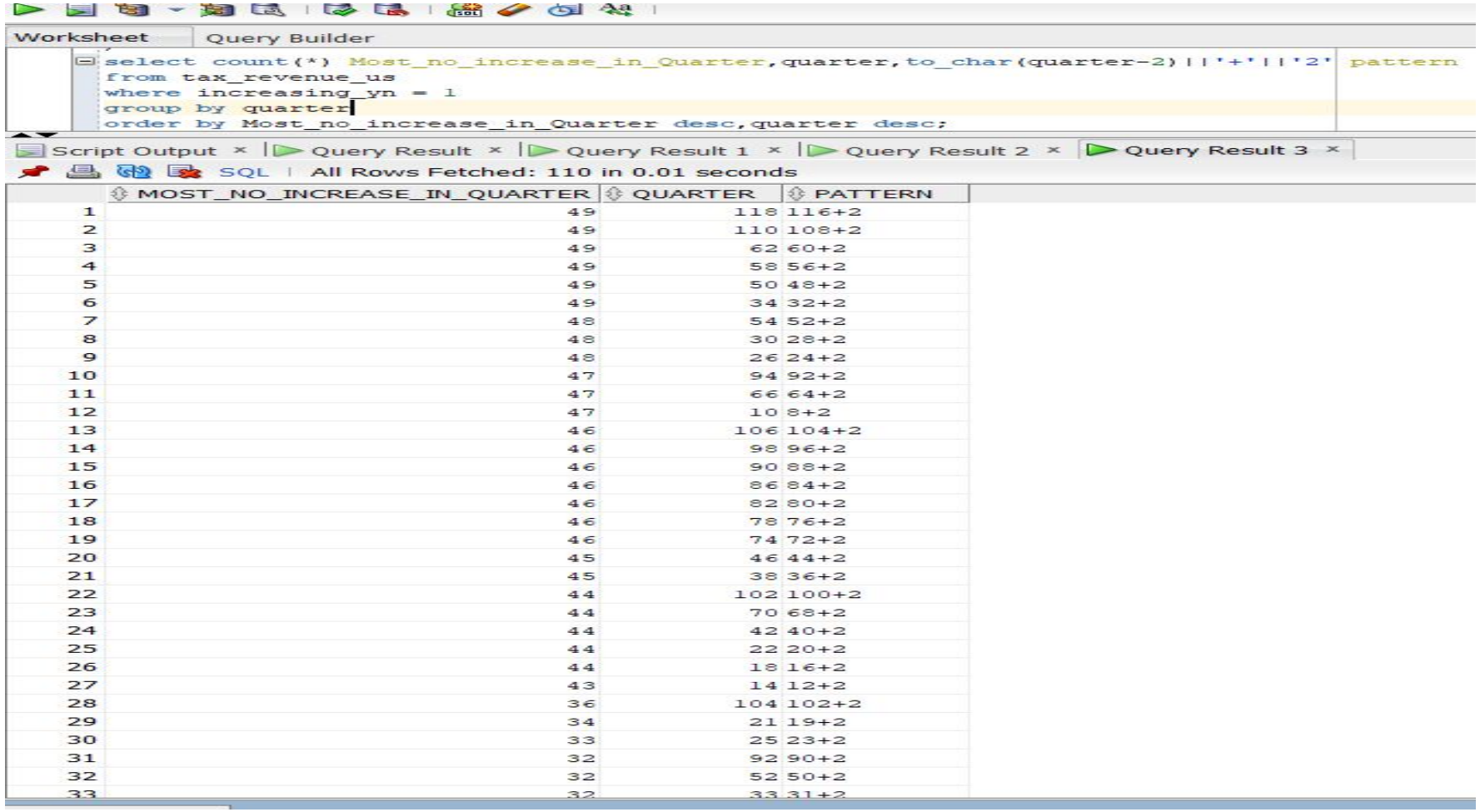


- For state Alaska the tax revenue increase and decrease for the consecutive years (Sharp turns in chart) except for quarter 27,28,29 (Straight line and then turns in the chart).
- In the next chart we will see the same result for all the states



- This chart displays the same output which is explained in the previous chart but for all the states.
- The tool tip will help us getting a more clear picture and the scroll box on the side will allows to see the value for other states and by changing the filter condition we can check the value for other quarters.

Quarter which has the most number of increase in revenue compared to previous year



Worksheet | Query Builder

```
select count(*) Most_no_increase_in_Quarter,quarter,to_char(quarter-2)||'+'||'2' pattern
from tax_revenue_us
where increasing_yn = 1
group by quarter
order by Most_no_increase_in_Quarter desc,quarter desc;
```

Script Output | Query Result | Query Result 1 | Query Result 2 | Query Result 3

SQL | All Rows Fetched: 110 in 0.01 seconds

	MOST_NO_INCREASE_IN_QUARTER	QUARTER	PATTERN
1	49	118	116+2
2	49	110	108+2
3	49	62	60+2
4	49	58	56+2
5	49	50	48+2
6	49	34	32+2
7	48	54	52+2
8	48	30	28+2
9	48	26	24+2
10	47	94	92+2
11	47	66	64+2
12	47	10	8+2
13	46	106	104+2
14	46	98	96+2
15	46	90	88+2
16	46	86	84+2
17	46	82	80+2
18	46	78	76+2
19	46	74	72+2
20	45	46	44+2
21	45	38	36+2
22	44	102	100+2
23	44	70	68+2
24	44	42	40+2
25	44	22	20+2
26	44	18	16+2
27	43	14	12+2
28	36	104	102+2
29	34	21	19+2
30	33	25	23+2
31	32	92	90+2
32	32	52	50+2
33	32	33	31+2

- If we closely look at the quarters which has the most number of increase in revenue we can see there is a pattern emerging out.
- In “Pattern” column in image we can see the numbers are divisible by 4 and then 2 is added.
- In my opinion for every four quarter there is a huge increase in tax revenue for 98% of states and ie. the quarter where more people file their taxes henceforth the result.

Thank you!