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CS 195 A

i. Identifying a Database

Datasets:
https://www.kaggle.com/datasets/marshallproject/crime-rates

https://www.kaggle.com/datasets/jboysen/state-firearms

https://www.kaggle.com/datasets/murderaccountability/homicide-reports

a) Provide a reason why you chose the database and what you expect to learn from it.

- I created this database because I want to know the relationships between crimes, homicides, and gun sales, and analyze if they have anything to do with each other. This is interesting to me because if we are able to analyze things like this, we can maybe see correlation between states with looser gun laws and increasing rate of gun crimes.

iii. Framing Queries

1) **What states in order have the most strict gun laws in 2017?**
   a) SELECT state, lawtotal FROM gun_sales WHERE year = "2017" ORDER BY lawtotal DESC;
   b)

	state	lawtotal
1	California	106
2	Massachusetts	100
3	Connecticut	89
4	Hawaii	78
5	New Jersey	75
6	New York	75
7	Illinois	64
8	Maryland	64

Execution finished without errors.
Result: 50 rows returned in 15ms

   c) $\tau_{\text{lawtotal}\downarrow}\ \pi_{\text{state, lawtotal}}\ \sigma_{\text{year = "2017"}}$ gun_sales
   d) I want to know this because it is so internesting that they had a “law total” for this dataset, counting how many gun restrictions they have in the state in that year so you could tell how strict it is in terms of gun laws. The states that came up first did not surprise me. California is the state with the strictest gun laws.
2) **In a state that had the most homicides in 2000, could you buy a hand-gun at 21?**
   a) SELECT year, state, agency_jurisdiction, homicides, age21handgunsale
   FROM total_crimes
   JOIN gun_sales ON total_crimes.report_year = gun_sales.year
   WHERE report_year ="2000" AND state ="New York"
   ORDER BY homicides DESC
   LIMIT 1;

a)

	year	state	agency_jurisdiction	homicides	age21handgunsale
1	2000	New York	New York City, NY	673	1

Execution finished without errors.
Result: 1 rows returned in 22ms

b) $\tau_{\text{homicides}\downarrow}\ \pi_{\text{year, state, agency\_jurisdiction, homicides, age21handgunsale}}\ \sigma_{\text{report\_year = "2000" AND state = "New York"}}$ (total_crimes $\bowtie_{\text{total\_crimes . report\_year = gun\_sales . year}}$ gun_sales)

c) No you couldn't, because the value for the law handgunsale is 1 for that year. I wanted to know this because maybe the sale of guns was less resitricted in that year, but I think it has something to do with population, because this specific metric was covered under the law in New York.

3) **What how many homicides were there in in the year that there was the oldest victim of a homicide?**

a) SELECT homicides, agency_jurisdiction FROM total_crimes
JOIN homicide ON total_crimes.report_year = homicide.year
ORDER BY VictimAge DESC
LIMIT 1;

	homicides	agency_jurisdiction
1	49	Albuquerque, NM

Execution finished without errors.
Result: 1 rows returned in 12810ms

b)

c) $\tau_{\text{victimage}\downarrow}\ \pi_{\text{homicides, agency\_jurisdiction}}$ (total_crimes $\bowtie_{\text{total\_crimes . report\_year = homicide . year}}$ homicide)

d) I wanted to know the how many homicides in the city there was the highest victim age, because I wanted to see if it would be high, or if the city was another one of the cities that are more frequent in the dataset. It was about normal.

4) What is the year and number of homicides of the state that was the first to outlaw being able to possess long guns at 18?

a) SELECT homicides
FROM gun_sales
JOIN total_crimes
ON gun_sales.year = total_crimes.report_year
WHERE age18longgunpossess = "1" LIMIT 1;

b)

	homicides	year	state
1	10	1991	Michigan

Execution finished without errors.
Result: 1 rows returned in 38ms

c) $\pi_{\text{homicides, year, state}} \sigma_{\text{age18longgunpossess = "1"}} (\text{gun\_sales} \bowtie_{\text{gun\_sales . year = total\_crimes . report\_year}} \text{total\_crimes})$

d) I was interested in this because I wanted to know when gun laws started really changing, as I saw that not a lot of states not not restrict this certain field, and a lot of them still have laws that allow the sale of long guns to people who are 18.

5) In the state with the least assaults_per_capita, how many homicides involved guns?

a)
```
SELECT agency_jurisdiction, min(assaults_percapita)
FROM total_crimes;
SELECT count(Weapon)
FROM homicide
WHERE state = "Virginia"
AND Weapon LIKE '%gun%';
```

b)

	count(Weapon)
1	8093

Execution finished without errors.
Result: 1 rows returned in 283ms

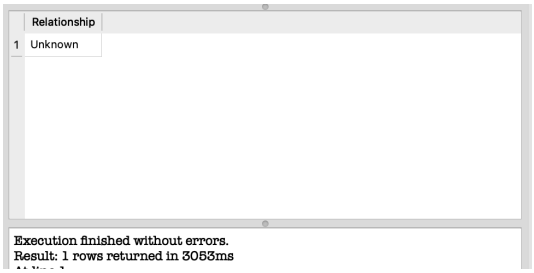
c) $\pi_{\text{agency\_jurisdiction, MIN (assaults\_percapita)}} \text{total\_crimes}$
$\pi_{\text{COUNT (weapon)}} \sigma_{\text{state = "Virginia" AND weapon LIKE "%gun%"}} \text{homicide}$

d) I wanted to know this because there is probably less crimes involving guns in some of the the least violent states, and I wanted to see if that was true. This is a pretty low number compared to the rest in the dataset.

6) What is the most common relationship between the victim and perpetrator of the homicides reported?

a)
```
SELECT Relationship
FROM homicide
```

GROUP BY Relationship
ORDER BY COUNT(*) DESC
LIMIT 1;

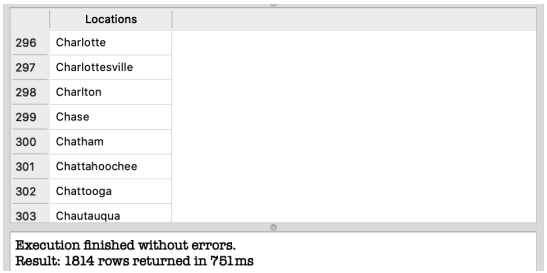
b) 

c) $\tau_{COUNT\ (*)\ \downarrow} \pi_{relationship} \gamma_{relationship,}$ homicide

d) I wanted to know what the most common type of relationship homicides were preformed by. I was not surprised by this result, as a lot of the cases in the dataset had this relationship. I was even more interesting when I took the limit 1 off and could see the most common relationships at the top, and friend was very close to being number one.

7) What is every city that has had a homicide and every state that has recorded gun laws?

a) SELECT state
AS "Locations"
FROM gun_sales
UNION
SELECT city
FROM homicide;

b) 

c) π_{state} gun_sales $\cup$ π_{city} homicide

d) I wanted to know this because I wanted to know every city in every state that has had a reported homicide in that state.

8) How are the the data of the homicide perpetrator sex split up by precentage?

a) SELECT PerpetratorSex, count(PerpetratorSex) * 100 / (select count(*) from homicide)
AS 'Precentage'
FROM homicide
GROUP BY PerpetratorSex
ORDER BY COUNT(*) DESC;

	PerpetratorSex	Precentage
1	Male	62
2	Unknown	29
3	Female	7

Execution finished without errors.
Result: 3 rows returned in 2887ms

b)

c) $\tau_{\text{COUNT (*)}} \downarrow \pi_{\text{perpetratorsex, COUNT (perpetratorsex) * 100 / COUNT (*)}} \gamma_{\text{perpetratorsex,}}$ homicide

d) I wanted to know this because I wanted to know what sex was the greatest perpetrator of homicides, and how they compared to each other which is why I converted them into percentages.

9) What are the years there is data for Gun laws and data for homicides?

a) SELECT year
AS "Years Intersection"
FROM gun_sales
INTERSECT
SELECT year
FROM homicide

	Years Intersection
1	1991
2	1992
3	1993
4	1994
5	1995
6	1996
7	1997
8	1998

Execution finished without errors.
Result: 24 rows returned in 370ms

b)

c) π_{year} gun_sales $\cap$ π_{year} homicide

d) I wanted to know this because I wanted to know what years I had data for both gun sale laws and homicide cases, and where I would be able to look at the data to see if they correlated.

10) What is the most common weapon of each state, and what is their highest overall gun law score?

a) SELECT homicide.state, weapon, count(weapon), max(lawtotal)
FROM homicide
JOIN gun_sales ON homicide.State=gun_sales.state
GROUP BY homicide.state
ORDER BY count(weapon) DESC;

a)

	State	Weapon	count(weapon)	max(lawtotal)
1	California	Knife	2694141	106
2	Massachusetts	Knife	162972	100
3	Connecticut	Handgun	132192	89
4	Hawaii	Handgun	36126	78
5	New York	Blunt Object	1330236	75
6	New Jersey	Knife	381564	75
7	Illinois	Rifle	698517	66
8	Maryland	Strangulation	467424	64

Execution finished without errors.
Result: 49 rows returned in 88495ms

b) $\tau_{\text{COUNT (weapon)} \downarrow} \pi_{\text{homicide . state, weapon, COUNT (weapon), MAX (lawtotal)}} \gamma_{\text{state, COUNT (weapon), MAX (lawtotal)}} (\text{homicide} \bowtie_{\text{homicide . state = gun\_sales . state}} \text{gun\_sales})$

c) I wanted to know this question because I wanted to see if the places with the strictest laws on guns had less guns as their weapon of choice. In the top two, that is correct. As you get further down the list, more and more of the weapons are gun-related things. This means that in places that they have stricter gun laws, less guns are used as weapons in homicides.