Text-to-SQL Project Using Gemini

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Grading Methodology

0 - 100 scale

10 points for giving a relevant answer

20 points for giving back sql code

20 points for giving back sql code with no errors

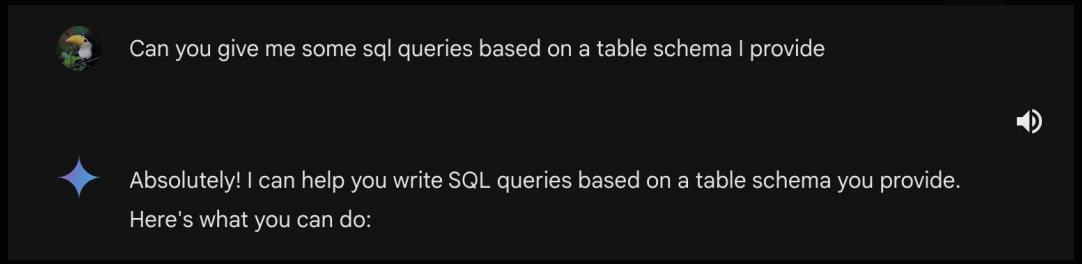
50 points for giving the correct answer on first try

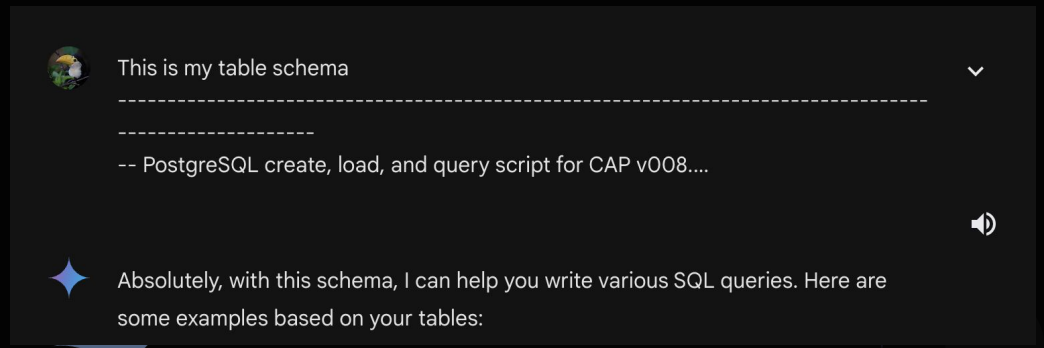
20 points for giving the correct answer on second try

10 points for giving the correct answer on >= 3 attempts

Background Information

Before I ask Gemini for any sql queries, I will first preface it for what I want to accomplish, and then feed it all of the relevant tables from the CAP Database



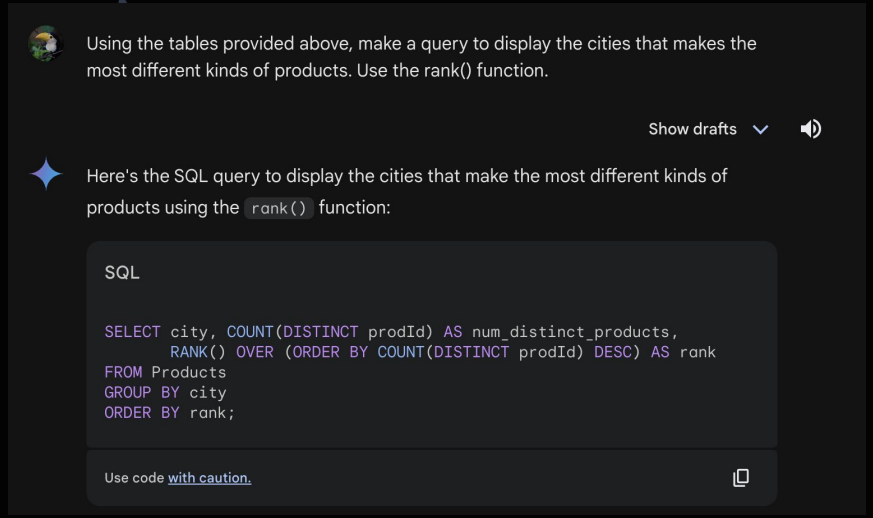


Question 1

After slightly rewording the Question 1 prompt, Gemini was able to solve it easily with no errors

Grade: 100/100

No fixing required
Results are the same



Gemini's Results

	city text	num_distinct_products bigint	rank bigint
1	Newark	3	1
2	Dallas	2	2
3	Duluth	2	2
4	Beijing	1	4
5	Montreal	1	4

My Results

Data Output | Messages | Notifications

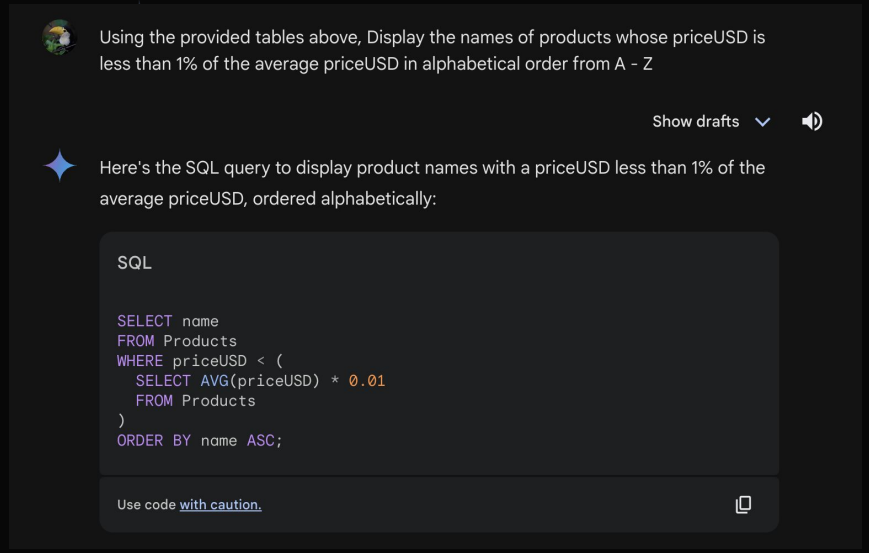
	city text	num_products bigint	city_rank bigint
1	Newark	3	1
2	Dallas	2	2
3	Duluth	2	2
4	Beijing	1	4
5	Montreal	1	4

Question 2

Just like question 1,

Gemini was easily able to

Give the correct query



Grade 100/100

No fixing needed

Results are the exact same

Gemini's Results

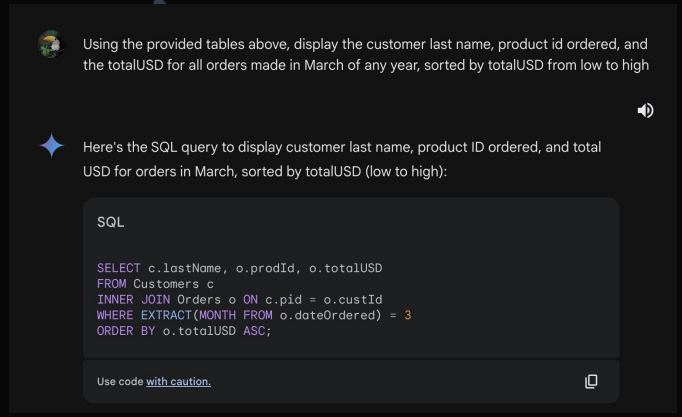
	name text
1	Denis Wick Valve Oil
2	Flux Capacitor
3	HAL 9000 memory chip
4	LCARS module

My Results

	name text
1	Denis Wick Valve Oil
2	Flux Capacitor
3	HAL 9000 memory chip
4	LCARS module

Question 3

Gemini struggled quite a bit with question 3. After multiple tries and rewording, Gemini was unable to give me error-free code with the correct solution



Gemini's Error

Data Output | Messages | Notifications

```
ERROR:  column cus.lastname does not exist
LINE 1: SELECT cus.lastName, o.prodId, o.totalUSD
               ^

SQL state: 42703
Character: 8
```

Gemini's Error

```
ERROR:  column cus.firstname does not exist
LINE 1: SELECT cus.firstName, o.prodId, o.totalUSD
               ^

SQL state: 42703
Character: 8
```

Gemini's Wrong Result

	customer_id integer	prodid character	totalusd numeric (12,2)
1	1	p05	6550.98
2	1	p06	31236.48
3	5	p01	56671.55

Fixing Question 3

To fix the code, I had to change all references to the customer table and query the lastName from the People table instead

Fixed Code

```
SELECT p.lastName AS people_last_name,
       o.prodId AS product_id_ordered,
       SUM(o.totalUSD) AS totalUSD
FROM Orders o
JOIN People p ON o.custId = p.pid
WHERE EXTRACT(MONTH FROM o.dateOrdered) = 3
GROUP BY p.lastName, o.prodId
ORDER BY totalUSD ASC;
```

My Results

	customer_last_name text	product_id_ordered character	totalusd numeric
1	Ferguson	p05	6550.98
2	Ferguson	p06	31236.48
3	Armstrong	p01	56671.55

Gemini's Results

	people_last_name text	product_id_ordered character	totalusd numeric
1	Ferguson	p05	6550.98
2	Ferguson	p06	31236.48
3	Armstrong	p01	56671.55

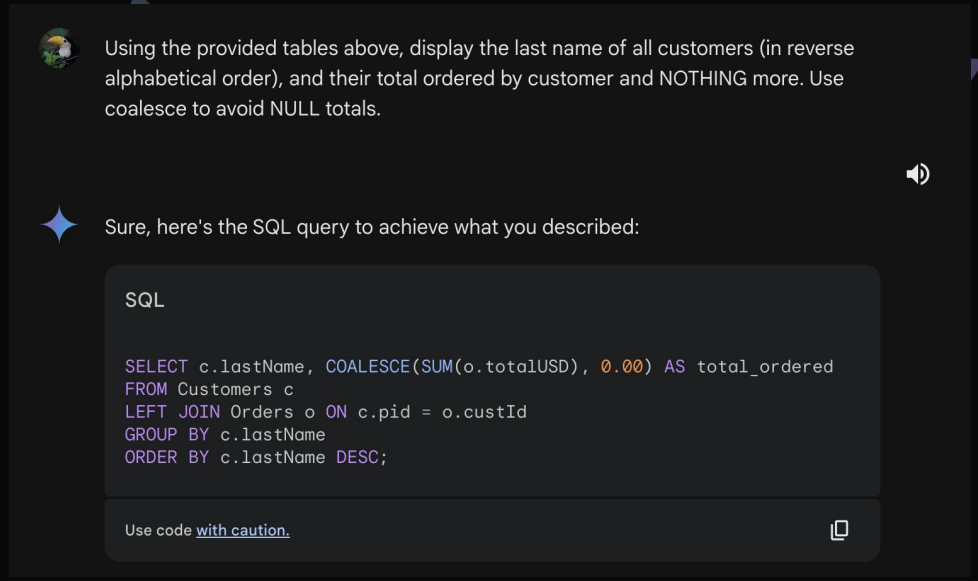
Grade: 50/100

Fixing required, but error free code was eventually given

Results are the exact same with different column names

Question 4

Again, Gemini is unable to get the answer correct through the first prompt. It seems to be selecting the customer table instead of the people table.



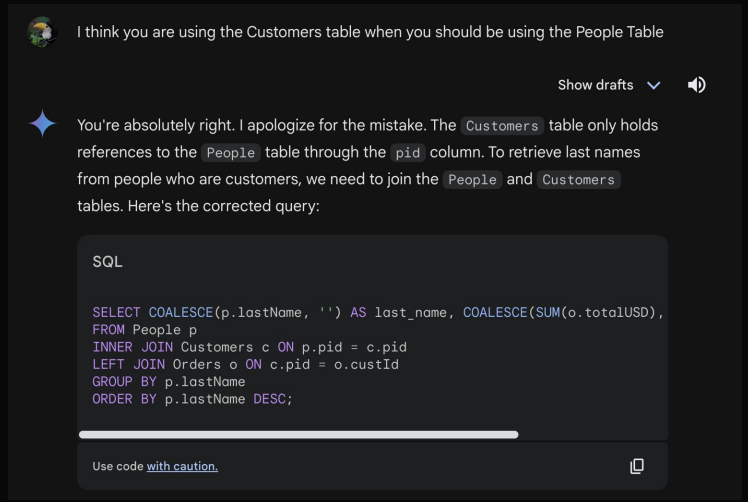

```
ERROR:  column c.lastname does not exist
LINE 1: SELECT c.lastName, COALESCE(SUM(o.totalUSD), 0.00) AS total_...
               ^

SQL state: 42703
Character: 8
```

*for question 4, I decided to start a new chat with Gemini, just to keep it's memory fresh

Fixing Question 4

After some quick prompt engineering, Gemini was able to fix the problems and select the right table in the query.



Grade: 70/100

No fixing was required, but needed a little bit of prompt engineering

Results were a little bit different as Gemini's didn't include a lot of the orders where total_ordered = 0

*for question 4, I decided to start a new chat with Gemini, just to keep it's memory fresh

Gemini's Results

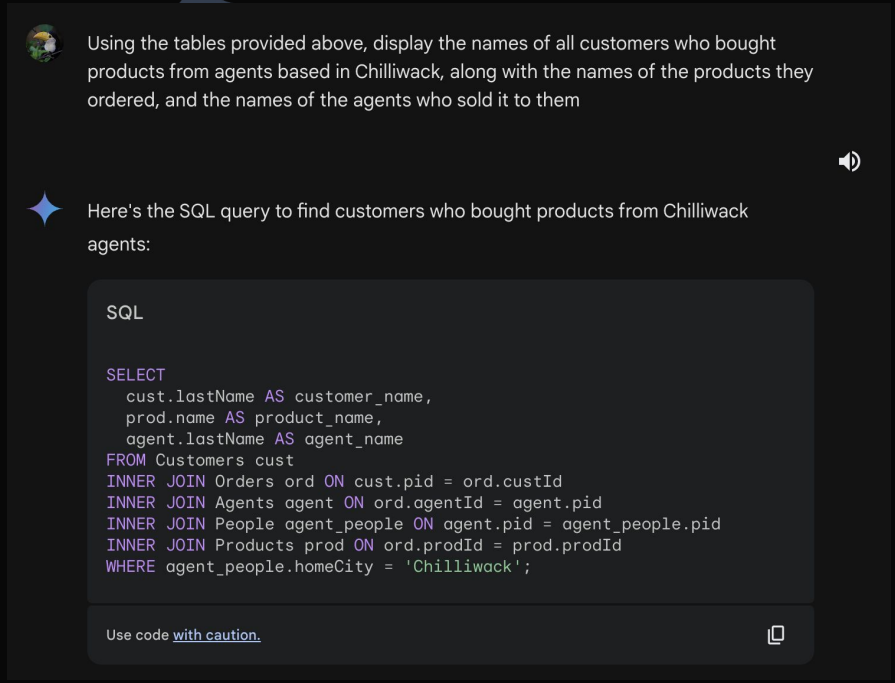
	last_name text	total_ordered numeric
1	Severinsen	142768.32
2	Robinson	0.00
3	Morrison	109053.62
4	Ferguson	146525.21
5	Armstrong	72442.75

My Results

	lastname text	total_ordered numeric
1	Skonberg	0
2	Severinsen	142768.32
3	Robinson	0
4	Morrison	109053.62
5	Helseth	0
6	Gillespie	0
7	Ferguson	146525.21
8	Davis	0
9	Armstrong	72442.75

Question 5

Gemini is still unable to get the answer correct through the first prompt. It seems to be selecting the customer table instead of the people table once more.




```
ERROR:  column cust.lastname does not exist
LINE 3:   cust.lastName AS customer_name,
          ^

SQL state: 42703
Character: 12
```

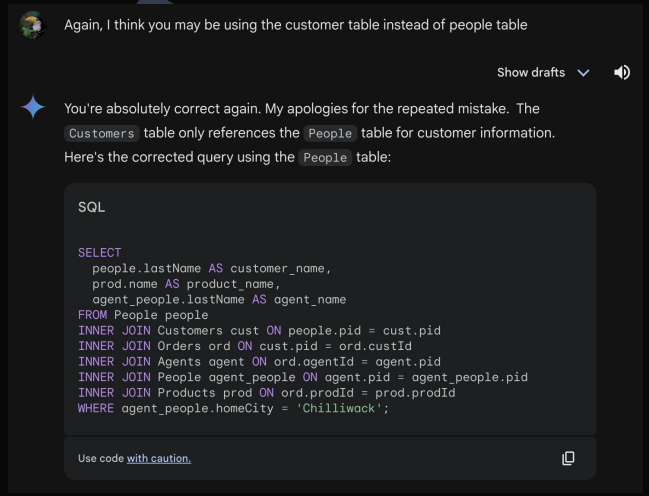
Fixing Question 5

After prompt engineering, Gemini was able to fix the selection problem.

Grade: 70/100

No fixing was required, but needed a little bit of prompt engineering

Results were pretty much the same except I had a column separating first and last name



Gemini's Results

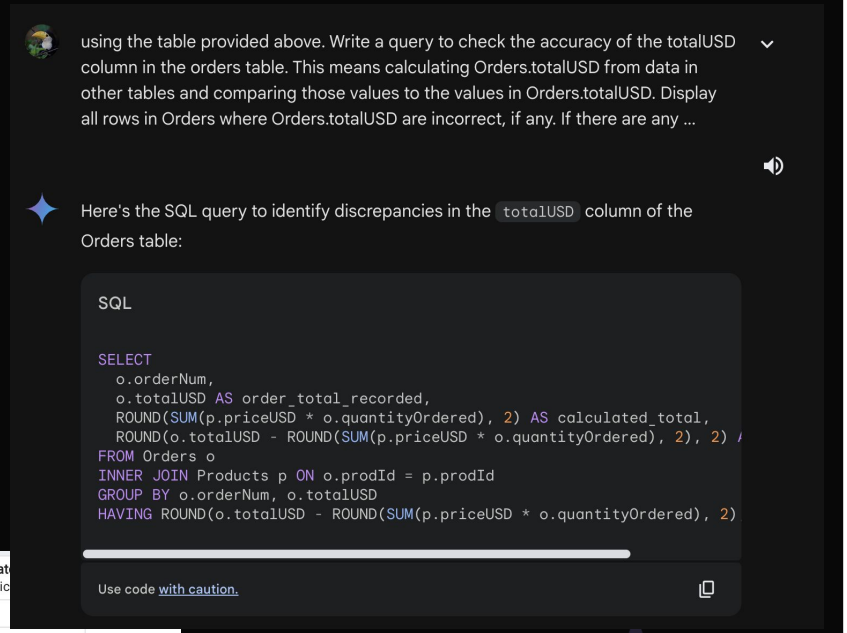
	customer_name text	product_name text	agent_name text
1	Ferguson	Heisenberg Compensator	Skonberg
2	Ferguson	Universal Translator	Skonberg
3	Ferguson	Denis Wick Valve Oil	Skonberg
4	Armstrong	Heisenberg Compensator	Skonberg

My Results

	customer_name text	product_name text	agent_first_name text	agent_last_name text
1	Ferguson	Heisenberg Compensator	Bria	Skonberg
2	Ferguson	Universal Translator	Bria	Skonberg
3	Ferguson	Denis Wick Valve Oil	Bria	Skonberg
4	Armstrong	Heisenberg Compensator	Bria	Skonberg

Question 6

Again, Gemini is unable to get the answer correct through the first prompt. I am not quite sure where it went wrong. Probably selecting the wrong tables or doing the wrong math.



	ordernum [PK] integer	order_total_recorded numeric (12,2)	calculat numeric	
1	1018	8050.49		
2	1025	799.11	888.00	-88.89
3	1022	31236.48	39600.00	-8363.52
4	1016	60977.22	67760.00	-6782.78
5	1015	15771.20	16610.00	-838.80
6	1021	66086.33	67760.00	-1673.67
7	1024	56671.55	59628.80	-2957.25
8	1012	76096.81	78024.00	-1927.19
9	1020	585.18	600.00	-14.82
10	1017	25643.98	32510.00	-6866.02
11	1019	16249.28	20600.00	-4350.72
12	1011	58794.00	74536.00	-15742.00
13	1023	6550.98	8305.00	-1754.02
14	1026	47277.29	52536.16	-5258.87

Fixing Question 6

After prompt engineering, Gemini was able to fix the selection problem.

```
SQL

SELECT
  o.orderNum,
  o.totalUSD AS recorded_total,
  ROUND(SUM(p.priceUSD * o.quantityOrdered * (1 - (c.discountPct / 100)),
  ROUND(o.totalUSD - ROUND(SUM(p.priceUSD * o.quantityOrdered * (1 - (c
FROM Orders o
INNER JOIN Customers c ON o.custId = c.pid
INNER JOIN Products p ON o.prodId = p.prodId
GROUP BY o.orderNum, o.totalUSD
HAVING ROUND(o.totalUSD - ROUND(SUM(p.priceUSD * o.quantityOrdered * (1

Use code with caution.
```

Grade: 60/100

No fixing was required, but needed a few rounds of prompt engineering

Results were formatted differently but still the same

Gemini's Results

	ordernum [PK] integer	recorded_total numeric (12,2)	calculated_total numeric	difference numeric
1	1024	56671.55	56617.55	54.00
2	1017	25643.98	25643.89	0.09

My Results

	ordernum integer	dateordered date	custid integer	agentid integer	prodid character	quantityordered integer	totalusd numeric (12,2)	pid integer	paymentterms text	discountpct numeric (5,2)
1	1017	2023-02-14	1	3	p03	500	25643.98	1	Net 30	21.12
2	1024	2023-03-15	5	2	p01	880	56671.55	5	In Advance	5.05

In conclusion…

I think that LLMs could be very useful for SQL queries. But at this point in time, it seems like once the queries start to get a little more complex, the LLM starts to mess up a little bit. So for now, human jobs are safe, but as LLMs advance, I can 100% see them taking over and doing all the queries instead of a human manually typing them in.

This worked much better than I expected and only produced very small errors that were easily fixed.