# Generating SQL for SQLite using Ollama, ChromaDB

This notebook runs through the process of using the vanna Python package to generate SQL using AI (RAG + LLMs) including connecting to a database and training. If you're not ready to train on your own database, you can still try it using a sample SQLite database.

## Which LLM do you want to use?

- OpenAl via Vanna.Al (Recommended)
   Use Vanna.Al for free to generate your queries
- OpenAl

Use OpenAI with your own API key

Azure OpenAl

If you have OpenAI models deployed on Azure

[Selected] Ollama

Use Ollama locally for free. Requires additional setup.

Mistral via Mistral API

If you have a Mistral API key

Other LLM

If you have a different LLM model

## Where do you want to store the 'training' data?

- Vanna Hosted Vector DB (Recommended)
   Use Vanna.Als hosted vector database (pgvector) for free. This is usable across machines with no additional setup.
- [Selected] ChromaDB

Use ChromaDBs open-source vector database for free locally. No additional setup is necessary -- all database files will be created and stored locally.

Marqo

Use Margo locally for free. Requires additional setup. Or use their hosted option.

Other VectorDB

Use any other vector database. Requires additional setup.

## Setup

!pwd!pip install vanna!pip install 'vanna[chromadb]'!pip install ollama!pip show vanna # 0.5.5, 0.2.1!pip show ollama # 0.2.0

```
In [1]: import warnings
import re
```

```
warnings.filterwarnings('ignore', category=DeprecationWarning, message='^Num
        # warnings.filterwarnings('ignore', category=DeprecationWarning, message=re.
        import os
        import re
        from time import time
        from vanna.ollama import Ollama
        from vanna.chromadb.chromadb vector import ChromaDB VectorStore
In [2]: class MyVanna(ChromaDB VectorStore, Ollama):
            def init (self, config=None):
                ChromaDB VectorStore. init (self, config=config)
                Ollama.__init__(self, config=config)
In [3]: file db = "~/Downloads/chinook.sqlite"
        model name = 'mistral'
        clean and train = True # False
In [4]: config = {
            'model': model name, # 'mistral' # "starcoder2"
        vn = MyVanna(config=config)
In [5]: hostname = os.uname().nodename
        print("Hostname:", hostname)
       Hostname: ducklover1
In [6]: file db = os.path.abspath(os.path.expanduser(file db))
        vn.connect to sqlite(file db)
In [7]: vn.run sql is set
Out[7]: True
In [8]: def remove collections(collection name=None, ACCEPTED TYPES = ["sql", "ddl",
            if not collection name:
                collections = ACCEPTED TYPES
            elif isinstance(collection name, str):
                collections = [collection name]
            elif isinstance(collection name, list):
                collections = collection name
            else:
                print(f"\t{collection name} is unknown: Skipped")
                return
            for c in collections:
                if not c in ACCEPTED TYPES:
                    print(f"\t{c} is unknown: Skipped")
                    continue
```

## **Training**

#### SQLite sample database

You only need to train once. Do not train again unless you want to add more training data.

```
In [11]: df_ddl = vn.run_sql("SELECT type, sql FROM sqlite_master WHERE sql is not nu
In [12]: df_ddl
```

Out[12]:		type	sql
	0	table	CREATE TABLE "albums"\ $r\n(\r\n [AlbumId] IN$
	1	table	CREATE TABLE sqlite_sequence(name,seq)
	2	table	CREATE TABLE "artists"\ $r$ \ $n$ (\ $r$ \ $n$ [ArtistId]
	3	table	CREATE TABLE "customers"\r\n(\r\n [Customer
	4	table	CREATE TABLE "employees"\r\n(\r\n [Employee
	5	table	CREATE TABLE "genres"\r\n(\r\n [GenreId] IN
	6	table	CREATE TABLE "invoices"\r\n(\r\n [InvoiceId
	7	table	CREATE TABLE "invoice_items"\r\n(\r\n [Invo
	8	table	CREATE TABLE "media_types"\r\n(\r\n [MediaT
	9	table	CREATE TABLE "playlists"\r\n(\r\n [Playlist
	10	table	CREATE TABLE "playlist_track"\r\n(\r\n [Pla
	11	table	CREATE TABLE "tracks"\r\n(\r\n [TrackId] IN
	12	index	CREATE INDEX [IFK_AlbumArtistId] ON "albums" (
	13	index	CREATE INDEX [IFK_CustomerSupportRepId] ON "cu
	14	index	${\tt CREATE\ INDEX\ [IFK\_EmployeeReportsTo]\ ON\ "emplo}$
	15	index	CREATE INDEX [IFK_InvoiceCustomerId] ON "invoi
	16	index	CREATE INDEX [IFK_InvoiceLineInvoiceId] ON "in
	17	index	CREATE INDEX [IFK_InvoiceLineTrackId] ON "invo
	18	index	CREATE INDEX [IFK_PlaylistTrackTrackId] ON "pl
	19	index	CREATE INDEX [IFK_TrackAlbumId] ON "tracks" ([
	20	index	CREATE INDEX [IFK_TrackGenreId] ON "tracks" ([
	21	index	CREATE INDEX [IFK_TrackMediaTypeId] ON "tracks
	22	table	CREATE TABLE sqlite_stat1(tbl,idx,stat)
In [13]:	if	for d	<pre>and_train: dl in df_ddl['sql'].to_list(): dl = strip_brackets(ddl) n.train(ddl=ddl)  metimes you may want to add documentation a</pre>

vn.train(documentation="In the chinook database invoice means order")

```
Adding ddl: CREATE TABLE "albums"
    Albumid INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL.
    Title NVARCHAR(160) NOT NULL,
    ArtistId INTEGER NOT NULL,
    FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId)
                ON DELETE NO ACTION ON UPDATE NO ACTION
Adding ddl: CREATE TABLE sqlite sequence(name, seq)
Adding ddl: CREATE TABLE "artists"
    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    Name NVARCHAR(120)
Adding ddl: CREATE TABLE "customers"
    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    FirstName NVARCHAR(40) NOT NULL,
    LastName NVARCHAR(20) NOT NULL,
    Company NVARCHAR(80),
    Address NVARCHAR(70),
    City NVARCHAR(40),
    State NVARCHAR(40),
    Country NVARCHAR(40),
    PostalCode NVARCHAR(10),
    Phone NVARCHAR(24),
    Fax NVARCHAR(24),
    Email NVARCHAR(60) NOT NULL,
    SupportRepId INTEGER,
    FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeId)
                ON DELETE NO ACTION ON UPDATE NO ACTION
Adding ddl: CREATE TABLE "employees"
    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    LastName NVARCHAR(20) NOT NULL,
    FirstName NVARCHAR(20) NOT NULL,
    Title NVARCHAR(30),
    ReportsTo INTEGER,
    BirthDate DATETIME,
    HireDate DATETIME,
    Address NVARCHAR(70),
    City NVARCHAR(40),
    State NVARCHAR(40),
    Country NVARCHAR(40),
    PostalCode NVARCHAR(10),
    Phone NVARCHAR(24).
    Fax NVARCHAR(24).
    Email NVARCHAR(60),
    FOREIGN KEY (ReportsTo) REFERENCES "employees" (EmployeeId)
                ON DELETE NO ACTION ON UPDATE NO ACTION
Adding ddl: CREATE TABLE "genres"
    GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    Name NVARCHAR(120)
```

```
Adding ddl: CREATE TABLE "invoices"
    InvoiceId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    CustomerId INTEGER NOT NULL,
    InvoiceDate DATETIME NOT NULL,
    BillingAddress NVARCHAR(70),
    BillingCity NVARCHAR(40),
    BillingState NVARCHAR(40),
    BillingCountry NVARCHAR(40),
    BillingPostalCode NVARCHAR(10),
    Total NUMERIC(10,2) NOT NULL,
    FOREIGN KEY (CustomerId) REFERENCES "customers" (CustomerId)
                ON DELETE NO ACTION ON UPDATE NO ACTION
)
Adding ddl: CREATE TABLE "invoice items"
    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    InvoiceId INTEGER NOT NULL,
    TrackId INTEGER NOT NULL,
    UnitPrice NUMERIC(10,2) NOT NULL,
    Quantity INTEGER NOT NULL,
    FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId)
                ON DELETE NO ACTION ON UPDATE NO ACTION,
    FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId)
                ON DELETE NO ACTION ON UPDATE NO ACTION
Adding ddl: CREATE TABLE "media types"
    MediaTypeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    Name NVARCHAR(120)
Adding ddl: CREATE TABLE "playlists"
    PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    Name NVARCHAR(120)
Adding ddl: CREATE TABLE "playlist track"
    PlaylistId INTEGER NOT NULL,
    TrackId INTEGER NOT NULL.
    CONSTRAINT PK_PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),
    FOREIGN KEY (PlaylistId) REFERENCES "playlists" (PlaylistId)
                ON DELETE NO ACTION ON UPDATE NO ACTION,
    FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId)
                ON DELETE NO ACTION ON UPDATE NO ACTION
Adding ddl: CREATE TABLE "tracks"
    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL.
    Name NVARCHAR(200) NOT NULL,
    AlbumId INTEGER,
    MediaTypeId INTEGER NOT NULL,
    GenreId INTEGER,
    Composer NVARCHAR(220),
    Milliseconds INTEGER NOT NULL,
```

```
Bytes INTEGER,
            UnitPrice NUMERIC(10,2) NOT NULL,
            FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId)
                        ON DELETE NO ACTION ON UPDATE NO ACTION,
            FOREIGN KEY (GenreId) REFERENCES "genres" (GenreId)
                        ON DELETE NO ACTION ON UPDATE NO ACTION,
            FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId)
                        ON DELETE NO ACTION ON UPDATE NO ACTION
       Adding ddl: CREATE INDEX IFK AlbumArtistId ON "albums" (ArtistId)
       Adding ddl: CREATE INDEX IFK CustomerSupportRepId ON "customers" (SupportRep
       Adding ddl: CREATE INDEX IFK EmployeeReportsTo ON "employees" (ReportsTo)
       Adding ddl: CREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId)
       Adding ddl: CREATE INDEX IFK InvoiceLineInvoiceId ON "invoice items" (Invoic
       eId)
       Adding ddl: CREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)
       Adding ddl: CREATE INDEX IFK PlaylistTrackTrackId ON "playlist track" (Track
       Adding ddl: CREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)
       Adding ddl: CREATE INDEX IFK TrackGenreId ON "tracks" (GenreId)
       Adding ddl: CREATE INDEX IFK TrackMediaTypeId ON "tracks" (MediaTypeId)
       Adding ddl: CREATE TABLE sqlite stat1(tbl,idx,stat)
       Adding documentation....
In [14]: # show training data
         training data = vn.get training data()
         training data
```

Out[14]:		id	question content		training_data_type	
	0	039f9d54-59f7-5f29- 8c04-14dbc3e95671- ddl	None	CREATE TABLE "artists"\r\n(\r\n ArtistId IN	ddl	
	1	0db84e3d-ef41-563c- 803e-21c1b985dc19- ddl	None	CREATE TABLE "invoices"\r\n(\r\n InvoiceId	ddl	
	2	10cba811-ddba-5042- 9e90-d764dfcd1629- ddl	None	CREATE INDEX IFK_InvoiceCustomerId ON "invoice	ddl	
	3	2c711317-b93d-5f60- a728-cb1c6fcbc040- ddl	None	CREATE INDEX IFK_CustomerSupportRepId ON "cust	ddl	
	4	37319c81-65f7-50ee- 956b-795de244bee5- ddl	None	CREATE TABLE sqlite_stat1(tbl,idx,stat)	ddl	
	5	40bd77cd-e1de- 5872-8693- 624117ff413c-ddl	None	CREATE INDEX IFK_InvoiceLineInvoiceId ON "invo	ddl	
	6	41130543-7164-562a- 90a7-0fd0a409c154- ddl	None	CREATE TABLE "albums"\r\n(\r\n AlbumId INTE	ddl	
	7	458debc8-8082-5450- a17a-66028bd55ace- ddl	None	CREATE TABLE "playlists"\r\n(\r\n PlaylistI	ddl	
	8	4815f3fd-925b-53ce- 9dfa-0e4285d5abd3- ddl	None	CREATE TABLE "invoice_items"\r\n(\r\n Invoi	ddl	
	9	48d484e9-984c-58ff- b391-75521c69d486- ddl	None	CREATE INDEX IFK_PlaylistTrackTrackId ON "play	ddl	
	10	551e1120-a6ee-554f- 8b8a-ccf4f22d3636- ddl	None	CREATE INDEX IFK_AlbumArtistId ON "albums" (Ar	ddl	
	11	5ff4911e-45c1-5a59- 9566-243a9b6a3320- ddl	None	CREATE TABLE "employees"\r\n(\r\n Employeel	ddl	
	12	65df0648-bf05-5f75- 9365-c21f54b2302d- ddl	None	CREATE TABLE "media_types"\r\n(\r\n MediaTy	ddl	
	13	6b585176-e66d- 5b23-8d86- ca8a80e3af3d-ddl	None	CREATE INDEX IFK_EmployeeReportsTo ON "employe	ddl	
	14	868758b8-e018- 55e7-8cc3- 75c0e6d211c8-ddl	None	CREATE INDEX IFK_TrackAlbumId ON "tracks" (Alb	ddl	
	15	9ea4613d-c1be-5a77- ada9-c54ee3f0cab7- ddl	None	CREATE INDEX IFK_TrackMediaTypeId ON "tracks"	ddl	
	16	a9c9a852-608d-5ef2- aede-26ba098d83d1-	None	CREATE INDEX IFK_TrackGenreId ON "tracks" (Gen	ddl	

	id	question	content	training_data_type	
	ddl				
17	b42cc9e1-9219-5a42- 9a06-de906f76239e- ddl	None	CREATE TABLE "tracks"\r\n(\r\n TrackId INTE	ddl	
18	c387b9d2-5ff4-5a07- 8364-f5dab45bb2a9- ddl	None	CREATE TABLE "genres"\r\n(\r\n GenreId INTE	ddl	
19	d654f328-dc36-549e- 84c3-06ee0db7e0f7- ddl	None	CREATE TABLE "playlist_track"\r\n(\r\n Play	ddl	
20	d93f0d68-023d-5afb- 8121-ba346699d318- ddl	None	CREATE TABLE "customers"\r\n(\r\n CustomerI	ddl	
21	e5879308-329e-543f- a693-0c14e2f9972e- ddl	None	CREATE INDEX IFK_InvoiceLineTrackId ON "invoic	ddl	
22	ea84418b-1a28-59b4- a1f4-2fb674208adc- ddl	None	CREATE TABLE sqlite_sequence(name,seq)	ddl	
0	2b4dda0a-a6ac-5e34- 8f76-e41c0734d55e- doc	None	In the chinook database invoice means order	documentation	

## Asking the Al

Whenever you ask a new question, it will find the 10 most relevant pieces of training data and use it as part of the LLM prompt to generate the SQL.

```
In [15]: ts_start = time()

SELECT name FROM sqlite_master WHERE type = 'table';
In [16]: vn.ask(question="Can you list all tables in the SQLite database catalog?")

Number of requested results 10 is greater than number of elements in index 1, updating n results = 1
```

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE sqlite stat1(tbl,idx,stat)\n\nCR EATE TABLE sqlite sequence(name, seq)\n\nCREATE TABLE "playlists"\r\n(\r\n PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR  $(120)\r\n)\n\CREATE TABLE "genres"\r\n(\r\n$ GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n\nCREATE TABLE "trac"$ TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n ame NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTE GER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMER FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumI IC(10.2) NOT NULL.\r\n d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Genr eId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaType ACTION,\r\n Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "me dia types"\r\n(\r\n MediaTypeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL Name NVARCHAR(120) $\r\n)\n\n$ CREATE TABLE "artists" $\r\n(\r\n$ stId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r \n)\n\nCREATE TABLE "invoice items"\r\n(\r\n InvoiceLineId INTEGER PRIMAR Y KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n ckId INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n 0ua ntity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoice s" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n GN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\t0N DELETE NO ACTION 0 N UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist track"\r\n(\r\n tId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT P K PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (Play listId) REFERENCES "playlists" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON U FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) PDATE NO ACTION,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "album  $s"\r\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n tle NVARCHAR(160) NOT NULL,\r\n GN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTIO N ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook dat abase invoice means order\n\n===Response Guidelines \n1. If the provided con text is sufficient, please generate a valid SQL query without any explanatio ns for the question. \n2. If the provided context is almost sufficient but r equires knowledge of a specific string in a particular column, please genera te an intermediate SQL query to find the distinct strings in that column. Pr epend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can\'t be generated. \n4. Ple ase use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': 'Can you list all tables in the SQLite dat abase catalog?'}] Info: Ollama parameters:

model=mistral:latest,

options={},

keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE sglite stat1(tbl,idx,stat)\n\nCREATE TABLE s

qlite sequence(name,seq)\n\nCREATE TABLE \"playlists\"\r\n(\r\n d INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120) $\r\n$ ) \n\nCREATE TABLE \"genres\"\r\n(\r\n GenreId INTEGER PRIMARY KEY AUTOINCR EMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\nCREATE TABLE \"tracks\"\r TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $\n(\r\n$ VARCHAR(200) NOT NULL,\r\n AlbumId INTEGER.\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n iseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(1 FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) 0,2) NOT NULL,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreI d) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (MediaTypeId) REFERENCES \"media types\" (MediaTy peId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"media types\"\r\n(\r\n MediaTypeId INTEGER PRIMARY KEY AUTOINCREMENT NO T NULL,\r\n Name NVARCHAR(120) $\r\n)\n\n$ CREATE TABLE \"artists\"\ $\r\n$ (\ $\r\n$ ) ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(12 0)\r\n)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL.\r\n UnitPrice NUMERIC(10.2) NOT NULL.\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES \"invo ices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n OREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlist track\"\r\n(\r\n TrackId INTEGER NOT NULL,\r\n PlaylistId INTEGER NOT NULL,\r\n RAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KE Y (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TAB LE \"albums\"\r\n(\r\n Albumid INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NUL L.\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\t0 L.\r\n N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nI n the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query withou t any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular colum n, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. I f the provided context is insufficient, please explain why it can't be gener ated. \n4. Please use the most relevant table(s). \n5. If the question has b een asked and answered before, please repeat the answer exactly as it was gi ven before. \n"}, {"role": "user", "content": "Can you list all tables in th e SQLite database catalog?"}] Info: Ollama Response:

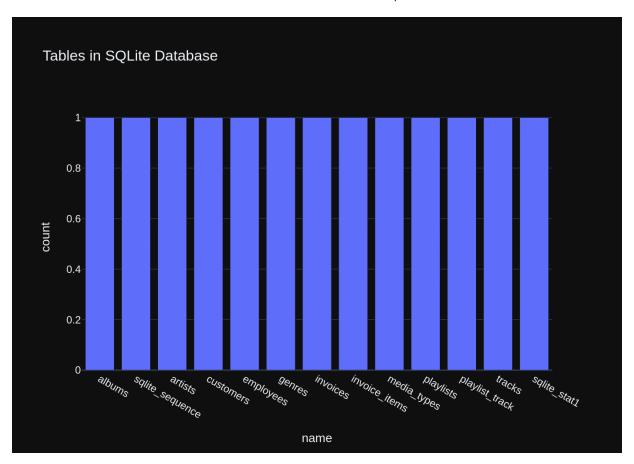
{'model': 'mistral:latest', 'created at': '2024-08-01T19:17:57.479816913Z', 'message': {'role': 'assistant', 'content': " SELECT name FROM sqlite master WHERE type='table';"}, 'done\_reason': 'stop', 'done': True, 'total\_duratio n': 36960199164, 'load duration': 2593113288, 'prompt eval count': 1071, 'pr ompt\_eval\_duration': 32145993000, 'eval\_count': 14, 'eval duration': 2121965 000}

LLM Response: SELECT name FROM sqlite master WHERE type='table'; Info: Output from LLM: SELECT name FROM sqlite master WHERE type='table'; Extracted SQL: SELECT name FROM sqlite master WHERE type='table' SELECT name FROM sqlite master WHERE type='table'

name

0 albums

```
1
    sqlite sequence
2
            artists
3
          customers
4
          employees
5
             genres
6
           invoices
      invoice items
7
8
        media types
9
          playlists
10
     playlist track
11
             tracks
12
       sqlite stat1
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: 'Ca
n you list all tables in the SQLite database catalog?'\n\nThe DataFrame was
produced using this query: SELECT name FROM sqlite master WHERE type='tabl
e'\n\nThe following is information about the resulting pandas DataFrame 'd
f': \nRunning df.dtypes gives:\n name
                                         object\ndtype: object"}, {"role":
"user", "content": "Can you generate the Python plotly code to chart the res
ults of the dataframe? Assume the data is in a pandas dataframe called 'df'.
If there is only one value in the dataframe, use an Indicator. Respond with
only Python code. Do not answer with any explanations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:18:16.296041315Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres
s as px\nif df.shape[0] > 1:\n fig = px.bar(df, x="name", title=\'Tables
in SQLite Database\')\nelse:\n fig = px.scatter(x=df.index, y=[None], tit
le=\'Table in SQLite Database\')\nfig.show()\n```'}, 'done reason': 'stop',
'done': True, 'total duration': 18784457050, 'load duration': 3770616, 'prom
pt eval count': 166, 'prompt eval duration': 5423201000, 'eval count': 84,
'eval duration': 13261514000}
```



```
Out[16]: ("SELECT name FROM sqlite master WHERE type='table'",
                          name
          0
                        albums
           1
               sqlite sequence
           2
                       artists
           3
                     customers
           4
                     employees
           5
                        genres
           6
                      invoices
           7
                 invoice items
           8
                   media types
           9
                     playlists
           10
                playlist track
           11
                        tracks
           12
                  sqlite stat1,
           Figure({
               'data': [{'alignmentgroup': 'True',
                         'hovertemplate': 'name=%{x}<br>count=%{y}<extra></extra>',
                         'legendgroup': '',
                         'marker': {'color': '#636efa', 'pattern': {'shape': ''}},
                         'name': '',
                         'offsetgroup': '',
                         'orientation': 'v',
                         'showlegend': False,
                         'textposition': 'auto',
                         'type': 'bar',
                         'x': array(['albums', 'sqlite sequence', 'artists', 'custome
          rs', 'employees',
                                     'genres', 'invoices', 'invoice items', 'media ty
          pes', 'playlists',
                                     'playlist track', 'tracks', 'sqlite stat1'], dty
          pe=object),
                         'xaxis': 'x',
                         'y': array([1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]),
                         'yaxis': 'y'}],
               'layout': {'barmode': 'relative',
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                          'title': {'text': 'Tables in SQLite Database'},
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'name'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'count'}}}
           }))
In [17]: vn.ask(question="which table stores customer's orders")
        Number of requested results 10 is greater than number of elements in index
        1, updating n results = 1
        Number of requested results 10 is greater than number of elements in index
        1, updating n results = 1
```

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n otal NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES "cu stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE TABLE "invoice items"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n NTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Ouantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (Inv oiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION\r\n)\n\nCREATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NUL LastName NVARCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVA  $RCHAR(24), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEGER,\r\n FOREIGN KEY (SupportRepId) REFERENCES "employee s" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREA TE TABLE "employees"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREMEN T NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHA R(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70).\r State NVARCHAR(40),\r\n Country NVARCHAR City NVARCHAR(40),\r\n  $(40), \r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$ Email NVARCHAR(60),\r\n  $NVARCHAR(24), \r\n$ FOREIGN KEY (ReportsTo) REFE RENCES "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACT ION\r\n)\n\nCREATE TABLE sqlite sequence(name, seq)\n\nCREATE TABLE "playlist PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $s"\r\n(\r\n$ Name NVARCHAR(120)\r\n)\n\nCREATE TABLE sqlite stat1(tbl,idx,stat)\n\nCREATE TABLE "albums"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NUL  $L,\r\n$ FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON  $L,\r\n$ DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist track"\r PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r  $\n(\r\n$ CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n \n FOREIGN KEY (PlaylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\t0N DELE TE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "t racks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCRE ATE TABLE "media types"\r\n(\r\n MediaTypeId INTEGER PRIMARY KEY AUTOINCR EMENT NOT NULL,\r\n Name NVARCHAR(120) $\r\n)\n\n===Additional Context \n$ \nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query wit hout any explanations for the question. \n2. If the provided context is almo st sufficient but requires knowledge of a specific string in a particular co lumn, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n 3. If the provided context is insufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it w as given before. \n'}, {'role': 'user', 'content': 'Can you list all tables

in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite master WHERE type='table'"}, {'role': 'user', 'content': "w hich table stores customer's orders"}] Info: Ollama parameters: model=mistral:latest, options={}. keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL.\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n BillingState NVARCHAR(40),\r\n illingCity NVARCHAR(40),\r\n BillingCou ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n Total NUMER IC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOIN CREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER UnitPrice NUMERIC(10,2) NOT NULL,\r\n NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackI d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRI MARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r LastName NVARCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n ddress NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n  $RCHAR(24), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEGER,\r\n FOREIGN KEY (SupportRepId) REFERENCES \"employe es\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCR EATE TABLE \"employees\"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCR EMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVA RCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n  $(70), \r\n$  $ARCHAR(40).\r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\nCREATE TABLE sqlite sequence(name, seq)\n\nCREATE TABLE \"p PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL laylists\"\r\n(\r\n Name NVARCHAR(120)\r\n)\n\nCREATE TABLE sqlite stat1(tbl,idx,stat) \n\nCREATE TABLE \"albums\"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCR ArtistId INTEGE EMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) R NOT NULL,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playl ist track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, Track NOT NULL,\r\n FOREIGN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackI d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"media types\"\r\n(\r\n MediaTypeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\n===A

dditional Context \n\nIn the chinook database invoice means order\n\n===Resp
onse Guidelines \n1. If the provided context is sufficient, please generate

a valid SQL query without any explanations for the question. \n2. If the pro vided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate\_sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assistant", "content": "SELECT name FROM sqlite\_master WHERE type='table'"}, {"role": "user", "content": "which table stores customer's orders"}]
Info: Ollama Response:

{'model': 'mistral:latest', 'created\_at': '2024-08-01T19:19:04.980597463Z', 'message': {'role': 'assistant', 'content': 'SELECT "customers".CustomerId FROM "customers"'}, 'done\_reason': 'stop', 'done': True, 'total\_duration': 4 8258765102, 'load duration': 4209287, 'prompt eval count': 1373, 'prompt eval

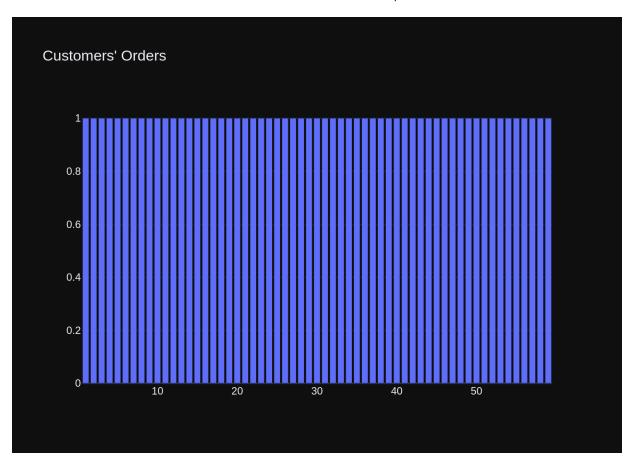
l\_duration': 45916062000, 'eval\_count': 14, 'eval\_duration': 2148151000}

LLM Response: SELECT "customers".CustomerId FROM "customers"

SELECT "customers".CustomerId FROM "customers"

	CustomerId
0	1
1	3
1 2 3 4	12
3	15
4	18
5 6	19
6	24
7	29
8	30
9	33
10	37
11	38
12	42
13	43
14	44
15	45
16	46
17	52
18	53
19	58
20	59 4
21 22	
23	5 8
23 24	9
25	10
26	13
27	16
28	20
29	22
30	23
31	26
32	27
33	32
34	34
35	35
	33

```
39
36
37
            40
38
            49
39
            55
40
            56
41
             2
42
             6
43
             7
44
            11
45
            14
46
            17
47
            21
            25
48
49
            28
            31
50
51
            36
52
            41
53
            47
54
            48
55
            50
56
            51
57
            54
58
            57
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: 'wh
ich table stores customer's orders'\n\nThe DataFrame was produced using this
query: SELECT \"customers\".CustomerId FROM \"customers\"\n\nThe following
is information about the resulting pandas DataFrame 'df': \nRunning df.dtype
                          int64\ndtype: object"}, {"role": "user", "content":
s gives:\n CustomerId
"Can you generate the Python plotly code to chart the results of the datafra
me? Assume the data is in a pandas dataframe called 'df'. If there is only o
ne value in the dataframe, use an Indicator. Respond with only Python code.
Do not answer with any explanations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:19:45.556558746Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.graph
objects as go\n\nif len(df) == 1:\n
                                        fig = go.Indicator(\n
{\'x': [0, 1], \'y': [0, 1]},\n
                                          value = df.iloc[0][\'CustomerId
              title = {\'text\': "Unique Customer ID", \'font\':{\'size\': 2
\'],\n
4}},\n
              mode = "gauge+number+delta",\n
                                                      gauge = {\'axis\': {\'ra
nge\': [None, df.iloc[0][\'CustomerId\']]},\n
                                                               \'bar\': {\'col
                                      \'steps\': [{\'range\': [0, 5], \'color
or\': "lightgray"},\n
\': "green"}]})\nelse:\n fig = go.Figure(data=go.Bar(x=df[\'CustomerId
\'].values, y=[1]*len(df)))\nfig.update layout(title text="Customers\' Order
s")\n```'}, 'done reason': 'stop', 'done': True, 'total duration': 405555547
22, 'load_duration': 45789355, 'prompt_eval_count': 166, 'prompt_eval_duration': 5436065000, 'eval_count': 220, 'eval_duration': 35028734000}
```



Out[17]:		T "customers' tomerId	'.CustomerId	FR0M	"customers"',
	0	1			
	1	3			
	2	12			
	3	15			
	4	18			
	5	19			
	6	24			
	7	29			
	8	30			
	9	33			
	10	37			
	11 12	38 42			
	13	43			
	14	44			
	15	45			
	16	46			
	17	52			
	18	53			
	19	58			
	20	59			
	21	4			
	22	5			
	23	8			
	24	9			
	25	10			
	26 27	13 16			
	28	20			
	29	22			
	30	23			
	31	26			
	32	27			
	33	32			
	34	34			
	35	35			
	36	39			
	37	40			
	38	49			
	39	55			
	40 41	56 2			
	41	6			
	43	7			
	44	11			
	45	14			
	46	17			
	47	21			
	48	25			
	49	28			
	50	31			
	51	36			
	52	41			
	53	47			

```
48
54
55
         50
56
         51
57
         54
58
         57,
Figure({
   'data': [{'type': 'bar',
           'x': array([ 1, 3, 12, 15, 18, 19, 24, 29, 30, 33, 37, 38,
42, 43, 44, 45, 46, 52,
                   53, 58, 59, 4, 5, 8, 9, 10, 13, 16, 20, 22,
23, 26, 27, 32, 34, 35,
                   39, 40, 49, 55, 56, 2, 6, 7, 11, 14, 17, 21,
25, 28, 31, 36, 41, 47,
                   48, 50, 51, 54, 57]),
          1, 1, 1,
               1, 1, 1,
               'layout': {'template': '...', 'title': {'text': "Customers' Orders"}}
}))
```

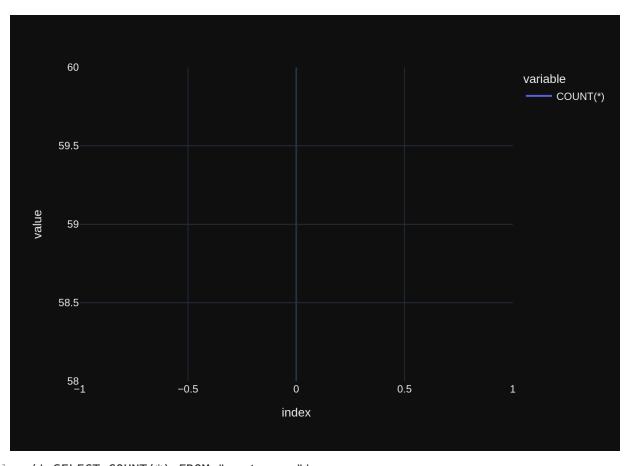
#### In [18]: vn.ask(question="How many customers are there")

Number of requested results 10 is greater than number of elements in index 2, updating  $n_results = 2$ Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$  SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n FOREIGN KEY (CustomerId) REFERENCES "cu otal NUMERIC(10,2) NOT NULL,\r\n stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE INDEX IFK CustomerSupportRepId ON "customers" (SupportRepId)\n\nCRE ATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREME NT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n LastName NVARCH AR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(7 State NVARCHAR(40),\r\n 0),\r\n City NVARCHAR(40),\r\n Country NVAR PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$  $CHAR(40), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId I FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeI NTEGER,\r\n d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE TABLE "invoice item InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $s"\r\n(\r\n$ InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n ice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREI GN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE IND EX IFK InvoiceLineInvoiceId ON "invoice items" (InvoiceId)\n\nCREATE TABLE "albums" $\r\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n EIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACT ION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invo ice items" (TrackId)\n\nCREATE TABLE "employees"\r\n(\r\n EmployeeId INTE GER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NU FirstName NVARCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVA  $RCHAR(24).\r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIG N KEY (ReportsTo) REFERENCES "employees" (EmployeeId) \r\n\t\t0N DELETE NO A CTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlists"\r\n(\r\n istId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120) \r\n)\n\n===Additional Context \n\nIn the chinook database invoice means o rder\n\n===Response Guidelines \n1. If the provided context is sufficient, p lease generate a valid SQL guery without any explanations for the guestion. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQ L query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficie nt, please explain why it can\'t be generated. \n4. Please use the most rele vant table(s). \n5. If the question has been asked and answered before, plea se repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assistant', 'c ontent': ' SELECT "customers".CustomerId FROM "customers"'}, {'role': 'use r', 'content': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite master WHERE type ='table'"}, {'role': 'user', 'content': 'How many customers are there'}]

Info: Ollama parameters:
model=mistral:latest,
options={},
keep\_alive=None
Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10).\r\n Total NUMER IC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON \"customers\" (SupportRepId)\n\nCREATE TAB LE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NO T NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n LastName NVARCHAR(2 0) NOT NULL.\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NVARCHAR(40),\r PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$ Fax NVARCHA  $R(24), \r\n$ Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEGER,\r\n FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustome rId ON \"invoices\" (CustomerId)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId I NTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n UnitPrice NUMERIC (10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (Inv oiceId) REFERENCES \"invoices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON U PDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackI d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (InvoiceId)\n\nCREATE TABLE \"albu  $ms\"\r\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n EIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\t0N DELETE NO A CTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON \"i nvoice items\" (TrackId)\n\nCREATE TABLE \"employees\"\r\n(\r\n d INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r\n Title NVARCHAR(3 0),\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DAT ETIME,\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State N PostalCode NVARCHAR(10),\r  $VARCHAR(40), \r\n$ Country NVARCHAR(40),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(6 FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlis PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $ts\"\r\n(\r\n$ Name  $NVARCHAR(120)\r\n)\n\n==Additional Context \n\nIn the chinook databa$ se invoice means order\n\n===Response Guidelines \n1. If the provided contex t is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requ ires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepe nd the query with a comment saying intermediate sql \n3. If the provided con text is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s).  $\n$ 5. If the question has been asked and answ ered before, please repeat the answer exactly as it was given before. \n"},

```
{"role": "user", "content": "which table stores customer's orders"}, {"rol
e": "assistant", "content": " SELECT \"customers\".CustomerId FROM \"custome
rs\""}, {"role": "user", "content": "Can you list all tables in the SQLite d
atabase catalog?"}, {"role": "assistant", "content": "SELECT name FROM sqlit
e master WHERE type='table'"}, {"role": "user", "content": "How many custome
rs are there"}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:20:31.973477286Z',
'message': {'role': 'assistant', 'content': ' SELECT COUNT(*) FROM "customer
s"'}, 'done reason': 'stop', 'done': True, 'total duration': 46331087306, 'l
oad duration': 4682911, 'prompt eval count': 1278, 'prompt eval duration': 4
4173888000, 'eval count': 12, 'eval duration': 1868871000}
LLM Response: SELECT COUNT(*) FROM "customers"
 SELECT COUNT(*) FROM "customers"
   COUNT(*)
0
         59
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: 'Ho
w many customers are there'\n\nThe DataFrame was produced using this query:
SELECT COUNT(*) FROM \"customers\"\n\nThe following is information about the
resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n COUNT(*)
t64\ndtype: object"}, {"role": "user", "content": "Can you generate the Pyth
on plotly code to chart the results of the dataframe? Assume the data is in
a pandas dataframe called 'df'. If there is only one value in the dataframe,
use an Indicator. Respond with only Python code. Do not answer with any expl
anations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:20:54.440447287Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.graph_
objects as qo\n = qo.Indicator(\n value=df.iloc[0],\n
{"x": [0, 1], "y": [0, 1]},\n
                                title="Customers count",\n
                                                               mode="gauge+n
                  delta={"reference": 0, "increasing": {"color": "gree
umber+delta",\n
n"}},\n)\nfig.show()\n```'}, 'done reason': 'stop', 'done': True, 'total dur
ation': 22440069621, 'load_duration': 50520908, 'prompt_eval_count': 164, 'p
rompt eval duration': 5447456000, 'eval count': 107, 'eval duration': 168511
91000}
```



```
Out[18]: (' SELECT COUNT(*) FROM "customers"',
              COUNT(*)
           0
                    59,
           Figure({
               'data': [{'hovertemplate': 'variable=COUNT(*)<br>index=%{x}<br>value=%
          {y}<extra></extra>',
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                         'line': {'color': '#636efa', 'dash': 'solid'},
                          'marker': {'symbol': 'circle'},
                         'mode': 'lines',
                         'name': 'COUNT(*)',
                         'orientation': 'v',
                         'showlegend': True,
                         'type': 'scatter',
                         'x': array([0]),
                         'xaxis': 'x',
                         'y': array([59]),
                         'yaxis': 'y'}],
               'layout': {'legend': {'title': {'text': 'variable'}, 'tracegroupgap':
          0},
                          'margin': {'t': 60},
                          'template': '...',
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'index'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'value'}}}
           }))
 In [ ]:
```

In [19]: vn.ask(question="what are the top 5 countries that customers come from?")

Number of requested results 10 is greater than number of elements in index 3, updating  $n_results = 3$ Number of requested results 10 is greater than number of elements in index

1, updating n\_results = 1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n otal NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES "cu stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOIN CREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n VARCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR (70), r nCity NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NV PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n  $ARCHAR(40), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId I FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeI d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "inv InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT oice items"\r\n(\r\n NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NUL UnitPrice NUMERIC(10,2) NOT NULL,\r\n  $L,\r\n$ Quantity INTEGER NOT NU  $LL,\r\n$ FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r  $\n)\n\n\CREATE TABLE "media_types"\r\n(\r\n$ MediaTypeId INTEGER PRIMARY KE Y AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON "customers" (SupportRepId)\n\nCREATE TABLE "employe es"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r ReportsTo INTEGER,\r\n BirthDate DATETIM Title NVARCHAR(30),\r\n E, r nHireDate DATETIME,\r\n Address NVARCHAR(70),\r\n City NVARCH  $AR(40), \r\n$ State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n lCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$ Fax NVARCHAR(24),\r\n FOREIGN KEY (ReportsTo) REFERENCES "employees" (E Email NVARCHAR(60),\r\n mployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TA BLE "albums"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NUL  $L,\r\n$ FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON  $L,\r\n$ DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist track"\r PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r  $\n(\r\n$ CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n \n FOREIGN KEY (PlaylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\t0N DELE TE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "t racks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCRE ATE TABLE sqlite sequence(name, seq)\n\nCREATE TABLE "tracks"\r\n(\r\n ckId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) MediaTypeId INTEGER NOT NULL,\r\n NOT NULL,\r\n AlbumId INTEGER,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER GenreId INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r NOT NULL,\r\n Bytes INTEGER,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genr es" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n N KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chi nook database invoice means order\n\n===Response Guidelines \n1. If the prov ided context is sufficient, please generate a valid SQL query without any ex

planations for the question. \n2. If the provided context is almost sufficie nt but requires knowledge of a specific string in a particular column, pleas e generate an intermediate SQL guery to find the distinct strings in that co lumn. Prepend the query with a comment saying intermediate sql \n3. If the p rovided context is insufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been as ked and answered before, please repeat the answer exactly as it was given be fore. \n'}, {'role': 'user', 'content': 'How many customers are there'}, {'r ole': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assist ant', 'content': ' SELECT "customers".CustomerId FROM "customers"'}, {'rol e': 'user', 'content': 'Can you list all tables in the SQLite database catal og?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHER E type='table'"}, {'role': 'user', 'content': 'what are the top 5 countries that customers come from?'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCou ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n Total NUMER FOREIGN KEY (CustomerId) REFERENCES \"customers\" IC(10,2) NOT NULL,\r\n (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT FirstName NVARCHAR(40) NOT NULL,\r\n NOT NULL,\r\n LastName NVARCHAR (20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NVARCHAR  $(40), \r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n  $NVARCHAR(24), \ r\ n$ Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEG FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoi ce items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT N InvoiceId INTEGER NOT NULL,\r\n ULL,\r\n TrackId INTEGER NOT NULL,\r UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NUL \n FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n\t  $L,\r\n$ \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION  $\r\n)\n\n\CREATE TABLE \"media types\\"\r\n(\r\n$ MediaTypeId INTEGER PRIMAR Y KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120) $\r\n)\n\cREATE$  INDEX IFK CustomerSupportRepId ON \"customers\" (SupportRepId)\n\nCREATE TABLE \"e EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL mployees\"\r\n(\r\n  $L,\r\n$ LastName NVARCHAR(20) NOT NULL, $\r\$ FirstName NVARCHAR(20) T NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDat e DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n Ci State NVARCHAR(40),\r\n ty  $NVARCHAR(40), \r\n$ Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(2 FOREIGN KEY (ReportsTo) REFERENCES \"e Email NVARCHAR(60),\r\n mployees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)

\n\nCREATE TABLE \"albums\"\r\n(\r\n

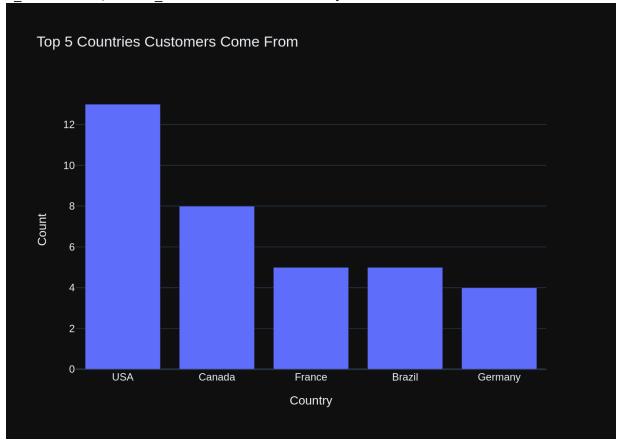
AlbumId INTEGER PRIMARY KEY AUTOINCR

EMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGE R NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playl ist track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, Track NOT NULL,\r\n FOREIGN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackI d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE sqlite sequence(name,seq)\n\nCREATE TABLE \"trac TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $ks\"\r\n(\r\n$ Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INT GenreId INTEGER,\r\n EGER NOT NULL,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL.\r\n Bvtes INTEGER.\r\n UnitPrice NUMER FOREIGN KEY (AlbumId) REFERENCES \"albums\" (Albu IC(10,2) NOT NULL,\r\n mId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Ge nreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES \"media types\" (Medi aTypeId)  $\r \n \$  DELETE NO ACTION ON UPDATE NO ACTION $\r \n \$ onal Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a val id SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the d istinct strings in that column. Prepend the query with a comment saying inte rmediate sql \n3. If the provided context is insufficient, please explain wh y it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer ex actly as it was given before. \n"}, {"role": "user", "content": "How many cu stomers are there"}, {"role": "assistant", "content": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": "which table stores customer's orders"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId FROM \"customers\""}, {"role": "user", "content": "Can you list all tables i n the SQLite database catalog?"}, {"role": "assistant", "content": "SELECT n ame FROM sqlite master WHERE type='table'"}, {"role": "user", "content": "wh at are the top 5 countries that customers come from?"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:21:56.262990752Z', 'message': {'role': 'assistant', 'content': ' SELECT Country, COUNT(\*) AS Co unt\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, 'done reason': 'stop', 'done': True, 'total duration': 61711709186, 'load duratio n': 3219649, 'prompt eval count': 1632, 'prompt eval duration': 56727968000, 'eval count': 28, 'eval duration': 4526444000} LLM Response: SELECT Country, COUNT(\*) AS Count FROM customers GROUP BY Country ORDER BY Count DESC LIMIT 5 SELECT Country, COUNT(\*) AS Count FROM customers GROUP BY Country ORDER BY Count DESC LIMIT 5 Country Count 0 USA 13 1 Canada 8 2 5 France

3 Brazil 5
4 Germany 4
Info: Ollama parameters:
model=mistral:latest,
options={},
keep\_alive=None
Info: Prompt Content:
[{"role": "system", "contains the results of the

[{"role": "system", "content": "The following is a pandas DataFrame that con tains the results of the query that answers the question the user asked: 'wh at are the top 5 countries that customers come from?'\n\nThe DataFrame was p roduced using this query: SELECT Country, COUNT(\*) AS Count\nFROM customers \nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5\n\nThe following is informa tion about the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n Country object\nCount int64\ndtype: object"}, {"role": "user", "con tent": "Can you generate the Python plotly code to chart the results of the dataframe? Assume the data is in a pandas dataframe called 'df'. If there is only one value in the dataframe, use an Indicator. Respond with only Python code. Do not answer with any explanations -- just the code."}]

Info: Ollama Response:



```
Out[19]: (' SELECT Country, COUNT(*) AS Count\nFROM customers\nGROUP BY Country\nORD
          ER BY Count DESC\nLIMIT 5',
             Country Count
           0
                  USA
                          13
           1
               Canada
                           8
                           5
           2
              France
                           5
           3
               Brazil
          4 Germany
                           4,
           Figure({
               'data': [{'alignmentgroup': 'True',
                         'hovertemplate': 'Country=%{x}<br>Count=%{y}<extra></extra
          >',
                         'legendgroup': '',
                         'marker': {'color': '#636efa', 'pattern': {'shape': ''}},
                         'name': '',
                         'offsetgroup': '',
                         'orientation': 'v',
                         'showlegend': False,
                         'textposition': 'auto',
                         'type': 'bar',
                         'x': array(['USA', 'Canada', 'France', 'Brazil', 'Germany'],
          dtype=object),
                         'xaxis': 'x',
                         'y': array([13, 8, 5, 5, 4]),
                         'yaxis': 'y'}],
               'layout': {'barmode': 'relative',
                          'legend': {'tracegroupgap': 0},
                          'template': '...',
                          'title': {'text': 'Top 5 Countries Customers Come From'},
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'Country'}},
                           'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'Count'}}}
          }))
```

### More SQL questions

see sample-sql-queries-sqlite-chinook.ipynb

Number of requested results 10 is greater than number of elements in index 4, updating  $n_results = 4$ Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$  SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE INDEX IFK AlbumArtistId ON "albums" (A rtistId)\n\nCREATE TABLE "albums"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AU TOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES "artists" (Artis tId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "t TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INT EGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMER FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumI IC(10.2) NOT NULL.\r\n d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Genr eId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaType ACTION,\r\n Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE TABLE "artists"\r\n(\r\n tistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL.\r\n Name NVARCHAR(120) \r\n)\n\nCREATE INDEX IFK TrackGenreId ON "tracks" (GenreId)\n\nCREATE INDEX IFK PlaylistTrackTrackId ON "playlist track" (TrackId)\n\nCREATE TABLE "play lists"\r\n(\r\n PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r Name NVARCHAR(120) $\r\n)\n\n$ CREATE TABLE "genres" $\r\n(\r\n$ GenreId I NTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n$ \nCREATE INDEX IFK TrackMediaTypeId ON "tracks" (MediaTypeId)\n\n===Additi onal Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a val id SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the d istinct strings in that column. Prepend the query with a comment saying inte rmediate sql \n3. If the provided context is insufficient, please explain wh y it can\'t be generated. \n4. Please use the most relevant table(s). \n5. I f the question has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': 'Can you l ist all tables in the SQLite database catalog?'}, {'role': 'assistant', 'con tent': "SELECT name FROM sqlite master WHERE type='table'"}, {'role': 'use r', 'content': 'what are the top 5 countries that customers come from?'}, {'role': 'assistant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM c ustomers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': 'How many customers are there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': "which tab le stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "cu stomers".CustomerId FROM "customers"'}, {'role': 'user', 'content': ' \n List all albums and their corresponding artist names \n'\] Info: Ollama parameters: model=mistral:latest. options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE INDEX IFK AlbumArtistId ON \"albums\" (ArtistId)\n \nCREATE TABLE \"albums\"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREM ENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER

NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"tracks TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n \"\r\n(\r\n me NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEG GenreId INTEGER,\r\n ER NOT NULL,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bvtes INTEGER.\r\n UnitPrice NUMER IC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (Albu mId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Ge nreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES \"media types\" (Medi aTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDE X IFK TrackAlbumId ON \"tracks\" (AlbumId)\n\nCREATE TABLE \"artists\"\r\n ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n ARCHAR(120)\r\n)\n\nCREATE INDEX IFK TrackGenreId ON \"tracks\" (GenreId)\n \nCREATE INDEX IFK PlaylistTrackTrackId ON \"playlist track\" (TrackId)\n\nC REATE TABLE \"playlists\"\r\n(\r\n PlaylistId INTEGER PRIMARY KEY AUTOINC REMENT NOT NULL,\r\n Name NVARCHAR(120) $\r\n)\n\n$ CREATE TABLE \"genres\"\r GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $n(\r\n$ VARCHAR(120)\r\n)\n\nCREATE INDEX IFK TrackMediaTypeId ON \"tracks\" (MediaT ypeId)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQ L query to find the distinct strings in that column. Prepend the guery with a comment saying intermediate sql \n3. If the provided context is insufficie nt, please explain why it can't be generated. \n4. Please use the most relev ant table(s). \n5. If the question has been asked and answered before, pleas e repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalog?"}, {"rol e": "assistant", "content": "SELECT name FROM sqlite master WHERE type='tabl e'"}, {"role": "user", "content": "what are the top 5 countries that custome rs come from?"}, {"role": "assistant", "content": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": "How many customers are there"}, {"role": "assis tant", "content": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": "which table stores customer's orders"}, {"role": "assistant", ontent": " SELECT \"customers\".CustomerId FROM \"customers\""}, {"role": "u ser", "content": " \n List all albums and their corresponding artist nam es \n"}]

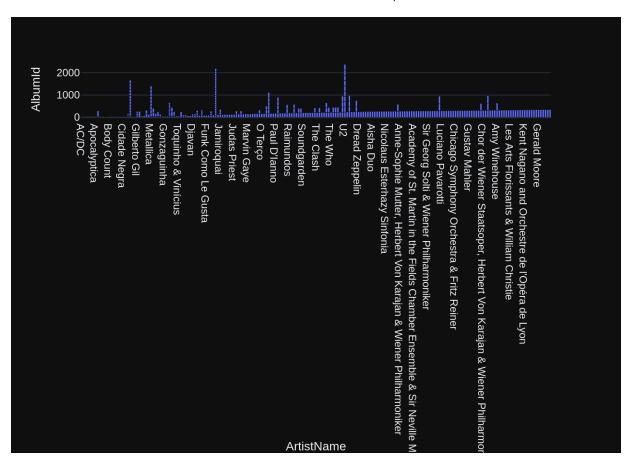
Info: Ollama Response:

{'model': 'mistral:latest', 'created\_at': '2024-08-01T19:22:55.237550892Z',
'message': {'role': 'assistant', 'content': ' SELECT "albums".AlbumId, "arti
sts".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".Artis
tId = "artists".ArtistId;'}, 'done\_reason': 'stop', 'done': True, 'total\_dur
ation': 38368827463, 'load\_duration': 3344276, 'prompt\_eval\_count': 927, 'pr
ompt\_eval\_duration': 30186327000, 'eval\_count': 49, 'eval\_duration': 7655600
000}

LLM Response: SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "a lbums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId; Info: Output from LLM: SELECT "albums".AlbumId, "artists".Name AS ArtistNam e FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".Artist Id:

Extracted SQL: SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "a lbums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JO

```
IN "artists" ON "albums".ArtistId = "artists".ArtistId
     AlbumId
                                                     ArtistName
0
           1
                                                          AC/DC
           4
1
                                                          AC/DC
2
           2
                                                         Accept
           3
3
                                                         Accept
           5
4
                                                      Aerosmith
         . . .
. .
342
               Mela Tenenbaum, Pro Musica Prague & Richard Kapp
         342
343
         344
                                         Emerson String Quartet
344
         345
             C. Monteverdi, Nigel Rogers - Chiaroscuro; Lon...
345
         346
                                                  Nash Ensemble
         347
                                          Philip Glass Ensemble
346
[347 rows x 2 columns]
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
      List all albums and their corresponding artist names \n'\n\nThe DataF
rame was produced using this query: SELECT \"albums\".AlbumId, \"artists\".N
ame AS ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".Artis
tId = \"artists\".ArtistId\n\nThe following is information about the resulti
ng pandas DataFrame 'df': \nRunning df.dtypes gives:\n AlbumId
\nArtistName
                object\ndtype: object"}, {"role": "user", "content": "Can yo
u generate the Python plotly code to chart the results of the dataframe? Ass
ume the data is in a pandas dataframe called 'df'. If there is only one valu
e in the dataframe, use an Indicator. Respond with only Python code. Do not
answer with any explanations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:23:18.739952372Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres
s as px\nfig = px.bar("AlbumId", "ArtistName", data=df)\nfig.update layout(t
itle="Albums by Artist")\n\n# If there is only one value in the dataframe, u
se an Indicator\nif df.shape[0] == 1:\n fig = px.indicator(df, title="Alb
um: {}".format(df["ArtistName"].iloc[0]))\n```'}, 'done_reason': 'stop', 'do
ne': True, 'total duration': 23481539658, 'load duration': 3677082, 'prompt
eval count': 211, 'prompt eval duration': 6249897000, 'eval count': 111, 'ev
al duration': 17138273000}
```



```
Out[20]: ('SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER
          JOIN "artists" ON "albums".ArtistId = "artists".ArtistId',
                AlbumId
                                                                 ArtistName
           0
                                                                       AC/DC
                      1
           1
                      4
                                                                       AC/DC
                      2
           2
                                                                      Accept
           3
                      3
                                                                      Accept
           4
                      5
                                                                   Aerosmith
                    . . .
           342
                    342
                          Mela Tenenbaum, Pro Musica Prague & Richard Kapp
                                                     Emerson String Quartet
           343
                    344
           344
                    345 C. Monteverdi, Nigel Rogers - Chiaroscuro; Lon...
           345
                    346
                                                              Nash Ensemble
           346
                    347
                                                      Philip Glass Ensemble
           [347 \text{ rows } \times 2 \text{ columns}],
           Figure({
               'data': [{'alignmentgroup': 'True',
                         'hovertemplate': 'ArtistName=%{x}<br>AlbumId=%{y}<extra></ex
          tra>',
                          'legendgroup': '',
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                          'name': '',
                         'offsetgroup': '',
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                         'showlegend': False,
                         'textposition': 'auto',
                         'type': 'bar',
                          'x': array(['AC/DC', 'AC/DC', 'Accept', ...,
                                      'C. Monteverdi, Nigel Rogers - Chiaroscuro; Lond
          on Baroque; London Cornett & Sackbu',
                                      'Nash Ensemble', 'Philip Glass Ensemble'], dtype
          =object),
                          'xaxis': 'x',
                          'y': array([ 1, 4, 2, ..., 345, 346, 347]),
                         'yaxis': 'y'}],
               'layout': {'barmode': 'relative',
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                           'margin': {'t': 60},
                           'template': '...',
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          ext': 'ArtistName'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'AlbumId'}}
          }))
In [21]: question = """
             Find all tracks with a name containing "What" (case-insensitive)
         vn.ask(question=question)
        Number of requested results 10 is greater than number of elements in index
        5, updating n results = 5
        Number of requested results 10 is greater than number of elements in index
        1, updating n results = 1
```

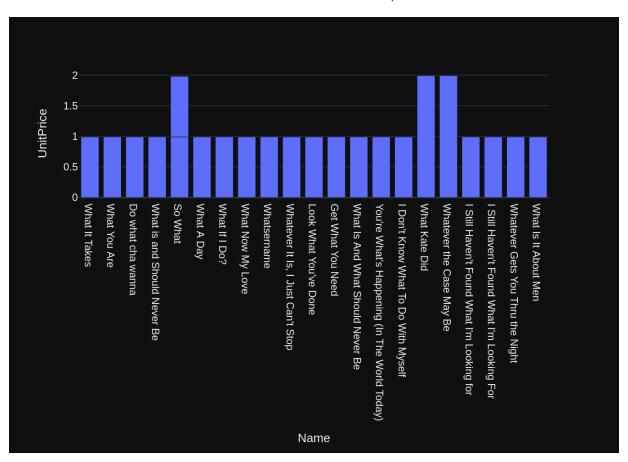
SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE INDEX IFK TrackGenreId ON "tracks" (Ge nreId)\n\nCREATE INDEX IFK PlaylistTrackTrackId ON "playlist track" (TrackI d)\n\nCREATE TABLE "tracks"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCR Name NVARCHAR(200) NOT NULL,\r\n EMENT NOT NULL,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n R, r nMilliseconds INTEGER NOT NULL,\r\n oser NVARCHAR(220),\r\n Bytes INTE UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (Albumid) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO FOREIGN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\tON DEL ETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENC ES "media types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTI ON\r\n)\n\CREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE IND EX IFK TrackMediaTypeId ON "tracks" (MediaTypeId)\n\nCREATE TABLE "playlist track"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackI NULL,\r\n FOREIGN KEY (PlaylistId) REFERENCES "playlists" (PlaylistId) \r\n \t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Trackid) RE FERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION \r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n \nCREATE INDEX IFK AlbumArtistId ON "albums" (ArtistId)\n\nCREATE TABLE "pla ylists"\r\n(\r\n PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r Name NVARCHAR(120) $\r\n)\n\n$ CREATE TABLE "genres" $\r\n(\r\n$ NTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n$ \n\n===Additional Context \n\nIn the chinook database invoice means order\n \n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. I f the provided context is almost sufficient but requires knowledge of a spec ific string in a particular column, please generate an intermediate SQL guer y to find the distinct strings in that column. Prepend the query with a comm ent saying intermediate sql \n3. If the provided context is insufficient, pl ease explain why it can\'t be generated. \n4. Please use the most relevant t able(s). \n5. If the question has been asked and answered before, please rep eat the answer exactly as it was given before. \n'}, {'role': 'user', 'conte List all albums and their corresponding artist names \n'}, {'role': 'assistant', 'content': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artist s".ArtistId'}, {'role': 'user', 'content': 'Can you list all tables in the S QLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FRO M sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': 'what are the top 5 countries that customers come from?'}, {'role': 'assistant', 'cont ent': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country \nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': 'How many cust omers are there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': "which table stores customer's or ders"}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId FRO M "customers"'}, {'role': 'user', 'content': ' \n Find all tracks with a name containing "What" (case-insensitive)\n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene

rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE INDEX IFK TrackGenreId ON \"tracks\" (GenreId)\n\n CREATE INDEX IFK PlaylistTrackTrackId ON \"playlist track\" (TrackId)\n\nCRE TrackId INTEGER PRIMARY KEY AUTOINCREMENT N ATE TABLE \"tracks\"\r\n(\r\n OT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER.\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n  $HAR(220), \r\n$ Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO A CTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES \"med ia types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE INDEX IFK TrackAlbumId ON \"tracks\" (AlbumId)\n\nCREATE INDEX IFK TrackMediaTypeId ON \"tracks\" (MediaTypeId)\n\nCREATE TABLE \"playlist track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NO T NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackI d), r nFOREIGN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACT ION\r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackI d)\n\nCREATE INDEX IFK AlbumArtistId ON \"albums\" (ArtistId)\n\nCREATE TABL E \"playlists\"\r\n(\r\n PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT Name NVARCHAR(120)\r\n)\n\nCREATE TABLE \"genres\"\r\n(\r\n GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(12 0)\r\n)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQ L query to find the distinct strings in that column. Prepend the guery with a comment saying intermediate sql \n3. If the provided context is insufficie nt, please explain why it can't be generated. \n4. Please use the most relev ant table(s). \n5. If the question has been asked and answered before, pleas e repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": " \n List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists \".Name AS ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".A rtistId = \"artists\".ArtistId"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assistant", "conten t": "SELECT name FROM sqlite master WHERE type='table'"}, {"role": "user", "content": "what are the top 5 countries that customers come from?"}, {"rol e": "assistant", "content": " SELECT Country, COUNT(\*) AS Count\nFROM custom ers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "con tent": "How many customers are there"}, {"role": "assistant", "content": " S ELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": "which tabl e stores customer's orders"}, {"role": "assistant", "content": " SELECT \"cu stomers\".CustomerId FROM \"customers\""}, {"role": "user", "content": " \n Find all tracks with a name containing \"What\" (case-insensitive)\n"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:23:55.715824552Z', 'message': {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHERE L OWER(Name) LIKE \'%what%\''}, 'done reason': 'stop', 'done': True, 'total du ration': 36824937280, 'load duration': 2820092, 'prompt eval count': 1022, 'prompt eval duration': 32902237000, 'eval count': 21, 'eval duration': 3205

757000}

	l Response:	SELECT	* FR0M	   "tracks" WHERE LOWER(Name) LI	KF '%what%'	ı
30				RE LOWER(Name) LIKE '%what%'	ite owniae o	
	TrackId			Name	AlbumId \	
0	26			What It Takes	5	
1	88			What You Are	10	
2	130			Do what cha wanna	13	
3	342			What is and Should Never Be	30	
4	607			So What	48	
5	960			What A Day	76	
6	1000			What If I Do?	80	
7	1039			What Now My Love	83	
8	1145			Whatsername	89	
9	1440		What	ever It Is, I Just Can't Stop	116	
10	1469			Look What You've Done	119	
11	1470			Get What You Need	119	
12	1628			t Is And What Should Never Be	133	
13	1778	You're Wh	nat's H	lappening (In The World Today)	146	
14	1823			So What	149	
15	2772		I Don'	t Know What To Do With Myself	223	
16	2884			What Kate Did	231	
17	2893			Whatever the Case May Be	230	
18	2992			't Found What I'm Looking for	237	
19	3007	I Still		't Found What I'm Looking For	238	
20	3258		Wha	tever Gets You Thru the Night	255	
21	3475			What Is It About Men	322	
	ModiaTus	Td Canna	TA		C	
\	MediaType	eId Genre	era		CC	omposer
Ò		1	1	Steven Tyler, Joe Per	ry, Desmond	d Child
1				-	-	
		1	1	Audiosla	ave/Chris (	ornell
		1 1	1 2	Audiosla	ave/Chris ( Georo	
2			1 2 1			ge Duke
2 3		1	2		Georg Page/Robert	ge Duke
2		1 1	2 1		Georg Page/Robert Miles	ge Duke Plant Davis
2 3 4		1 1 1	2 1 2 1	Jimmy	Georg Page/Robert Miles ould, Mike	ge Duke Plant Davis Patton
2 3 4 5		1 1 1 1	2 1 2 1	Jimmy   Mike Bordin, Billy G	Georg Page/Robert Miles ould, Mike Mendel, Ch	ge Duke Plant Davis Patton
2 3 4 5 6		1 1 1 1	2 1 2 1 1 Da	Jimmy   Mike Bordin, Billy G ove Grohl, Taylor Hawkins, Nate	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l	ge Duke Plant Davis Patton
2 3 4 5 6 7		1 1 1 1 1	2 1 2 1 1 Da	Jimmy   Mike Bordin, Billy G ove Grohl, Taylor Hawkins, Nate	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l	ge Duke Plant Davis Patton nris Leroyer een Day
2 3 4 5 6 7 8		1 1 1 1 1 1	2 1 2 1 1 Da 12 4	Jimmy   Mike Bordin, Billy G ove Grohl, Taylor Hawkins, Nate	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka	ge Duke Plant Davis Patton nris Leroyer een Day
2 3 4 5 6 7 8 9		1 1 1 1 1 1 1	2 1 2 1 1 Da 12 4 1	Jimmy   Mike Bordin, Billy G ove Grohl, Taylor Hawkins, Nate	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N.	ge Duke Plant Davis Patton nris eroyer een Day ay, Jay Cester
2 3 4 5 6 7 8 9 10 11 12		1 1 1 1 1 1 1 1	2 1 2 1 1 Da 12 4 1 4	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becar C. Cester/C.	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert	pe Duke Plant Davis Patton Pris Peroyer Pen Day Ay, Jay Cester Cester Plant
2 3 4 5 6 7 8 9 10		1 1 1 1 1 1 1 1 1 1	2 1 2 1 1 Da 12 4 1 4 4 1 14	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becar	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert	pe Duke Plant Davis Patton Pris Peroyer Peen Day Oy Cester Cester Cester Cordy
2 3 4 5 6 7 8 9 10 11 12 13 14		1 1 1 1 1 1 1 1 1 1 1	2 1 2 1 Da 12 4 1 4 4 1 14 3	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becar C. Cester/C.	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert	pe Duke Plant Davis Patton Pris Peroyer Pen Day Oy, Jay Cester Cester Plant Gordy Cexalt
2 3 4 5 6 7 8 9 10 11 12 13 14 15		1 1 1 1 1 1 1 1 1 1 1 1	2 1 2 1 1 Da 12 4 1 4 4 1 14 3 7	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becar C. Cester/C.	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert	pe Duke Plant Davis Patton Pris Peroyer Pen Day Oy, Jay Cester Cester Plant Gordy Cexalt None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3	2 1 2 1 1 Da 12 4 1 4 1 14 3 7	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becar C. Cester/C.	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert	pe Duke Plant Davis Patton Pris Peroyer Pen Day Oy Cester Cester Plant Gordy Cexalt None None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 3	2 1 2 1 1 Da 12 4 1 4 4 1 14 3 7 19	Jimmy Mike Bordin, Billy Gave Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Pa	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Peen Day Cester Cester Plant Gordy Pixalt None None None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 3 3	2 1 2 1 1 Da 12 4 1 4 4 4 1 14 3 7 19 19	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becar C. Cester/C.	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Davis Patton Day Pen Day Oester Cester Cester Cester Cordy F/Exalt None None None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19		1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 3 3	2 1 2 1 1 Da 12 4 1 4 4 1 14 3 7 19 19 1	Jimmy Mike Bordin, Billy Gave Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Pa	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Cester Cordy Cexalt None None None Redge U2
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 3 3 1 1	2 1 2 1 1 Da 12 4 1 4 1 14 3 7 19 19 1 1	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Park Allen Story/George Government	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Plant Gordy Cexalt None None None Edge U2 None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19		1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 3 3	2 1 2 1 1 Da 12 4 1 4 1 14 3 7 19 19 1 1	Jimmy Mike Bordin, Billy Gave Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Pa	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Plant Gordy Cexalt None None None Edge U2 None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Milliseco	1 1 1 1 1 1 1 1 1 1 1 1 3 3 1 1 2 2	2 1 2 1 1 Da 12 4 1 4 4 1 14 3 7 19 19 1 1 9 9 De	Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Pa Allen Story/George Government of the Story (Seorge Government) o	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Plant Gordy Cexalt None None None Edge U2 None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Milliseco 310	1 1 1 1 1 1 1 1 1 1 1 1 1 3 3 1 1 1 2 2	2 1 2 1 1 Da 12 4 1 4 4 4 1 14 3 7 19 19 1 1 9 9 De	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Park Allen Story/George Government Cooper, Donovan Jaylor Cooper, Donovan Jaylor UnitPrice	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Plant Gordy Cexalt None None None Edge U2 None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	316	1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 onds 0622 101	2 1 2 1 1 Da 12 4 1 4 1 14 3 7 19 19 1 1 9 9 De Bytes	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Part Allen Story/George Government Cooper, Donovan January Chris	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Plant Gordy Cexalt None None None Edge U2 None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	316 249	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 onds 0622 101 0391 59	2 1 2 1 1 Da 12 4 1 4 1 14 3 7 19 19 1 1 9 9 De Bytes 44730	Jimmy Mike Bordin, Billy Gave Grohl, Taylor Hawkins, Nate carl sigman/gilbert became C. Cester/C. Jimmy Part Allen Story/George Game Bono/Clayton, Adam/Mullen Jrelroy "Chris" Cooper, Donovan Jawa UnitPrice  0.99 0.99	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Plant Gordy Cexalt None None None Edge U2 None
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	316 249 274	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 0nds 0622 101 0391 59	2 1 2 1 1 Da 12 4 1 4 1 14 3 7 19 19 1 1 9 9 De Bytes	Jimmy Mike Bordin, Billy Gove Grohl, Taylor Hawkins, Nate carl sigman/gilbert becard C. Cester/C. Jimmy Part Allen Story/George Government Cooper, Donovan January Chris	Georg Page/Robert Miles ould, Mike Mendel, Ch ud/pierre l Gre Jay Kay/Ka N. Muncey/N. age, Robert ordy/Robert Culmer	pe Duke Plant Davis Patton Pris Peroyer Pen Day Cester Cester Plant Gordy Cexalt None None None Edge U2 None

```
4
          564009
                                  0.99
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5
                                  0.99
          158275
                    5203430
6
          302994
                    9929799
                                  0.99
7
          149995
                    4913383
                                  0.99
8
          252316
                                  0.99
                    8244843
9
          247222
                    8249453
                                  0.99
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11
          247719
                    8043765
                                  0.99
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                                  0.99
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                    9369385
13
          142027
                    4631104
                                  0.99
14
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                    6162894
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18
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19
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                                  0.99
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                    3499018
                                  0.99
21
          209573
                    3426106
                                  0.99
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked:
      Find all tracks with a name containing \"What\" (case-insensitive)
\n'\nThe DataFrame was produced using this query: SELECT * FROM \"tracks
\" WHERE LOWER(Name) LIKE '%what%'\n\nThe following is information about the
resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n TrackId
                                                                           i
int64\nName
                        object\nAlbumId
                                                  int64\nMediaTypeId
                                                object\nMilliseconds
nt64\nGenreId
                        int64\nComposer
                       int64\nUnitPrice
                                              float64\ndtype: object"}, {"ro
t64\nBytes
le": "user", "content": "Can you generate the Python plotly code to chart th
e results of the dataframe? Assume the data is in a pandas dataframe called
'df'. If there is only one value in the dataframe, use an Indicator. Respond
with only Python code. Do not answer with any explanations -- just the cod
e."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created_at': '2024-08-01T19:24:17.152828809Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres
s as px\nif df.shape[0] > 1:\n
                                fig = px.bar(df, x="Name", y="UnitPrice")
             fig = px.bar(df, y="UnitPrice", text=\'Name\', title=f\'Track:
{df.iloc[0,0]}\')\nfig.show()\n```'}, 'done reason': 'stop', 'done': True,
'total duration': 21408771405, 'load duration': 3130830, 'prompt eval coun
t': 239, 'prompt eval duration': 7338862000, 'eval count': 90, 'eval duratio
n': 13934222000}
```



Out[21]:	(' SELE	CT * F	ROM "t	racks"	<pre>WHERE LOWER(Name) LIKE \'%what%\'',</pre>
		ackId			Name AlbumId \
	0	26			What It Takes 5
	1	88			What You Are 10
	2	130			Do what cha wanna 13
	3	342			What is and Should Never Be 30
	4	607			So What 48
	5	960			What A Day 76
	6	1000			What If I Do? 80
	7	1039			What Now My Love 83
	8	1145			Whatsername 89
	9	1440		W	Whatever It Is, I Just Can't Stop 116
	10	1469			Look What You've Done 119
	11	1470			Get What You Need 119
	12	1628			What Is And What Should Never Be 133
	13	1778	You'r	e wnat'	's Happening (In The World Today) 146
	14	1823		T D	So What 149
	15	2772		ΙD	Don't Know What To Do With Myself 223
	16	2884			What Kate Did 231
	17	2893			Whatever the Case May Be 230
	18	2992			aven't Found What I'm Looking for 237
	19	3007	IS		aven't Found What I'm Looking For 238
	20	3258			Whatever Gets You Thru the Night 255
	21	3475			What Is It About Men 322
	Ме	diaTyp	eId G	enreId	Compose
	r \				
	0		1	1	Steven Tyler, Joe Perry, Desmond Chil
•	d 1		1	1	Audioslave/Chris Cornel
	l				
	2 e		1	2	George Duk
	3 t		1	1	Jimmy Page/Robert Plan
	4		1	2	Miles Davi
	s 5		1	1	Mike Bordin, Billy Gould, Mike Patto
I	n 6		1	1	Dave Grohl, Taylor Hawkins, Nate Mendel, Chri
	s 7		1	12	carl sigman/gilbert becaud/pierre leroye
	r 8		1	4	
,	У				Green Da
,	9 y		1	1	Jay Kay/Kay, Ja
	10 r		1	4	N. Ceste
	11		1	4	C. Cester/C. Muncey/N. Ceste
	r 12		1	1	Jimmy Page, Robert Plan
	t 13		1	14	Allen Story/George Gordy/Robert Gord
!	у 14		1	3	Culmer/Exal

```
t
                        7
 15
               1
                                                                            Non
е
               3
                        19
 16
                                                                            Non
е
 17
               3
                        19
                                                                            Non
е
 18
               1
                         1
                                Bono/Clayton, Adam/Mullen Jr., Larry/The Edg
е
 19
               1
                         1
                                                                              U
2
                         9
 20
               2
                                                                            Non
е
21
               2
                            Delroy "Chris" Cooper, Donovan Jackson, Earl
C...
     Milliseconds
                        Bytes UnitPrice
0
           310622
                     10144730
                                    0.99
 1
                                    0.99
           249391
                      5988186
 2
           274155
                      9018565
                                    0.99
 3
                                    0.99
           260675
                      8497116
 4
                                    0.99
           564009
                     18360449
 5
                                    0.99
           158275
                      5203430
 6
           302994
                      9929799
                                    0.99
 7
           149995
                      4913383
                                    0.99
 8
           252316
                      8244843
                                    0.99
 9
                                    0.99
           247222
                      8249453
 10
           230974
                      7517083
                                    0.99
                                    0.99
 11
           247719
                      8043765
 12
           287973
                      9369385
                                    0.99
 13
                                    0.99
           142027
                      4631104
 14
                                    0.99
           189152
                      6162894
 15
                                    0.99
           221387
                      7251478
 16
          2610250
                   484583988
                                    1.99
 17
          2616410
                   183867185
                                    1.99
 18
           353567
                     11542247
                                    0.99
 19
                                    0.99
           280764
                      9306737
 20
                                    0.99
           215084
                      3499018
 21
           209573
                                    0.99
                      3426106
 Figure({
     'data': [{'alignmentgroup': 'True',
                'hovertemplate': 'Name=%{x}<br>UnitPrice=%{y}<extra></extra
>',
                'legendgroup': '',
                'marker': {'color': '#636efa', 'pattern': {'shape': ''}},
                'name': '',
                'offsetgroup': '',
                'orientation': 'v',
                'showlegend': False,
                'textposition': 'auto',
                'type': 'bar',
                'x': array(['What It Takes', 'What You Are', 'Do what cha wa
nna',
                            'What is and Should Never Be', 'So What', 'What
A Day', 'What If I Do?',
                            'What Now My Love', 'Whatsername', "Whatever It
```

```
Is, I Just Can't Stop",
                                     "Look What You've Done", 'Get What You Need',
                                     'What Is And What Should Never Be'.
                                     "You're What's Happening (In The World Today)",
          'So What',
                                     "I Don't Know What To Do With Myself", 'What Kat
          e Did',
                                     'Whatever the Case May Be',
                                     "I Still Haven't Found What I'm Looking for",
                                     "I Still Haven't Found What I'm Looking For",
                                     'Whatever Gets You Thru the Night', 'What Is It
          About Men'],
                                    dtype=object),
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                         'y': array([0.99, 0.99, 0.99, 0.99, 0.99, 0.99, 0.99, 0.99,
          0.99, 0.99, 0.99, 0.99,
                                     0.99, 0.99, 0.99, 0.99, 1.99, 1.99, 0.99, 0.99,
          0.99, 0.99]),
                         'yaxis': 'y'}],
               'layout': {'barmode': 'relative',
                          'legend': {'tracegroupgap': 0},
                          'margin': {'t': 60},
                          'template': '...',
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'Name'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'UnitPrice'}}
          }))
In [22]: question = """
             Get the total number of invoices for each customer
         vn.ask(question=question)
        Number of requested results 10 is greater than number of elements in index
        6, updating n results = 6
        Number of requested results 10 is greater than number of elements in index
```

file:///home/gongai/Downloads/ollama-mistral-chromadb-sqlite-test-3.html

1, updating n results = 1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n  $0), \r\n$ BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n otal NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES "cu stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE IN DEX IFK InvoiceLineInvoiceId ON "invoice items" (InvoiceId)\n\nCREATE TABLE "invoice items"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NU UnitPrice NUMERIC(10,2) NOT NULL,\r\n  $LL,\r\n$ Quantity INTEGER NOT N ULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nC REATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCRE MENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n LastName NVAR Company NVARCHAR(80),\r\n CHAR(20) NOT NULL,\r\n Address NVARCHAR(7 City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n 0), r nCountry NVAR  $CHAR(40), \r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$ Email NVARCHAR(60) NOT NULL,\r\n Fax NVARCHAR(24),\r\n SupportRepId I FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeI NTEGER,\r\n d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON "customers" (SupportRepId)\n\nCREATE TABLE "employee EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r Title NVARCHAR(30),\r\n ReportsTo INTEGER.\r\n BirthDate DATETIM \n City NVARCH  $E,\r\n$ HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n  $AR(40), \r\n$ State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n Phone NVARCHAR(24),\r\n lCode NVARCHAR(10),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES "employees" (E mployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE IN DEX IFK EmployeeReportsTo ON "employees" (ReportsTo)\n\nCREATE TABLE "track s"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n me NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEG GenreId INTEGER,\r\n ER NOT NULL,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMER FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumI IC(10,2) NOT NULL,\r\n d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Genr eId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaType Id)  $\r \n \t \0 ACTION ON UPDATE NO ACTION \r \n \n \n \===Additional$ Context \n\nIn the chinook database invoice means order\n\n===Response Guide lines \n1. If the provided context is sufficient, please generate a valid SQ L query without any explanations for the question. \n2. If the provided cont ext is almost sufficient but requires knowledge of a specific string in a pa rticular column, please generate an intermediate SQL query to find the disti nct strings in that column. Prepend the query with a comment saying intermed iate sql \n3. If the provided context is insufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactl y as it was given before. \n'}, {'role': 'user', 'content': 'How many custom

ers are there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "cu stomers"'}, {'role': 'user', 'content': 'what are the top 5 countries that c ustomers come from?'}, {'role': 'assistant', 'content': ' SELECT Country, CO UNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMI T 5'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId FROM "custo mers"'}, {'role': 'user', 'content': ' \n List all albums and their corr esponding artist names \n'}, {'role': 'assistant', 'content': 'SELECT "albu ms".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': ' Find all tracks with a name containing "What" (case-insensitive)\n'}, {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHERE LOWER(Name) LIKE \'%what%\''}, {'role': 'user', 'content': 'Can you list all tables in t he SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': ' \n Get the total number of invoices for each customer\n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCou BillingPostalCode NVARCHAR(10),\r\n ntry NVARCHAR(40),\r\n IC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices\" (CustomerId)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (InvoiceId)\n\nCREATE TABLE \"inv InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT oice items\"\r\n(\r\n NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NUL  $L,\r\n$ UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NU FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n  $LL,\r\n$ \t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) RE FERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO N\r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId) \n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AU TOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n me NVARCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARC City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n  $HAR(70), \r\n$  $NVARCHAR(40), \r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n Fax NVARCHAR(24), r nSupportRepId I FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (Employee NTEGER,\r\n Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON \"customers\" (SupportRepId)\n\nCREATE TABLE \"empl EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NU \n ReportsTo INTEGER,\r\n LL,\r\n Title NVARCHAR(30),\r\n BirthDate DA HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n TETIME,\r\n  $VARCHAR(40), \r\n$ State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(2 4),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"e

mployees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n) \n\nCREATE INDEX IFK EmployeeReportsTo ON \"employees\" (ReportsTo)\n\nCREAT E TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n diaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHA Milliseconds INTEGER NOT NULL,\r\n Bvtes INTEGER.\r\n  $R(220), \r\n$ UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\t0N DELETE NO A CTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES \"med ia types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\n===Additional Context \n\nIn the chinook database invoice means ord er\n\n===Response Guidelines \n1. If the provided context is sufficient, ple ase generate a valid SQL query without any explanations for the question. \n 2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficien t, please explain why it can't be generated. \n4. Please use the most releva nt table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "co ntent": "How many customers are there"}, {"role": "assistant", "content": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": "what are the top 5 countries that customers come from?"}, {"role": "assistant", "cont ent": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country \nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": "which table s tores customer's orders"}, {"role": "assistant", "content": " SELECT \"custo mers\".CustomerId FROM \"customers\""}, {"role": "user", "content": " \n List all albums and their corresponding artist names \n"}, {"role": "assist ant", "content": "SELECT \"albums\".AlbumId, \"artists\".Name AS ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".ArtistId = \"artists\". ArtistId"}, {"role": "user", "content": " \n Find all tracks with a name containing \"What\" (case-insensitive)\n"}, {"role": "assistant", "content": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIKE '%what%'"}, {"role": "use r", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assistant", "content": "SELECT name FROM sqlite master WHERE type ='table'"}, {"role": "user", "content": " \n Get the total number of inv oices for each customer\n"}] Info: Ollama Response:

{'model': 'mistral:latest', 'created at': '2024-08-01T19:25:21.014142256Z', 'message': {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, COUNT("invoices". "InvoiceId") AS TotalInvoices FROM "customers" LEFT JOIN "i nvoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "custome rs".CustomerId'}, 'done reason': 'stop', 'done': True, 'total duration': 637 60463785, 'load duration': 3609879, 'prompt\_eval\_count': 1590, 'prompt\_eval\_ duration': 52325666000, 'eval count': 66, 'eval duration': 10608413000} LLM Response: SELECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" LEFT JOIN "invoices" ON "customers".Custom erId = "invoices".CustomerId GROUP BY "customers".CustomerId

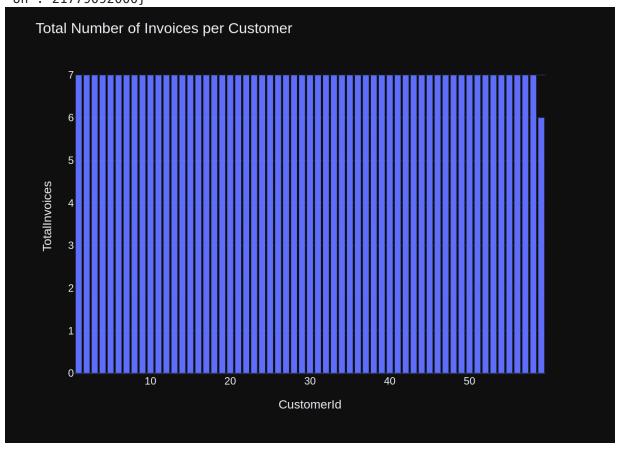
SELECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoic es FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoic es".CustomerId GROUP BY "customers".CustomerId

CustomerId TotalInvoices

0	1	7
1	2	7
2	3	7

3	4	7
4	5	7
5	6	7
6	7	7 7 7
7	8	7
8	9	7
9	10	7
10		7 7
	11	
11	12	7
12	13	7
13	14	7
14	15	7
15	16 17 18 19	7 7 7
16	17	7
17	18	7
18	19	7
19	20	7
20	21	7
	22	
21	21 22 23	7
22	23	/
23	24 25	7 7 7 7
24	25	7
25	26	7 7
26	27	7
27	28	7
28	29	7
29	30	7
30	31	7
31	32	7
32	33	7 7
	27	7
33	34	7
34	35	7
35	36	7
36	37	7
37	38	7
38	39	7
39	40	7
40	41	7
41	42	7
42	43	7
43	44	7
44	45	7
45	46	7
46	47	7
47	48	7
48	49	7
49	50	7
50	51	7
51	52	7
52	53	7
53	54	7
54	55	7
55	56	7
		7
56	57	
57	58	7
58	59	6

Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "The following is a pandas DataFrame that con tains the results of the query that answers the question the user asked: ' Get the total number of invoices for each customer\n'\n\nThe DataFrame was produced using this query: SELECT \"customers\".CustomerId, COUNT(\"inv oices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LEFT JOIN \"invoi ces\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"custo mers\".CustomerId\n\nThe following is information about the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n CustomerId int64\nTotalIn int64\ndtype: object"}, {"role": "user", "content": "Can you gener ate the Python plotly code to chart the results of the dataframe? Assume the data is in a pandas dataframe called 'df'. If there is only one value in the dataframe, use an Indicator. Respond with only Python code. Do not answer wi th any explanations -- just the code."}] Info: Ollama Response: {'model': 'mistral:latest', 'created\_at': '2024-08-01T19:25:50.092324588Z', 'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres s as px\n\nfig = px.bar(df, x="CustomerId", y="TotalInvoices")\nfig.update l ayout(title=\'Total Number of Invoices per Customer\')\nfig.show()\n\nif df.  $shape[0] == 1:\n$ fig = go.Indicators(\n domain={"x": [0, 1], "y": [0, 1]}.\n value=df["TotalInvoices"].iloc[0],\n title="Total I fig.show()\n```'}, 'done reason': 'stop', 'done': True, nvoices"\n )\n 'total duration': 29051474585, 'load duration': 3889454, 'prompt eval coun t': 235, 'prompt eval duration': 7181055000, 'eval count': 140, 'eval durati on': 21779092000}



voic	es".Customer	
	CustomerId	TotalInvoices
0	1	7
1	2	7
2	3	7
3	4	7
4	5	7
5	6	7
6	7	7
7	8	7
8	9	7
9	10	7
10	11	7
11	12	7
12	13	7
13	14	7
14	15	7
15	16	7
16	17	7
17	18	7
18	19	7
19	20	7
20	21	7
21	22	7
22	23	7
		7
23	24	7
24	25	
25	26	7
26	27	7
27	28	7
28	29	7
29	30	7
30	31	7
31	32	7
32	33	7
33	34	7
34	35	7
35	36	7
36	37	7
37	38	7
38	39	7
39	40	7
40	41	7
41	42	7
42	43	7
43	44	7
44	45	7
45	46	7
46	47	7
47	48	7
48	49	7
49	50	7
50	51	7
51	52	7

52

53

7

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53
                     54
                                    7
          54
                     55
                                    7
                                    7
          55
                     56
                     57
                                    7
          56
                                    7
          57
                     58
                                    6.
          58
                     59
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                                  19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30,
         31, 32, 33, 34, 35, 36,
                                  37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48,
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                                  55, 56, 57, 58, 59]),
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         ext': 'CustomerId'}},
                        'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
         ext': 'TotalInvoices'}}}
          }))
In [23]: question = """
            Find the total number of invoices per country:
        vn.ask(question=question)
       Number of requested results 10 is greater than number of elements in index
       7, updating n results = 7
       Number of requested results 10 is greater than number of elements in index
       1, updating n results = 1
```

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingState NVARCHAR(40),\r\n BillingCity NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n otal NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES "cu stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE TABLE "invoice items"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n NTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Ouantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (Inv oiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (Custom erId)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON "invoice items" (InvoiceI d)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nCR EATE TABLE "employees"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREM ENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARC HAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r City NVARCHAR(40),\r\n State NVARCHAR(40), \r\n Country NVARCHAR PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFE  $NVARCHAR(24).\r\n$ RENCES "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACT ION\r\n)\n\nCREATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n Company NVARCHAR(80),\r\n LastName NVARCHAR(20) NOT NULL,\r\n  $NVARCHAR(70), \r\n$ City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n untry NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(2 4),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n FOREIGN KEY (SupportRepId) REFERENCES "employees" portRepId INTEGER,\r\n (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "albums" $\r\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NUL  $L,\r\n$ FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON  $L,\r\n$ DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "tracks"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(20 0) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NUL GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n  $L.\r\n$ Millisecond s INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) N FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\t OT NULL,\r\n ON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERE NCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK EmployeeReport  $sTo\ ON\ "employees"\ (ReportsTo)\n\n===Additional\ Context\ \n\nIn\ the\ chinook$ database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explana tions for the question. \n2. If the provided context is almost sufficient bu t requires knowledge of a specific string in a particular column, please gen erate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. If the provide d context is insufficient, please explain why it can\'t be generated. \n4. P

lease use the most relevant table(s). \n5. If the question has been asked an d answered before, please repeat the answer exactly as it was given before. Get the total number of invoices \n'}, {'role': 'user', 'content': ' \n for each customer\n'}, {'role': 'assistant', 'content': ' SELECT "customer s".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customer s" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GR OUP BY "customers".CustomerId'}, {'role': 'user', 'content': 'what are the t op 5 countries that customers come from?'}, {'role': 'assistant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': 'How many customers ar e there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customer s"'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId FROM "custo mers"'}, {'role': 'user', 'content': ' \n List all albums and their corr esponding artist names \n'}, {'role': 'assistant', 'content': 'SELECT "albu ms".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': ' Find all tracks with a name containing "What" (case-insensitive)\n'}, {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHERE LOWER(Name) LIKE \'%what%\''}, {'role': 'user', 'content': 'Can you list all tables in t he SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite master WHERE type='table'"}, {'role': 'user', 'content': ' \n Find the total number of invoices per country:\n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCou ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" IC(10,2) NOT NULL,\r\n (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOIN InvoiceId INTEGER NOT NULL,\r\n CREMENT NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) NOT NULL,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackI d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices\" (CustomerI d)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (InvoiceId) \n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId)\n\nCR EATE TABLE \"employees\"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCR EMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVA RCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER.\r BirthDate DATETIME,\r\n HireDate DATETIME,\r\n \n Address NVARCHAR  $(70), \r\n$ City NVARCHAR(40),\r\n State NVARCHAR(40), \r\n Country NV PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n  $ARCHAR(40), \r\n$ Fax NVARCHAR(24),  $\r\n$ Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER

PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NUL Company NVARCHAR(80),\r\n LastName NVARCHAR(20) NOT NULL,\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVA Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n  $RCHAR(24), \r\n$ SupportRepId INTEGER.\r\n FOREIGN KEY (SupportRepId) REFERENCES \"employe es\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCR EATE TABLE \"albums\"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREMENT Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t NULL,\r\n \t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"tracks\"\r TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n VARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n iseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(1 FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) 0,2) NOT NULL,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreI d) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (MediaTypeId) REFERENCES \"media types\" (MediaTy peId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX I FK EmployeeReportsTo ON \"employees\" (ReportsTo)\n\n\===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n 1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is a lmost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strin gs in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it w as given before. \n"}, {"role": "user", "content": " \n Get the total nu mber of invoices for each customer\n"}, {"role": "assistant", "content": " S ELECT \"customers\".CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS TotalIn voices FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId"}, {"role": "use r", "content": "what are the top 5 countries that customers come from?"}, {"role": "assistant", "content": " SELECT Country, COUNT(\*) AS Count\nFROM c ustomers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": "How many customers are there"}, {"role": "assistant", "content": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": "which t able stores customer's orders"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId FROM \"customers\""}, {"role": "user", "content": " List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists\".Name AS Arti stName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".ArtistId = \"art ists\".ArtistId"}, {"role": "user", "content": " \n Find all tracks with a name containing \"What\" (case-insensitive)\n"}, {"role": "assistant", "co ntent": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIKE '%what%'"}, {"rol e": "user", "content": "Can you list all tables in the SQLite database catal og?"}, {"role": "assistant", "content": "SELECT name FROM sglite master WHER E type='table'"}, {"role": "user", "content": " \n Find the total number of invoices per country:\n"}]

Info: Ollama Response:

{'model': 'mistral:latest', 'created at': '2024-08-01T19:26:59.296409085Z', 'message': {'role': 'assistant', 'content': ' SELECT "customers".Country, CO UNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "in voices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customer s".Country'}, 'done reason': 'stop', 'done': True, 'total duration': 6910888 6667, 'load\_duration': 3266193, 'prompt\_eval\_count': 1749, 'prompt\_eval\_dura tion': 57883110000, 'eval count': 64, 'eval duration': 10321769000} LLM Response: SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customers".Customer Id = "invoices".CustomerId GROUP BY "customers".Country SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoice s".CustomerId GROUP BY "customers".Country

_	reastomeria citoor	Bi cascomers
	Country	TotalInvoices
0	Argentina	7
1	Australia	7
2	Austria	7
3	Belgium	7
4	Brazil	35
5	Canada	56
6	Chile	7
7	Czech Republic	14
8	Denmark	7
9	Finland	7
10	France	35
11	Germany	28
12	Hungary	7
13	India	13
14	Ireland	7
15	Italy	7
16	Netherlands	7
17	Norway	7
18	Poland	7
19	Portugal	14
20	Spain	7
21	Sweden	7
22	USA	91
23	United Kingdom	21
In	fo: Ollama paramet	ters:
mo	del=mistral:lates	t,

options={},

keep alive=None

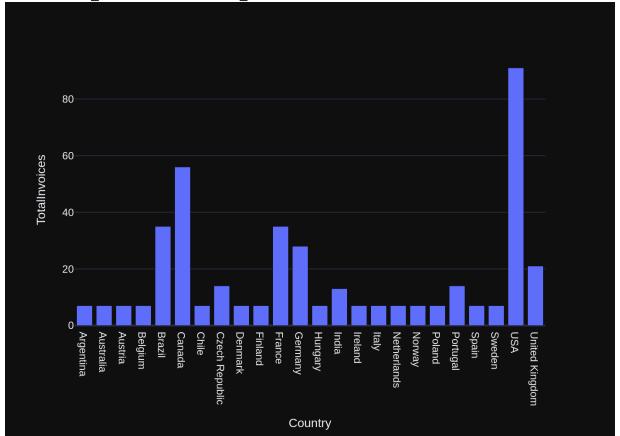
Info: Prompt Content:

[{"role": "system", "content": "The following is a pandas DataFrame that con tains the results of the query that answers the question the user asked: ' Find the total number of invoices per country:\n'\nThe DataFrame was produced using this query: SELECT \"customers\".Country, COUNT(\"invoices \".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOIN \"invoices \" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customer s\".Country\n\nThe following is information about the resulting pandas DataF rame 'df': \nRunning df.dtypes gives:\n Country object\nTotalInvoic int64\ndtype: object"}, {"role": "user", "content": "Can you generate the Python plotly code to chart the results of the dataframe? Assume the dat a is in a pandas dataframe called 'df'. If there is only one value in the da taframe, use an Indicator. Respond with only Python code. Do not answer with any explanations -- just the code."}]

Info: Ollama Response:

```
{'model': 'mistral:latest', 'created at': '2024-08-01T19:27:28.341551908Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres
```

s as px\nfig = px.bar("Country", "TotalInvoices", data=df)\nfig.update\_layou t(title="Total Number of Invoices per Country")\nif len(df) == 1:\n fig = px.scatter(x=[df["Country"].iloc[0]], y=[df["TotalInvoices"].iloc[0]], mode= \'markers\', marker=dict(color=\'red\', symbol="star"))\n fig.update\_layo ut(title="Single Invoice Count: {}".format(df["Country"].iloc[0]))\n```'}, 'done\_reason': 'stop', 'done': True, 'total\_duration': 29018321020, 'load\_du ration': 47638835, 'prompt\_eval\_count': 230, 'prompt\_eval\_duration': 7031804 000, 'eval count': 141, 'eval duration': 21888553000}



```
Out[23]: (' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvoic
          es FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invo
          ices".CustomerId GROUP BY "customers".Country',
                      Country TotalInvoices
          0
                    Argentina
                                           7
           1
                    Australia
           2
                                           7
                      Austria
           3
                                           7
                      Belgium
           4
                       Brazil
                                          35
           5
                       Canada
                                          56
                        Chile
                                           7
           6
           7
                                          14
               Czech Republic
                                           7
          8
                      Denmark
                                           7
          9
                      Finland
           10
                       France
                                          35
           11
                      Germany
                                          28
           12
                      Hungary
                                          7
           13
                        India
                                          13
                                           7
           14
                      Ireland
           15
                                           7
                        Italy
           16
                 Netherlands
                                           7
                                           7
           17
                       Norway
                                           7
           18
                       Poland
           19
                     Portugal
                                          14
          20
                        Spain
                                           7
                                           7
          21
                       Sweden
          22
                          USA
                                          91
          23 United Kingdom
                                          21,
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                         'type': 'bar',
                         'x': array(['Argentina', 'Australia', 'Austria', 'Belgium',
          'Brazil', 'Canada',
                                     'Chile', 'Czech Republic', 'Denmark', 'Finland',
          'France', 'Germany',
                                     'Hungary', 'India', 'Ireland', 'Italy', 'Netherl
          ands', 'Norway',
                                     'Poland', 'Portugal', 'Spain', 'Sweden', 'USA',
          'United Kingdom'],
                                    dtype=object),
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                         'y': array([ 7, 7, 7, 7, 35, 56, 7, 14, 7, 7, 35, 28,
          7, 13, 7, 7, 7, 7,
                                      7, 14, 7, 7, 91, 21]),
                         'yaxis': 'y'}],
               'layout': {'barmode': 'relative',
                          'legend': {'tracegroupgap': 0},
```

1, updating n results = 1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoice items"\r\n(\r\n iceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEG ER NOT NULL,\r\n TrackId INTEGER NOT NULL.\r\n UnitPrice NUMERIC(10. NOT NULL.\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (Invoice Id) REFERENCES "invoices" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t NO ACTION,\r\n \t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLi neInvoiceId ON "invoice items" (InvoiceId)\n\nCREATE TABLE "invoices"\r\n(\r InvoiceId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n d INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAd dress NVARCHAR(70),\r\n BillingCity NVARCHAR(40),\r\n BillingState NVA BillingCountry NVARCHAR(40),\r\n  $RCHAR(40), \r\n$ BillingPostalCode NVAR Total NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (Customer  $CHAR(10), \r\n$ Id) REFERENCES "customers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId)\n \nCREATE TABLE "tracks"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMEN Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n T NOT NULL,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARC Milliseconds INTEGER NOT NULL,\r\n Bvtes INTEGER.\r\n  $HAR(220), \r\n$ UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n OREIGN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTI ON ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media t ypes" (MediaTypeId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n CREATE INDEX IFK EmployeeReportsTo ON "employees" (ReportsTo)\n\nCREATE TABL CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT N E "customers"\r\n(\r\n FirstName NVARCHAR(40) NOT NULL,\r\n LastName NVARCHAR(20) ULL,\r\n NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r\n ity NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NVARCHAR(40),\r PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHA Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEGER,\r\n FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeId) \r\n\t\tON DE LETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "employees"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARC HAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r\n Title NVA BirthDate DATETIME,\r\n  $RCHAR(30), \r\n$ ReportsTo INTEGER,\r\n HireD ate DATETIME,\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n PostalCode NVARCHAR Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARC FOREIGN KEY (ReportsTo) REFERENCES "employees" (EmployeeId)  $HAR(60), \r\n$ \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK Cus tomerSupportRepId ON "customers" (SupportRepId)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n 1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is a lmost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strin gs in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can\'t b e generated. \n4. Please use the most relevant table(s). \n5. If the questio n has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': ' \n Get the total n

umber of invoices for each customer\n'}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoice s FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoice s".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': Find the total number of invoices per country:\n'}, {'role': 'assis tant', 'content': ' SELECT "customers".Country, COUNT("invoices"."InvoiceI d") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customers".C ustomerId = "invoices".CustomerId GROUP BY "customers".Country'}, {'role': 'user', 'content': 'How many customers are there'}, {'role': 'assistant', 'c ontent': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': 'what are the top 5 countries that customers come from?'}, {'role': 'assista nt', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP B Y Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': ' \n List all albums and their corresponding artist names \n'\}, {'role': 'assist ant', 'content': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'rol e': 'assistant', 'content': ' SELECT "customers".CustomerId FROM "customer s"'}, {'role': 'user', 'content': ' \n Find all tracks with a name conta ining "What" (case-insensitive)\n'}, {'role': 'assistant', 'content': ' SELE CT \* FROM "tracks" WHERE LOWER(Name) LIKE \'%what%\''}, {'role': 'user', 'co ntent': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='tabl e'"}, {'role': 'user', 'content': ' \n List all invoices with a total ex ceeding  $$10:\n'}$ Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NU  $LL,\r\n$ TrackId INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NU Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERE NCES \"invoices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO N, r nFOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON D ELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineInvo iceId ON \"invoice items\" (InvoiceId)\n\nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTE GER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress BillingCity NVARCHAR(40),\r\n  $NVARCHAR(70), \r\n$ BillingState NVARCHAR  $(40), \r\n$ BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR (10), r nTotal NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices\" (CustomerId) \n\nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCR EMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGE MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Milliseconds INTEGER NOT NULL,\r\n oser NVARCHAR(220),\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) GER.\r\n REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACT FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON  $ION, \r\n$ 

DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFER ENCES \"media types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK EmployeeReportsTo ON \"employees\" (ReportsT o)\n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n Name NVARCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVA State NVARCHAR(40),\r\n City NVARCHAR(40),\r\n  $RCHAR(70).\r\n$ ry NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(2 Fax NVARCHAR(24),\r\n 4),\r\n Email NVARCHAR(60) NOT NULL,\r\n portRepId INTEGER,\r\n FOREIGN KEY (SupportRepId) REFERENCES \"employees \" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREA TE TABLE \"employees\"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREM LastName NVARCHAR(20) NOT NULL,\r\n ENT NOT NULL,\r\n FirstName NVARC HAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NVARCHAR PostalCode NVARCHAR(10),\r\n (40), r nPhone NVARCHAR(24),\r\n  $NVARCHAR(24), \r\n$ Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFE RENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO A CTION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON \"customers\" (Suppor  $tRepId)\n\n===Additional Context \n\nIn the chinook database invoice means$ order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQ L query to find the distinct strings in that column. Prepend the guery with a comment saying intermediate sql \n3. If the provided context is insufficie nt, please explain why it can't be generated. \n4. Please use the most relev ant table(s). \n5. If the question has been asked and answered before, pleas e repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": " \n Get the total number of invoices for each customer\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId, COUNT (\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "content": " \n tal number of invoices per country:\n"}, {"role": "assistant", "content": " SELECT \"customers\".Country, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvo ices FROM \"customers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".Country"}, {"role": "user", "content": "How many customers are there"}, {"role": "assistant", "content": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": "what ar e the top 5 countries that customers come from?"}, {"role": "assistant", "co ntent": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Countr y\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists\".Name AS ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".ArtistId = \"artists\".Artis tId"}, {"role": "user", "content": "which table stores customer's orders"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId FROM \"cu stomers\""}, {"role": "user", "content": " \n Find all tracks with a nam e containing \"What\" (case-insensitive)\n"}, {"role": "assistant", "conten t": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIKE '%what%'"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalo g?"}, {"role": "assistant", "content": "SELECT name FROM sqlite\_master WHERE type='table'"}, {"role": "user", "content": " \n List all invoices with a total exceeding \$10:\n"}]

```
Info: Ollama Response:
```

{'model': 'mistral:latest', 'created\_at': '2024-08-01T19:28:35.66307132Z',
'message': {'role': 'assistant', 'content': ' SELECT InvoiceId, InvoiceDate,
CustomerId, BillingAddress, BillingCity, BillingState, BillingCountry, Billi
ngPostalCode, Total FROM "invoices" WHERE Total > 10'}, 'done\_reason': 'sto
p', 'done': True, 'total\_duration': 67199876737, 'load\_duration': 2905425,
'prompt\_eval\_count': 1759, 'prompt\_eval\_duration': 58319121000, 'eval\_coun
t': 49, 'eval duration': 7871853000}

LLM Response: SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingCountry, BillingPostalCode, Total FROM "invoices" WHERE Total > 10

SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingCountry, BillingPostalCode, Total FROM "invoices" WHERE To tal > 10

BillingAddress	CustomerId	InvoiceDate	InvoiceId	
69 Salem Street	23	2009-01-11 00:00:00	5	0
Theodor-Heuss-Straße 34	2	2009-02-11 00:00:00	12	1
8, Rue Hanovre	40	2009-03-14 00:00:00	19	2
1 Infinite Loop	19	2009-04-14 00:00:00	26	3
Calle Lira, 198	57	2009-05-15 00:00:00	33	4
Rua Dr. Falcão Filho, 155	10	2013-08-12 00:00:00	383	59
Lijnbaansgracht 120bg	48	2013-09-12 00:00:00	390	60
1033 N Park Ave	27	2013-10-13 00:00:00	397	61
Rilská 3174/6	6	2013-11-13 00:00:00	404	62
Porthaninkatu 9	44	2013-12-14 00:00:00	411	63
	Theodor-Heuss-Straße 34 8, Rue Hanovre 1 Infinite Loop Calle Lira, 198  Rua Dr. Falcão Filho, 155 Lijnbaansgracht 120bg 1033 N Park Ave Rilská 3174/6	23 69 Salem Street 2 Theodor-Heuss-Straße 34 40 8, Rue Hanovre 19 1 Infinite Loop 57 Calle Lira, 198 10 Rua Dr. Falcão Filho, 155 48 Lijnbaansgracht 120bg 27 1033 N Park Ave 6 Rilská 3174/6	2009-01-11 00:00:00       23       69 Salem Street         2009-02-11 00:00:00       2 Theodor-Heuss-Straße 34         2009-03-14 00:00:00       40       8, Rue Hanovre         2009-04-14 00:00:00       19       1 Infinite Loop         2009-05-15 00:00:00       57       Calle Lira, 198              2013-08-12 00:00:00       10 Rua Dr. Falcão Filho, 155         2013-09-12 00:00:00       48 Lijnbaansgracht 120bg         2013-10-13 00:00:00       27       1033 N Park Ave         2013-11-13 00:00:00       6 Rilská 3174/6	5       2009-01-11       00:00:00       23       69 Salem Street         12       2009-02-11       00:00:00       2       Theodor-Heuss-Straße 34         19       2009-03-14       00:00:00       40       8, Rue Hanovre         26       2009-04-14       00:00:00       19       1 Infinite Loop         33       2009-05-15       00:00:00       57       Calle Lira, 198               383       2013-08-12       00:00:00       10       Rua Dr. Falcão Filho, 155         390       2013-09-12       00:00:00       48       Lijnbaansgracht 120bg         397       2013-10-13       00:00:00       27       1033       N Park Ave         404       2013-11-13       00:00:00       6       Rilská       3174/6

	BillingCity	BillingState	BillingCountry	BillingPostalCode	Total
0	Boston	MA	USA	2113	13.86
1	Stuttgart	None	Germany	70174	13.86
2	Paris	None	France	75002	13.86
3	Cupertino	CA	USA	95014	13.86
4	Santiago	None	Chile	None	13.86
59	São Paulo	SP	Brazil	01007-010	13.86
60	Amsterdam	VV	Netherlands	1016	13.86
61	Tucson	AZ	USA	85719	13.86
62	Prague	None	Czech Republic	14300	25.86
63	Helsinki	None	Finland	00530	13.86

[64 rows x 9 columns]

Info: Ollama parameters:
model=mistral:latest,

options={},

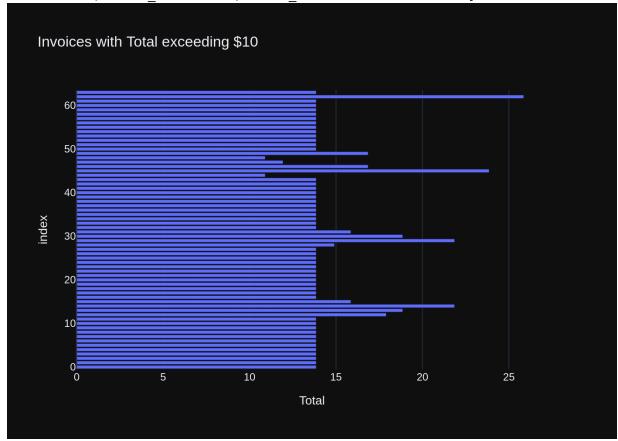
keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "The following is a pandas DataFrame that con tains the results of the query that answers the question the user asked: ' List all invoices with a total exceeding \$10:\n'\nThe DataFrame was produced using this query: SELECT InvoiceId, InvoiceDate, CustomerId, Billi ngAddress, BillingCity, BillingState, BillingCountry, BillingPostalCode, Tot al FROM \"invoices\" WHERE Total > 10\n\nThe following is information about the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n InvoiceId int64\nInvoiceDate object\nCustomerId int64\nBillingAd object\nBillingCity object\nBillingState obj ect\nBillingCountry object\nBillingPostalCode object\nTotal

float64\ndtype: object"}, {"role": "user", "content": "Can you generate the Python plotly code to chart the results of the dataframe? Assume the data is in a pandas dataframe called 'df'. If there is only one value in the datafra me, use an Indicator. Respond with only Python code. Do not answer with any explanations -- just the code."}]

Info: Ollama Response:



	tal > 10', InvoiceId	Invo		Custome			illingAd	
\	INVOICCIU	11100	лесьасс	cuscome	. i I u	В.	rccingAu	ui c33
`O	5	2009-01-11 0	00:00:00		23	69	Salem S	treet
1	12	2009-02-11 0			2	Theodor-He		
2	19	2009-03-14 0			40		, Rue Ha	
3	26	2009-04-14 0			19		Infinite	
4	33	2009-05-15 0			57		lle Lira	•
59	383	2013-08-12 0	00:00:00		10	Rua Dr. Falca	ão Filho	, 155
60	390	2013-09-12 0	00:00:00		48	Lijnbaan	sgracht	120bg
61	397	2013-10-13 6	00:00:00		27	103	33 N Par	k Ave
62	404	2013-11-13 0	00:00:00		6	I	Rilská 3	174/6
63	411	2013-12-14 6	00:00:00		44	Po	rthanink	atu 9
F	RillingCity	/ BillingState	Rilli	naCount ry	/ Bil	lingPostalCode	e Total	
0	Bostor	-		USA		2113		
1	Stuttgart			Germany		7017		
2	Paris			France		7500		
3	Cupertino			USA		9501		
4	Santiago			Chile		None		
59	São Paulo			Brazil	L	01007-01		
60	Amsterdam	n VV	/ Ne	therlands	5	101	6 13.86	i
61	Tucsor	n AZ	<del>7</del> -	USA	A	8571	9 13.86	
62	Prague	e None	Czech	Republic		1430	9 25.86	i
63	Helsinki	i None	9	Finland	d	0053	9 13.86	i
	rows x 9 ( ure({ 'data': [	<pre>('alignmentgro 'hovertemplat 'legendgroup' 'marker': {'o 'name': '', 'offsetgroup' 'orientation' 'showlegend': 'textpositior 'type': 'bar'</pre>	e': 'To : '', color': : '', : 'h', False, n': 'aut	tal=%{x}< '#636efa' 0',	', 'p	ndex=%{y} <ext attern': {'sha</ext 	ape': ''	}},
13.86	6, 13.86, 1	L3.86,				13.86, 13.86,		
13.86	6, 13.86, 1		13.86, 1	3.86, 17.	.91,	18.86, 21.86,	15.86,	13.86,
12.06	5 14 01 5		3.86, 1	3.86, 13.	.86,	13.86, 13.86,	13.86,	13.86,
13.80	5, 14.91, 2		8.86. 1	5.86. 13.	.86.	13.86, 13.86,	13.86.	13.86.
13.86	6, 13.86, 1				,	,		,
		1	3.86, 1	3.86, 13.	86,	13.86, 10.91,	23.86,	16.86,
11.94	4, 10.91, 1	L6.86,						
		1	3.86, 1	3.86, 13.	.86,	13.86, 13.86,	13.86,	13.86,
13.86	5, 13.86, 1							
				3.86, 25.	.86,	13.86]),		
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         30, 31, 32, 33, 34, 35,
                                     36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47,
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               'layout': {'barmode': 'relative',
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                          'title': {'text': 'Invoices with Total exceeding $10'},
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
         ext': 'Total'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
         ext': 'index'}}}
          }))
         question = """
In [25]:
             Find all invoices since 2010 and the total amount invoiced:
         vn.ask(question=question)
```

Number of requested results 10 is greater than number of elements in index 9, updating  $n_results = 9$ Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$  SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n otal NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES "cu stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE TABLE "invoice items"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n NTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Ouantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (Inv oiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON "invoice items" (InvoiceId)\n\nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId) \n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nCREA TE TABLE "employees"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREMEN LastName NVARCHAR(20) NOT NULL,\r\n T NOT NULL,\r\n FirstName NVARCHA Title NVARCHAR(30),\r\n R(20) NOT NULL,\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r State NVARCHAR(40),\r\n City NVARCHAR(40),\r\n Country NVARCHAR PostalCode NVARCHAR(10).\r\n Phone NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFE  $NVARCHAR(24).\r\n$ RENCES "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACT ION\r\n)\n\nCREATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n  $NVARCHAR(70), \r\n$ City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n untry NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(2 4),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n FOREIGN KEY (SupportRepId) REFERENCES "employees" portRepId INTEGER,\r\n (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "tracks"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL Name NVARCHAR(200) NOT NULL, $\r\n$ AlbumId INTEGER,\r\n TypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(2 Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n Uni tPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "alb ums" (Albumid) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n F0RFT GN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\t0N DELETE NO ACTION 0 N UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media type s" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCRE ATE TABLE "albums"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT Title NVARCHAR(160) NOT NULL,\r\n NULL,\r\n ArtistId INTEGER NOT NUL FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON L,\r\n DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist track"\r PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r  $n(\r\n$ CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\tON DELE TE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "t racks" (TrackId)  $\r \n \$  DELETE NO ACTION ON UPDATE NO ACTION $\r \n \$ ==Additional Context \n\nIn the chinook database invoice means order\n\n===R esponse Guidelines \n1. If the provided context is sufficient, please genera te a valid SQL query without any explanations for the question. \n2. If the

provided context is almost sufficient but requires knowledge of a specific s tring in a particular column, please generate an intermediate SQL query to f ind the distinct strings in that column. Prepend the query with a comment sa ying intermediate sql \n3. If the provided context is insufficient, please e xplain why it can\'t be generated. \n4. Please use the most relevant table (s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': List all invoices with a total exceeding \$10:\n'}, {'role': 'assist ant', 'content': ' SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddres s, BillingCity, BillingState, BillingCountry, BillingPostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'content': ' \n total number of invoices per country:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoice s".CustomerId GROUP BY "customers".Country'}, {'role': 'user', 'content': ' Get the total number of invoices for each customer\n'}, {'role': 'assi stant', 'content': ' SELECT "customers".CustomerId, COUNT("invoices"."Invoic eId") AS TotalInvoices FROM "customers" LEFT JOIN "invoices" ON "customers". CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'rol e': 'user', 'content': 'How many customers are there'}, {'role': 'assistan 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'conte nt': 'what are the top 5 countries that customers come from?'}, {'role': 'as sistant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGR OUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId FROM "customers"'}, {'role': 'user', 'conten Find all tracks with a name containing "What" (case-insensitiv e)\n'}, {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHERE LOWE R(Name) LIKE \'%what%\''}, {'role': 'user', 'content': ' \n List all alb ums and their corresponding artist names \n'}, {'role': 'assistant', 'conte nt': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" IN NER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'us er', 'content': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite master WHERE type ='table'"}, {'role': 'user', 'content': ' \n Find all invoices since 201 0 and the total amount invoiced:\n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n IC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOIN CREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackI

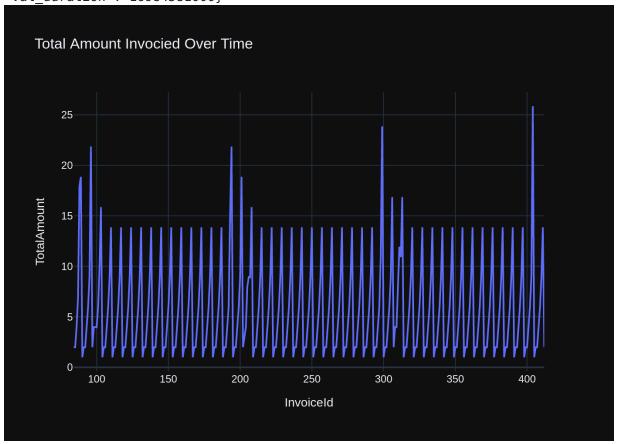
d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (I nvoiceId)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices\" (CustomerId) \n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId)\n\nCR EATE TABLE \"employees\"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCR EMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVA RCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER.\r BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR \n State NVARCHAR(40),\r\n  $(70), \r\n$ City NVARCHAR(40),\r\n Country NV  $ARCHAR(40), \r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NUL LastName NVARCHAR(20) NOT NULL,\r\n  $L,\r\n$ Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n  $RCHAR(24), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEGER,\r\n FOREIGN KEY (SupportRepId) REFERENCES \"employe es\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCR EATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARC  $HAR(220), \r\n$ Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO A CTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES \"med ia types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r  $\n)\n\n\CREATE TABLE <math>\adjums\"\r\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOI Title NVARCHAR(160) NOT NULL,\r\n NCREMENT NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (Artist EGER NOT NULL,\r\n Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"p laylist track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INT EGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES \"playlists\" (Playlist Id) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Tra ckid) REFERENCES \"tracks\" (Trackid) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook database invoic e means order\n\n===Response Guidelines \n1. If the provided context is suff icient, please generate a valid SQL query without any explanations for the q uestion. \n2. If the provided context is almost sufficient but requires know ledge of a specific string in a particular column, please generate an interm ediate SQL query to find the distinct strings in that column. Prepend the qu ery with a comment saying intermediate sql \n3. If the provided context is i nsufficient, please explain why it can't be generated. \n4. Please use the m ost relevant table(s). \n5. If the question has been asked and answered befo re, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": " \n List all invoices with a total exceeding \$1 0:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, InvoiceDate, Cu stomerId, BillingAddress, BillingCity, BillingState, BillingCountry, Billing PostalCode, Total FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "co Find the total number of invoices per country:\n"}, {"rol e": "assistant", "content": " SELECT \"customers\".Country, COUNT(\"invoices \".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOIN \"invoices \" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customer

```
s\".Country"}, {"role": "user", "content": " \n
                                                  Get the total number of
invoices for each customer\n"}, {"role": "assistant", "content": " SELECT
\"customers\".CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices
FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"in
voices\".CustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "c
ontent": "How many customers are there"}, {"role": "assistant", "content": "
SELECT COUNT(*) FROM \"customers\""}, {"role": "user", "content": "what are
the top 5 countries that customers come from?"}, {"role": "assistant", "cont
ent": " SELECT Country, COUNT(*) AS Count\nFROM customers\nGROUP BY Country
\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": "which table s
tores customer's orders"}, {"role": "assistant", "content": " SELECT \"custo
mers\".CustomerId FROM \"customers\""}, {"role": "user", "content": " \n
Find all tracks with a name containing \"What\" (case-insensitive)\n"}, {"ro
le": "assistant", "content": " SELECT * FROM \"tracks\" WHERE LOWER(Name) LI
KE '%what%'"}, {"role": "user", "content": " \n List all albums and thei
r corresponding artist names \n"}, {"role": "assistant", "content": "SELECT
\"albums\".AlbumId, \"artists\".Name AS ArtistName FROM \"albums\" INNER JOI
N \"artists\" ON \"albums\".ArtistId = \"artists\".ArtistId"}, {"role": "use
r", "content": "Can you list all tables in the SQLite database catalog?"},
{"role": "assistant", "content": "SELECT name FROM sqlite_master WHERE type
='table'"}, {"role": "user", "content": " \n Find all invoices since 201
0 and the total amount invoiced:\n"}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:30:16.150489682Z',
'message': {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Total) A
                  FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDate) >=
S TotalAmount\n
\'2010\'\n GROUP BY InvoiceId'}, 'done_reason': 'stop', 'done': True, 'tot
al duration': 77241634702, 'load duration': 3039827, 'prompt eval count': 20
24, 'prompt eval duration': 67320240000, 'eval count': 53, 'eval duration':
8706232000}
LLM Response: SELECT InvoiceId, SUM(Total) AS TotalAmount
   FROM "invoices"
   WHERE strftime('%Y', InvoiceDate) >= '2010'
   GROUP BY InvoiceId
 SELECT InvoiceId, SUM(Total) AS TotalAmount
   FROM "invoices"
   WHERE strftime('%Y', InvoiceDate) >= '2010'
   GROUP BY InvoiceId
     InvoiceId TotalAmount
0
            84
                       1.98
1
            85
                       1.98
2
            86
                       3.96
3
            87
                       6.94
4
            88
                      17.91
           . . .
324
           408
                       3.96
325
           409
                       5.94
326
           410
                       8.91
327
           411
                      13.86
328
           412
                       1.99
[329 rows x 2 columns]
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
```

Info: Prompt Content:

[{"role": "system", "content": "The following is a pandas DataFrame that con tains the results of the query that answers the question the user asked: '\n Find all invoices since 2010 and the total amount invoiced:\n'\n\nThe DataFrame was produced using this query: SELECT InvoiceId, SUM(Total) AS To talAmount\n FROM \"invoices\"\n WHERE strftime('%Y', InvoiceDate) >= '20 10'\n GROUP BY InvoiceId\n\nThe following is information about the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n InvoiceId int6 4\nTotalAmount float64\ndtype: object"}, {"role": "user", "content": "Can you generate the Python plotly code to chart the results of the dataframe? A ssume the data is in a pandas dataframe called 'df'. If there is only one value in the dataframe, use an Indicator. Respond with only Python code. Do not answer with any explanations -- just the code."}]

Info: Ollama Response:



```
Out[25]: (' SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM "invoices"\n
                                                                                  WHER
          E strftime(\'%Y\', InvoiceDate) >= \'2010\'\n GROUP BY InvoiceId',
                InvoiceId TotalAmount
           0
                       84
                                  1.98
           1
                       85
                                  1.98
           2
                                  3.96
                       86
           3
                       87
                                  6.94
           4
                       88
                                 17.91
                      . . .
                                   . . .
          324
                      408
                                  3.96
                                  5.94
           325
                      409
           326
                      410
                                  8.91
           327
                                 13.86
                      411
          328
                      412
                                  1.99
           [329 rows \times 2 columns],
           Figure({
               'data': [{'hovertemplate': 'InvoiceId=%{x}<br>TotalAmount=%{y}<extra>
          </extra>',
                         'legendgroup': '',
                         'line': {'color': '#636efa', 'dash': 'solid'},
                         'marker': {'symbol': 'circle'},
                         'mode': 'lines',
                         'name': '',
                         'orientation': 'v',
                         'showlegend': False,
                         'type': 'scatter',
                         'x': array([ 84, 85, 86, ..., 410, 411, 412]).
                         'xaxis': 'x',
                         'y': array([ 1.98, 1.98, 3.96, ..., 8.91, 13.86, 1.99]),
                         'yaxis': 'y'}],
               'layout': {'legend': {'tracegroupgap': 0},
                          'template': '...',
                          'title': {'text': 'Total Amount Invocied Over Time'},
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'InvoiceId'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'TotalAmount'}}}
          }))
In [26]: question = """
             List all employees and their reporting manager's name (if any):
         vn.ask(question=question)
        Number of requested results 10 is greater than number of elements in index
        1, updating n results = 1
```

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE INDEX IFK EmployeeReportsTo ON "employ ees" (ReportsTo)\n\nCREATE TABLE "employees"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL.\r\n LastName NVARCHAR(20) NOT NUL FirstName NVARCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVA  $RCHAR(24), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIG N KEY (ReportsTo) REFERENCES "employees" (EmployeeId) \r\n\t\t0N DELETE NO A CTION ON UPDATE NO ACTION\r\n)\n\CREATE TABLE "customers"\r\n(\r\n merId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR LastName NVARCHAR(20) NOT NULL,\r\n (40) NOT NULL,\r\n Company NVARC  $HAR(80), \r\n$ Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n  $NVARCHAR(40), \r\n$ Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60) SupportRepId INTEGER.\r\n FOREIGN KEY (SupportRepId) REF ERENCES "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO AC TION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON "customers" (SupportRe pId)\n\nCREATE TABLE "invoices"\r\n(\r\n InvoiceId INTEGER PRIMARY KEY AU TOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDat e DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n  $NVARCHAR(40), \r\n$ BillingState NVARCHAR(40),\r\n BillingCountry NVARCH  $AR(40), \r\n$ BillingPostalCode NVARCHAR(10),\r\n Total NUMERIC(10,2) N FOREIGN KEY (CustomerId) REFERENCES "customers" (CustomerId) OT NULL,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "invoic InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL e items"\r\n(\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n L.\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "trac ks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "artists"\r\n(\r\n ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT N Name NVARCHAR(120) $\r\n)\n\n$ CREATE TABLE "tracks" $\r\n(\r\n$ ckId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER UnitPrice NUMERIC(10,2) NOT NULL,\r NOT NULL,\r\n Bytes INTEGER,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE \n NO ACTION ON UPDATE NO ACTION.\r\n FOREIGN KEY (GenreId) REFERENCES "genr es" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n N KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "albums"\r\n(\r\n mId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) ArtistId INTEGER NOT NULL,\r\n NOT NULL.\r\n FOREIGN KEY (ArtistId) R EFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTI ON\r\n)\n\nCREATE TABLE sqlite stat1(tbl,idx,stat)\n\n\n===Additional Contex t \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL guer y without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particula r column, please generate an intermediate SQL query to find the distinct str ings in that column. Prepend the query with a comment saying intermediate sq l \n3. If the provided context is insufficient, please explain why it can\'t

be generated. \n4. Please use the most relevant table(s). \n5. If the questi on has been asked and answered before, please repeat the answer exactly as i t was given before. \n'}, {'role': 'user', 'content': 'what are the top 5 co untries that customers come from?'}, {'role': 'assistant', 'content': ' SELE CT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Co unt DESC\nLIMIT 5'}, {'role': 'user', 'content': ' \n Find all invoices since 2010 and the total amount invoiced:\n'}, {'role': 'assistant', 'conten t': 'SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM "invoices"\n ERE strftime(\' $^{Y}$ \', InvoiceDate) >= \'2010\'\n GROUP BY InvoiceId'}, {'ro le': 'user', 'content': ' \n List all invoices with a total exceeding \$1 0:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, InvoiceDate, Cu stomerId, BillingAddress, BillingCity, BillingState, BillingCountry, Billing PostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'cont List all albums and their corresponding artist names \n'}, {'role': 'assistant', 'content': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artist s".ArtistId'}, {'role': 'user', 'content': ' \n Get the total number of invoices for each customer\n'}, {'role': 'assistant', 'content': ' SELECT "c ustomers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "c ustomers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".Custom erId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': "which t able stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId FROM "customers"'}, {'role': 'user', 'content': ' \n Find the total number of invoices per country:\n'}, {'role': 'assistant', 'c ontent': ' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS Tota lInvoices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".Country'}, {'role': 'user', 'cont ent': 'How many customers are there'}, {'role': 'assistant', 'content': ' SE LECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'conten t': "SELECT name FROM sqlite master WHERE type='table'"}, {'role': 'user', 'content': ' \n Find all tracks with a name containing "What" (case-inse nsitive)\n'}, {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHER E LOWER(Name) LIKE \'%what%\''}, {'role': 'user', 'content': " \n ll employees and their reporting manager's name (if any):\n"}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE INDEX IFK EmployeeReportsTo ON \"employees\" (Repo rtsTo)\n\nCREATE TABLE \"employees\"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n irstName NVARCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n  $NVARCHAR(70), \r\n$ untry NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(2 Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n 4),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTIO N ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"customers\"\r\n(\r\n rId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(4 0) NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n Company NVARCHA Address NVARCHAR(70),\r\n  $R(80), \r\n$ City NVARCHAR(40),\r\n State N

 $VARCHAR(40), \r\n$ Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEGER,\r\n FOREIGN KEY (SupportRepId) REF ERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON \"customers\" (Suppo rtRepId)\n\nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER PRIMARY CustomerId INTEGER NOT NULL,\r\n KEY AUTOINCREMENT NOT NULL,\r\n iceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n Billi ngCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCountry BillingPostalCode NVARCHAR(10),\r\n Total NUMERIC(1 0,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (Cu stomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TAB LE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCRE MENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER N UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER OT NULL,\r\n NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) FOREIGN KEY (TrackI \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"artists\"\r\n(\r\n ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\nCREATE TABLE TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r \"tracks\"\r\n(\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaType GenreId INTEGER,\r\n Composer NVARCHAR(22 Id INTEGER NOT NULL,\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n Price NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"alb ums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n IGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTIO N ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES \"media t ypes\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n Albumid INTEGER PRIMARY KEY AUTOINCREM \nCREATE TABLE \"albums\"\r\n(\r\n ENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r NOT NULL,\r\n \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE sqlite st atl(tbl,idx,stat) $\n\n===Additional$  Context  $\n\n$  the chinook database inv oice means order\n\n===Response Guidelines \n1. If the provided context is s ufficient, please generate a valid SQL query without any explanations for th e question. \n2. If the provided context is almost sufficient but requires k nowledge of a specific string in a particular column, please generate an int ermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered bef ore, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": "what are the top 5 countries that customers come fro m?"}, {"role": "assistant", "content": " SELECT Country, COUNT(\*) AS Count\n FROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n Find all invoices since 2010 and the total amoun t invoiced:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, SUM(To tal) AS TotalAmount\n FROM \"invoices\"\n WHERE strftime('%Y', InvoiceDa GROUP BY InvoiceId"}, {"role": "user", "content": " \n te) >= '2010'\n List all invoices with a total exceeding \$10:\n"}, {"role": "assistant", "co ntent": " SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, Billing City, BillingState, BillingCountry, BillingPostalCode, Total FROM \"invoices \" WHERE Total > 10"}, {"role": "user", "content": " \n List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists\".Name AS ArtistName FROM \"albums\" I

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NNER JOIN \"artists\" ON \"albums\".ArtistId = \"artists\".ArtistId"}, {"rol
e": "user", "content": " \n
                               Get the total number of invoices for each cu
stomer\n"}, {"role": "assistant", "content": " SELECT \"customers\".Customer
Id, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LE
FT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId G
ROUP BY \"customers\".CustomerId"}, {"role": "user", "content": "which table
stores customer's orders"}, {"role": "assistant", "content": " SELECT \"cust
omers\".CustomerId FROM \"customers\""}, {"role": "user", "content": " \n
Find the total number of invoices per country:\n"}, {"role": "assistant", "c
ontent": " SELECT \"customers\".Country, COUNT(\"invoices\".\"InvoiceId\") A
S TotalInvoices FROM \"customers\" INNER JOIN \"invoices\" ON \"customers\".
CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".Country"}, {"rol
e": "user", "content": "How many customers are there"}, {"role": "assistan
t", "content": " SELECT COUNT(*) FROM \"customers\""}, {"role": "user", "con
tent": "Can you list all tables in the SQLite database catalog?"}, {"role":
"assistant", "content": "SELECT name FROM sqlite master WHERE type='tabl
e'"}, {"role": "user", "content": " \n Find all tracks with a name conta
ining \"What\" (case-insensitive)\n"}, {"role": "assistant", "content": " SE
LECT * FROM \"tracks\" WHERE LOWER(Name) LIKE '%what%'"}, {"role": "user",
"content": " \n
                   List all employees and their reporting manager's name (i
f any):\n"}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:31:58.433331568Z',
'message': {'role': 'assistant', 'content': ' SELECT el.LastName, el.FirstNa
me, e2.LastName, e2.FirstName AS ReportingManager\n FROM employees e1\n
LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID; '}, 'done reason': 's
top', 'done': True, 'total_duration': 77677282499, 'load_duration': 3991203,
'prompt eval count': 1991, 'prompt eval duration': 66471945000, 'eval coun
t': 60, 'eval duration': 9862077000}
LLM Response: SELECT el.LastName, el.FirstName, e2.LastName, e2.FirstName A
S ReportingManager
   FROM employees el
   LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID;
Info: Output from LLM: SELECT el.LastName, el.FirstName, e2.LastName, e2.Fi
rstName AS ReportingManager
   FROM employees el
   LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID;
Extracted SQL: SELECT el.LastName, el.FirstName, e2.LastName, e2.FirstName A
S ReportingManager
   FROM employees el
   LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID
SELECT el.LastName, el.FirstName, e2.LastName, e2.FirstName AS ReportingMana
   FROM employees el
   LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID
   LastName FirstName LastName ReportingManager
0
      Adams
              Andrew
                           None
                                            None
1
    Edwards
                Nancy
                          Adams
                                          Andrew
2
    Peacock
                 Jane
                        Edwards
                                           Nancy
3
       Park Margaret
                       Edwards
                                           Nancy
4
                        Edwards
   Johnson
                Steve
                                          Nancy
5 Mitchell
             Michael
                          Adams
                                          Andrew
              Robert Mitchell
                                         Michael
6
       Kina
7 Callahan
               Laura Mitchell
                                         Michael
Info: Ollama parameters:
model=mistral:latest,
```

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options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
      List all employees and their reporting manager's name (if any):\n'\n\n
The DataFrame was produced using this guery: SELECT el.LastName, el.FirstNam
e, e2.LastName, e2.FirstName AS ReportingManager\n
                                                     FROM employees e1\n
EFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID\n\nThe following is in
formation about the resulting pandas DataFrame 'df': \nRunning df.dtypes giv
es:\n LastName
                          object\nFirstName
                                                      object\nLastName
                            object\ndtype: object"}, {"role": "user", "conte
object\nReportingManager
nt": "Can you generate the Python plotly code to chart the results of the da
taframe? Assume the data is in a pandas dataframe called 'df'. If there is o
nly one value in the dataframe, use an Indicator. Respond with only Python c
ode. Do not answer with any explanations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created_at': '2024-08-01T19:32:28.253364012Z',
'message': {'role': 'assistant', 'content': "```python\nimport plotly.expres
s as px\n = px.bar(df, x='LastName', y='FirstName', color='ReportingMan')
ager', barmode='group')\nfig.update layout(margin=dict(l=0, r=0, t=0, b=0))
\nfig.update traces(marker colorscale=px.colors.qualitative.Plotly)\nif len
                fig = px.scatter(df, x='LastName', y=None, name='Employee',
(df) == 1:\n
marker=dict(color='black', symbol='circle'))\n```"}, 'done_reason': 'stop',
'done': True, 'total_duration': 29799967208, 'load_duration': 4030873, 'prom
pt eval count': 235, 'prompt eval duration': 7188139000, 'eval count': 145,
'eval duration': 22477398000}
Couldn't run plotly code: The truth value of a Series is ambiguous. Use a.e
mpty, a.bool(), a.item(), a.any() or a.all().
```

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Traceback (most recent call last):
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/vann
a/base/base.py", line 1999, in get plotly figure
   exec(plotly_code, globals(), ldict)
 File "<string>", line 3, in <module>
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/plotl
y/express/ chart types.py", line 373, in bar
   return make figure(
          ^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/plotl
y/express/_core.py", line 2090, in make_figure
   args = build dataframe(args, constructor)
          ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/plotl
y/express/_core.py", line 1492, in build dataframe
   df output, wide id vars = process args into dataframe(
                           ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/plotl
y/express/ core.py", line 1228, in process args into dataframe
   df output[col name] = to unindexed series(
                       ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/plotl
y/express/ core.py", line 1076, in to unindexed series
   return pd.Series(x, name=name).reset index(drop=True)
          ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/panda
s/core/series.py", line 584, in __init_
   data = sanitize array(data, index, dtype, copy)
          ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/panda
s/core/construction.py", line 633, in sanitize array
   return sanitize arrav(
          ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/panda
s/core/construction.py", line 606, in sanitize array
   subarr = maybe infer to datetimelike(data)
            ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/panda
s/core/dtypes/cast.py", line 1182, in maybe infer to datetimelike
   raise ValueError(value.ndim) # pragma: no cover
   ^^^^^
ValueError: 2
During handling of the above exception, another exception occurred:
Traceback (most recent call last):
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/vann
a/base/base.py", line 1675, in ask
   fig = self.get plotly figure(plotly code=plotly code, df=df)
         ^^^^^
 File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/vann
a/base/base.py", line 2016, in get plotly figure
   elif len(categorical cols) >= 1 and df[categorical cols[0]].nunique() <</pre>
10:
                                    ^^^^^
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File "/home/gongai/anaconda3/envs/vanna/lib/python3.11/site-packages/panda
s/core/generic.py", line 1577, in __nonzero__
    raise ValueError(
ValueError: The truth value of a Series is ambiguous. Use a.empty, a.bool(),
a.item(), a.any() or a.all().
```

Number of requested results 10 is greater than number of elements in index 1, updating n results =1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N ULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n FOREIGN KEY (CustomerId) REFERENCES "cu otal NUMERIC(10,2) NOT NULL,\r\n stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE IN DEX IFK InvoiceLineInvoiceId ON "invoice items" (InvoiceId)\n\nCREATE TABLE InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT "invoice items"\r\n(\r\n NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NU UnitPrice NUMERIC(10,2) NOT NULL,\r\n LL,\r\n Quantity INTEGER NOT N FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t ULL,\r\n \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nC REATE TABLE sglite stat1(tbl,idx,stat)\n\nCREATE INDEX IFK CustomerSupportRe pId ON "customers" (SupportRepId)\n\nCREATE TABLE "customers"\r\n(\r\n stomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCH AR(40) NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n Company NVA  $RCHAR(80), \r\n$ Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n te NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n PostalCode NVARCHAR(1 Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n  $0).\r\n$ Email NVARCHA SupportRepId INTEGER,\r\n R(60) NOT NULL,\r\n FOREIGN KEY (SupportRep Id) REFERENCES "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION\r\n)\n\nCREATE INDEX IFK EmployeeReportsTo ON "employees" (Repor tsTo)\n\nCREATE TABLE "employees"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY LastName NVARCHAR(20) NOT NULL,\r\n AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(20) NOT NULL,\r\n ReportsTo INT Title NVARCHAR(30),\r\n EGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NV  $ARCHAR(70), \r\n$ City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n try NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(2 4),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook datab ase invoice means order\n\n===Response Guidelines \n1. If the provided conte xt is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requ ires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepe nd the query with a comment saying intermediate sql \n3. If the provided con text is insufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answ ered before, please repeat the answer exactly as it was given before. \n'}, Get the total number of invoices for ea {'role': 'user', 'content': ' \n ch customer\n'}, {'role': 'assistant', 'content': ' SELECT "customers".Custo merId, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': ' \n Find the tota l number of invoices per country:\n'}, {'role': 'assistant', 'content': ' SE LECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvoices FRO M "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".C ustomerId GROUP BY "customers".Country'}, {'role': 'user', 'content': ' \n

Find all invoices since 2010 and the total amount invoiced:\n'}, {'role': 'a ssistant', 'content': ' SELECT InvoiceId, SUM(Total) AS TotalAmount\n "invoices"\n WHERE strftime(\'%Y\', InvoiceDate) >= \'2010\'\n GROUP BY InvoiceId'}, {'role': 'user', 'content': ' \n List all invoices with a t otal exceeding \$10:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceI d, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, Billi ngCountry, BillingPostalCode, Total FROM "invoices" WHERE Total > 10'}, {'ro le': 'user', 'content': 'How many customers are there'}, {'role': 'assistan t', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'conte nt': 'what are the top 5 countries that customers come from?'}, {'role': 'as sistant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGR OUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId FROM "customers"'}, {'role': 'user', 'conten List all employees and their reporting manager's name (if an y):\n"}, {'role': 'assistant', 'content': 'SELECT el.LastName, el.FirstName, e2.LastName, e2.FirstName AS ReportingManager\n FROM employees e1\n JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID'}, {'role': 'user', 'conte List all albums and their corresponding artist names \n'}, {'role': 'assistant', 'content': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artist s".ArtistId'}, {'role': 'user', 'content': ' \n Find all tracks with a n ame containing "What" (case-insensitive)\n'}, {'role': 'assistant', 'conten t': ' SELECT \* FROM "tracks" WHERE LOWER(Name) LIKE \'%what%\''}, {'role': 'user', 'content': ' \n Get the average invoice total for each custome r:\n'}]

Info: Ollama parameters:

model=mistral:latest,

options={},

keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillinaCou ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n Total NUMER IC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE  $INDEX \ IFK\_InvoiceCustomerId \ ON \ \verb|'invoices|'' \ (CustomerId) \verb|\n\nCREATE INDEX IFK| \\$ InvoiceLineInvoiceId ON \"invoice items\" (InvoiceId)\n\nCREATE TABLE \"inv oice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NUL  $L,\r\n$ UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NU FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n  $LL,\r\n$ \t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) RE FERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO N\r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId) \n\nCREATE TABLE sqlite stat1(tbl,idx,stat)\n\nCREATE INDEX IFK CustomerSupp ortRepId ON \"customers\" (SupportRepId)\n\nCREATE TABLE \"customers\"\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(40) NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r\n City NVARCHAR(4 0),\r\n State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n PostalCod

e NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n SupportRepId INTEGER,\r\n mail NVARCHAR(60) NOT NULL,\r\n (SupportRepId) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK EmployeeReportsTo ON \"emp loyees\" (ReportsTo)\n\nCREATE TABLE \"employees\"\r\n(\r\n EmployeeId IN TEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT Title NVARCHAR(30),\r FirstName NVARCHAR(20) NOT NULL,\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIM \n  $E,\r\n$ Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARC  $HAR(40), \r\n$ Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DEL ETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the p rovided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost suffic ient but requires knowledge of a specific string in a particular column, ple ase generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been as ked and answered before, please repeat the answer exactly as it was given be fore. \n"}, {"role": "user", "content": " \n Get the total number of inv oices for each customer\n"}, {"role": "assistant", "content": " SELECT \"cus tomers\".CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoice s\".CustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "conten Find the total number of invoices per country:\n"}, {"role": "a ssistant", "content": " SELECT \"customers\".Country, COUNT(\"invoices\".\"I nvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".Co untry"}, {"role": "user", "content": " \n Find all invoices since 2010 a nd the total amount invoiced:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM \"invoices\"\n WHERE strftim e('%Y', InvoiceDate) >= '2010'\n GROUP BY InvoiceId"}, {"role": "user", "c ontent": " \n List all invoices with a total exceeding \$10:\n"}, {"rol e": "assistant", "content": " SELECT InvoiceId, InvoiceDate, CustomerId, Bil lingAddress, BillingCity, BillingState, BillingCountry, BillingPostalCode, T otal FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": "How many customers are there"}, {"role": "assistant", "content": " SELECT COUNT (\*) FROM \"customers\""}, {"role": "user", "content": "what are the top 5 co untries that customers come from?"}, {"role": "assistant", "content": " SELE CT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Co unt DESC\nLIMIT 5"}, {"role": "user", "content": "which table stores custome r's orders"}, {"role": "assistant", "content": " SELECT \"customers\".Custom erId FROM \"customers\""}, {"role": "user", "content": " \n List all emp loyees and their reporting manager's name (if any):\n"}, {"role": "assistan t", "content": "SELECT el.LastName, el.FirstName, e2.LastName, e2.FirstName AS ReportingManager\n FROM employees e1\n LEFT JOIN employees e2 ON e1.R eportsTo = e2.EmployeeID"}, {"role": "user", "content": " \n bums and their corresponding artist names \n"}, {"role": "assistant", "cont ent": "SELECT \"albums\".AlbumId, \"artists\".Name AS ArtistName FROM \"albu ms\" INNER JOIN \"artists\" ON \"albums\".ArtistId = \"artists\".ArtistId"}, {"role": "user", "content": " \n Find all tracks with a name containing \"What\" (case-insensitive)\n"}, {"role": "assistant", "content": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIKE '%what%'"}, {"role": "user", "conten

t": " \n Get the average invoice total for each customer:\n"}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created\_at': '2024-08-01T19:33:37.225014682Z',
'message': {'role': 'assistant', 'content': ' SELECT "customers".CustomerId,
AVG("invoices"."Total") AS AverageInvoiceTotal FROM "customers" INNER JOIN
"invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "custo
mers".CustomerId'}, 'done\_reason': 'stop', 'done': True, 'total\_duration': 6
8921130044, 'load\_duration': 3440100, 'prompt\_eval\_count': 1725, 'prompt\_eval\_duration': 57247425000, 'eval\_count': 64, 'eval\_duration': 10333559000}
LLM Response: SELECT "customers".CustomerId, AVG("invoices"."Total") AS AverageInvoiceTotal FROM "customers" INNER JOIN "invoices" ON "customers".Custo
merId = "invoices".CustomerId GROUP BY "customers".CustomerId
 SELECT "customers".CustomerId, AVG("invoices"."Total") AS AverageInvoiceTot

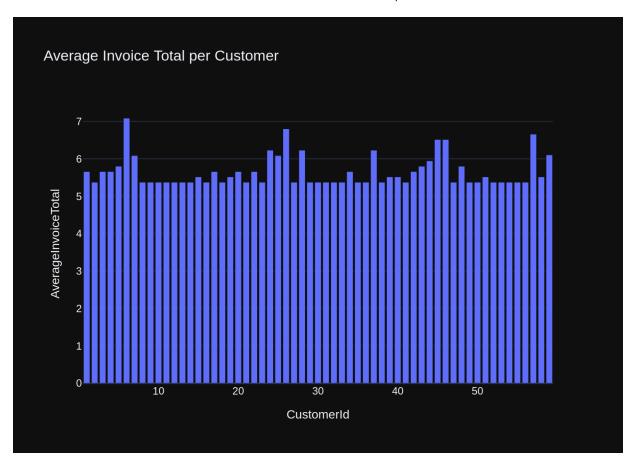
SELECT "customers".CustomerId, AVG("invoices"."Total") AS AverageInvoiceTot al FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId

	CustomerId	AverageInvoiceTotal
0	1	5.660000
1	2	5.374286
2	3	5.660000
3	4	5.660000
4	5	5.802857
5	6	7.088571
6	7	6.088571
7	8	5.374286
8	9	5.374286
9	10	5.374286
10	11	5.374286
11	12	5.374286
12	13	5.374286
13	14	5.374286
14	15	5.517143
15	16	5.374286
16	17	5.660000
17	18	5.374286
18	19	5.517143
19	20	5.660000
20	21	5.374286
21	22	5.660000
22	23	5.374286
23	24	6.231429
24	25	6.088571
25	26	6.802857
26	27	5.374286
27	28	6.231429
28	29	5.374286
29	30	5.374286
30	31	5.374286
31	32	5.374286
32	33	5.374286
33	34	5.660000
34	35	5.374286
35	36	5.374286
36	37	6.231429
37	38	5.374286
38	39	5.517143
39	40	5.517143

```
40
            41
                           5.374286
            42
41
                           5.660000
42
            43
                           5.802857
43
            44
                           5.945714
44
            45
                           6.517143
45
            46
                           6.517143
            47
46
                           5.374286
47
            48
                           5.802857
48
            49
                           5.374286
49
            50
                           5.374286
            51
50
                           5.517143
51
            52
                           5.374286
52
            53
                           5.374286
53
            54
                           5.374286
54
            55
                           5.374286
55
            56
                           5.374286
56
            57
                           6.660000
57
            58
                           5.517143
58
            59
                           6.106667
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
      Get the average invoice total for each customer:\n'\n\nThe DataFrame w
as produced using this query: SELECT \"customers\".CustomerId, AVG(\"invoic
es\".\"Total\") AS AverageInvoiceTotal FROM \"customers\" INNER JOIN \"invoi
ces\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"custo
mers\".CustomerId\n\nThe following is information about the resulting pandas
DataFrame 'df': \nRunning df.dtypes gives:\n CustomerId
\nAverageInvoiceTotal
                         float64\ndtype: object"}, {"role": "user", "conten
t": "Can you generate the Python plotly code to chart the results of the dat
aframe? Assume the data is in a pandas dataframe called 'df'. If there is on
ly one value in the dataframe, use an Indicator. Respond with only Python co
de. Do not answer with any explanations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:34:15.572915019Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres
s as px \in df.shape[0] == 1: n
                                     fig = px.bar(df, x="CustomerId", y="Ave
rageInvoiceTotal", title="Average Invoice Total per Customer")\n
                                                                     fig.upda
te layout(template=\'none\')\n
                                fig.add trace(go.Indicator(\n
                                                                        domai
n=\{"x": [0, 1]\}, \n
                          value=df["AverageInvoiceTotal"].iloc[0],\n
title="Total Average Invoice",\n
                                        title font family="Arial",\n
                             mode=\'gauge+number\'\n
title font size=18,\n
                                                        ))\nelse:\n
px.bar(df, x="CustomerId", y="AverageInvoiceTotal", title="Average Invoice T
```

otal per Customer")\nfig.show()\n```'}, 'done\_reason': 'stop', 'done': True, 'total\_duration': 38327249397, 'load\_duration': 3184040, 'prompt\_eval\_coun t': 233, 'prompt eval duration': 7079706000, 'eval count': 200, 'eval durati

on': 31109479000}



Out[27]: (' SELECT "customers".CustomerId, AVG("invoices"."Total") AS AverageInvoice
 Total FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "i
 nvoices".CustomerId GROUP BY "customers".CustomerId',

nvoi		erId GROUP BY "custome
	CustomerId	AverageInvoiceTotal
0	1	5.660000
1	2	5.374286
2	3	5.660000
3	4	5.660000
4	5	5.802857
5	6	7.088571
6	7	6.088571
7		
	8	5.374286
8	9	5.374286
9	10	5.374286
10	11	5.374286
11	12	5.374286
12	13	5.374286
13	14	5.374286
14	15	5.517143
15	16	5.374286
16	17	5.660000
17	18	5.374286
18	19	5.517143
19	20	5.660000
		5.374286
20	21	
21	22	5.660000
22	23	5.374286
23	24	6.231429
24	25	6.088571
25	26	6.802857
26	27	5.374286
27	28	6.231429
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29	30	5.374286
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33	34	5.660000
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35	36	5.374286
36	37	6.231429
37	38	5.374286
38	39	5.517143
39	40	5.517143
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41	42	5.660000
42	43	5.802857
43	44	5.945714
44	45	6.517143
45	46	6.517143
46	47	5.374286
47	48	5.802857
48	49	5.374286
49	50	5.374286
50	51	5.517143
51	52	5.374286

```
52
             53
                            5.374286
 53
             54
                            5.374286
 54
             55
                            5.374286
 55
             56
                            5.374286
             57
 56
                            6.660000
 57
             58
                            5.517143
 58
             59
                            6.106667,
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                           19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30,
31, 32, 33, 34, 35, 36,
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49, 50, 51, 52, 53, 54,
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5.37428571. 5.37428571.
                           5.37428571, 5.37428571, 5.51714286, 5.37428571,
5.66
          , 5.37428571,
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6.106666671).
               'yaxis': 'y'}],
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                'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
ext': 'CustomerId'}},
                'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
```

```
ext': 'AverageInvoiceTotal'}}
}))

In [28]: question = """
    Find the top 5 most expensive tracks (based on unit price):
    """
    vn.ask(question=question)
```

Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$ 

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "tracks"\r\n(\r\n EGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NUL AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n L.\r\n Milliseconds INTEGER NOT eId INTEGER.\r\n Composer NVARCHAR(220),\r\n NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACT ION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (G enreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE INDEX IFK TrackGenreId ON "tracks" (GenreId)\n\nCREATE I NDEX IFK PlaylistTrackTrackId ON "playlist track" (TrackId)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nCREATE INDEX IFK Trac kMediaTypeId ON "tracks" (MediaTypeId)\n\nCREATE TABLE "invoice items"\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n In TrackId INTEGER NOT NULL.\r\n voiceId INTEGER NOT NULL,\r\n e NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t\t0N DELETE NO ACTIO FOREIGN KEY (TrackId) REFERENCES "tracks" (Tra N ON UPDATE NO ACTION,\r\n ckid) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist track"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistI d, TrackId).\r\n FOREIGN KEY (PlaylistId) REFERENCES "playlists" (Playlis tId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Tr ackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE N O ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON "albums" (ArtistId)\n\nCR EATE TABLE "albums"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NO T NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT N FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\t0 N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nI n the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query withou t any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular colum n, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. I f the provided context is insufficient, please explain why it can\'t be gene rated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was g iven before. \n'}, {'role': 'user', 'content': ' \n Find all tracks with a name containing "What" (case-insensitive)\n'}, {'role': 'assistant', 'cont ent': ' SELECT \* FROM "tracks" WHERE LOWER(Name) LIKE \'%what%\''}, {'role': List all invoices with a total exceeding \$1 'user', 'content': ' \n 0:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, InvoiceDate, Cu stomerId, BillingAddress, BillingCity, BillingState, BillingCountry, Billing PostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'cont List all albums and their corresponding artist names \n'}, {'role': 'assistant', 'content': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artist s".ArtistId'}, {'role': 'user', 'content': 'what are the top 5 countries tha t customers come from?'}, {'role': 'assistant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLI MIT 5'}, {'role': 'user', 'content': ' \n Find all invoices since 2010 a

nd the total amount invoiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM "invoices"\n WHERE strftime (\'%Y\', InvoiceDate) >= \'2010\'\n GROUP BY InvoiceId'}, {'role': 'user', 'content': ' \n Get the average invoice total for each customer:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, AVG("invoi ces"."Total") AS AverageInvoiceTotal FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".Custo merId'}, {'role': 'user', 'content': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqli te master WHERE type='table'"}, {'role': 'user', 'content': ' \n e total number of invoices per country:\n'}, {'role': 'assistant', 'conten t': ' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvo ices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "inv oices".CustomerId GROUP BY "customers".Country'}, {'role': 'user', 'conten Get the total number of invoices for each customer\n'}, {'rol e': 'assistant', 'content': ' SELECT "customers".CustomerId, COUNT("invoice s"."InvoiceId") AS TotalInvoices FROM "customers" LEFT JOIN "invoices" ON "c ustomers".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerI d'}, {'role': 'user', 'content': 'How many customers are there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'use r', 'content': ' \n Find the top 5 most expensive tracks (based on unit price):\n'}]

Info: Ollama parameters:

model=mistral:latest,

options={},

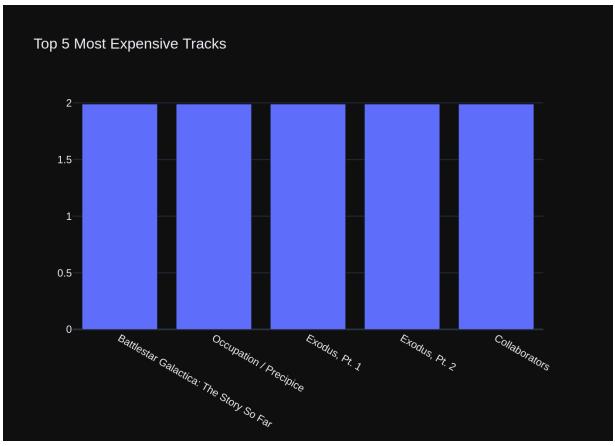
keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMA RY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n lbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGE Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n R, r nBytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPD FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) ATE NO ACTION,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTv peId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION O N UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackAlbumId ON \"tracks\" (Albu mId)\n\nCREATE INDEX IFK TrackGenreId ON \"tracks\" (GenreId)\n\nCREATE INDE X IFK\_PlaylistTrackTrackId ON \"playlist\_track\" (TrackId)\n\nCREATE INDEX I FK\_InvoiceLineTrackId ON \"invoice\_items\" (TrackId)\n\nCREATE INDEX IFK Tra ckMediaTypeId ON \"tracks\" (MediaTypeId)\n\nCREATE TABLE \"invoice items \"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n UnitPr ice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n GN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES \"tracks \" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlist track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (Pl ackId INTEGER NOT NULL,\r\n aylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON \"albums\" (Artis

tId)\n\nCREATE TABLE \"albums\"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTO Title NVARCHAR(160) NOT NULL,\r\n INCREMENT NOT NULL,\r\n TEGER NOT NULL.\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (Artis tId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guide lines \n1. If the provided context is sufficient, please generate a valid SQ L query without any explanations for the question. \n2. If the provided cont ext is almost sufficient but requires knowledge of a specific string in a pa rticular column, please generate an intermediate SQL query to find the disti nct strings in that column. Prepend the guery with a comment saying intermed iate sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactl y as it was given before. \n"}, {"role": "user", "content": " \n l tracks with a name containing \"What\" (case-insensitive)\n"}, {"role": "a ssistant", "content": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIKE '%wh at%'"}, {"role": "user", "content": " \n List all invoices with a total exceeding \$10:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, Inv oiceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingCoun try, BillingPostalCode, Total FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": " \n List all albums and their corresponding artist n ames \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"a rtists\".Name AS ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albu ms\".ArtistId = \"artists\".ArtistId"}, {"role": "user", "content": "what ar e the top 5 countries that customers come from?"}, {"role": "assistant", "co ntent": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Countr y\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n all invoices since 2010 and the total amount invoiced:\n"}, {"role": "assist ant", "content": " SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM \"in voices\"\n WHERE strftime('%Y', InvoiceDate) >= '2010'\n GROUP BY Invoic eId"}, {"role": "user", "content": " \n Get the average invoice total fo r each customer:\n"}, {"role": "assistant", "content": " SELECT \"customers \".CustomerId, AVG(\"invoices\".\"Total\") AS AverageInvoiceTotal FROM \"cus tomers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\". CustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assist ant", "content": "SELECT name FROM sqlite master WHERE type='table'"}, {"rol e": "user", "content": " \n Find the total number of invoices per countr y:\n"}, {"role": "assistant", "content": " SELECT \"customers\".Country, COU NT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOI N \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP B Y \"customers\".Country"}, {"role": "user", "content": " \n l number of invoices for each customer\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS Tota lInvoices FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".Custome rId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "content": "How many customers are there"}, {"role": "assistant", "c ontent": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": Find the top 5 most expensive tracks (based on unit price):\n"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:35:16.279935542Z', 'message': {'role': 'assistant', 'content': ' SELECT "tracks".Name, "track s".UnitPrice\n FROM "tracks"\n ORDER BY "tracks".UnitPrice DESC\n T 5'}, 'done reason': 'stop', 'done': True, 'total duration': 60613468627, 'load duration': 3951450, 'prompt eval count': 1612, 'prompt eval duration': 52977735000, 'eval count': 40, 'eval duration': 6333891000}

```
LLM Response: SELECT "tracks".Name, "tracks".UnitPrice
   FROM "tracks"
   ORDER BY "tracks". UnitPrice DESC
   LIMIT 5
 SELECT "tracks".Name, "tracks".UnitPrice
   FROM "tracks"
   ORDER BY "tracks". UnitPrice DESC
   LIMIT 5
                                     Name UnitPrice
O Battlestar Galactica: The Story So Far
                                                1.99
1
                   Occupation / Precipice
                                                1.99
2
                            Exodus, Pt. 1
                                                1.99
                            Exodus, Pt. 2
3
                                                1.99
                            Collaborators
                                                1.99
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
      Find the top 5 most expensive tracks (based on unit price):\n'\n\nThe
DataFrame was produced using this query: SELECT \"tracks\".Name, \"tracks
                 FROM \"tracks\"\n
                                    ORDER BY \"tracks\".UnitPrice DESC\n
\".UnitPrice\n
LIMIT 5\n\nThe following is information about the resulting pandas DataFrame
'df': \nRunning df.dtypes gives:\n Name
                                                 object\nUnitPrice
4\ndtype: object"}, {"role": "user", "content": "Can you generate the Python
plotly code to chart the results of the dataframe? Assume the data is in a p
andas dataframe called 'df'. If there is only one value in the dataframe, us
e an Indicator. Respond with only Python code. Do not answer with any explan
ations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:35:42.854542843Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.graph
objects as go\n\nfig = go.Figure(data=[go.Bar(x=df[\'Name\'], y=df[\'UnitPri
ce\'])])\nfig.update layout(title=\'Top 5 Most Expensive Tracks\')\nif len(d
              fig = go.Figure(data=[go.Indicator(mode="number+delta", value=
df[\'UnitPrice\'][0], domain={\'x\': [0, 1]})])\n
                                                    fig.update layout(title
=\'Most Expensive Track\')\n```'}, 'done_reason': 'stop', 'done': True, 'tot
al duration': 26548004925, 'load duration': 3154349, 'prompt eval count': 20
7, 'prompt eval duration': 6421969000, 'eval count': 129, 'eval duration': 1
9992590000}
```



```
Out[28]: (' SELECT "tracks".Name, "tracks".UnitPrice\n FROM "tracks"\n
                                                                            ORDER BY
          "tracks".UnitPrice DESC\n LIMIT 5',
                                                Name UnitPrice
             Battlestar Galactica: The Story So Far
                                                           1.99
          1
                             Occupation / Precipice
                                                           1.99
          2
                                       Exodus, Pt. 1
                                                           1.99
          3
                                       Exodus, Pt. 2
                                                           1.99
          4
                                       Collaborators
                                                           1.99,
          Figure({
               'data': [{'type': 'bar',
                         'x': array(['Battlestar Galactica: The Story So Far', 'Occup
         ation / Precipice',
                                     'Exodus, Pt. 1', 'Exodus, Pt. 2', 'Collaborator
         s'], dtype=object),
                         'y': array([1.99, 1.99, 1.99, 1.99, 1.99])}],
               'layout': {'template': '...', 'title': {'text': 'Top 5 Most Expensive
         Tracks'}}
          }))
In [29]: question = """
             List all genres and the number of tracks in each genre:
         vn.ask(question=question)
        Number of requested results 10 is greater than number of elements in index
```

1, updating n results = 1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "tracks"\r\n(\r\n EGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NUL AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n L.\r\n Milliseconds INTEGER NOT eId INTEGER.\r\n Composer NVARCHAR(220),\r\n NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACT ION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (G enreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackGenreId ON "tracks" (GenreId)\n\nCREATE TABLE "genres"\r\n(\r\n GenreId INTEGER PRIMARY KEY A UTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK Pl aylistTrackTrackId ON "playlist track" (TrackId)\n\nCREATE INDEX IFK TrackAl bumId ON "tracks" (AlbumId)\n\nCREATE TABLE "playlists"\r\n(\r\n Id INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r \n)\n\nCREATE INDEX IFK TrackMediaTypeId ON "tracks" (MediaTypeId)\n\nCREATE TABLE "playlist track"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n kId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (Play listId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES "playlists" (Pl aylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n Y (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPD ATE NO ACTION\r\n)\n\nCREATE TABLE "albums"\r\n(\r\n AlbumId INTEGER PRIM ARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES "artist s" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON "albums" (ArtistId)\n\n===Additional Context \n \nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query wit hout any explanations for the question. \n2. If the provided context is almo st sufficient but requires knowledge of a specific string in a particular co lumn, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n 3. If the provided context is insufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it w as given before. \n'}, {'role': 'user', 'content': ' \n Find the top 5 m ost expensive tracks (based on unit price):\n'}, {'role': 'assistant', 'cont ent': ' SELECT "tracks".Name, "tracks".UnitPrice\n FROM "tracks"\n LIMIT 5'}, {'role': 'user', 'content': ' \n BY "tracks".UnitPrice DESC\n List all albums and their corresponding artist names \n'\}, {'role': 'assist ant', 'content': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': ' \n Find all tracks with a name containing "What" (case-insensitive)\n'}, {'role': 'assistant', 'content': ' SELECT \* F ROM "tracks" WHERE LOWER(Name) LIKE \'%what%\''}, {'role': 'user', 'conten t': 'what are the top 5 countries that customers come from?'}, {'role': 'ass istant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGRO UP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'assist ant', 'content': "SELECT name FROM sqlite master WHERE type='table'"}, {'rol List all invoices with a total exceeding \$1 e': 'user', 'content': ' \n 0:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, InvoiceDate, Cu stomerId, BillingAddress, BillingCity, BillingState, BillingCountry, Billing

PostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'cont Find all invoices since 2010 and the total amount invoice d:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Total) AS T otalAmount\n FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDate) >= GROUP BY InvoiceId'}, {'role': 'user', 'content': ' \n \'2010\'\n the total number of invoices per country:\n'}, {'role': 'assistant', 'conten t': ' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvo ices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "inv oices".CustomerId GROUP BY "customers".Country'}, {'role': 'user', 'conten t': 'How many customers are there'}, {'role': 'assistant', 'content': ' SELE CT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': '  $\n$  Get the total number of invoices for each customer\n'}, {'role': 'assistant', 'conte nt': ' SELECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS Total Invoices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'c ontent': '\n List all genres and the number of tracks in each genr e:\n'}]

Info: Ollama parameters:

model=mistral:latest,

options={},

keep alive=None

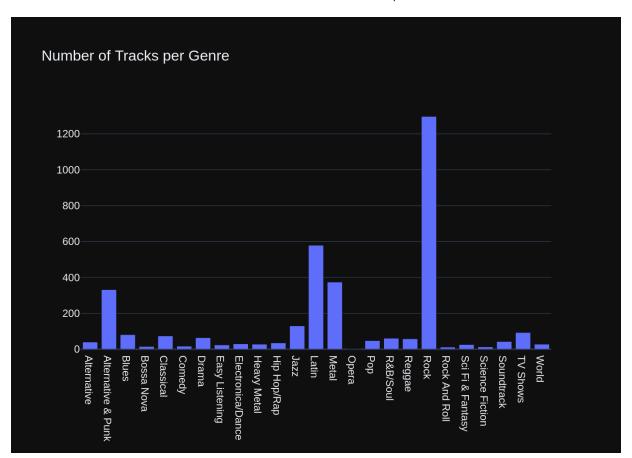
Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMA RY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n lbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGE Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPD ATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTy peId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\t0N DELETE NO ACTION 0 N UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackGenreId ON \"tracks\" (Genr eId)\n\nCREATE TABLE \"genres\"\r\n(\r\n GenreId INTEGER PRIMARY KEY AUTO INCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK Playl$ istTrackTrackId ON \"playlist track\" (TrackId)\n\nCREATE INDEX IFK TrackAlb umId ON \"tracks\" (AlbumId)\n\nCREATE TABLE \"playlists\"\r\n(\r\n istId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120) \r\n)\n\nCREATE INDEX IFK TrackMediaTypeId ON \"tracks\" (MediaTypeId)\n\nCR EATE TABLE \"playlist track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES \"playlist s\" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n EIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTI ON ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"albums\"\r\n(\r\n NTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT N ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERE NCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION \r\n)\n\nCREATE INDEX IFK AlbumArtistId ON \"albums\" (ArtistId)\n\n===Add itional Context \n\nIn the chinook database invoice means order\n\n===Respon se Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provi ded context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find th

e distinct strings in that column. Prepend the guery with a comment saying i ntermediate sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": " \n ind the top 5 most expensive tracks (based on unit price):\n"}, {"role": "as sistant", "content": " SELECT \"tracks\".Name, \"tracks\".UnitPrice\n \"tracks\"\n ORDER BY \"tracks\".UnitPrice DESC\n LIMIT 5"}, {"role": "u ser", "content": " \n List all albums and their corresponding artist nam es \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"art ists\".Name AS ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albums \".ArtistId = \"artists\".ArtistId"}, {"role": "user", "content": " \n ind all tracks with a name containing \"What\" (case-insensitive)\n"}, {"rol e": "assistant", "content": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIK E '%what%'"}, {"role": "user", "content": "what are the top 5 countries that customers come from?"}, {"role": "assistant", "content": " SELECT Country, C OUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIM IT 5"}, {"role": "user", "content": "Can you list all tables in the SQLite d atabase catalog?"}, {"role": "assistant", "content": "SELECT name FROM sqlit e\_master WHERE type='table'"}, {"role": "user", "content": " \n invoices with a total exceeding \$10:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, Bill ingState, BillingCountry, BillingPostalCode, Total FROM \"invoices\" WHERE T otal > 10"}, {"role": "user", "content": " \n Find all invoices since 20 10 and the total amount invoiced:\n"}, {"role": "assistant", "content": " SE LECT InvoiceId, SUM(Total) AS TotalAmount\n FROM \"invoices\"\n rftime('%Y', InvoiceDate) >= '2010'\n GROUP BY InvoiceId"}, {"role": "use Find the total number of invoices per country:\n"}, r", "content": " \n {"role": "assistant", "content": " SELECT \"customers\".Country, COUNT(\"inv oices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOIN \"invo ices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"cust omers\".Country"}, {"role": "user", "content": "How many customers are ther e"}, {"role": "assistant", "content": " SELECT COUNT(\*) FROM \"customers \""}, {"role": "user", "content": " \n Get the total number of invoices for each customer\n"}, {"role": "assistant", "content": " SELECT \"customers \".CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"cus tomers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".C ustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "content": " List all genres and the number of tracks in each genre:\n"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:36:43.36798359Z', 'message': {'role': 'assistant', 'content': ' SELECT "genres".Name AS GenreN ame, COUNT("tracks"."TrackId") AS TrackCount FROM "genres" INNER JOIN "track s" ON "genres".GenreId = "tracks".GenreId GROUP BY "genres".Name'}, 'done re ason': 'stop', 'done': True, 'total duration': 60433563793, 'load duration': 3497760, 'prompt eval count': 1487, 'prompt eval duration': 48881764000, 'ev al count': 64, 'eval duration': 10234133000} LLM Response: SELECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS TrackCount FROM "genres" INNER JOIN "tracks" ON "genres".GenreId = "track s".GenreId GROUP BY "genres".Name SELECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS TrackCount FROM "genres" INNER JOIN "tracks" ON "genres".GenreId = "tracks".GenreId GRO UP BY "genres".Name

GenreName TrackCount
O Alternative 40
1 Alternative & Punk 332

```
2
                 Blues
                                81
3
            Bossa Nova
                                15
4
             Classical
                                74
5
                                17
                Comedy
6
                 Drama
                                64
7
        Easy Listening
                                24
     Electronica/Dance
8
                                30
9
           Heavy Metal
                                28
10
           Hip Hop/Rap
                                35
11
                  Jazz
                               130
12
                 Latin
                               579
13
                 Metal
                               374
14
                                 1
                 0pera
15
                   Pop
                                48
              R&B/Soul
16
                                61
17
                Reggae
                                58
18
                  Rock
                              1297
19
         Rock And Roll
                                12
20
      Sci Fi & Fantasv
                                26
21
       Science Fiction
                                13
22
            Soundtrack
                                43
23
              TV Shows
                                93
24
                 World
                                28
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
      List all genres and the number of tracks in each genre:\n'\n\nThe Data
Frame was produced using this query: SELECT \"genres\".Name AS GenreName, C
OUNT(\"tracks\".\"TrackId\") AS TrackCount FROM \"genres\" INNER JOIN \"trac
ks\" ON \"genres\".GenreId = \"tracks\".GenreId GROUP BY \"genres\".Name\n\n
The following is information about the resulting pandas DataFrame 'df': \nRu
                                       object\nTrackCount
nning df.dtypes gives:\n GenreName
                                                               int64\ndtvpe:
object"}, {"role": "user", "content": "Can you generate the Python plotly co
de to chart the results of the dataframe? Assume the data is in a pandas dat
aframe called 'df'. If there is only one value in the dataframe, use an Indi
cator. Respond with only Python code. Do not answer with any explanations --
just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:37:14.906618184Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.graph_
objects as go\n\nfig = go.Figure(data=[go.Bar(x=df["GenreName"], y=df["Track
Count"])])\nfig.update layout(title=\'Number of Tracks per Genre\')\n\nif d
f.shape[0] == 1:\n
                      fig = go.Indicator(value=df["TrackCount"].iloc[0],\n
title={\'text\': \'Tracks\', \'font\': {\'size\': 24}},\n
                                            fig.update_layout(title=\'Numbe
domain={ (x)' : [0, 1], (y)' : [0, .5] }) 
r of Tracks\')\n```'}, 'done reason': 'stop', 'done': True, 'total duratio
n': 31513680151, 'load_duration': 3259431, 'prompt_eval_count': 232, 'prompt
eval duration': 7140086000, 'eval count': 156, 'eval duration': 2423887200
0}
```



```
Out[29]: (' SELECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS TrackCou
          nt FROM "genres" INNER JOIN "tracks" ON "genres".GenreId = "tracks".GenreId
          GROUP BY "genres". Name',
                        GenreName TrackCount
           0
                      Alternative
           1
               Alternative & Punk
                                          332
           2
                            Blues
                                           81
           3
                       Bossa Nova
                                            15
           4
                                           74
                        Classical
           5
                           Comedy
                                           17
           6
                            Drama
                                            64
           7
                   Easy Listening
                                           24
           8
                Electronica/Dance
                                           30
           9
                      Heavy Metal
                                           28
           10
                      Hip Hop/Rap
                                           35
           11
                             Jazz
                                           130
           12
                            Latin
                                          579
           13
                                          374
                            Metal
           14
                            Opera
                                            1
           15
                              Pop
                                           48
           16
                         R&B/Soul
                                           61
           17
                           Reggae
                                           58
           18
                             Rock
                                         1297
           19
                    Rock And Roll
                                           12
           20
                 Sci Fi & Fantasy
                                           26
           21
                  Science Fiction
                                           13
           22
                       Soundtrack
                                           43
           23
                                           93
                         TV Shows
                            World
           24
                                           28.
           Figure({
               'data': [{'type': 'bar',
                         'x': array(['Alternative', 'Alternative & Punk', 'Blues', 'B
          ossa Nova', 'Classical',
                                      'Comedy', 'Drama', 'Easy Listening', 'Electronic
          a/Dance', 'Heavy Metal',
                                      'Hip Hop/Rap', 'Jazz', 'Latin', 'Metal', 'Oper
         a', 'Pop', 'R&B/Soul',
                                      'Reggae', 'Rock', 'Rock And Roll', 'Sci Fi & Fan
          tasy',
                                      'Science Fiction', 'Soundtrack', 'TV Shows', 'Wo
          rld'], dtype=object),
                         'y': array([ 40, 332,
                                                   81,
                                                          15.
                                                                74. 17.
                                                                            64. 24.
          30,
                28,
                      35, 130,
                                      579, 374,
                                                                      58, 1297,
                                                    1,
                                                          48,
                                                                61,
                                                                                12,
          26.
                13.
                      43.
                            93.
                                       28])}],
               'layout': {'template': '...', 'title': {'text': 'Number of Tracks per
          Genre'}}
          }))
In [30]: question = """
             Get all genres that do not have any tracks associated with them:
         vn.ask(question=question)
```

Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$ 

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE INDEX IFK TrackGenreId ON "tracks" (Ge nreId)\n\nCREATE TABLE "tracks"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTO INCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTE MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER.\r\n mposer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumI d) REFERENCES "albums" (Albumid) \r\n\t\tON DELETE NO ACTION ON UPDATE NO AC TION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFER ENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO A CTION\r\n)\n\nCREATE INDEX IFK PlaylistTrackTrackId ON "playlist track" (Tra ckId)\n\nCREATE INDEX IFK TrackMediaTypeId ON "tracks" (MediaTypeId)\n\nCREA TE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE TABLE "genres"\r\n GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $RCHAR(120)\r\n)\n\nCREATE TABLE "albums"\r\n(\r\n$ AlbumId INTEGER PRIMARY Title NVARCHAR(160) NOT NULL.\r\n KEY AUTOINCREMENT NOT NULL,\r\n istId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId)  $\r \n \$  DELETE NO ACTION ON UPDATE NO ACTION $\r \n \$   $\n \$  TA BLE "playlist track"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n d INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (Plavli stId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES "playlists" (Play listId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION $\r\n)\n\cREATE$  INDEX IFK AlbumArtistId ON "albums" (ArtistId) $\n$ \nCREATE TABLE "playlists"\r\n(\r\n PlaylistId INTEGER PRIMARY KEY AUTOIN Name  $NVARCHAR(120)\r\n)\n\n===Additional Context$ CREMENT NOT NULL,\r\n \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n 1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is a lmost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strin gs in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can\'t b e generated. \n4. Please use the most relevant table(s). \n5. If the questio n has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': ' \n List all genres and the number of tracks in each genre:\n'}, {'role': 'assistant', 'conten t': ' SELECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS TrackC ount FROM "genres" INNER JOIN "tracks" ON "genres".GenreId = "tracks".GenreI d GROUP BY "genres".Name'}, {'role': 'user', 'content': ' \n p 5 most expensive tracks (based on unit price):\n'}, {'role': 'assistant', 'content': ' SELECT "tracks".Name, "tracks".UnitPrice\n FROM "tracks"\n ORDER BY "tracks".UnitPrice DESC\n LIMIT 5'}, {'role': 'user', 'content': Find all tracks with a name containing "What" (case-insensitive) \n'}, {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHERE LOWER (Name) LIKE \'%what%\''}, {'role': 'user', 'content': ' \n List all albu ms and their corresponding artist names \n'}, {'role': 'assistant', 'conten t': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INN ER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'use r', 'content': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type ='table'"}, {'role': 'user', 'content': ' \n List all invoices with a to tal exceeding \$10:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId,

InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingC ountry, BillingPostalCode, Total FROM "invoices" WHERE Total > 10'}, {'rol e': 'user', 'content': 'what are the top 5 countries that customers come fro m?'}, {'role': 'assistant', 'content': ' SELECT Country, COUNT(\*) AS Count\n FROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': ' \n Find all invoices since 2010 and the total amoun t invoiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(To tal) AS TotalAmount\n FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDa GROUP BY InvoiceId'}, {'role': 'user', 'content': 'How m te)  $>= \'2010\'\n$ any customers are there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': ' \n Get the average invoice total for each customer:\n'}, {'role': 'assistant', 'content': ' SEL ECT "customers".CustomerId, AVG("invoices"."Total") AS AverageInvoiceTotal F ROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoice s".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': ' \n Get all genres that do not have any tracks associated with the m:\n'}]

Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None

Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE INDEX IFK TrackGenreId ON \"tracks\" (GenreId)\n\n TrackId INTEGER PRIMARY KEY AUTOINCREMEN CREATE TABLE \"tracks\"\r\n(\r\n T NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARC Milliseconds INTEGER NOT NULL,\r\n  $HAR(220), \r\n$ Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO A FOREIGN KEY (MediaTypeId) REFERENCES \"med CTION ON UPDATE NO ACTION,\r\n ia types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE INDEX IFK PlaylistTrackTrackId ON \"playlist track\" (TrackId) \n\nCREATE INDEX IFK TrackMediaTypeId ON \"tracks\" (MediaTypeId)\n\nCREATE INDEX IFK TrackAlbumId ON \"tracks\" (AlbumId)\n\nCREATE TABLE \"genres\"\r  $n(\r\n$ GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $VARCHAR(120)\r\n)\n\nCREATE TABLE \"albums\"\r\n(\r\n$ AlbumId INTEGER PRI MARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artis ArtistId INTEGER NOT NULL,\r\n ts\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREA TE TABLE \"playlist track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES \"playlist s\" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n EIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\t0N DELETE NO ACTI ON ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON \"albums\" (ArtistId)\n\nCREATE TABLE \"playlists\"\r\n(\r\n PlaylistId INTEGER PRIM ARY KEY AUTOINCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n\n===Addit$ ional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a val id SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the d

istinct strings in that column. Prepend the query with a comment saying inte rmediate sql \n3. If the provided context is insufficient, please explain wh y it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer ex actly as it was given before. \n"}, {"role": "user", "content": " \n t all genres and the number of tracks in each genre:\n"}, {"role": "assistan t", "content": " SELECT \"genres\".Name AS GenreName, COUNT(\"tracks\".\"Tra ckId\") AS TrackCount FROM \"genres\" INNER JOIN \"tracks\" ON \"genres\".Ge nreId = \"tracks\".GenreId GROUP BY \"genres\".Name"}, {"role": "user", "con Find the top 5 most expensive tracks (based on unit pric tent": " \n e):\n"}, {"role": "assistant", "content": " SELECT \"tracks\".Name, \"tracks \".UnitPrice\n FROM \"tracks\"\n ORDER BY \"tracks\".UnitPrice DESC\n LIMIT 5"}, {"role": "user", "content": " \n Find all tracks with a name containing \"What\" (case-insensitive)\n"}, {"role": "assistant", "content": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIKE '%what%'"}, {"role": "use r", "content": " \n List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists \".Name AS ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".A rtistId = \"artists\".ArtistId"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assistant", "conten t": "SELECT name FROM sqlite master WHERE type='table'"}, {"role": "user", "content": " \n List all invoices with a total exceeding \$10:\n"}, {"rol e": "assistant", "content": " SELECT InvoiceId, InvoiceDate, CustomerId, Bil lingAddress, BillingCity, BillingState, BillingCountry, BillingPostalCode, T otal FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": "what are the top 5 countries that customers come from?"}, {"role": "assistant", "content": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Cou ntry\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n ind all invoices since 2010 and the total amount invoiced:\n"}, {"role": "as sistant", "content": " SELECT InvoiceId, SUM(Total) AS TotalAmount\n \"invoices\"\n WHERE strftime('%Y', InvoiceDate) >= '2010'\n GROUP BY In voiceId"}, {"role": "user", "content": "How many customers are there"}, {"ro le": "assistant", "content": " SELECT COUNT(\*) FROM \"customers\""}, {"rol e": "user", "content": " \n Get the average invoice total for each custo mer:\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerI d, AVG(\"invoices\".\"Total\") AS AverageInvoiceTotal FROM \"customers\" INN ER JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId G ROUP BY \"customers\".CustomerId"}, {"role": "user", "content": " \n all genres that do not have any tracks associated with them:\n"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:38:24.045724756Z', 'message': {'role': 'assistant', 'content': ' -- Intermediate sql to get dis SELECT DISTINCT Name FROM "genres" AS "g" LEFT JOIN "t tinct genre names\n racks" ON "tracks".GenreId = "g".GenreId WHERE "tracks".TrackId IS NULL\n\n -- Final SQL query to filter out genres with no tracks\n SELECT g.Name FRO M "genres" AS g WHERE NOT EXISTS (SELECT 1 FROM "tracks" AS t WHERE g.GenreI d = t.GenreId)'}, 'done reason': 'stop', 'done': True, 'total duration': 690 15717081, 'load duration': 4013337, 'prompt eval count': 1487, 'prompt eval duration': 48426137000, 'eval\_count': 119, 'eval\_duration': 19279685000} LLM Response: -- Intermediate sql to get distinct genre names

SELECT DISTINCT Name FROM "genres" AS "g" LEFT JOIN "tracks" ON "tracks". GenreId = "g".GenreId WHERE "tracks". TrackId IS NULL

-- Final SQL query to filter out genres with no tracks
SELECT g.Name FROM "genres" AS g WHERE NOT EXISTS (SELECT 1 FROM "tracks"
AS t WHERE q.GenreId = t.GenreId)

-- Intermediate\_sql to get distinct genre names

SELECT DISTINCT Name FROM "genres" AS "g" LEFT JOIN "tracks" ON "tracks".

GenreId = "g".GenreId WHERE "tracks".TrackId IS NULL

-- Final SQL query to filter out genres with no tracks
SELECT g.Name FROM "genres" AS g WHERE NOT EXISTS (SELECT 1 FROM "tracks"
AS t WHERE q.GenreId = t.GenreId)

Couldn't run sql: Execution failed on sql ' -- Intermediate\_sql to get dist inct genre names

SELECT DISTINCT Name FROM "genres" AS "g" LEFT JOIN "tracks" ON "tracks". GenreId = "g".GenreId WHERE "tracks".TrackId IS NULL

-- Final SQL query to filter out genres with no tracks
SELECT g.Name FROM "genres" AS g WHERE NOT EXISTS (SELECT 1 FROM "tracks"
AS t WHERE g.GenreId = t.GenreId)': near "SELECT": syntax error

Number of requested results 10 is greater than number of elements in index 1, updating n\_results = 1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingState NVARCHAR(40),\r\n BillingCity NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n FOREIGN KEY (CustomerId) REFERENCES "cu otal NUMERIC(10,2) NOT NULL,\r\n stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOIN CREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n NOT NULL,\r\n Company NVARCHAR(80),\r\n VARCHAR(20) Address NVARCHAR (70), r nCity NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NV PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n  $ARCHAR(40), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId I FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeI d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "inv InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT oice items"\r\n(\r\n NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NUL UnitPrice NUMERIC(10,2) NOT NULL,\r\n  $L,\r\n$ Quantity INTEGER NOT NU  $LL,\r\n$ FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE TABLE "employees"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY A UTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n ame NVARCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTE GER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVA City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n  $RCHAR(70), \r\n$ ry NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(2 Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY 4),\r\n (ReportsTo) REFERENCES "employees" (EmployeeId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist track"\r\n(\r\n Playli TrackId INTEGER NOT NULL,\r\n stId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (Pla ylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) UPDATE NO ACTION,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "album  $s"\r\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n tle NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n GN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTIO N ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK\_CustomerSupportRepId ON "cust omers" (SupportRepId)\n\nCREATE TABLE "playlists"\r\n(\r\n PlaylistId INT EGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n\nC$ REATE TABLE "tracks"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT N Name NVARCHAR(200) NOT NULL,\r\n OT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARC Milliseconds INTEGER NOT NULL,\r\n  $HAR(220), \r\n$ Bytes INTEGER.\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n OREIGN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTI ON ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media t ypes" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n CREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId)\n\n\n===Additi onal Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a val

id SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the d istinct strings in that column. Prepend the query with a comment saying inte rmediate sql \n3. If the provided context is insufficient, please explain wh y it can\'t be generated. \n4. Please use the most relevant table(s). \n5. I f the question has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': "which tab le stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "cu stomers".CustomerId FROM "customers"'}, {'role': 'user', 'content': 'what ar e the top 5 countries that customers come from?'}, {'role': 'assistant', 'co ntent': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Countr y\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': 'How many cus tomers are there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': ' \n Get the total number of invoices for each customer\n'}, {'role': 'assistant', 'content': ' SELECT "c ustomers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "c ustomers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".Custom erId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': ' \n List all invoices with a total exceeding \$10:\n'}, {'role': 'assistant', 'co ntent': 'SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, Billing City, BillingState, BillingCountry, BillingPostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'content': ' \n Find the total numb er of invoices per country:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "cu stomers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".Custom erId GROUP BY "customers".Country'}, {'role': 'user', 'content': ' \n t the average invoice total for each customer:\n'}, {'role': 'assistant', 'c ontent': ' SELECT "customers".CustomerId, AVG("invoices"."Total") AS Average InvoiceTotal FROM "customers" INNER JOIN "invoices" ON "customers".CustomerI d = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'use r', 'content': ' \n Find all invoices since 2010 and the total amount in voiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDate) > = \'2010\'\n GROUP BY InvoiceId'}, {'role': 'user', 'content': " \n st all employees and their reporting manager's name (if any):\n"}, {'role': 'assistant', 'content': 'SELECT el.LastName, el.FirstName, e2.LastName, e2.F irstName AS ReportingManager\n FROM employees e1\n LEFT JOIN employees e 2 ON e1.ReportsTo = e2.EmployeeID'}, {'role': 'user', 'content': ' \n st all albums and their corresponding artist names \n'}, {'role': 'assistan t', 'content': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': ' \n List all customers who have not placed any orders:\n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n

BillingState NVARCHAR(40),\r\n

illingCity NVARCHAR(40),\r\n

BillingCou

ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" IC(10,2) NOT NULL,\r\n (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMENT FirstName NVARCHAR(40) NOT NULL,\r\n NOT NULL,\r\n LastName NVARCHAR (20) NOT NULL.\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r Country NVARCHAR State NVARCHAR(40),\r\n City NVARCHAR(40),\r\n  $(40), \r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\n$ Email NVARCHAR(60) NOT NULL,\r\n  $NVARCHAR(24), \r\n$ SupportRepId INTEG  $ER, \r\n$ FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoi InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT N ce items\"\r\n(\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r ULL.\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NUL FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n\t  $L,\r\n$ \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION \r\n)\n\nCREATE TABLE \"employees\"\r\n(\r\n EmployeeId INTEGER PRIMARY K EY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL.\r\n rstName NVARCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo BirthDate DATETIME,\r\n HireDate DATETIME,\r\n INTEGER,\r\n Address  $NVARCHAR(70), \r\n$ City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n untry NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(2 Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r\n\t\t0N DELETE NO ACTIO N ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlist track\"\r\n(\r\n aylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRA INT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\t0N DELETE NO ACTI FOREIGN KEY (TrackId) REFERENCES \"tracks\" ON ON UPDATE NO ACTION,\r\n (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TAB LE \"albums\"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL  $L,\r\n$ Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NUL FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\t0  $L,\r\n$ N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK CustomerSupp ortRepId ON \"customers\" (SupportRepId)\n\nCREATE TABLE \"playlists\"\r\n PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $NVARCHAR(120)\r\n)\nCREATE TABLE \"tracks\"\r\n(\r\n$ TrackId INTEGER PR IMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n MediaTypeId INTEGER NOT NULL,\r\n AlbumId INTEGER,\r\n GenreId INTEGE  $R_{i} r n$ Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Bytes INTEGER,\r\n FOREIGN KEY (Albumid) REFERENCES \"albums\" (Albumid) \r\n\t\tON DELETE NO ACTION ON UPD FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) ATE NO ACTION,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTy peId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION O N UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices \" (CustomerId)\n\n===Additional Context \n\nIn the chinook database invoi ce means order\n\n===Response Guidelines \n1. If the provided context is suf ficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires kno wledge of a specific string in a particular column, please generate an inter mediate SQL query to find the distinct strings in that column. Prepend the q uery with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered bef

ore, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": "which table stores customer's orders"}, {"role": "assist ant", "content": " SELECT \"customers\".CustomerId FROM \"customers\""}, {"r ole": "user", "content": "what are the top 5 countries that customers come f rom?"}, {"role": "assistant", "content": " SELECT Country, COUNT(\*) AS Count \nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": "How many customers are there"}, {"role": "assistant", "c ontent": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": Get the total number of invoices for each customer\n"}, {"role": "a ssistant", "content": " SELECT \"customers\".CustomerId, COUNT(\"invoices \".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers \".CustomerId"}, {"role": "user", "content": " \n List all invoices with a total exceeding \$10:\n"}, {"role": "assistant", "content": " SELECT Invoic eId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, Bil lingCountry, BillingPostalCode, Total FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": " \n Find the total number of invoices per c ountry:\n"}, {"role": "assistant", "content": " SELECT \"customers\".Countr y, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INN ER JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId G ROUP BY \"customers\".Country"}, {"role": "user", "content": " \n e average invoice total for each customer:\n"}, {"role": "assistant", "conte nt": " SELECT \"customers\".CustomerId, AVG(\"invoices\".\"Total\") AS Avera geInvoiceTotal FROM \"customers\" INNER JOIN \"invoices\" ON \"customers\".C ustomerId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId"}, {"r ole": "user", "content": " \n Find all invoices since 2010 and the total amount invoiced:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, S UM(Total) AS TotalAmount\n FROM \"invoices\"\n WHERE strftime('%Y', Invo iceDate) >= '2010'\n GROUP BY InvoiceId"}, {"role": "user", "content": " List all employees and their reporting manager's name (if any):\n"}, {"role": "assistant", "content": "SELECT el.LastName, el.FirstName, e2.LastN ame, e2.FirstName AS ReportingManager\n FROM employees e1\n LEFT JOIN em ployees e2 ON e1.ReportsTo = e2.EmployeeID"}, {"role": "user", "content": " List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists\".Name AS Arti stName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".ArtistId = \"art ists\".ArtistId"}, {"role": "user", "content": " \n List all customers w ho have not placed any orders:\n"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:39:44.432973676Z', 'message': {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, "customers".FirstName, "customers".LastName\n FROM "customers"\n LEFT J0 IN "invoices" ON "customers".CustomerId = "invoices".CustomerId\n nvoices".InvoiceId IS NULL;'}, 'done\_reason': 'stop', 'done': True, 'total\_d uration': 80345409469, 'load duration': 3572080, 'prompt eval count': 2022, 'prompt eval duration': 67912956000, 'eval count': 70, 'eval duration': 1158 8053000} LLM Response: SELECT "customers".CustomerId, "customers".FirstName, "custom ers".LastName FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId WHERE "invoices". InvoiceId IS NULL; Info: Output from LLM: SELECT "customers".CustomerId, "customers".FirstNam e, "customers".LastName FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId

```
WHERE "invoices". InvoiceId IS NULL;
Extracted SQL: SELECT "customers".CustomerId, "customers".FirstName, "custom
ers".LastName
   FROM "customers"
   LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId
   WHERE "invoices". InvoiceId IS NULL
SELECT "customers".CustomerId, "customers".FirstName, "customers".LastName
   FROM "customers"
   LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId
   WHERE "invoices". InvoiceId IS NULL
Empty DataFrame
Columns: [CustomerId, FirstName, LastName]
Index: []
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
      List all customers who have not placed any orders:\n'\n\nThe DataFrame
was produced using this query: SELECT \"customers\".CustomerId, \"customers
\".FirstName, \"customers\".LastName\n FROM \"customers\"\n
                                                                 LEFT JOIN
\"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId\n
\"invoices\".InvoiceId IS NULL\n\nThe following is information about the res
ulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n CustomerId
                   object\nLastName
                                          object\ndtype: object"}, {"role":
ect\nFirstName
"user", "content": "Can you generate the Python plotly code to chart the res
ults of the dataframe? Assume the data is in a pandas dataframe called 'df'.
If there is only one value in the dataframe, use an Indicator. Respond with
only Python code. Do not answer with any explanations -- just the code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:40:08.39003255Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres
s as px\nfig = px.bar("CustomerId", "FirstName", "LastName", data=df)\nfig.u
pdate layout(title="Customers without orders")\nfig.show()\n\n# If there is
only one value in the DataFrame, use an Indicator instead\nif len(df) ==
        fig = px.Indicator(df, title="Customer without orders")\n
w()\n```'}, 'done_reason': 'stop', 'done': True, 'total duration': 239548275
92, 'load duration': 4543310, 'prompt eval count': 235, 'prompt eval duratio
n': 7307965000, 'eval count': 107, 'eval duration': 16554092000}
```

```
Out[31]: ('SELECT "customers".CustomerId, "customers".FirstName, "customers".LastNam
              FROM "customers"\n LEFT JOIN "invoices" ON "customers".CustomerId =
          "invoices".CustomerId\n WHERE "invoices".InvoiceId IS NULL',
          Empty DataFrame
          Columns: [CustomerId, FirstName, LastName]
          Index: [],
          Figure({
               'data': [{'domain': {'x': [0.0, 1.0], 'y': [0.0, 1.0]},
                         'hovertemplate': 'CustomerId=%{label}<extra></extra>',
                         'labels': array([], dtype=object),
                         'legendgroup': '',
                         'name': '',
                         'showlegend': True,
                         'type': 'pie'}],
               'layout': {'legend': {'tracegroupgap': 0}, 'margin': {'t': 60}, 'templ
         ate': '...'}
          }))
In [32]: question = """
             There are 3 tables: artists, albums and tracks, where albums and artists
             Can you find the top 10 most popular artists based on the number of trad
         vn.ask(question=question)
        Number of requested results 10 is greater than number of elements in index
        1, updating n results = 1
```

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "tracks"\r\n(\r\n EGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NUL AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n L.\r\n eId INTEGER.\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACT ION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (G enreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "albums"\r\n(\r\n AlbumId I NTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT N FOREIGN KEY (ArtistId) REFERE ArtistId INTEGER NOT NULL,\r\n NCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE TABLE "artists"\r\n(\r\n ArtistId INTEGER PRIMARY KEY AUTOI NCREMENT NOT NULL,\r\n Name NVARCHAR(120) $\r\n)\n\n$ CREATE INDEX IFK AlbumA rtistId ON "albums" (ArtistId)\n\nCREATE INDEX IFK TrackAlbumId ON "tracks"  $(AlbumId)\n\nCREATE\ TABLE\ "playlists"\r\n(\r\n$ PlaylistId INTEGER PRIMARY Name  $NVARCHAR(120)\r\n)\n\nCREATE TABLE$ KEY AUTOINCREMENT NOT NULL,\r\n GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n "genres"\r\n(\r\n Name NVARCHAR(120)\r\n)\n\nCREATE TABLE "playlist track"\r\n(\r\n Plavlis tId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT P K PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (Play listId) REFERENCES "playlists" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON U FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) PDATE NO ACTION,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK Tra ckGenreId ON "tracks" (GenreId)\n\nCREATE INDEX IFK PlaylistTrackTrackId ON "playlist track" (TrackId)\n\n===Additional Context \n\nIn the chinook dat abase invoice means order\n\n===Response Guidelines \n1. If the provided con text is sufficient, please generate a valid SQL query without any explanatio ns for the question. \n2. If the provided context is almost sufficient but r equires knowledge of a specific string in a particular column, please genera te an intermediate SQL query to find the distinct strings in that column. Pr epend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can\'t be generated. \n4. Ple ase use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': ' \n Find the top 5 most expensive tra cks (based on unit price):\n'}, {'role': 'assistant', 'content': ' SELECT "t racks".Name, "tracks".UnitPrice\n FROM "tracks"\n ORDER BY "tracks".Unit Price DESC\n LIMIT 5'}, {'role': 'user', 'content': ' \n es and the number of tracks in each genre:\n'}, {'role': 'assistant', 'conte nt': 'SELECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS Track Count FROM "genres" INNER JOIN "tracks" ON "genres".GenreId = "tracks".Genre Id GROUP BY "genres".Name'}, {'role': 'user', 'content': ' \n List all a lbums and their corresponding artist names \n'}, {'role': 'assistant', 'con tent': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': 'what are the top 5 countries that customers come fro m?'}, {'role': 'assistant', 'content': ' SELECT Country, COUNT(\*) AS Count\n FROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': 'Can you list all tables in the SQLite database catalo g?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': ' \n Find all tracks with a

name containing "What" (case-insensitive)\n'}, {'role': 'assistant', 'conten t': ' SELECT \* FROM "tracks" WHERE LOWER(Name) LIKE \'%what%\''}, {'role': 'user', 'content': ' \n List all invoices with a total exceeding \$1 0:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, InvoiceDate, Cu stomerId, BillingAddress, BillingCity, BillingState, BillingCountry, Billing PostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'cont ent': " \n List all employees and their reporting manager's name (if an y):\n"}, {'role': 'assistant', 'content': 'SELECT el.LastName, el.FirstName, e2.LastName, e2.FirstName AS ReportingManager\n FROM employees e1\n JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID'}, {'role': 'user', 'conte Find the total number of invoices per country:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".Country, COUNT("invoices"."Invo iceId") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customer s".CustomerId = "invoices".CustomerId GROUP BY "customers".Country'}, {'rol e': 'user', 'content': ' \n Find all invoices since 2010 and the total a mount invoiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SU M(Total) AS TotalAmount\n FROM "invoices"\n WHERE strftime(\'%Y\', Invoi ceDate) >= \'2010\'\n GROUP BY InvoiceId'}, {'role': 'user', 'content': ' There are 3 tables: artists, albums and tracks, where albums and artis ts are linked by ArtistId, albums and tracks are linked by AlbumId,\n you find the top 10 most popular artists based on the number of tracks\n'}] Info: Ollama parameters:

model=mistral:latest,

options={},

keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMA RY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n MediaTypeId INTEGER NOT NULL,\r\n lbumId INTEGER,\r\n GenreId INTEGE R, r nComposer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPD ATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTy peId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\t0N DELETE NO ACTION 0 N UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"albums\"\r\n(\r\n AlbumId INTEG ER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NUL ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENC L.\r\n ES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE TABLE \"artists\"\r\n(\r\n ArtistId INTEGER PRIMARY KEY AUT OINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK Albu mArtistId ON \"albums\" (ArtistId)\n\nCREATE INDEX IFK TrackAlbumId ON \"tra cks\" (AlbumId)\n\nCREATE TABLE \"playlists\"\r\n(\r\n PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\nCREATE TABLE \"genres\"\r\n(\r\n GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT N Name NVARCHAR(120)\r\n)\n\nCREATE TABLE \"playlist track\"\r\n ULL,\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n GN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES \"tra cks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREA TE INDEX IFK TrackGenreId ON \"tracks\" (GenreId)\n\nCREATE INDEX IFK Playli stTrackTrackId ON \"playlist track\" (TrackId)\n\n===Additional Context \n

\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query wit hout any explanations for the question. \n2. If the provided context is almo st sufficient but requires knowledge of a specific string in a particular co lumn, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n 3. If the provided context is insufficient, please explain why it can't be q enerated. \n4. Please use the most relevant table(s). \n5. If the question h as been asked and answered before, please repeat the answer exactly as it wa s given before. \n"}, {"role": "user", "content": " \n Find the top 5 mo st expensive tracks (based on unit price):\n"}, {"role": "assistant", "conte nt": " SELECT \"tracks\".Name, \"tracks\".UnitPrice\n FROM \"tracks\"\n ORDER BY \"tracks\".UnitPrice DESC\n LIMIT 5"}, {"role": "user", "conten List all genres and the number of tracks in each genre:\n"}, {"role": "assistant", "content": " SELECT \"genres\".Name AS GenreName, COUN T(\"tracks\".\"TrackId\") AS TrackCount FROM \"genres\" INNER JOIN \"tracks \" ON \"genres\".GenreId = \"tracks\".GenreId GROUP BY \"genres\".Name"}, {"role": "user", "content": " \n List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".Albu mId, \"artists\".Name AS ArtistName FROM \"albums\" INNER JOIN \"artists\" 0 N \"albums\".ArtistId = \"artists\".ArtistId"}, {"role": "user", "content": "what are the top 5 countries that customers come from?"}, {"role": "assista nt", "content": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP B Y Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assistant", "content": "SELECT name FROM sqlite master WHERE type='table'"}, {"role": "u ser", "content": " \n Find all tracks with a name containing \"What\" (c ase-insensitive)\n"}, {"role": "assistant", "content": " SELECT \* FROM \"tra cks\" WHERE LOWER(Name) LIKE '%what%'"}, {"role": "user", "content": " \n List all invoices with a total exceeding \$10:\n"}, {"role": "assistant", "co ntent": " SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, Billing City, BillingState, BillingCountry, BillingPostalCode, Total FROM \"invoices \" WHERE Total > 10"}, {"role": "user", "content": " \n List all employe es and their reporting manager's name (if any):\n"}, {"role": "assistant", "content": "SELECT e1.LastName, e1.FirstName, e2.LastName, e2.FirstName AS R eportingManager\n FROM employees e1\n LEFT JOIN employees e2 ON e1.Repor tsTo = e2.EmployeeID"}, {"role": "user", "content": " \n Find the total number of invoices per country:\n"}, {"role": "assistant", "content": " SELE CT \"customers\".Country, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"i nvoices\".CustomerId GROUP BY \"customers\".Country"}, {"role": "user", "con Find all invoices since 2010 and the total amount invoice d:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, SUM(Total) AS T FROM \"invoices\"\n WHERE strftime('%Y', InvoiceDate) >= '2 otalAmount\n GROUP BY InvoiceId"}, {"role": "user", "content": " \n 3 tables: artists, albums and tracks, where albums and artists are linked by ArtistId, albums and tracks are linked by AlbumId,\n Can you find the top 10 most popular artists based on the number of tracks\n"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:41:34.40138236Z',

NNER JOIN "albums" ON "artists".ArtistId = "albums".ArtistId INNER JOIN "tracks" ON "albums".AlbumId = "tracks".AlbumId\n ) AS t GROUP BY ArtistName O RDER BY TrackCount DESC LIMIT 10'}, 'done\_reason': 'stop', 'done': True, 'to tal\_duration': 85937257023, 'load\_duration': 4202805, 'prompt\_eval\_count': 1603, 'prompt\_eval\_duration': 52346574000, 'eval\_count': 198, 'eval\_duration': 32290791000}

LLM Response: -- intermediate\_sql: Find the distinct artist names

SELECT DISTINCT Name AS ArtistName FROM "artists" INNER JOIN "albums" ON "artists".ArtistId = "albums".ArtistId INNER JOIN "tracks" ON "albums".Album Id = "tracks".AlbumId

-- main query: List the top 10 artists based on the number of tracks SELECT ArtistName, COUNT(\*) AS TrackCount FROM (

SELECT DISTINCT Name AS ArtistName FROM "artists" INNER JOIN "albums" ON "artists".ArtistId = "albums".ArtistId INNER JOIN "tracks" ON "albums".AlbumId = "tracks".AlbumId

) AS t GROUP BY ArtistName ORDER BY TrackCount DESC LIMIT 10 The LLM is not allowed to see the data in your database. Your question requires database introspection to generate the necessary SQL. Please set allow\_l lm to see data=True to enable this.

Couldn't run sql: Execution failed on sql 'The LLM is not allowed to see the data in your database. Your question requires database introspection to generate the necessary SQL. Please set allow\_llm\_to\_see\_data=True to enable this.': near "The": syntax error

In [33]: question = """
 List all customers from Canada and their email addresses:
 """
 vn.ask(question=question)

Number of requested results 10 is greater than number of elements in index 1, updating n\_results = 1

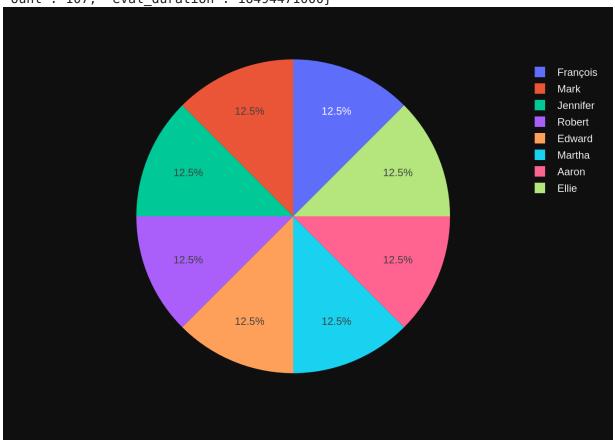
SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE INDEX IFK CustomerSupportRepId ON "cus tomers" (SupportRepId)\n\nCREATE TABLE "customers"\r\n(\r\n CustomerId IN TEGER PRIMARY KEY AUTOINCREMENT NOT NULL.\r\n FirstName NVARCHAR(40) NOT Company NVARCHAR(80),\r LastName NVARCHAR(20) NOT NULL,\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR \n PostalCode NVARCHAR(10),\r\n  $(40), \r\n$ Country NVARCHAR(40),\r\n one NVARCHAR(24),  $\r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NU SupportRepId INTEGER,\r\n LL,\r\n FOREIGN KEY (SupportRepId) REFERENCE S "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE TABLE "invoices"\r\n(\r\n InvoiceId INTEGER PRIMARY KEY AUT OINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingCity N BillingAddress NVARCHAR(70),\r\n  $VARCHAR(40), \r\n$ BillingState NVARCHAR(40),\r\n BillingCountry NVARCHA BillingPostalCode NVARCHAR(10),\r\n  $R(40), \r\n$ Total NUMERIC(10,2) NO T NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES "customers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK Inv oiceCustomerId ON "invoices" (CustomerId)\n\nCREATE TABLE "employees"\r\n(\r EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r\n e NVARCHAR(30), \r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40),\r State NVARCHAR(40).\r\n Country NVARCHAR(40),\r\n PostalCode NVA Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n  $RCHAR(10), \r\n$ FOREIGN KEY (ReportsTo) REFERENCES "employees" (Employe  $NVARCHAR(60), \r\n$ eId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "i InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NO nvoice items"\r\n(\r\n T NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NUL UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NU L,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t LL,\r\n \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE TABLE sqlite sequence(name,seq)\n\nCREATE TABLE "playlist trac  $k"\r\n(\r\n$ PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NUL CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r  $L,\r\n$ FOREIGN KEY (PlaylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\t0 N DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFEREN CES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n) \n\nCREATE INDEX IFK EmployeeReportsTo ON "employees" (ReportsTo)\n\nCREATE AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL TABLE "albums"\r\n(\r\n  $L,\r\n$ Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NUL FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If t he provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost su fficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in th at column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can\'t be genera ted. \n4. Please use the most relevant table(s). \n5. If the question has be en asked and answered before, please repeat the answer exactly as it was giv en before. \n'}, {'role': 'user', 'content': 'what are the top 5 countries t hat customers come from?'}, {'role': 'assistant', 'content': ' SELECT Countr y, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC

\nLIMIT 5'}, {'role': 'user', 'content': ' \n Find the total number of i nvoices per country:\n'}, {'role': 'assistant', 'content': ' SELECT "custome rs".Country, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROU P BY "customers".Country'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "customers".C ustomerId FROM "customers"'}, {'role': 'user', 'content': ' \n otal number of invoices for each customer\n'}, {'role': 'assistant', 'conten t': ' SELECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalI nvoices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "i nvoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'con tent': 'How many customers are there'}, {'role': 'assistant', 'content': ' S ELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': ' \n all invoices with a total exceeding \$10:\n'}, {'role': 'assistant', 'conten t': 'SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCit y, BillingState, BillingCountry, BillingPostalCode, Total FROM "invoices" WH ERE Total > 10'}, {'role': 'user', 'content': " \n List all employees an d their reporting manager's name (if any):\n"}, {'role': 'assistant', 'conte nt': 'SELECT el.LastName, el.FirstName, e2.LastName, e2.FirstName AS Reporti FROM employees e1\n LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID'}, {'role': 'user', 'content': ' \n Get the average invoic e total for each customer:\n'}, {'role': 'assistant', 'content': ' SELECT "c ustomers".CustomerId, AVG("invoices"."Total") AS AverageInvoiceTotal FROM "c ustomers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".Custo merId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': 'Can yo u list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite master WHERE type='table'"}, {'role': 'u ser', 'content': ' \n Find all invoices since 2010 and the total amount invoiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Tota FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDat l) AS TotalAmount\n GROUP BY InvoiceId'}, {'role': 'user', 'content': ' \n e)  $>= \'2010\'\n$ List all customers from Canada and their email addresses:\n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE INDEX IFK CustomerSupportRepId ON \"customers\" (S upportRepId)\n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PR IMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r LastName NVARCHAR(20) NOT NULL, $\r\n$ Company NVARCHAR(80),\r\n ddress NVARCHAR(70),\r\n City NVARCHAR(40),\r\n State NVARCHAR(40),\r PostalCode NVARCHAR(10),\r\n Country NVARCHAR(40),\r\n  $RCHAR(24), \r\n$ Fax NVARCHAR(24), r nEmail NVARCHAR(60) NOT NULL,\r\n FOREIGN KEY (SupportRepId) REFERENCES \"employe SupportRepId INTEGER,\r\n es\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCR EATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER PRIMARY KEY AUTOINCREM ENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETI ME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n BillingCity NVARCHA  $R(40), \r\n$ BillingState NVARCHAR(40),\r\n BillingCountry NVARCHAR(4 0),\r\n BillingPostalCode NVARCHAR(10),\r\n Total NUMERIC(10,2) NOT N FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) ULL,\r\n

\r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK Inv oiceCustomerId ON \"invoices\" (CustomerId)\n\nCREATE TABLE \"employees\"\r EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n  $\n(\r\n$ tName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r\n ReportsTo INTEGER,\r\n BirthDate DATETIME,\r\n Title NVARCHAR(30),\r\n HireDate DATETIME.\r\n Address NVARCHAR(70),\r\n City NVARCHAR(40).\r State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n PostalCode NVA  $RCHAR(10), \r\n$ Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (Emplo  $NVARCHAR(60), \r\n$ yeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMEN T NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACT ION\r\n)\n\nCREATE TABLE sqlite sequence(name, seq)\n\nCREATE TABLE \"playlis t track\"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n TrackId INTEGER CONSTRAINT PK PlaylistTrack PRIMARY KEY (PlaylistId, Track FOREIGN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackI d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK EmployeeReportsTo ON \"employees\" (ReportsT o)\n\nCREATE TABLE \"albums\"\r\n(\r\n AlbumId INTEGER PRIMARY KEY AUTOIN CREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL.\r\n ArtistId INTE GER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistI d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional C ontext \n\nIn the chinook database invoice means order\n\n===Response Guidel ines \nl. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided contex t is almost sufficient but requires knowledge of a specific string in a part icular column, please generate an intermediate SQL query to find the distinc t strings in that column. Prepend the query with a comment saying intermedia te sql \n3. If the provided context is insufficient, please explain why it c an't be generated. \n4. Please use the most relevant table(s). \n5. If the g uestion has been asked and answered before, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": "what are the top 5 countries that customers come from?"}, {"role": "assistant", "content": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER B Y Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n Find the total number of invoices per country:\n"}, {"role": "assistant", "content": " SELE CT \"customers\".Country, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"i nvoices\".CustomerId GROUP BY \"customers\".Country"}, {"role": "user", "con tent": "which table stores customer's orders"}, {"role": "assistant", "conte nt": " SELECT \"customers\".CustomerId FROM \"customers\""}, {"role": "use r", "content": " \n Get the total number of invoices for each customer \n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId, CO UNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LEFT JOI N \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP B Y \"customers\".CustomerId"}, {"role": "user", "content": "How many customer s are there"}, {"role": "assistant", "content": " SELECT COUNT(\*) FROM \"cus tomers\""}, {"role": "user", "content": " \n List all invoices with a to tal exceeding \$10:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingC ountry, BillingPostalCode, Total FROM \"invoices\" WHERE Total > 10"}, {"rol

```
e": "user", "content": " \n
                               List all employees and their reporting manag
er's name (if any):\n"}, {"role": "assistant", "content": "SELECT el.LastNam
e, e1.FirstName, e2.LastName, e2.FirstName AS ReportingManager\n FROM empl
oyees e1\n LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeID"}, {"rol
e": "user", "content": " \n Get the average invoice total for each custo
mer:\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerI
d, AVG(\"invoices\".\"Total\") AS AverageInvoiceTotal FROM \"customers\" INN
ER JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId G
ROUP BY \"customers\".CustomerId"}, {"role": "user", "content": "Can you lis
t all tables in the SQLite database catalog?"}, {"role": "assistant", "conte
nt": "SELECT name FROM sqlite master WHERE type='table'"}, {"role": "user",
                  Find all invoices since 2010 and the total amount invoic
"content": " \n
ed:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, SUM(Total) AS
TotalAmount\n FROM \"invoices\"\n WHERE strftime('%Y', InvoiceDate) >=
         GROUP BY InvoiceId"}, {"role": "user", "content": " \n
all customers from Canada and their email addresses:\n"}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created_at': '2024-08-01T19:42:42.611774926Z',
'message': {'role': 'assistant', 'content': ' SELECT FirstName, LastName, Em
ail FROM "customers" WHERE Country = \'Canada\''}, 'done_reason': 'stop', 'd
one': True, 'total duration': 68169097880, 'load duration': 4074085, 'prompt
eval count': 1911, 'prompt eval duration': 63391739000, 'eval count': 22,
'eval duration': 3476184000}
LLM Response: SELECT FirstName, LastName, Email FROM "customers" WHERE Coun
trv = 'Canada'
 SELECT FirstName, LastName, Email FROM "customers" WHERE Country = 'Canada'
  FirstName LastName
                                       Email
0 François Tremblay
                         ftremblay@gmail.com
                          mphilips12@shaw.ca
1
      Mark
            Philips
2 Jennifer Peterson
                         jenniferp@rogers.ca
3
                            robbrown@shaw.ca
    Robert
               Brown
4
     Edward
             Francis
                         edfrancis@yachoo.ca
5
    Martha
                 Silk
                        marthasilk@gmail.com
6
     Aaron Mitchell aaronmitchell@yahoo.ca
7
      Ellie Sullivan ellie.sullivan@shaw.ca
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
      List all customers from Canada and their email addresses:\n'\n\nThe D
ataFrame was produced using this guery: SELECT FirstName, LastName, Email F
ROM \"customers\" WHERE Country = 'Canada'\n\nThe following is information a
bout the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n First
       object\nLastName
                            object\nEmail
                                                 object\ndtype: object"},
{"role": "user", "content": "Can you generate the Python plotly code to char
t the results of the dataframe? Assume the data is in a pandas dataframe cal
led 'df'. If there is only one value in the dataframe, use an Indicator. Res
pond with only Python code. Do not answer with any explanations -- just the
code."}]
Info: Ollama Response:
{'model': 'mistral:latest', 'created at': '2024-08-01T19:43:04.959384127Z',
'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres
s as px\nfig = px.bar("FirstName", "LastName", data=df, barmode="group")\nfi
```

g.update\_layout(title="Canadian Customers\' Email Distribution")\nif df.shap
e[0] == 1:\n fig = px.scatter(x=\'LastName\', y=\'Email\', data=df)\n
fig.update\_layout(title="Email of a Canadian Customer")\n```'}, 'done\_reaso
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```
0 François Tremblay
                           ftremblay@gmail.com
       Mark
             Philips
                            mphilips12@shaw.ca
   Jennifer Peterson
                           jenniferp@rogers.ca
3
     Robert
                Brown
                              robbrown@shaw.ca
              Francis
4
                           edfrancis@yachoo.ca
     Edward
5
     Martha
                  Silk
                          marthasilk@gmail.com
6
      Aaron Mitchell aaronmitchell@yahoo.ca
      Ellie Sullivan ellie.sullivan@shaw.ca,
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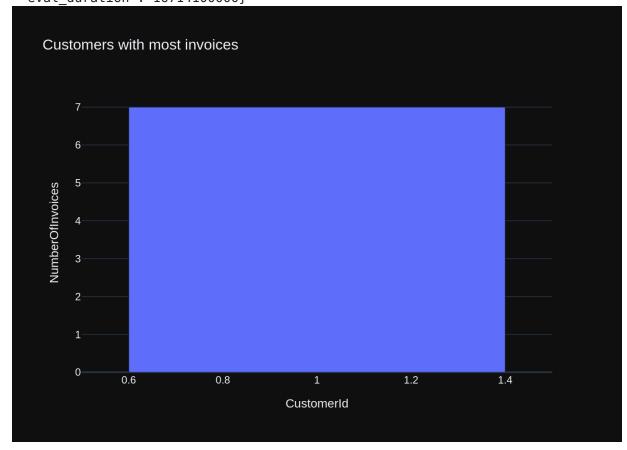
Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$ 

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n 0),\r\n BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n FOREIGN KEY (CustomerId) REFERENCES "cu otal NUMERIC(10,2) NOT NULL,\r\n stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE IN DEX IFK InvoiceLineInvoiceId ON "invoice items" (InvoiceId)\n\nCREATE TABLE InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT "invoice items"\r\n(\r\n NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NU UnitPrice NUMERIC(10,2) NOT NULL,\r\n LL,\r\n Quantity INTEGER NOT N FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t ULL,\r\n \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFE RENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nC REATE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCRE FirstName NVARCHAR(40) NOT NULL,\r\n MENT NOT NULL,\r\n LastName NVAR CHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(7 City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n 0), r nCountry NVAR PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$  $CHAR(40), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId I FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeI NTEGER,\r\n d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON "customers" (SupportRepId)\n\nCREATE TABLE "employee EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r LastName NVARCHAR(20) NOT NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER.\r\n BirthDate DATETIM \n  $E,\r\n$ HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n City NVARCH  $AR(40), \r\n$ State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n lCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(24),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES "employees" (E mployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE IN DEX IFK EmployeeReportsTo ON "employees" (ReportsTo)\n\nCREATE TABLE "track s"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n me NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEG ER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMER FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumI IC(10,2) NOT NULL,\r\n d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (Genr eId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaType Id)  $\r \n \t \0$  DELETE NO ACTION ON UPDATE NO ACTION $\r \n \n \===Additional$ Context \n\nIn the chinook database invoice means order\n\n===Response Guide lines \n1. If the provided context is sufficient, please generate a valid SQ L query without any explanations for the question. \n2. If the provided cont ext is almost sufficient but requires knowledge of a specific string in a pa rticular column, please generate an intermediate SQL query to find the disti nct strings in that column. Prepend the query with a comment saying intermed iate sql \n3. If the provided context is insufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactl y as it was given before. \n'}, {'role': 'user', 'content': ' \n Get the

total number of invoices for each customer\n'}, {'role': 'assistant', 'conte nt': 'SELECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS Total Invoices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'c ontent': ' \n Find the total number of invoices per country:\n'}, {'rol e': 'assistant', 'content': ' SELECT "customers".Country, COUNT("invoice s"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".Countr y'}, {'role': 'user', 'content': ' \n List all invoices with a total exc eeding \$10:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, Invoic eDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingCountr y, BillingPostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'us er', 'content': ' \n Get the average invoice total for each custome r:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, AV G("invoices"."Total") AS AverageInvoiceTotal FROM "customers" INNER JOIN "in voices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customer s".CustomerId'}, {'role': 'user', 'content': ' \n Find all invoices sinc e 2010 and the total amount invoiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM "invoices"\n strftime(\'%Y\', InvoiceDate) >= \'2010\'\n GROUP BY InvoiceId'}, {'role': 'user', 'content': ' \n Find the top 5 most expensive tracks (based on u nit price):\n'}, {'role': 'assistant', 'content': ' SELECT "tracks".Name, "t racks".UnitPrice\n FROM "tracks"\n ORDER BY "tracks".UnitPrice DESC\n LIMIT 5'}, {'role': 'user', 'content': 'what are the top 5 countries that cu stomers come from?'}, {'role': 'assistant', 'content': ' SELECT Country, COU NT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': "which table stores customer's orders"}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId FROM "custo mers"'}, {'role': 'user', 'content': 'How many customers are there'}, {'rol e': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': ' \n List all customers from Canada and their email addresses:\n'}, {'role': 'assistant', 'content': ' SELECT FirstName, LastNam e, Email FROM "customers" WHERE Country = \'Canada\''}, {'role': 'user', 'co ntent': ' \n Find the customer with the most invoices \n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCou BillingPostalCode NVARCHAR(10),\r\n ntry NVARCHAR(40),\r\n Total NUMER IC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices\" (CustomerId)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (InvoiceId)\n\nCREATE TABLE \"inv InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT oice items\"\r\n(\r\n InvoiceId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NUL NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n L,\r\n Quantity INTEGER NOT NU FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n \t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) RE

FERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO N\r\n)\n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId) \n\nCREATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AU TOINCREMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n Company NVARCHAR(80),\r\n me NVARCHAR(20) NOT NULL,\r\n Address NVARC  $HAR(70).\r\n$ City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n  $NVARCHAR(40), \r\n$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId I FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (Employee NTEGER,\r\n Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK CustomerSupportRepId ON \"customers\" (SupportRepId)\n\nCREATE TABLE \"empl oyees\"\r\n(\r\n EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) \n LL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDate DA TETIME,\r\n HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n City N  $VARCHAR(40), \r\n$ State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(2 4),\r\n Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"e mployees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n) \n\nCREATE INDEX IFK EmployeeReportsTo ON \"employees\" (ReportsTo)\n\nCREAT E TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n diaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHA Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO A CTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES \"med ia types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r  $\n)\n\n===Additional Context \n\nIn the chinook database invoice means ord$ er\n\n===Response Guidelines \n1. If the provided context is sufficient, ple ase generate a valid SQL query without any explanations for the question. \n 2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficien t, please explain why it can't be generated. \n4. Please use the most releva nt table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "co Get the total number of invoices for each customer\n"}, {"r ntent": " \n ole": "assistant", "content": " SELECT \"customers\".CustomerId, COUNT(\"inv oices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LEFT JOIN \"invoi ces\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"custo mers\".CustomerId"}, {"role": "user", "content": " \n Find the total num ber of invoices per country:\n"}, {"role": "assistant", "content": " SELECT \"customers\".Country, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FR OM \"customers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"inv oices\".CustomerId GROUP BY \"customers\".Country"}, {"role": "user", "conte List all invoices with a total exceeding \$10:\n"}, {"role": "a ssistant", "content": " SELECT InvoiceId, InvoiceDate, CustomerId, BillingAd dress, BillingCity, BillingState, BillingCountry, BillingPostalCode, Total F ROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": " \n t the average invoice total for each customer:\n"}, {"role": "assistant", "c ontent": " SELECT \"customers\".CustomerId, AVG(\"invoices\".\"Total\") AS A verageInvoiceTotal FROM \"customers\" INNER JOIN \"invoices\" ON \"customers \".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId"},

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{"role": "user", "content": " \n
                                  Find all invoices since 2010 and the to
tal amount invoiced:\n"}, {"role": "assistant", "content": " SELECT InvoiceI
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       FROM \"tracks\"\n ORDER BY \"tracks\".UnitPrice DESC\n
5"}, {"role": "user", "content": "what are the top 5 countries that customer
s come from?"}, {"role": "assistant", "content": " SELECT Country, COUNT(*)
AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"},
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rs\""}, {"role": "user", "content": "How many customers are there"}, {"rol
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addresses:\n"}, {"role": "assistant", "content": " SELECT FirstName, LastNam
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ntent": " \n
                  Find the customer with the most invoices \n"}]
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AS CustomerId, COUNT("invoices"."InvoiceId") AS NumberOfInvoices FROM "custo
mers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId
GROUP BY "customers".CustomerId ORDER BY NumberOfInvoices DESC LIMIT 1'}, 'd
one reason': 'stop', 'done': True, 'total duration': 79805273910, 'load dura
tion': 4214388, 'prompt eval count': 1947, 'prompt eval duration': 648816510
00, 'eval count': 83, 'eval duration': 13606861000}
LLM Response: SELECT "customers".CustomerId AS CustomerId, COUNT("invoice
s"."InvoiceId") AS NumberOfInvoices FROM "customers" LEFT JOIN "invoices" ON
"customers".CustomerId = "invoices".CustomerId GROUP BY "customers".Customer
Id ORDER BY NumberOfInvoices DESC LIMIT 1
 SELECT "customers".CustomerId AS CustomerId, COUNT("invoices"."InvoiceId")
AS NumberOfInvoices FROM "customers" LEFT JOIN "invoices" ON "customers".Cus
tomerId = "invoices".CustomerId GROUP BY "customers".CustomerId ORDER BY Num
berOfInvoices DESC LIMIT 1
   CustomerId NumberOfInvoices
Info: Ollama parameters:
model=mistral:latest,
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
       Find the customer with the most invoices \n'\nThe DataFrame was pro
duced using this query: SELECT \"customers\".CustomerId AS CustomerId, COUN
T(\"invoices\".\"InvoiceId\") AS NumberOfInvoices FROM \"customers\" LEFT JO
IN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP
BY \"customers\".CustomerId ORDER BY NumberOfInvoices DESC LIMIT 1\n\nThe fo
llowing is information about the resulting pandas DataFrame 'df': \nRunning
                                      int64\nNumber0fInvoices
df.dtypes gives:\n CustomerId
pe: object"}, {"role": "user", "content": "Can you generate the Python plotl
y code to chart the results of the dataframe? Assume the data is in a pandas
dataframe called 'df'. If there is only one value in the dataframe, use an I
ndicator. Respond with only Python code. Do not answer with any explanations
-- just the code."}]
```



```
Out[34]: (' SELECT "customers".CustomerId AS CustomerId, COUNT("invoices"."InvoiceI
          d") AS NumberOfInvoices FROM "customers" LEFT JOIN "invoices" ON "customer
          s".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId ORDER
          BY NumberOfInvoices DESC LIMIT 1',
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                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'NumberOfInvoices'}}}
           }))
 In []:
```

## Advanced SQL questions

Number of requested results 10 is greater than number of elements in index 1, updating n\_results = 1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "tracks"\r\n(\r\n EGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NUL AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n L.\r\n Milliseconds INTEGER NOT eId INTEGER.\r\n Composer NVARCHAR(220),\r\n NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACT ION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (G enreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "invoice items"\r\n(\r\n voiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n EGER NOT NULL,\r\n UnitPrice NUMERIC(1 0.2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (Invoi ceId) REFERENCES "invoices" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n \t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "albums"\r  $\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n NVARCHAR(160) NOT  $NULL, \r\n$ FOREIGN K EY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON "albums" (ArtistI d)\n\nCREATE TABLE "invoices"\r\n(\r\n InvoiceId INTEGER PRIMARY KEY AUTO INCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n BillingCity N BillingState NVARCHAR(40),\r\n  $VARCHAR(40), \r\n$ BillingCountry NVARCHA  $R(40), \r\n$ BillingPostalCode NVARCHAR(10),\r\n Total NUMERIC(10.2) NO FOREIGN KEY (CustomerId) REFERENCES "customers" (CustomerId) T NULL,\r\n  $\r\n\t\$  ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK Inv oiceLineTrackId ON "invoice items" (TrackId)\n\nCREATE INDEX IFK InvoiceLine InvoiceId ON "invoice items" (InvoiceId)\n\nCREATE INDEX IFK InvoiceCustomer Id ON "invoices" (CustomerId)\n\nCREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE TABLE "artists"\r\n(\r\n ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\n===Additional Co ntext \n\nIn the chinook database invoice means order\n\n===Response Guideli nes \nl. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided contex t is almost sufficient but requires knowledge of a specific string in a part icular column, please generate an intermediate SQL query to find the distinc t strings in that column. Prepend the query with a comment saying intermedia te sql \n3. If the provided context is insufficient, please explain why it c an\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactl y as it was given before. \n'}, {'role': 'user', 'content': ' \n he customer with the most invoices \n'}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId AS CustomerId, COUNT("invoices"."InvoiceId") A S NumberOfInvoices FROM "customers" LEFT JOIN "invoices" ON "customers".Cust omerId = "invoices".CustomerId GROUP BY "customers".CustomerId ORDER BY Numb erOfInvoices DESC LIMIT 1'}, {'role': 'user', 'content': ' \n op 5 most expensive tracks (based on unit price):\n'}, {'role': 'assistant', 'content': ' SELECT "tracks".Name, "tracks".UnitPrice\n FROM "tracks"\n ORDER BY "tracks".UnitPrice DESC\n LIMIT 5'}, {'role': 'user', 'content': Find all invoices since 2010 and the total amount invoiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Total) AS TotalAmou FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDate) >= \'2010\'\n nt\n

GROUP BY InvoiceId'}, {'role': 'user', 'content': ' \n Get the total num ber of invoices for each customer\n'}, {'role': 'assistant', 'content': ' SE LECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoice s".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': List all invoices with a total exceeding \$10:\n'}, {'role': 'assist ant', 'content': ' SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddres s, BillingCity, BillingState, BillingCountry, BillingPostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'content': ' \n total number of invoices per country:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoice s".CustomerId GROUP BY "customers".Country'}, {'role': 'user', 'content': ' Get the average invoice total for each customer:\n'}, {'role': 'assist ant', 'content': ' SELECT "customers".CustomerId, AVG("invoices"."Total") AS AverageInvoiceTotal FROM "customers" INNER JOIN "invoices" ON "customers".Cu stomerId = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': ' \n List all albums and their corresponding artist n ames \n'}, {'role': 'assistant', 'content': 'SELECT "albums".AlbumId, "arti sts".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".Artis tId = "artists".ArtistId'}, {'role': 'user', 'content': ' \n List all ge nres and the number of tracks in each genre:\n'}, {'role': 'assistant', 'con tent': 'SELECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS Tra ckCount FROM "genres" INNER JOIN "tracks" ON "genres".GenreId = "tracks".Gen reId GROUP BY "genres".Name'}, {'role': 'user', 'content': 'what are the top 5 countries that customers come from?'}, {'role': 'assistant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER B Y Count DESC\nLIMIT 5'}, {'role': 'user', 'content': ' \n Find the cust omer who bought the most albums in total quantity (across all invoices):

Info: Ollama parameters:

model=mistral:latest,

options={},

keep\_alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMA RY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n MediaTypeId INTEGER NOT NULL,\r\n lbumId INTEGER,\r\n GenreId INTEGE Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Bytes INTEGER,\r\n (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPD ATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTy peId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\t0N DELETE NO ACTION 0 N UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n eLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER TrackId INTEGER NOT NULL,\r\n NOT NULL,\r\n UnitPrice NUMERIC(10.2) Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) NOT NULL,\r\n REFERENCES \"invoices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t \tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"albums\"\r AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n FOREIGN K

EY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON \"albums\" (Ar tistId)\n\nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER PRIMARY K EY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n ceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n Billin gCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCountry BillingPostalCode NVARCHAR(10),\r\n  $NVARCHAR(40).\r\n$ Total NUMERIC(1 0,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (Cu stomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE IND EX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (InvoiceId)\n\nCREATE INDEX IFK I nvoiceCustomerId ON \"invoices\" (CustomerId)\n\nCREATE INDEX IFK TrackAlbum Id ON \"tracks\" (AlbumId)\n\nCREATE TABLE \"artists\"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n$ \n\n===Additional Context \n\nIn the chinook database invoice means order\n \n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. I f the provided context is almost sufficient but requires knowledge of a spec ific string in a particular column, please generate an intermediate SQL quer y to find the distinct strings in that column. Prepend the query with a comm ent saying intermediate sql \n3. If the provided context is insufficient, pl ease explain why it can't be generated. \n4. Please use the most relevant ta ble(s). \n5. If the question has been asked and answered before, please repe at the answer exactly as it was given before. \n"}, {"role": "user", "conten Find the customer with the most invoices \n"}, {"role": "assis tant", "content": " SELECT \"customers\".CustomerId AS CustomerId, COUNT(\"i nvoices\".\"InvoiceId\") AS NumberOfInvoices FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId ORDER BY NumberOfInvoices DESC LIMIT 1"}, {"role": "user", "content": " \n Find the top 5 most expensive tracks (based on u nit price):\n"}, {"role": "assistant", "content": " SELECT \"tracks\".Name, FROM \"tracks\"\n ORDER BY \"tracks\".UnitPrice D \"tracks\".UnitPrice\n LIMIT 5"}, {"role": "user", "content": " \n Find all invoices si nce 2010 and the total amount invoiced:\n"}, {"role": "assistant", "conten t": " SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM \"invoices\"\n WHERE strftime('%Y', InvoiceDate) >= '2010'\n GROUP BY InvoiceId"}, {"rol e": "user", "content": " \n Get the total number of invoices for each cu stomer\n"}, {"role": "assistant", "content": " SELECT \"customers\".Customer Id, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" LE FT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId G ROUP BY \"customers\".CustomerId"}, {"role": "user", "content": " \n t all invoices with a total exceeding \$10:\n"}, {"role": "assistant", "conte nt": " SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCit y, BillingState, BillingCountry, BillingPostalCode, Total FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": " \n Find the total numb er of invoices per country:\n"}, {"role": "assistant", "content": " SELECT \"customers\".Country, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FR OM \"customers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"inv oices\".CustomerId GROUP BY \"customers\".Country"}, {"role": "user", "conte Get the average invoice total for each customer:\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId, AVG(\"invoices \".\"Total\") AS AverageInvoiceTotal FROM \"customers\" INNER JOIN \"invoice s\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"custome rs\".CustomerId"}, {"role": "user", "content": " \n List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SE LECT \"albums\".AlbumId, \"artists\".Name AS ArtistName FROM \"albums\" INNE

R JOIN \"artists\" ON \"albums\".ArtistId = \"artists\".ArtistId"}, {"role": "user", "content": " \n List all genres and the number of tracks in each genre:\n"}, {"role": "assistant", "content": " SELECT \"genres\".Name AS Gen reName, COUNT(\"tracks\".\"TrackId\") AS TrackCount FROM \"genres\" INNER JO IN \"tracks\" ON \"genres\".GenreId = \"tracks\".GenreId GROUP BY \"genres \".Name"}, {"role": "user", "content": "what are the top 5 countries that cu stomers come from?"}, {"role": "assistant", "content": " SELECT Country, COU NT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n Find the customer who bought the most albums in total quantity (across all invoices): \n"}] Info: Ollama Response:

{'model': 'mistral:latest', 'created\_at': '2024-08-01T19:46:09.569484477Z',
'message': {'role': 'assistant', 'content': 'SELECT "customers".CustomerId,
COUNT("albums"."AlbumId") AS TotalAlbumsPurchased FROM "invoice\_items" INNER
JOIN "tracks" ON "invoice\_items".TrackId = "tracks".TrackId INNER JOIN "albu
ms" ON "tracks".AlbumId = "albums".AlbumId GROUP BY "customers".CustomerId O
RDER BY TotalAlbumsPurchased DESC LIMIT 1'}, 'done\_reason': 'stop', 'done':
True, 'total\_duration': 80070039897, 'load\_duration': 3005297, 'prompt\_eval\_
count': 1825, 'prompt\_eval\_duration': 60425688000, 'eval\_count': 109, 'eval\_
duration': 18355417000}

LLM Response: SELECT "customers".CustomerId, COUNT("albums"."AlbumId") AS T otalAlbumsPurchased FROM "invoice\_items" INNER JOIN "tracks" ON "invoice\_ite ms".TrackId = "tracks".TrackId INNER JOIN "albums" ON "tracks".AlbumId = "albums".AlbumId GROUP BY "customers".CustomerId ORDER BY TotalAlbumsPurchased DESC LIMIT 1

SELECT "customers".CustomerId, COUNT("albums"."AlbumId") AS TotalAlbumsPurc hased FROM "invoice\_items" INNER JOIN "tracks" ON "invoice\_items".TrackId = "tracks".TrackId INNER JOIN "albums" ON "tracks".AlbumId = "albums".AlbumId GROUP BY "customers".CustomerId ORDER BY TotalAlbumsPurchased DESC LIMIT 1 Couldn't run sql: Execution failed on sql 'SELECT "customers".CustomerId, COUNT("albums"."AlbumId") AS TotalAlbumsPurchased FROM "invoice\_items" INNER JOIN "tracks" ON "invoice\_items".TrackId = "tracks".TrackId INNER JOIN "albums" ON "tracks".AlbumId = "albums".AlbumId GROUP BY "customers".CustomerId ORDER BY TotalAlbumsPurchased DESC LIMIT 1': no such column: customers.Custom erId

Number of requested results 10 is greater than number of elements in index 1, updating n\_results = 1

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoice items"\r\n(\r\n iceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEG ER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10. NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (Invoice Id) REFERENCES "invoices" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t \t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "tracks"\r\n (\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVA RCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NO GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n T NULL,\r\n Millis econds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10, FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r 2) NOT NULL,\r\n \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) N, r n\r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "album  $s"\r\n(\r\n$ AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n tle NVARCHAR(160) NOT NULL,\r\n GN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\t0N DELETE NO ACTIO N ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON "albums" (Ar tistId)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON "invoice items" (Invoice Id)\n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nC InvoiceId INTEGER PRIMARY KEY AUTOINCREME REATE TABLE "invoices"\r\n(\r\n CustomerId INTEGER NOT NULL,\r\n NT NOT NULL,\r\n InvoiceDate DATETIM E NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n BillingCity NVARCHAR BillingState NVARCHAR(40),\r\n BillingCountry NVARCHAR(4  $(40), \r\n$ 0),\r\n BillingPostalCode NVARCHAR(10),\r\n Total NUMERIC(10,2) NOT N FOREIGN KEY (CustomerId) REFERENCES "customers" (CustomerId) \r \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK Invoi ceCustomerId ON "invoices" (CustomerId)\n\nCREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE TABLE "artists"\r\n(\r\n ArtistId INTEGER PR IMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\n===Add itional Context \n\nIn the chinook database invoice means order\n\n===Respon se Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provi ded context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find th e distinct strings in that column. Prepend the guery with a comment saying i ntermediate sql \n3. If the provided context is insufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': ' \n ind the top 5 most expensive tracks (based on unit price):\n'}, {'role': 'as sistant', 'content': ' SELECT "tracks".Name, "tracks".UnitPrice\n ORDER BY "tracks".UnitPrice DESC\n LIMIT 5'}, {'role': 'user', Find the customer with the most invoices \n'}, {'role': 'content': ' \n 'assistant', 'content': ' SELECT "customers".CustomerId AS CustomerId, COUNT ("invoices"."InvoiceId") AS NumberOfInvoices FROM "customers" LEFT JOIN "inv oices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customer s".CustomerId ORDER BY NumberOfInvoices DESC LIMIT 1'}, {'role': 'user', 'co List all invoices with a total exceeding \$10:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, InvoiceDate, CustomerId, Billing Address, BillingCity, BillingState, BillingCountry, BillingPostalCode, Total

FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'content': ' \n d the total number of invoices per country:\n'}, {'role': 'assistant', 'cont ent': ' SELECT "customers".Country, COUNT("invoices"."InvoiceId") AS TotalIn voices FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "i nvoices".CustomerId GROUP BY "customers".Country'}, {'role': 'user', 'conten Find all invoices since 2010 and the total amount invoice d:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(Total) AS T FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDate) >= otalAmount\n GROUP BY InvoiceId'}, {'role': 'user', 'content': 'what are the \'2010\'\n top 5 countries that customers come from?'}, {'role': 'assistant', 'conten t': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\n0 RDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': ' \n total number of invoices for each customer\n'}, {'role': 'assistant', 'conte nt': 'SELECT "customers".CustomerId, COUNT("invoices"."InvoiceId") AS Total Invoices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'c ontent': ' \n Get the average invoice total for each customer:\n'}, {'ro le': 'assistant', 'content': ' SELECT "customers".CustomerId, AVG("invoice s"."Total") AS AverageInvoiceTotal FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".Customer Id'}, {'role': 'user', 'content': ' \n List all albums and their corresp onding artist names \n'}, {'role': 'assistant', 'content': 'SELECT "album s".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': ' List all genres and the number of tracks in each genre:\n'}, {'role': 'assistant', 'content': ' SELECT "genres".Name AS GenreName, COUNT("track s"."TrackId") AS TrackCount FROM "genres" INNER JOIN "tracks" ON "genres".Ge nreId = "tracks".GenreId GROUP BY "genres".Name'}, {'role': 'user', 'conten Hint: album quantity is found in invoice items, \n d the top 5 customers who bought the most albums in total quantity (across a ll invoices):\n'}l

Info: Ollama parameters:

model=mistral:latest,

options={},

keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NU  $LL,\r\n$ TrackId INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NU Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERE  $LL,\r\n$ NCES \"invoices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON D ELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL.\r\n Name NVARCHAR(20 0) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NUL GenreId INTEGER,\r\n Composer NVARCHAR(220),\r\n Millisecond  $L,\r\n$ UnitPrice NUMERIC(10,2) N s INTEGER NOT NULL.\r\n Bytes INTEGER,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t OT NULL,\r\n \tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFE RENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO FOREIGN KEY (MediaTypeId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"album Albumid INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n s\"\r\n(\r\n

itle NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n IGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON \"albums \" (ArtistId)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (InvoiceId)\n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (Tra ckId)\n\nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT NULL,\r\n ate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n BillingCi ty NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCountry NVA  $RCHAR(40), \ r \ n$ BillingPostalCode NVARCHAR(10),\r\n Total NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (Customer Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices\" (CustomerId)\n\nCREATE INDEX IFK TrackAlb umId ON \"tracks\" (AlbumId)\n\nCREATE TABLE \"artists\"\r\n(\r\n d INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120) $\r\n$ ) \n\n===Additional Context \n\nIn the chinook database invoice means order \n\n===Response Guidelines \n1. If the provided context is sufficient, pleas e generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a spe cific string in a particular column, please generate an intermediate SQL que ry to find the distinct strings in that column. Prepend the query with a com ment saying intermediate sql \n3. If the provided context is insufficient, p lease explain why it can't be generated. \n4. Please use the most relevant t able(s). \n5. If the question has been asked and answered before, please rep eat the answer exactly as it was given before. \n"}, {"role": "user", "conte nt": " \n Find the top 5 most expensive tracks (based on unit pric e):\n"}, {"role": "assistant", "content": " SELECT \"tracks\".Name, \"tracks \".UnitPrice\n FROM \"tracks\"\n ORDER BY \"tracks\".UnitPrice DESC\n LIMIT 5"}, {"role": "user", "content": " \n Find the customer with the most invoices \n"}, {"role": "assistant", "content": " SELECT \"customers\". CustomerId AS CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS NumberOfInvoi ces FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId ORDER BY NumberOfI nvoices DESC LIMIT 1"}, {"role": "user", "content": " \n List all invoic es with a total exceeding \$10:\n"}, {"role": "assistant", "content": " SELEC T InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingSt ate, BillingCountry, BillingPostalCode, Total FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": " \n Find the total number of invoic es per country:\n"}, {"role": "assistant", "content": " SELECT \"customers \".Country, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"custom ers\" INNER JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".Cus tomerId GROUP BY \"customers\".Country"}, {"role": "user", "content": " \n Find all invoices since 2010 and the total amount invoiced:\n"}, {"role": "a ssistant", "content": " SELECT InvoiceId, SUM(Total) AS TotalAmount\n \"invoices\"\n WHERE strftime('%Y', InvoiceDate) >= '2010'\n GROUP BY In voiceId"}, {"role": "user", "content": "what are the top 5 countries that cu stomers come from?"}, {"role": "assistant", "content": " SELECT Country, COU NT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n Get the total number of invoices f or each customer\n"}, {"role": "assistant", "content": " SELECT \"customers \".CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"cus tomers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".C ustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "content": " Get the average invoice total for each customer:\n"}, {"role": "assist ant", "content": " SELECT \"customers\".CustomerId, AVG(\"invoices\".\"Total \") AS AverageInvoiceTotal FROM \"customers\" INNER JOIN \"invoices\" ON \"c

Info: Ollama Response:

{'model': 'mistral:latest', 'created\_at': '2024-08-01T19:47:40.511824866Z',
'message': {'role': 'assistant', 'content': ' SELECT "customers".CustomerId,
COUNT(DISTINCT "tracks"."TrackId") AS TotalAlbums FROM "customers" LEFT JOIN
"invoices" ON "customers".CustomerId = "invoices".CustomerId LEFT JOIN "invo
ice\_items" ON "invoices".InvoiceId = "invoice\_items".InvoiceId LEFT JOIN "tr
acks" ON "invoice\_items".TrackId = "tracks".TrackId GROUP BY "customers".Cus
tomerId ORDER BY TotalAlbums DESC LIMIT 5'}, 'done\_reason': 'stop', 'done':
True, 'total\_duration': 90862844144, 'load\_duration': 3466716, 'prompt\_eval\_
count': 1845, 'prompt\_eval\_duration': 66481364000, 'eval\_count': 134, 'eval\_
duration': 23086684000}

LLM Response: SELECT "customers".CustomerId, COUNT(DISTINCT "tracks"."Track Id") AS TotalAlbums FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId LEFT JOIN "invoice\_items" ON "invoices".InvoiceId = "invoice\_items".InvoiceId LEFT JOIN "tracks" ON "invoice\_items".TrackId = "tracks".TrackId GROUP BY "customers".CustomerId ORDER BY TotalAlbums DESC LIMIT 5

SELECT "customers".CustomerId, COUNT(DISTINCT "tracks"."TrackId") AS TotalA lbums FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId LEFT JOIN "invoice\_items" ON "invoices".InvoiceId = "invoice\_items".InvoiceId LEFT JOIN "tracks" ON "invoice\_items".TrackId = "tracks".TrackId GROUP BY "customers".CustomerId ORDER BY TotalAlbums DESC LIMIT 5 CustomerId TotalAlbums

0	1	38
U	_	
1	2	38
2	3	38
3	4	38
1	5	38

Info: Ollama parameters:

model=mistral:latest,

options={},

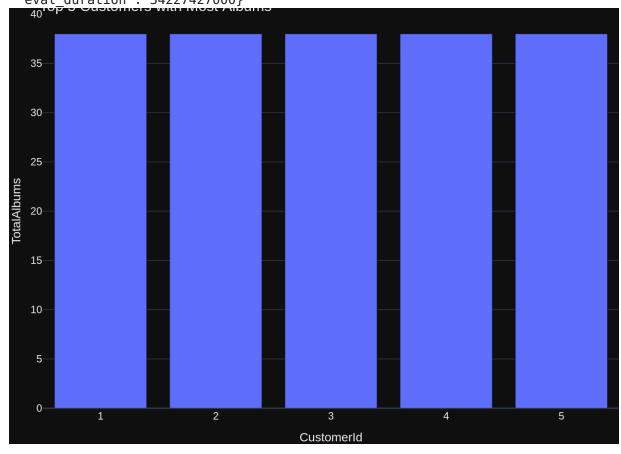
keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "The following is a pandas DataFrame that con tains the results of the query that answers the question the user asked: '
\n Hint: album quantity is found in invoice\_items, \n \n Find the t
op 5 customers who bought the most albums in total quantity (across all invo
ices):\n'\n\nThe DataFrame was produced using this query: SELECT \"customer
s\".CustomerId, COUNT(DISTINCT \"tracks\".\"TrackId\") AS TotalAlbums FROM
\"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoice
s\".CustomerId LEFT JOIN \"invoice\_items\" ON \"invoices\".InvoiceId = \"inv
oice\_items\".InvoiceId LEFT JOIN \"tracks\" ON \"invoice\_items\".TrackId =
\"tracks\".TrackId GROUP BY \"customers\".CustomerId ORDER BY TotalAlbums DE
SC LIMIT 5\n\nThe following is information about the resulting pandas DataFr

ame 'df': \nRunning df.dtypes gives:\n CustomerId int64\nTotalAlbums int64\ndtype: object"}, {"role": "user", "content": "Can you generate the Py thon plotly code to chart the results of the dataframe? Assume the data is in a pandas dataframe called 'df'. If there is only one value in the dataframe, use an Indicator. Respond with only Python code. Do not answer with any explanations -- just the code."}

Info: Ollama Response:



```
Out[36]: (' SELECT "customers".CustomerId, COUNT(DISTINCT "tracks"."TrackId") AS Tot
         alAlbums FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId =
          "invoices".CustomerId LEFT JOIN "invoice items" ON "invoices".InvoiceId =
          "invoice items".InvoiceId LEFT JOIN "tracks" ON "invoice items".TrackId =
          "tracks".TrackId GROUP BY "customers".CustomerId ORDER BY TotalAlbums DESC
          LIMIT 5',
             CustomerId TotalAlbums
                      1
                      2
          1
                                   38
          2
                       3
                                   38
          3
                       4
                                   38
                       5
          4
                                   38,
          Figure({
               'data': [{'alignmentgroup': 'True',
                         'hovertemplate': 'CustomerId=%{x}<br>TotalAlbums=%{y}<extra>
          </extra>'.
                         'leaendaroup': ''.
                         'marker': {'color': '#636efa', 'pattern': {'shape': ''}},
                         'name': '',
                         'offsetgroup': '',
                         'orientation': 'v',
                         'showlegend': False,
                         'textposition': 'auto',
                         'type': 'bar',
                         'x': array([1, 2, 3, 4, 5]),
                         'xaxis': 'x',
                         'y': array([38, 38, 38, 38, 38]),
                         'yaxis': 'y'}],
               'layout': {'barmode': 'relative',
                          'legend': {'tracegroupgap': 0},
                          'margin': {'b': 0, 'l': 0, 'r': 0, 't': 0},
                          'template': '...',
                          'title': {'text': 'Top 5 Customers with Most Albums'},
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
         ext': 'CustomerId'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
         ext': 'TotalAlbums'}}}
          }))
         SELECT c.CustomerId, SUM(il.Quantity) AS TotalAlbums
         FROM Customers c
         JOIN invoices i ON c.CustomerId = i.CustomerId
         JOIN invoice items il ON i.InvoiceId = il.InvoiceId
         GROUP BY c.CustomerId
         ORDER BY TotalAlbums DESC
         LIMIT 5
In [37]: question = """
              Find the top 5 customers who spent the most money overall,
              Hint: order total can be found on invoices table, calculation using inv
         vn.ask(question=question)
```

Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$ 

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "invoices"\r\n(\r\n INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n CustomerId INTEGER NOT N InvoiceDate DATETIME NOT NULL,\r\n ULL,\r\n BillingAddress NVARCHAR(7 BillingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n  $0), \r\n$ BillingCountry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n otal NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES "cu stomers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n \nCREATE TABLE "invoice items"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n InvoiceId INTEGER NOT NULL,\r\n NTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Ouantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES "invoices" (Inv oiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDAT E NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON "invoice items" (InvoiceId)\n\nCREATE INDEX IFK InvoiceCustomerId ON "invoices" (CustomerId) \n\nCREATE INDEX IFK InvoiceLineTrackId ON "invoice items" (TrackId)\n\nCREA TE TABLE "customers"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCREMEN FirstName NVARCHAR(40) NOT NULL,\r\n T NOT NULL,\r\n LastName NVARCHA R(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(70),\r City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NVARCHAR \n Phone NVARCHAR(24), $\r\$ n  $(40), \r\n$ PostalCode NVARCHAR(10),\r\n  $NVARCHAR(24).\r\n$ Email NVARCHAR(60) NOT NULL,\r\n SupportRepId INTEG FOREIGN KEY (SupportRepId) REFERENCES "employees" (EmployeeId) \r \n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "employee  $s"\r\n(\r\n$ EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NOT NULL,\r ReportsTo INTEGER,\r\n BirthDate DATETIM Title NVARCHAR(30),\r\n Address NVARCHAR(70),\r\n City NVARCH  $E,\r\n$ HireDate DATETIME.\r\n  $AR(40), \r\n$ State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n lCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$ n Fax NVARCHAR(24),\r\n FOREIGN KEY (ReportsTo) REFERENCES "employees" (E Email NVARCHAR(60),\r\n mployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TA BLE "tracks"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n TypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Composer NVARCHAR(2 Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n Uni FOREIGN KEY (AlbumId) REFERENCES "alb tPrice NUMERIC(10,2) NOT NULL,\r\n ums" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREI GN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\t0N DELETE NO ACTION 0 N UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media type s" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\RE ATE TABLE "playlist track"\r\n(\r\n PlaylistId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY TrackId INTEGER NOT NULL,\r\n (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) REFERENCES "playlist s" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n IGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK EmployeeReportsTo ON "employee s" (ReportsTo)\n\n===Additional Context \n\nIn the chinook database invoic e means order\n\n===Response Guidelines \n1. If the provided context is suff icient, please generate a valid SQL query without any explanations for the q uestion. \n2. If the provided context is almost sufficient but requires know ledge of a specific string in a particular column, please generate an interm ediate SQL query to find the distinct strings in that column. Prepend the qu

ery with a comment saying intermediate sql \n3. If the provided context is i nsufficient, please explain why it can\'t be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered bef ore, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': ' \n Hint: album quantity is found in invoice items, Find the top 5 customers who bought the most albums in total qua ntity (across all invoices):\n'}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, COUNT(DISTINCT "tracks"."TrackId") AS TotalAlbums FR OM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".C ustomerId LEFT JOIN "invoice items" ON "invoices".InvoiceId = "invoice item s".InvoiceId LEFT JOIN "tracks" ON "invoice items".TrackId = "tracks".TrackI d GROUP BY "customers".CustomerId ORDER BY TotalAlbums DESC LIMIT 5'}, {'rol e': 'user', 'content': ' \n Get the average invoice total for each custo mer:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, AVG("invoices". "Total") AS AverageInvoiceTotal FROM "customers" INNER JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "custo mers".CustomerId'}, {'role': 'user', 'content': ' \n Find the customer with the most invoices \n'}, {'role': 'assistant', 'content': ' SELECT "cust omers".CustomerId AS CustomerId, COUNT("invoices"."InvoiceId") AS NumberOfIn voices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "in voices".CustomerId GROUP BY "customers".CustomerId ORDER BY NumberOfInvoices DESC LIMIT 1'}, {'role': 'user', 'content': ' \n Find the top 5 most exp ensive tracks (based on unit price):\n'}, {'role': 'assistant', 'content': ' SELECT "tracks".Name, "tracks".UnitPrice\n FROM "tracks"\n ORDER BY "tra cks".UnitPrice DESC\n LIMIT 5'}, {'role': 'user', 'content': 'what are the top 5 countries that customers come from?'}, {'role': 'assistant', 'conten t': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Country\nO RDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': ' \n invoices since 2010 and the total amount invoiced:\n'}, {'role': 'assistan t', 'content': ' SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM "invoi WHERE strftime(\'%Y\', InvoiceDate) >= \'2010\'\n GROUP BY Invoic eId'}, {'role': 'user', 'content': ' \n List all invoices with a total e xceeding \$10:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, Invo iceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingCount ry, BillingPostalCode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'u ser', 'content': ' \n Find the total number of invoices per countr y:\n'}, {'role': 'assistant', 'content': ' SELECT "customers".Country, COUNT ("invoices"."InvoiceId") AS TotalInvoices FROM "customers" INNER JOIN "invoi ces" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers". Country'}, {'role': 'user', 'content': ' \n Get the total number of invo ices for each customer\n'}, {'role': 'assistant', 'content': ' SELECT "custo mers".CustomerId, COUNT("invoices"."InvoiceId") AS TotalInvoices FROM "custo mers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".CustomerId'}, {'role': 'user', 'content': 'How many cus tomers are there'}, {'role': 'assistant', 'content': ' SELECT COUNT(\*) FROM "customers"'}, {'role': 'user', 'content': ' \n Find the top 5 customer s who spent the most money overall, \n \n Hint: order total can be f ound on invoices table, calculation using invoice\_items detail table is unne cessary \n'}] Info: Ollama parameters: model=mistral:latest, options={}, keep alive=None Info: Prompt Content: [{"role": "system", "content": "You are a SQLite expert. Please help to gene

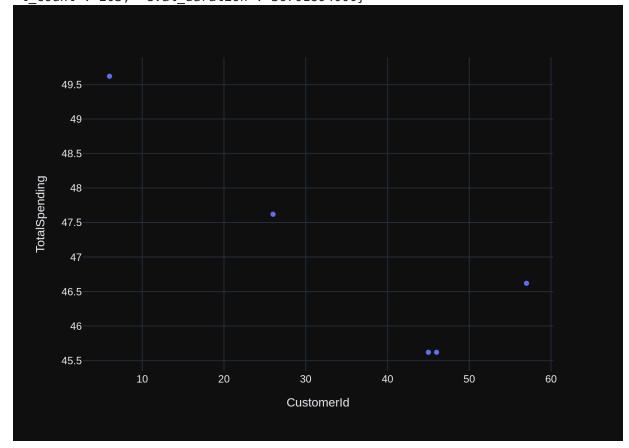
rate a SQL query to answer the question. Your response should ONLY be based

on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"invoices\"\r\n(\r\n InvoiceId INTEGER P RIMARY KEY AUTOINCREMENT NOT NULL.\r\n CustomerId INTEGER NOT NULL.\r\n InvoiceDate DATETIME NOT NULL,\r\n BillingAddress NVARCHAR(70),\r\n illingCity NVARCHAR(40),\r\n BillingState NVARCHAR(40),\r\n BillingCou ntry NVARCHAR(40),\r\n BillingPostalCode NVARCHAR(10),\r\n Total NUMER IC(10,2) NOT NULL,\r\n FOREIGN KEY (CustomerId) REFERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoice items\"\r\n(\r\n InvoiceLineId INTEGER PRIMARY KEY AUTOIN InvoiceId INTEGER NOT NULL,\r\n CREMENT NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n Quantity INTEGER NOT NULL,\r\n FOREIGN KEY (InvoiceId) REFERENCES \"invoices\" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (TrackI d) REFERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK InvoiceLineInvoiceId ON \"invoice items\" (I nvoiceId)\n\nCREATE INDEX IFK InvoiceCustomerId ON \"invoices\" (CustomerId) \n\nCREATE INDEX IFK InvoiceLineTrackId ON \"invoice items\" (TrackId)\n\nCR EATE TABLE \"customers\"\r\n(\r\n CustomerId INTEGER PRIMARY KEY AUTOINCR EMENT NOT NULL,\r\n FirstName NVARCHAR(40) NOT NULL,\r\n RCHAR(20) NOT NULL,\r\n Company NVARCHAR(80),\r\n Address NVARCHAR(7 City NVARCHAR(40),\r\n State NVARCHAR(40),\r\n 0),\r\n Country NVAR  $CHAR(40), \r\n$ PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24), $\r\$ Fax NVARCHAR(24),\r\n Email NVARCHAR(60) NOT NULL,\r\n SupportRepId I FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (Employee Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"e EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL mployees\"\r\n(\r\n LastName NVARCHAR(20) NOT NULL,\r\n FirstName NVARCHAR(20) NO  $L,\r\n$ T NULL,\r\n Title NVARCHAR(30),\r\n ReportsTo INTEGER,\r\n BirthDat HireDate DATETIME,\r\n Address NVARCHAR(70),\r\n e DATETIME,\r\n ty NVARCHAR(40),\r\n State NVARCHAR(40),\r\n Country NVARCHAR(40),\r\n PostalCode NVARCHAR(10),\r\n Phone NVARCHAR(24),\r\n Fax NVARCHAR(2 Email NVARCHAR(60),\r\n FOREIGN KEY (ReportsTo) REFERENCES \"e mployees\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n) TrackId INTEGER PRIMARY KEY AUTOINCR \n\nCREATE TABLE \"tracks\"\r\n(\r\n EMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGE R, r nMediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGER,\r\n Milliseconds INTEGER NOT NULL,\r\n oser NVARCHAR(220),\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) GER,\r\n REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACT FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) \r\n\t\tON  $ION, \r\n$ DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFER ENCES \"media types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlist track\"\r\n(\r\n PlaylistId INTEGE R NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT PK Playlist Track PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) RE FERENCES \"playlists\" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t ACTION,\r\n \t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK EmployeeR eportsTo ON \"employees\" (ReportsTo)\n\n===Additional Context  $\n\n$ In the chinook database invoice means order\n\n===Response Guidelines \n1. If the p rovided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost suffic ient but requires knowledge of a specific string in a particular column, ple ase generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can't be generated.

\n4. Please use the most relevant table(s). \n5. If the question has been as ked and answered before, please repeat the answer exactly as it was given be fore. \n"}, {"role": "user", "content": " \n Hint: album quantity is fou nd in invoice items, \n Find the top 5 customers who bought the mos \n t albums in total quantity (across all invoices):\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId, COUNT(DISTINCT \"tracks\".\"Tr ackId\") AS TotalAlbums FROM \"customers\" LEFT JOIN \"invoices\" ON \"custo mers\".CustomerId = \"invoices\".CustomerId LEFT JOIN \"invoice items\" ON \"invoices\".InvoiceId = \"invoice items\".InvoiceId LEFT JOIN \"tracks\" ON \"invoice items\".TrackId = \"tracks\".TrackId GROUP BY \"customers\".Custom erId ORDER BY TotalAlbums DESC LIMIT 5"}, {"role": "user", "content": " \n Get the average invoice total for each customer:\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId, AVG(\"invoices\".\"Total\") AS AverageInvoiceTotal FROM \"customers\" INNER JOIN \"invoices\" ON \"customer s\".CustomerId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerI d"}, {"role": "user", "content": " \n Find the customer with the most i nvoices \n"}, {"role": "assistant", "content": " SELECT \"customers\".Custom erId AS CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS NumberOfInvoices FR OM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invo ices\".CustomerId GROUP BY \"customers\".CustomerId ORDER BY NumberOfInvoice s DESC LIMIT 1"}, {"role": "user", "content": " \n Find the top 5 most e xpensive tracks (based on unit price):\n"}, {"role": "assistant", "content": " SELECT \"tracks\".Name, \"tracks\".UnitPrice\n FROM \"tracks\"\n BY \"tracks\".UnitPrice DESC\n LIMIT 5"}, {"role": "user", "content": "wha t are the top 5 countries that customers come from?"}, {"role": "assistant", "content": " SELECT Country, COUNT(\*) AS Count\nFROM customers\nGROUP BY Cou ntry\nORDER BY Count DESC\nLIMIT 5"}, {"role": "user", "content": " \n ind all invoices since 2010 and the total amount invoiced:\n"}, {"role": "as sistant", "content": " SELECT InvoiceId, SUM(Total) AS TotalAmount\n \"invoices\"\n WHERE strftime('%Y', InvoiceDate) >= '2010'\n voiceId"}, {"role": "user", "content": " \n List all invoices with a tot al exceeding \$10:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingC ountry, BillingPostalCode, Total FROM \"invoices\" WHERE Total > 10"}, {"rol e": "user", "content": " \n Find the total number of invoices per countr y:\n"}, {"role": "assistant", "content": " SELECT \"customers\".Country, COU NT(\"invoices\".\"InvoiceId\") AS TotalInvoices FROM \"customers\" INNER JOI N \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId GROUP B Y \"customers\".Country"}, {"role": "user", "content": " \n Get the tota l number of invoices for each customer\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS Tota lInvoices FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".Custome rId = \"invoices\".CustomerId GROUP BY \"customers\".CustomerId"}, {"role": "user", "content": "How many customers are there"}, {"role": "assistant", "c ontent": " SELECT COUNT(\*) FROM \"customers\""}, {"role": "user", "content": " \n Find the top 5 customers who spent the most money overall, \n Hint: order total can be found on invoices table, calculation using i nvoice items detail table is unnecessary \n"}] Info: Ollama Response: {'model': 'mistral:latest', 'created at': '2024-08-01T19:49:58.291935065Z', 'message': {'role': 'assistant', 'content': ' SELECT "customers".CustomerId, "customers".Company, SUM("invoices"."Total") as TotalSpending\n INNER JOIN invoices ON customers.CustomerId = invoices.CustomerId\n GROUP BY "customers".CustomerId, "customers".Company\n ORDER BY TotalSpend LIMIT 5;'}, 'done reason': 'stop', 'done': True, 'total duratio n': 92096136537, 'load duration': 4796943, 'prompt eval count': 2036, 'promp

```
t_eval_duration': 75319317000, 'eval_count': 89, 'eval_duration': 1571247500
LLM Response: SELECT "customers".CustomerId, "customers".Company, SUM("invo
ices"."Total") as TotalSpending
   FROM customers
   INNER JOIN invoices ON customers.CustomerId = invoices.CustomerId
   GROUP BY "customers".CustomerId, "customers".Company
   ORDER BY TotalSpending DESC
   LIMIT 5;
Info: Output from LLM: SELECT "customers".CustomerId, "customers".Company,
SUM("invoices"."Total") as TotalSpending
   FROM customers
   INNER JOIN invoices ON customers.CustomerId = invoices.CustomerId
   GROUP BY "customers".CustomerId, "customers".Company
   ORDER BY TotalSpending DESC
   LIMIT 5:
Extracted SQL: SELECT "customers".CustomerId, "customers".Company, SUM("invo
ices"."Total") as TotalSpending
   FROM customers
   INNER JOIN invoices ON customers.CustomerId = invoices.CustomerId
   GROUP BY "customers".CustomerId, "customers".Company
   ORDER BY TotalSpending DESC
   LIMIT 5
SELECT "customers".CustomerId, "customers".Company, SUM("invoices"."Total")
as TotalSpending
   FROM customers
   INNER JOIN invoices ON customers.CustomerId = invoices.CustomerId
   GROUP BY "customers".CustomerId, "customers".Company
   ORDER BY TotalSpending DESC
   LIMIT 5
   CustomerId Company TotalSpending
           6
                None
                              49.62
0
1
           26
                 None
                              47.62
2
           57
                              46.62
                 None
3
           45
                 None
                              45.62
           46
                 None
                               45.62
Info: Ollama parameters:
model=mistral:latest.
options={},
keep alive=None
Info: Prompt Content:
[{"role": "system", "content": "The following is a pandas DataFrame that con
tains the results of the query that answers the question the user asked: '
       Find the top 5 customers who spent the most money overall, \n
Hint: order total can be found on invoices table, calculation using invoice
items detail table is unnecessary \n'\n\nThe DataFrame was produced using th
is query: SELECT \"customers\".CustomerId, \"customers\".Company, SUM(\"invo
ices\".\"Total\") as TotalSpending\n FROM customers\n
                                                        INNER JOIN invoice
s ON customers.CustomerId = invoices.CustomerId\n GROUP BY \"customers\".C
ustomerId, \"customers\".Company\n ORDER BY TotalSpending DESC\n
\n\nThe following is information about the resulting pandas DataFrame 'df':
\nRunning df.dtypes gives:\n CustomerId
                                                int64\nCompany
                     float64\ndtype: object"}, {"role": "user", "content":
ect\nTotalSpending
"Can you generate the Python plotly code to chart the results of the datafra
me? Assume the data is in a pandas dataframe called 'df'. If there is only o
ne value in the dataframe, use an Indicator. Respond with only Python code.
```

Do not answer with any explanations -- just the code."}] Info: Ollama Response: {'model': 'mistral:latest', 'created\_at': '2024-08-01T19:50:45.893923842Z', 'message': {'role': 'assistant', 'content': '```python\nimport plotly.expres s as px\nfig = px.bar("CustomerId", "TotalSpending", data=df, title="Top 5 C ustomers by Total Spending")\nfig.update\_layout(showlegend=False)\nif len(d fig = go.Indicator(\n value=df["TotalSpending"].iloc [0],\n title={"text": "Total Spending", "font": {"size": 24}},\n mode="number+value+gauge+bottom",\n "bar": {"col gauge={\n "threshold": {\n "line": {"colo or": "#1a8cd9"},\n "thickness": 0.5,\n r": "red"},\n "value": df )\n```'}, 'done rea ["TotalSpending"].iloc[0]\n }\n }\n son': 'stop', 'done': True, 'total\_duration': 47580453728, 'load\_duration': 3684519, 'prompt eval count': 291, 'prompt eval duration': 10787522000, 'eva l count': 203, 'eval duration': 36701894000}



```
Out[37]: ('SELECT "customers".CustomerId, "customers".Company, SUM("invoices"."Tota
         l") as TotalSpending\n
                                  FROM customers\n
                                                     INNER JOIN invoices ON customer
          s.CustomerId = invoices.CustomerId\n GROUP BY "customers".CustomerId, "cu
          stomers".Company\n ORDER BY TotalSpending DESC\n LIMIT 5',
             CustomerId Company TotalSpending
          0
                       6
                            None
                                          49.62
          1
                            None
                     26
                                          47.62
          2
                     57
                            None
                                          46.62
          3
                     45
                            None
                                          45.62
                     46
                            None
                                          45.62.
          Figure({
               'data': [{'hovertemplate': 'CustomerId=%{x}<br>TotalSpending=%{y}<extr
          a></extra>',
                         'legendgroup': '',
                         'marker': {'color': '#636efa', 'symbol': 'circle'},
                         'mode': 'markers',
                         'name': '',
                         'orientation': 'v',
                         'showlegend': False,
                         'type': 'scatter',
                         'x': array([ 6, 26, 57, 45, 46]),
                         'xaxis': 'x',
                         'y': array([49.62, 47.62, 46.62, 45.62, 45.62]),
                         'yaxis': 'y'}],
               'layout': {'legend': {'tracegroupgap': 0},
                          'margin': {'t': 60},
                          'template': '...',
                          'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
         ext': 'CustomerId'}},
                          'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
         ext': 'TotalSpending'}}}
          }))
         question = """
In [38]:
              Get all playlists containing at least 10 tracks and the total duration
         vn.ask(question=question)
        Number of requested results 10 is greater than number of elements in index
        1, updating n results = 1
```

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE INDEX IFK PlaylistTrackTrackId ON "pla ylist track" (TrackId)\n\nCREATE TABLE "playlists"\r\n(\r\n PlaylistId IN TEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\n PlaylistId INTEGER NOT NULL,\r\n CREATE TABLE "playlist track"\r\n(\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY FOREIGN KEY (PlaylistId) REFERENCES "playlist (PlaylistId, TrackId),\r\n s" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n IGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "tracks"\r\n(\r\n R PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n Composer NVARCHAR(220),\r\n INTEGER,\r\n Milliseconds INTEGER NOT NUL Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n L.\r\n REIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACTIO N ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (Gen reid) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION.\r\n FOREIGN KEY (M ediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\t0N DELETE NO ACTI ON ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackGenreId ON "tracks" (Ge nreId)\n\nCREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE INDE X IFK TrackMediaTypeId ON "tracks" (MediaTypeId)\n\nCREATE INDEX IFK AlbumAr tistId ON "albums" (ArtistId)\n\nCREATE TABLE "albums"\r\n(\r\n NTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT N ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERE NCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r \n)\n\nCREATE TABLE "genres"\r\n(\r\n GenreId INTEGER PRIMARY KEY AUTOINC Name NVARCHAR(120)\r\n)\n\n===Additional Context REMENT NOT NULL,\r\n \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n 1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is a lmost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strin gs in that column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can\'t b e generated. \n4. Please use the most relevant table(s). \n5. If the questio n has been asked and answered before, please repeat the answer exactly as it was given before. \n'}, {'role': 'user', 'content': ' \n List all genres and the number of tracks in each genre:\n'}, {'role': 'assistant', 'conten t': ' SELECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS TrackC ount FROM "genres" INNER JOIN "tracks" ON "genres".GenreId = "tracks".GenreI d GROUP BY "genres".Name'}, {'role': 'user', 'content': ' \n quantity is found in invoice items, \n \n Find the top 5 customers who bought the most albums in total quantity (across all invoices):\n'}, {'rol e': 'assistant', 'content': ' SELECT "customers".CustomerId, COUNT(DISTINCT "tracks"."TrackId") AS TotalAlbums FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId LEFT JOIN "invoice items" ON "invoices".InvoiceId = "invoice\_items".InvoiceId LEFT JOIN "tracks" ON "invo ice items".TrackId = "tracks".TrackId GROUP BY "customers".CustomerId ORDER BY TotalAlbums DESC LIMIT 5'}, {'role': 'user', 'content': ' \n top 5 most expensive tracks (based on unit price):\n'}, {'role': 'assistan t', 'content': ' SELECT "tracks".Name, "tracks".UnitPrice\n FROM "track ORDER BY "tracks".UnitPrice DESC\n LIMIT 5'}, {'role': 'user', 'con Find all tracks with a name containing "What" (case-insensit ive)\n'}, {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHERE LO

WER(Name) LIKE \'%what%\''}, {'role': 'user', 'content': ' \n lbums and their corresponding artist names \n'}, {'role': 'assistant', 'con tent': 'SELECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'content': ' \n Find all invoices since 2010 and the total amoun t invoiced:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, SUM(To tal) AS TotalAmount\n FROM "invoices"\n WHERE strftime(\'%Y\', InvoiceDa GROUP BY InvoiceId'}, {'role': 'user', 'content': 'Can y te)  $>= \'2010\'\n$ ou list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite master WHERE type='table'"}, {'role': 'u ser', 'content': ' \n List all invoices with a total exceeding \$10:\n'}, {'role': 'assistant', 'content': ' SELECT InvoiceId, InvoiceDate, CustomerI d, BillingAddress, BillingCity, BillingState, BillingCountry, BillingPostalC ode, Total FROM "invoices" WHERE Total > 10'}, {'role': 'user', 'content': ' Find the top 5 customers who spent the most money overall, \n Hint: order total can be found on invoices table, calculation using invoice items detail table is unnecessary \n'}, {'role': 'assistant', 'content': 'SE LECT "customers".CustomerId, "customers".Company, SUM("invoices"."Total") as FROM customers\n INNER JOIN invoices ON customers.Custom erId = invoices.CustomerId\n GROUP BY "customers".CustomerId, "customers". ORDER BY TotalSpending DESC\n LIMIT 5'}, {'role': 'user', 'con Company\n tent': ' \n Find the customer with the most invoices \n'}, {'role': 'as sistant', 'content': ' SELECT "customers".CustomerId AS CustomerId, COUNT("i nvoices"."InvoiceId") AS NumberOfInvoices FROM "customers" LEFT JOIN "invoic es" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".C ustomerId ORDER BY NumberOfInvoices DESC LIMIT 1'}, {'role': 'user', 'conten Get all playlists containing at least 10 tracks and the total duration of those tracks:\n'}]

Info: Ollama parameters:

model=mistral:latest,

options={},

keep\_alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE INDEX IFK PlaylistTrackTrackId ON \"playlist track \" (TrackId)\n\nCREATE TABLE \"playlists\"\r\n(\r\n PlaylistId INTEGER PR IMARY KEY AUTOINCREMENT NOT NULL,\r\n Name  $NVARCHAR(120)\r\n)\n\nCREATE T$ PlaylistId INTEGER NOT NULL,\r\n ABLE \"playlist track\"\r\n(\r\n ckId INTEGER NOT NULL,\r\n CONSTRAINT PK PlaylistTrack PRIMARY KEY (Pla FOREIGN KEY (PlaylistId) REFERENCES \"playlists\" ylistId, TrackId),\r\n (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\t0N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n GenreId INTEGE Composer NVARCHAR(220),\r\n Milliseconds INTEGER NOT NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPD FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) ATE NO ACTION,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTy peId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\tON DELETE NO ACTION O N UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackGenreId ON \"tracks\" (Genr eId)\n\nCREATE INDEX IFK TrackAlbumId ON \"tracks\" (AlbumId)\n\nCREATE INDE X IFK TrackMediaTypeId ON \"tracks\" (MediaTypeId)\n\nCREATE INDEX IFK Album

ArtistId ON \"albums\" (ArtistId)\n\nCREATE TABLE \"albums\"\r\n(\r\n umId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) R EFERENCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO AC TION\r\n)\n\nCREATE TABLE \"genres\"\r\n(\r\n GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\n===Additional Co ntext \n\nIn the chinook database invoice means order\n\n===Response Guideli nes \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided contex t is almost sufficient but requires knowledge of a specific string in a part icular column, please generate an intermediate SQL query to find the distinc t strings in that column. Prepend the query with a comment saying intermedia te sql \n3. If the provided context is insufficient, please explain why it c an't be generated. \n4. Please use the most relevant table(s). \n5. If the g uestion has been asked and answered before, please repeat the answer exactly as it was given before. \n"}, {"role": "user", "content": " \n genres and the number of tracks in each genre:\n"}, {"role": "assistant", "c ontent": " SELECT \"genres\".Name AS GenreName, COUNT(\"tracks\".\"TrackId \") AS TrackCount FROM \"genres\" INNER JOIN \"tracks\" ON \"genres\".GenreI d = \"tracks\".GenreId GROUP BY \"genres\".Name"}, {"role": "user", "conten Hint: album quantity is found in invoice items, \n d the top 5 customers who bought the most albums in total quantity (across a ll invoices):\n"}, {"role": "assistant", "content": " SELECT \"customers\".C ustomerId, COUNT(DISTINCT \"tracks\".\"TrackId\") AS TotalAlbums FROM \"cust omers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".Cu stomerId LEFT JOIN \"invoice items\" ON \"invoices\".InvoiceId = \"invoice i tems\".InvoiceId LEFT JOIN \"tracks\" ON \"invoice items\".TrackId = \"track s\".TrackId GROUP BY \"customers\".CustomerId ORDER BY TotalAlbums DESC LIMI T 5"}, {"role": "user", "content": " \n Find the top 5 most expensive tr acks (based on unit price):\n"}, {"role": "assistant", "content": " SELECT \"tracks\".Name, \"tracks\".UnitPrice\n FROM \"tracks\"\n ORDER BY \"tra cks\".UnitPrice DESC\n LIMIT 5"}, {"role": "user", "content": " \n d all tracks with a name containing \"What\" (case-insensitive)\n"}, {"rol e": "assistant", "content": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIK E '%what%'"}, {"role": "user", "content": " \n List all albums and their corresponding artist names \n"}, {"role": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists\".Name AS ArtistName FROM \"albums\" INNER JOI N \"artists\" ON \"albums\".ArtistId = \"artists\".ArtistId"}, {"role": "use r", "content": " \n Find all invoices since 2010 and the total amount in voiced:\n"}, {"role": "assistant", "content": " SELECT InvoiceId, SUM(Total) AS TotalAmount\n FROM \"invoices\"\n WHERE strftime('%Y', InvoiceDate) > GROUP BY InvoiceId"}, {"role": "user", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assistant", "conten t": "SELECT name FROM sqlite master WHERE type='table'"}, {"role": "user", "content": " \n List all invoices with a total exceeding \$10:\n"}, {"rol e": "assistant", "content": " SELECT InvoiceId, InvoiceDate, CustomerId, Bil lingAddress, BillingCity, BillingState, BillingCountry, BillingPostalCode, T otal FROM \"invoices\" WHERE Total > 10"}, {"role": "user", "content": " \n Find the top 5 customers who spent the most money overall, \n t: order total can be found on invoices table, calculation using invoice ite ms detail table is unnecessary \n"}, {"role": "assistant", "content": "SELEC T \"customers\".CustomerId, \"customers\".Company, SUM(\"invoices\".\"Total \") as TotalSpending\n FROM customers\n INNER JOIN invoices ON customer GROUP BY \"customers\".CustomerId, s.CustomerId = invoices.CustomerId\n \"customers\".Company\n ORDER BY TotalSpending DESC\n LIMIT 5"}, {"rol e": "user", "content": " \n Find the customer with the most invoices

\n"}, {"role": "assistant", "content": " SELECT \"customers\".CustomerId AS
CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS NumberOfInvoices FROM \"cus
tomers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".C
ustomerId GROUP BY \"customers\".CustomerId ORDER BY NumberOfInvoices DESC L
IMIT 1"}, {"role": "user", "content": " \n Get all playlists containing
at least 10 tracks and the total duration of those tracks:\n"}]
Info: Ollama Response:

{'model': 'mistral:latest', 'created\_at': '2024-08-01T19:52:20.731005893Z',
'message': {'role': 'assistant', 'content': ' SELECT "playlists".PlaylistId
AS PlaylistId, SUM(tracks."Milliseconds") AS TotalDuration FROM "playlists"
LEFT JOIN "playlist\_track" ON "playlists".PlaylistId = "playlist\_track".Play
listId INNER JOIN "tracks" ON "playlist\_track".TrackId = "tracks".TrackId GR
OUP BY "playlists".PlaylistId HAVING COUNT(DISTINCT "tracks".TrackId) >= 1
0'}, 'done\_reason': 'stop', 'done': True, 'total\_duration': 94744777784, 'lo
ad\_duration': 3291166, 'prompt\_eval\_count': 1765, 'prompt\_eval\_duration': 72
119023000, 'eval\_count': 116, 'eval\_duration': 21283994000}

LLM Response: SELECT "playlists".PlaylistId AS PlaylistId, SUM(tracks."Mill iseconds") AS TotalDuration FROM "playlists" LEFT JOIN "playlist\_track" ON "playlists".PlaylistId = "playlist\_track".PlaylistId INNER JOIN "tracks" ON "playlist\_track".TrackId = "tracks".TrackId GROUP BY "playlists".PlaylistId HAVING COUNT(DISTINCT "tracks".TrackId) >= 10

SELECT "playlists".PlaylistId AS PlaylistId, SUM(tracks."Milliseconds") AS TotalDuration FROM "playlists" LEFT JOIN "playlist\_track" ON "playlists".Pla ylistId = "playlist\_track".PlaylistId INNER JOIN "tracks" ON "playlist\_track".TrackId = "tracks".TrackId GROUP BY "playlists".PlaylistId HAVING COUNT(D ISTINCT "tracks".TrackId) >= 10

		•
	PlaylistId	TotalDuration
0	1	877683083
1	3	501094957
2	5	398705153
3	8	877683083
4	10	501094957
5	11	9486559
6	12	21770592
7	13	6755730
8	14	7575051
9	15	7439811
10	16	4122018
11	17	8206312

Info: Ollama parameters:
model=mistral:latest,

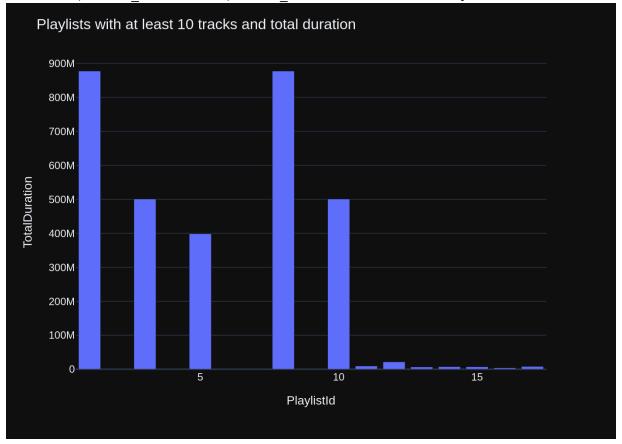
options={},

keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "The following is a pandas DataFrame that con tains the results of the query that answers the question the user asked: '
\n Get all playlists containing at least 10 tracks and the total duratio n of those tracks:\n'\n\nThe DataFrame was produced using this query: SELEC T \"playlists\".PlaylistId AS PlaylistId, SUM(tracks.\"Milliseconds\") AS To talDuration FROM \"playlists\" LEFT JOIN \"playlist\_track\" ON \"playlists \".PlaylistId = \"playlist\_track\".PlaylistId INNER JOIN \"tracks\" ON \"pla ylist\_track\".TrackId = \"tracks\".TrackId GROUP BY \"playlists\".PlaylistId HAVING COUNT(DISTINCT \"tracks\".TrackId) >= 10\n\nThe following is informat ion about the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n PlaylistId int64\nTotalDuration int64\ndtype: object"}, {"role": "u ser", "content": "Can you generate the Python plotly code to chart the resul

ts of the dataframe? Assume the data is in a pandas dataframe called 'df'. I f there is only one value in the dataframe, use an Indicator. Respond with o nly Python code. Do not answer with any explanations -- just the code."}] Info: Ollama Response:



```
Out[38]: (' SELECT "playlists".PlaylistId AS PlaylistId, SUM(tracks."Milliseconds")
         AS TotalDuration FROM "playlists" LEFT JOIN "playlist track" ON "playlist
          s".PlaylistId = "playlist track".PlaylistId INNER JOIN "tracks" ON "playlis
          t track".TrackId = "tracks".TrackId GROUP BY "playlists".PlaylistId HAVING
          COUNT(DISTINCT "tracks".TrackId) >= 10',
               PlaylistId TotalDuration
           0
                        1
                               877683083
           1
                        3
                               501094957
           2
                        5
                               398705153
           3
                        8
                               877683083
           4
                       10
                               501094957
           5
                       11
                                 9486559
           6
                       12
                                21770592
           7
                       13
                                 6755730
           8
                       14
                                 7575051
           9
                       15
                                 7439811
           10
                       16
                                 4122018
                       17
           11
                                 8206312,
           Figure({
               'data': [{'alignmentgroup': 'True',
                         'hovertemplate': 'PlaylistId=%{x}<br>TotalDuration=%{y}<extr
          a></extra>',
                         'legendgroup': '',
                         'marker': {'color': '#636efa', 'pattern': {'shape': ''}},
                         'name': '',
                         'offsetgroup': '',
                         'orientation': 'v',
                         'showlegend': False,
                         'textposition': 'auto',
                         'type': 'bar',
                         'x': array([ 1, 3, 5, 8, 10, 11, 12, 13, 14, 15, 16, 1
          7]),
                         'xaxis': 'x',
                         'y': array([877683083, 501094957, 398705153, 877683083, 5010
          94957.
                   9486559.
                                      21770592,
                                                   6755730,
                                                              7575051,
                                                                         7439811.
                                                                                    41
          22018,
                   8206312]),
                         'yaxis': 'y'}],
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         tal duration'},
                           'xaxis': {'anchor': 'y', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'PlaylistId'}},
                           'yaxis': {'anchor': 'x', 'domain': [0.0, 1.0], 'title': {'t
          ext': 'TotalDuration'}}}
           }))
In [39]: question = """
              Identify artists who have albums with tracks appearing in multiple genr
         0.00
```

vn.ask(question=question)

Number of requested results 10 is greater than number of elements in index 1, updating  $n_results = 1$ 

SQL Prompt: [{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ON LY be based on the given context and follow the response quidelines and form at instructions. \n===Tables \nCREATE TABLE "tracks"\r\n(\r\n EGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NUL AlbumId INTEGER,\r\n MediaTypeId INTEGER NOT NULL,\r\n L.\r\n Milliseconds INTEGER NOT eId INTEGER.\r\n Composer NVARCHAR(220),\r\n NULL,\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\tON DELETE NO ACT ION ON UPDATE NO ACTION,\r\n FOREIGN KEY (GenreId) REFERENCES "genres" (G enreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTypeId) REFERENCES "media types" (MediaTypeId) \r\n\t\tON DELETE NO AC TION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON "albums" (ArtistId)\n\nCREATE INDEX IFK TrackGenreId ON "tracks" (GenreId)\n\nCREATE INDEX IFK TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE TABLE "albums"\r\n(\r AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Title NVARC HAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (A rtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDA TE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackMediaTypeId ON "tracks" (MediaTyp eId)\n\nCREATE TABLE "genres"\r\n(\r\n GenreId INTEGER PRIMARY KEY AUTOIN Name NVARCHAR(120) $\r\n)\n$ CREATE INDEX IFK Playlis CREMENT NOT NULL,\r\n tTrackTrackId ON "playlist track" (TrackId)\n\nCREATE TABLE "artists"\r\n(\r ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARC  $HAR(120)\r\n)\n\nCREATE TABLE "playlist track"\r\n(\r\n$ PlaylistId INTEGE TrackId INTEGER NOT NULL,\r\n R NOT NULL,\r\n CONSTRAINT PK Plavlist Track PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (PlaylistId) RE FERENCES "playlists" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO A CTION,\r\n FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guidelines \n1. If t he provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost su fficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in th at column. Prepend the query with a comment saying intermediate sql \n3. If the provided context is insufficient, please explain why it can\'t be genera ted. \n4. Please use the most relevant table(s). \n5. If the question has be en asked and answered before, please repeat the answer exactly as it was giv en before. \n'}, {'role': 'user', 'content': ' \n List all genres and th e number of tracks in each genre:\n'}, {'role': 'assistant', 'content': ' SE LECT "genres".Name AS GenreName, COUNT("tracks"."TrackId") AS TrackCount FRO M "genres" INNER JOIN "tracks" ON "genres".GenreId = "tracks".GenreId GROUP BY "genres".Name'}, {'role': 'user', 'content': ' \n List all albums and their corresponding artist names \n'}, {'role': 'assistant', 'content': 'SE LECT "albums".AlbumId, "artists".Name AS ArtistName FROM "albums" INNER JOIN "artists" ON "albums".ArtistId = "artists".ArtistId'}, {'role': 'user', 'con Get all playlists containing at least 10 tracks and the tot al duration of those tracks:\n'}, {'role': 'assistant', 'content': ' SELECT "playlists".PlaylistId AS PlaylistId, SUM(tracks."Milliseconds") AS TotalDur ation FROM "playlists" LEFT JOIN "playlist track" ON "playlists".PlaylistId = "playlist track".PlaylistId INNER JOIN "tracks" ON "playlist track".TrackI d = "tracks".TrackId GROUP BY "playlists".PlaylistId HAVING COUNT(DISTINCT "tracks".TrackId) >= 10'}, {'role': 'user', 'content': ' \n quantity is found in invoice items, \n Find the top 5 customers who \n bought the most albums in total quantity (across all invoices):\n'}, {'rol e': 'assistant', 'content': ' SELECT "customers".CustomerId, COUNT(DISTINCT

"tracks"."TrackId") AS TotalAlbums FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId LEFT JOIN "invoice items" ON "invoices".InvoiceId = "invoice items".InvoiceId LEFT JOIN "tracks" ON "invo ice items".TrackId = "tracks".TrackId GROUP BY "customers".CustomerId ORDER BY TotalAlbums DESC LIMIT 5'}, {'role': 'user', 'content': ' \n top 5 most expensive tracks (based on unit price):\n'}, {'role': 'assistan t', 'content': ' SELECT "tracks".Name, "tracks".UnitPrice\n ORDER BY "tracks".UnitPrice DESC\n LIMIT 5'}, {'role': 'user', 'con Find all tracks with a name containing "What" (case-insensit ive)\n'}, {'role': 'assistant', 'content': ' SELECT \* FROM "tracks" WHERE LO WER(Name) LIKE \'%what%\''}, {'role': 'user', 'content': 'Can you list all t ables in the SQLite database catalog?'}, {'role': 'assistant', 'content': "S ELECT name FROM sqlite master WHERE type='table'"}, {'role': 'user', 'conten t': 'what are the top 5 countries that customers come from?'}, {'role': 'ass istant', 'content': ' SELECT Country, COUNT(\*) AS Count\nFROM customers\nGRO UP BY Country\nORDER BY Count DESC\nLIMIT 5'}, {'role': 'user', 'content': ' Find the customer with the most invoices \n'}, {'role': 'assistant', 'content': ' SELECT "customers".CustomerId AS CustomerId, COUNT("invoice s"."InvoiceId") AS NumberOfInvoices FROM "customers" LEFT JOIN "invoices" ON "customers".CustomerId = "invoices".CustomerId GROUP BY "customers".Customer Id ORDER BY NumberOfInvoices DESC LIMIT 1'}, {'role': 'user', 'content': ' List all invoices with a total exceeding \$10:\n'}, {'role': 'assistan t', 'content': ' SELECT InvoiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState, BillingCountry, BillingPostalCode, Total FROM "in voices" WHERE Total > 10'}, {'role': 'user', 'content': ' \n rtists who have albums with tracks appearing in multiple genres:\n\n\n'}] Info: Ollama parameters:

model=mistral:latest,

options={},

keep alive=None

Info: Prompt Content:

[{"role": "system", "content": "You are a SQLite expert. Please help to gene rate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructi ons. \n===Tables \nCREATE TABLE \"tracks\"\r\n(\r\n TrackId INTEGER PRIMA RY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(200) NOT NULL,\r\n MediaTypeId INTEGER NOT NULL,\r\n lbumId INTEGER,\r\n GenreId INTEGE Milliseconds INTEGER NOT NULL,\r\n  $R.\r\n$ Composer NVARCHAR(220),\r\n Bytes INTEGER,\r\n UnitPrice NUMERIC(10,2) NOT NULL,\r\n FOREIGN KEY (AlbumId) REFERENCES \"albums\" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPD FOREIGN KEY (GenreId) REFERENCES \"genres\" (GenreId) ATE NO ACTION,\r\n \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n FOREIGN KEY (MediaTv peId) REFERENCES \"media types\" (MediaTypeId) \r\n\t\t0N DELETE NO ACTION 0 N UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK AlbumArtistId ON \"albums\" (Art istId)\n\nCREATE INDEX IFK TrackGenreId ON \"tracks\" (GenreId)\n\nCREATE IN DEX IFK TrackAlbumId ON \"tracks\" (AlbumId)\n\nCREATE TABLE \"albums\"\r\n AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL.\r\n Title NV ARCHAR(160) NOT NULL,\r\n ArtistId INTEGER NOT NULL,\r\n FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK TrackMediaTypeId ON \"tracks\" (Me diaTypeId)\n\nCREATE TABLE \"genres\"\r\n(\r\n GenreId INTEGER PRIMARY KE Y AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120) $\r\n)\n\n$ CREATE INDEX IFK PlaylistTrackTrackId ON \"playlist track\" (TrackId)\n\nCREATE TABLE \"arti sts\"\r\n(\r\n ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n Name NVARCHAR(120)\r\n)\n\nCREATE TABLE \"playlist track\"\r\n(\r\n istId INTEGER NOT NULL,\r\n TrackId INTEGER NOT NULL,\r\n CONSTRAINT

PK PlaylistTrack PRIMARY KEY (PlaylistId, TrackId),\r\n FOREIGN KEY (Pla ylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\tON DELETE NO ACTION O N UPDATE NO ACTION.\r\n FOREIGN KEY (TrackId) REFERENCES \"tracks\" (Trac kId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n===Additional Context \n\nIn the chinook database invoice means order\n\n===Response Guide lines \n1. If the provided context is sufficient, please generate a valid SQ L query without any explanations for the question. \n2. If the provided cont ext is almost sufficient but requires knowledge of a specific string in a pa rticular column, please generate an intermediate SQL query to find the disti nct strings in that column. Prepend the guery with a comment saying intermed iate sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactl y as it was given before. \n"}, {"role": "user", "content": " \n l genres and the number of tracks in each genre:\n"}, {"role": "assistant", "content": " SELECT \"genres\".Name AS GenreName, COUNT(\"tracks\".\"TrackId \") AS TrackCount FROM \"genres\" INNER JOIN \"tracks\" ON \"genres\".GenreI d = \"tracks\".GenreId GROUP BY \"genres\".Name"}, {"role": "user", "conten List all albums and their corresponding artist names \n"}, {"r ole": "assistant", "content": "SELECT \"albums\".AlbumId, \"artists\".Name A S ArtistName FROM \"albums\" INNER JOIN \"artists\" ON \"albums\".ArtistId = \"artists\".ArtistId"}, {"role": "user", "content": " \n Get all plavli sts containing at least 10 tracks and the total duration of those track s:\n"}, {"role": "assistant", "content": " SELECT \"playlists\".PlaylistId A S PlaylistId, SUM(tracks.\"Milliseconds\") AS TotalDuration FROM \"playlists \" LEFT JOIN \"playlist track\" ON \"playlists\".PlaylistId = \"playlist tra ck\".PlaylistId INNER JOIN \"tracks\" ON \"playlist track\".TrackId = \"trac ks\".TrackId GROUP BY \"playlists\".PlaylistId HAVING COUNT(DISTINCT \"track s\".TrackId) >= 10"}, {"role": "user", "content": " \n Hint: album quant ity is found in invoice items, \n \n Find the top 5 customers who boug ht the most albums in total quantity (across all invoices):\n"}, {"role": "a ssistant", "content": " SELECT \"customers\".CustomerId, COUNT(DISTINCT \"tr acks\".\"TrackId\") AS TotalAlbums FROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"invoices\".CustomerId LEFT JOIN \"invoice it ems\" ON \"invoices\".InvoiceId = \"invoice items\".InvoiceId LEFT JOIN \"tr acks\" ON \"invoice items\".TrackId = \"tracks\".TrackId GROUP BY \"customer s\".CustomerId ORDER BY TotalAlbums DESC LIMIT 5"}, {"role": "user", "conten t": " \n Find the top 5 most expensive tracks (based on unit pric e):\n"}, {"role": "assistant", "content": " SELECT \"tracks\".Name, \"tracks \".UnitPrice\n FROM \"tracks\"\n ORDER BY \"tracks\".UnitPrice DESC\n LIMIT 5"}, {"role": "user", "content": " \n Find all tracks with a name containing \"What\" (case-insensitive)\n"}, {"role": "assistant", "content": " SELECT \* FROM \"tracks\" WHERE LOWER(Name) LIKE '%what%'"}, {"role": "use r", "content": "Can you list all tables in the SQLite database catalog?"}, {"role": "assistant", "content": "SELECT name FROM sqlite master WHERE type ='table'"}, {"role": "user", "content": "what are the top 5 countries that c ustomers come from?"}, {"role": "assistant", "content": " SELECT Country, CO UNT(\*) AS Count\nFROM customers\nGROUP BY Country\nORDER BY Count DESC\nLIMI T 5"}, {"role": "user", "content": " \n Find the customer with the most invoices \n"}, {"role": "assistant", "content": " SELECT \"customers\".Custo merId AS CustomerId, COUNT(\"invoices\".\"InvoiceId\") AS NumberOfInvoices F ROM \"customers\" LEFT JOIN \"invoices\" ON \"customers\".CustomerId = \"inv oices\".CustomerId GROUP BY \"customers\".CustomerId ORDER BY NumberOfInvoic es DESC LIMIT 1"}, {"role": "user", "content": " \n List all invoices wi th a total exceeding \$10:\n"}, {"role": "assistant", "content": " SELECT Inv oiceId, InvoiceDate, CustomerId, BillingAddress, BillingCity, BillingState,

BillingCountry, BillingPostalCode, Total FROM \"invoices\" WHERE Total > 1 0"}, {"role": "user", "content": " \n Identify artists who have albums with tracks appearing in multiple genres:\n\n\n"}]
Info: Ollama Response:

{'model': 'mistral:latest', 'created at': '2024-08-01T19:55:30.142518845Z', 'message': {'role': 'assistant', 'content': ' -- Find distinct genre names f or each track\n SELECT DISTINCT "tracks"."GenreId", "genres"."Name" AS Gen reName FROM "tracks" INNER JOIN "genres" ON "tracks"."GenreId" = "genres"."G -- Count the number of unique albums for each artist and find artists with more than one album in multiple genres\n SELECT "artists".Art istId, COUNT(DISTINCT "albums"."AlbumId") AS TotalAlbums FROM "artists" LEFT JOIN "albums" ON "artists".ArtistId = "albums".ArtistId GROUP BY "artists".A rtistId HAVING TotalAlbums > 1\n\n -- Join the intermediate sql and final query to find artists who have albums with tracks appearing in multiple genr es\n SELECT "artists"."Name", "TotalAlbums" FROM (SELECT "artists".ArtistI d, COUNT(DISTINCT "albums"."AlbumId") AS TotalAlbums FROM "artists" LEFT JOI N "albums" ON "artists".ArtistId = "albums".ArtistId GROUP BY "artists".Arti stId HAVING TotalAlbums > 1) AS SubQuery INNER JOIN (SELECT DISTINCT "track s"."GenreId". COUNT(DISTINCT "albums"."AlbumId") AS GenreCount FROM "tracks" INNER JOIN "albums" ON "tracks"."AlbumId" = "albums".AlbumId GROUP BY "track s"."GenreId" HAVING GenreCount > 1) AS GenreCount WHERE SubQuery.ArtistId = GenreCount.ArtistId'}, 'done reason': 'stop', 'done': True, 'total duratio n': 148702912646, 'load duration': 3879318, 'prompt eval count': 1730, 'prom pt eval duration': 71035158000, 'eval count': 418, 'eval duration': 76343363 000}

LLM Response: -- Find distinct genre names for each track

SELECT DISTINCT "tracks". "GenreId", "genres". "Name" AS GenreName FROM "tracks" INNER JOIN "genres" ON "tracks". "GenreId" = "genres". "GenreId"

-- Count the number of unique albums for each artist and find artists wit h more than one album in multiple genres

SELECT "artists".ArtistId, COUNT(DISTINCT "albums"."AlbumId") AS TotalAlb ums FROM "artists" LEFT JOIN "albums" ON "artists".ArtistId = "albums".ArtistId GROUP BY "artists".ArtistId HAVING TotalAlbums > 1

-- Join the intermediate\_sql and final query to find artists who have alb ums with tracks appearing in multiple genres

SELECT "artists". "Name", "TotalAlbums" FROM (SELECT "artists".ArtistId, C OUNT(DISTINCT "albums". "AlbumId") AS TotalAlbums FROM "artists" LEFT JOIN "a lbums" ON "artists".ArtistId = "albums".ArtistId GROUP BY "artists".ArtistId HAVING TotalAlbums > 1) AS SubQuery INNER JOIN (SELECT DISTINCT "tracks". "Ge nreId", COUNT(DISTINCT "albums". "AlbumId") AS GenreCount FROM "tracks" INNER JOIN "albums" ON "tracks". "AlbumId" = "albums".AlbumId GROUP BY "tracks". "Ge nreId" HAVING GenreCount > 1) AS GenreCount WHERE SubQuery.ArtistId = GenreCount.ArtistId

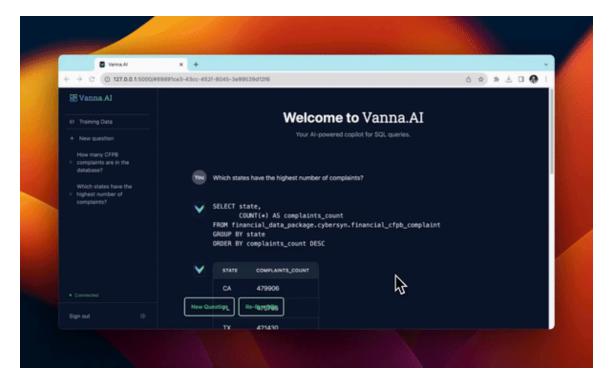
The LLM is not allowed to see the data in your database. Your question requires database introspection to generate the necessary SQL. Please set allow\_l lm to see data=True to enable this.

Couldn't run sql: Execution failed on sql 'The LLM is not allowed to see the data in your database. Your question requires database introspection to generate the necessary SQL. Please set allow\_llm\_to\_see\_data=True to enable this.': near "The": syntax error

## Check completion time

2024-08-01 15:55:30.159143

## Launch the User Interface



from vanna.flask import VannaFlaskApp app = VannaFlaskApp(vn) app.run()

## **Next Steps**

Using Vanna via Jupyter notebooks is great for getting started but check out additional customizable interfaces like the

- Streamlit app
- Flask app
- Slackbot