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?

- OpenAI via Vanna.AI (Recommended)

  Use Vanna.AI for free to generate your queries
- OpenAI

  Use OpenAI with your own API key
- Azure OpenAI

  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.AIs 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 Marqo 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 # 0.6.3 , 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 datetime import datetime

from vanna.ollama import Ollama
from vanna.chromadb.chromadb_vector import ChromaDB_VectorStore
```

In [2]:

```
model_name = "qwen2.5:14b" # "qwen2.5" # 'deepseek-coder-v2'
CONFIG = {
    'model': model_name,
}

file_db = "~/Downloads/chinook.sqlite"

clean_and_train = True  # False

sql_id = 1
NUM_RETRY = 3

allow_llm_to_see_data = True
# allow_llm_to_see_data (bool): Whether to allow the LLM to see the data (fo
```

In [3]:

```
class MyVanna(ChromaDB_VectorStore, Ollama):
    def __init__(self, config=None):
        ChromaDB_VectorStore.__init__(self, config=config)
        Ollama.__init__(self, config=config)

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

        # print(f"vn.remove_collection('{c}')")
        vn.remove_collection(c)

def strip_brackets(ddl):
    """
    This function removes square brackets from table and column names in a D
    Args:
        ddl (str): The DDL script containing square brackets.

    Returns:
        str: The DDL script with square brackets removed.
    """
    # Use regular expressions to match and replace square brackets
    pattern = r"\[([^\]]+)]"  # Match any character except ] within square b
    return re.sub(pattern, r"\1", ddl)

def my_vn_ask(question, sql_id, allow_llm_to_see_data=False, num_retry=NUM_R
    # allow retry by appending error msg to question
    print(f"\n{separator}\n# QUESTION - {sql_id}:  {question}\n{separator}\r
    sql, df, fig, err_msg = vn.ask(question=question, allow_llm_to_see_data=
    if not err_msg or ("[ERROR-SQL]" not in err_msg) and ("[ERROR-DB]" not i
        return sql, df, fig, err_msg

    if err_msg and "an unknown error was encountered while running the model
        # re-run
        sql, df, fig, err_msg = vn.ask(question=question, allow_llm_to_see_c
        if not err_msg or ("[ERROR-SQL]" not in err_msg) and ("[ERROR-DB]" r
            return sql, df, fig, err_msg

    # re-try
    for i_retry in range(num_retry-1):
        msg = f"*** RETRY {i_retry+1} ***"
        print(msg)
        question = f"""
        For the question {question},
        the generated SQL statement {sql} results in the following exceptior
        Please fix the error and re-generate the SQL
        """


        sql, df, fig, err_msg = vn.ask(question=question, allow_llm_to_see_c
        if not err_msg or ("[ERROR-SQL]" not in err_msg) and ("[ERROR-DB]" r
            break

    return sql, df, fig, err_msg
```

In [4]:

```
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]:

```
if clean_and_train:
    remove_collections()
```

Training

SQLite sample database

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

In [9]:

```
df_ddl = vn.run_sql("SELECT type, sql FROM sqlite_master WHERE sql is not nu
```

In [10]:

```
df_ddl
```

Out[10]:

	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	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 [11]:

```
if clean_and_train:
    for ddl in df_ddl['sql'].to_list():
        ddl = strip_brackets(ddl)
        vn.train(ddl=ddl)

    # Sometimes you may want to add documentation about your business termir
    vn.train(documentation="In the chinook database invoice means order")

    doc_str = """
    In the 'customers' table, address column names do not have 'Billing' pre
    e.g. country column name is 'country', not 'BillingCountry'
    """
    vn.train(documentation=doc_str)
```

```
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
Id)
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
Id)
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....
Adding documentation....
```

In [12]:

```
# show training data
training_data = vn.get_training_data()
training_data
```

Out[12]:

	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 EmployeeI...	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

	id	question	content	training_data_type
16	a9c9a852-608d-5ef2-aede-26ba098d83d1-ddl	None	CREATE INDEX IFK_TrackGenreId ON "tracks" (Gen...	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
1	ece10d36-9223-5045-9ac8-4b5bc090acb5-doc	None	\n In the 'customers' table, address column...	documentation

Asking the AI

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 [13]:

```
ts_start = time()
```

```
SELECT name FROM sqlite_master WHERE type = 'table';
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 [14]:

```
questions = [
    "Can you list all tables in the SQLite database catalog?",
    "which table stores customer's orders",
    "How many customers are there",
    "what are the top 5 countries that customers come from?",
    "List all albums and their corresponding artist names  ",
    """Find all tracks with a name containing "What" (case-insensitive) """,
    "Get the total number of invoices for each customer",
    "Find the total number of invoices per country",
    "List all invoices with a total exceeding $10",
    "Find all invoices since 2010 and the total amount invoiced:",
    "List all employees and their reporting manager's name (if any):",
    " Get the average invoice total for each customer:",
    "Find the top 5 most expensive tracks (based on unit price):",
    "List all genres and the number of tracks in each genre:",
    "Get all genres that do not have any tracks associated with them:",
    "List all customers who have not placed any orders:",
    """
        Can you find the top 10 most popular artists based on the number of
        Hint: There are 3 tables - artists, albums and tracks,
        where albums and artists are linked by ArtistId, albums and tracks a
    """,
    "List all customers from Canada and their email addresses:",
    "Find the customer with the most invoices ",
    "Find the customer who bought the most albums in total quantity (across
    """
        Find the top 5 customers who bought the most albums in total quantit
        Hint: album quantity is found in invoice_items,
    """,
    """
         Find the top 5 customers who spent the most money overall,
         Hint: order total can be found on invoices table, calculation using
    """,
    "Get all playlists containing at least 10 tracks and the total duration
    "Identify artists who have albums with tracks appearing in multiple genr
]
```

Loop over questions

In [15]:

```
for n, question in enumerate(questions):
    # if n != 4: continue

    # if n > 5: continue

    my_vn_ask(question=question, sql_id=n+2, allow_llm_to_see_data=allow_llm
```

```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 2:  Can you list all tables in the SQLite database catalog?
============================================================================
====



[( SQL Prompt )]
[{'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 sqlite_stat1(tbl,idx,stat)\n\nCREATE TABLE s
qlite_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
\nCREATE TABLE "genres"\r\n(\r\n    GenreId INTEGER PRIMARY KEY AUTOINCREMEN
T NOT NULL,\r\n    Name NVARCHAR(120)\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
L,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(220),\r\n    Millisecond
s INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    UnitPrice NUMERIC(10,2)  N
OT NULL,\r\n    FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\t
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 TABLE "media_types"\r\n
(\r\n    MediaTypeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name
NVARCHAR(120)\r\n)\n\nCREATE TABLE "artists"\r\n(\r\n    ArtistId INTEGER PR
IMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE T
ABLE "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
OT 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 AC
TION\r\n)\n\nCREATE TABLE "playlist_track"\r\n(\r\n    PlaylistId INTEGER  N
OT NULL,\r\n    TrackId INTEGER  NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrac
k PRIMARY KEY  (PlaylistId, TrackId),\r\n    FOREIGN KEY (PlaylistId) REFERE
NCES "playlists" (PlaylistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO
N,\r\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DEL
ETE 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    Title NVARCHAR(16
0)  NOT NULL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOREIGN KEY (ArtistI
d) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO
ACTION\r\n)\n\n\n===Additional Context \n\n\n    In the \'customers\' table,
address column names do not have \'Billing\' prefix, \n    e.g. country colu
mn name is \'country\', not \'BillingCountry\'\n    \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'},
{'role': 'user', 'content': 'Can you list all tables in the SQLite database
```

```
catalog?'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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 sqlite_stat1(tbl,idx,stat)\n\nCREATE TABLE s
qlite_sequence(name,seq)\n\nCREATE TABLE \"playlists\"\r\n(\r\n    PlaylistI
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
\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name 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    Mill
iseconds INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    UnitPrice NUMERIC(1
0,2)  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 (GenreI
d) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO
ACTION,\r\n    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\nCREATE 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    F
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
PlaylistId INTEGER  NOT NULL,\r\n    TrackId INTEGER  NOT NULL,\r\n    CONST
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
L,\r\n    Title NVARCHAR(160)  NOT NULL,\r\n    ArtistId INTEGER  NOT NUL
L,\r\n    FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tO
N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n\n===Additional Context \n\n
\n    In the 'customers' table, address column names do not have 'Billing' p
refix, \n    e.g. country column name is 'country', not 'BillingCountry'\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 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?"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:26:25.633170889Z', 'me
ssage': {'role': 'assistant', 'content': "The provided context does not incl
ude a way to list all tables in an SQLite database catalog through a SQL que
ry on the given table structure. However, typically in SQLite, one could use
the following query to achieve this:\n\n```sql\nSELECT name FROM sqlite_mast
er WHERE type = 'table';\n``` \n\nSince the above is standard SQLite practic
e and not specific to the schema provided, here's how you would list all tab
les relevant to the schema shown if you wanted only those:\n\n```sql\nSELECT
name FROM sqlite_master WHERE type = 'table' AND name IN ('playlists', 'genr
es', 'tracks', 'media_types', 'artists', 'invoice_items', 'playlist_track',
'albums');\n```\n\nBut generally, for listing all tables in an SQLite databa
se given the context you've provided about specific tables and their structu
re, we rely on standard SQLite practices rather than custom SQL based on you
r schema. \n\nIf you want to list ALL available tables as per typical SQLite
practice, stick with the first query I mentioned."}, 'done_reason': 'stop',
'done': True, 'total_duration': 154789623743, 'load_duration': 8828851120,
'prompt_eval_count': 803, 'prompt_eval_duration': 76602234000, 'eval_count':
203, 'eval_duration': 69245091000}

[( LLM Response )]
The provided context does not include a way to list all tables in an SQLite
database catalog through a SQL query on the given table structure. However,
typically in SQLite, one could use the following query to achieve this:

```sql
SELECT name FROM sqlite_master WHERE type = 'table';
```

Since the above is standard SQLite practice and not specific to the schema p
rovided, here's how you would list all tables relevant to the schema shown i
f you wanted only those:

```sql
SELECT name FROM sqlite_master WHERE type = 'table' AND name IN ('playlist
s', 'genres', 'tracks', 'media_types', 'artists', 'invoice_items', 'playlist
_track', 'albums');
```

But generally, for listing all tables in an SQLite database given the contex
t you've provided about specific tables and their structure, we rely on stan
dard SQLite practices rather than custom SQL based on your schema.

If you want to list ALL available tables as per typical SQLite practice, sti
ck with the first query I mentioned.

[( Output from LLM )]
 The provided context does not include a way to list all tables in an SQLite
database catalog through a SQL query on the given table structure. However,
typically in SQLite, one could use the following query to achieve this:

```sql
SELECT name FROM sqlite_master WHERE type = 'table';
```
~~~

~~~
Since the above is standard SQLite practice and not specific to the schema p
rovided, here's how you would list all tables relevant to the schema shown i
f you wanted only those:

```sql
SELECT name FROM sqlite_master WHERE type = 'table' AND name IN ('playlist
s', 'genres', 'tracks', 'media_types', 'artists', 'invoice_items', 'playlist
_track', 'albums');
```

But generally, for listing all tables in an SQLite database given the contex
t you've provided about specific tables and their structure, we rely on stan
dard SQLite practices rather than custom SQL based on your schema.

If you want to list ALL available tables as per typical SQLite practice, sti
ck with the first query I mentioned.
[( Extracted SQL )]
 SELECT name FROM sqlite_master WHERE type = 'table'

[( SQL )]
generated SQL statement
~~~

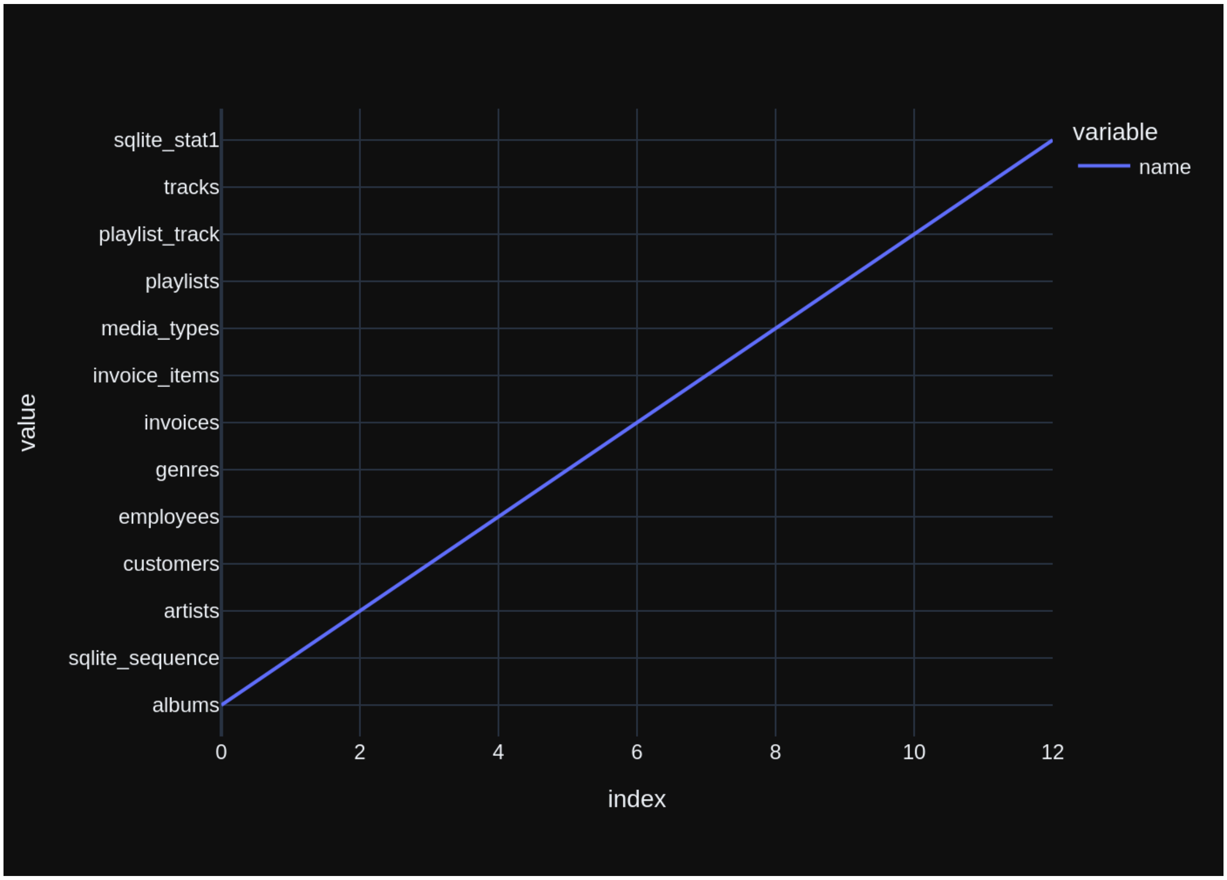
```sql
SELECT name FROM sqlite_master WHERE type = 'table'
```

```
[( DATA )]
queried data frame
```

	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

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:26:52.307248031Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\nim
port plotly.io as pio\n\nfig = go.Figure(go.Indicator(mode="indicator", valu
e=len(df), title={"text": "Number of Tables"}}))\nfig.show()'}, 'done_reaso
n': 'stop', 'done': True, 'total_duration': 26618995051, 'load_duration': 12
051190, 'prompt_eval_count': 150, 'prompt_eval_duration': 12348252000, 'eval
_count': 46, 'eval_duration': 14170242000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go
import plotly.io as pio

fig = go.Figure(go.Indicator(mode="indicator", value=len(df), title={"text": "Number of Tables"}}))
```



```
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
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 3:  which table stores customer's orders
============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 AUTOINCR
EMENT 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 "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 AC
TION\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    Address
NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r\n    Co
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    Sup
portRepId INTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES "employees"
(EmployeeId) \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 AUTOINCREMENT N
OT NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(2
0)  NOT NULL,\r\n    Title NVARCHAR(30),\r\n    ReportsTo INTEGER,\r\n    Bi
rthDate DATETIME,\r\n    HireDate 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(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHA
R(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 sqlite_sequence(name,seq)\n\nCREATE TABLE "playlists"\r
\n(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Nam
e NVARCHAR(120)\r\n)\n\nCREATE TABLE sqlite_stat1(tbl,idx,stat)\n\nCREATE TA
BLE "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
L,\r\n    FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \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    TrackId INTEGER  NOT NULL,\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\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\n===Additional Context \n
\nIn the chinook database invoice means order\n\n\n    In the \'customers\'
table, address column names do not have \'Billing\' prefix, \n    e.g. count
```

```
ry column name is \'country\', not \'BillingCountry\'\n    \n\n===Response G
uidelines \n1. If the provided context is sufficient, please generate a vali
d 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': "which table stores customer's orders"}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
CREMENT 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 \"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
\n    LastName NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    A
ddress NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r
\n    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 \"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
\n    BirthDate DATETIME,\r\n    HireDate DATETIME,\r\n    Address NVARCHAR
(70),\r\n    City NVARCHAR(40),\r\n    State 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 sqlite_sequence(name,seq)\n\nCREATE TABLE \"p
laylists\"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\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
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
NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, Track
Id),\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\n===A
dditional Context \n\nIn the chinook database invoice means order\n\n\n    I
n the 'customers' table, address column names do not have 'Billing' prefix,
\n    e.g. country column name is 'country', not 'BillingCountry'\n    \n\n=
==Response Guidelines \n1. If the provided context is sufficient, please gen
erate a valid SQL query without any explanations for the question. \n2. If t
he provided context is almost sufficient but requires knowledge of a specifi
c string in a particular column, please generate an intermediate SQL query t
o 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": "assist
ant", "content": "SELECT name FROM sqlite_master WHERE type = 'table'"}, {"r
ole": "user", "content": "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
2, updating n_results = 2
```

```
[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:28:43.750993627Z', 'me
ssage': {'role': 'assistant', 'content': 'invoices'}, 'done_reason': 'stop',
'done': True, 'total_duration': 110964951563, 'load_duration': 10426672, 'pr
ompt_eval_count': 1041, 'prompt_eval_duration': 110403260000, 'eval_count':
2, 'eval_duration': 337457000}

[( LLM Response )]
invoices
*** RETRY 1 ***

[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 AUTOINCR
EMENT 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 "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 AC
TION\r\n)\n\nCREATE TABLE sqlite_sequence(name,seq)\n\nCREATE INDEX IFK_Invo
iceLineInvoiceId ON "invoice_items" (InvoiceId)\n\nCREATE TABLE "artists"\r
\n(\r\n    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name
NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK_InvoiceCustomerId ON "invoices" (Cust
omerId)\n\nCREATE TABLE "customers"\r\n(\r\n    CustomerId INTEGER PRIMARY K
EY AUTOINCREMENT NOT NULL,\r\n    FirstName NVARCHAR(40)  NOT NULL,\r\n    L
astName 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\n    Co
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    Sup
portRepId INTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES "employees"
(EmployeeId) \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 AUTOINCREMENT N
OT NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(2
0)  NOT NULL,\r\n    Title NVARCHAR(30),\r\n    ReportsTo INTEGER,\r\n    Bi
rthDate DATETIME,\r\n    HireDate 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(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHA
R(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 "playlists"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY A
UTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE TABLE "genre
s"\r\n(\r\n    GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Na
me NVARCHAR(120)\r\n)\n\n\n===Additional Context \n\n\n    In the \'customer
s\' table, address column names do not have \'Billing\' prefix, \n    e.g. c
ountry column name is \'country\', not \'BillingCountry\'\n    \n\nIn the ch
inook database invoice means order\n\n===Response Guidelines \n1. If the pro
vided context is sufficient, please generate a valid SQL query without any e
```

```
xplanations for the question. \n2. If the provided context is almost suffici
ent but requires knowledge of a specific string in a particular column, plea
se generate an intermediate SQL query to find the distinct strings in that c
olumn. 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': 'Can you list all tables in the SQLi
te database catalog?'}, {'role': 'assistant', 'content': "SELECT name FROM s
qlite_master WHERE type = 'table'"}, {'role': 'user', 'content': "\n
For the question which table stores customer's orders, \n        the generat
ed SQL statement invoices results in the following exception [ERROR-SQL] the
generated SQL : invoices\n does not starts with ('select','with') .\n
Please fix the error and re-generate the SQL\n        "}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
CREMENT 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 \"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 sqlite_sequence(name,seq)\n\nCREATE INDEX IFK_In
voiceLineInvoiceId ON \"invoice_items\" (InvoiceId)\n\nCREATE TABLE \"artist
s\"\r\n(\r\n    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n
Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK_InvoiceCustomerId ON \"invoices
\" (CustomerId)\n\nCREATE TABLE \"customers\"\r\n(\r\n    CustomerId INTEGER
PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    FirstName NVARCHAR(40)  NOT NUL
L,\r\n    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
\n    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 \"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
\n    BirthDate DATETIME,\r\n    HireDate DATETIME,\r\n    Address NVARCHAR
(70),\r\n    City NVARCHAR(40),\r\n    State 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 \"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
ULL,\r\n    Name NVARCHAR(120)\r\n)\n\n\n===Additional Context \n\n\n    In
the 'customers' table, address column names do not have 'Billing' prefix, \n
e.g. country column name is 'country', not 'BillingCountry'\n    \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": "Can you list all tables in the SQLi
te database catalog?"}, {"role": "assistant", "content": "SELECT name FROM s
qlite_master WHERE type = 'table'"}, {"role": "user", "content": "\n
For the question which table stores customer's orders, \n        the generat
ed SQL statement invoices results in the following exception [ERROR-SQL] the
generated SQL : invoices\n does not starts with ('select','with') .\n
Please fix the error and re-generate the SQL\n        "}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:30:01.872177581Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT * FROM invoices'}, 'done_re
ason': 'stop', 'done': True, 'total_duration': 78071228182, 'load_duration':
13194148, 'prompt_eval_count': 982, 'prompt_eval_duration': 76424364000, 'ev
al_count': 5, 'eval_duration': 1386316000}

[( LLM Response )]
SELECT * FROM invoices

[( SQL )]
generated SQL statement
```

```sql
SELECT * FROM invoices
```

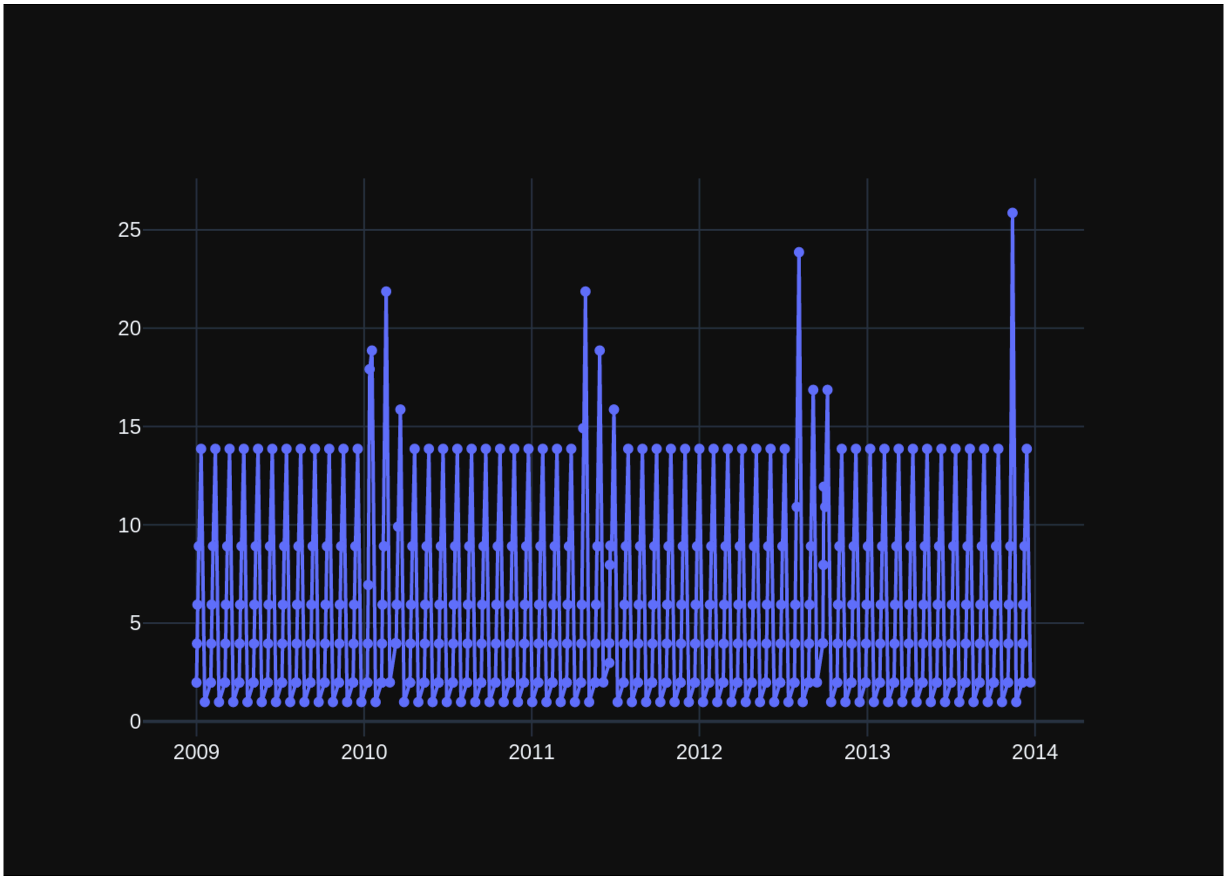
```
[( DATA )]
queried data frame
```

	InvoiceId	CustomerId	InvoiceDate	BillingAddress	BillingCity	BillingState	BillingCou
0	1	2	2009-01-01 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	None	Ger
1	2	4	2009-01-02 00:00:00	Ullevålsveien 14	Oslo	None	No
2	3	8	2009-01-03 00:00:00	Grétrystraat 63	Brussels	None	Bel
3	4	14	2009-01-06 00:00:00	8210 111 ST NW	Edmonton	AB	Ca
4	5	23	2009-01-11 00:00:00	69 Salem Street	Boston	MA	
...	...	...	...	...	...	...	
407	408	25	2013-12-05 00:00:00	319 N. Frances Street	Madison	WI	
408	409	29	2013-12-06 00:00:00	796 Dundas Street West	Toronto	ON	Ca
409	410	35	2013-12-09 00:00:00	Rua dos Campeões Europeus de Viena, 4350	Porto	None	Por
410	411	44	2013-12-14 00:00:00	Porthaninkatu 9	Helsinki	None	Fir
411	412	58	2013-12-22 00:00:00	12,Community Centre	Delhi	None	

412 rows × 9 columns

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
For the question which table stores customer's orders, \n        the generat
ed SQL statement invoices results in the following exception [ERROR-SQL] the
generated SQL : invoices\n does not starts with ('select','with') .\n
Please fix the error and re-generate the SQL\n        '\n\nThe DataFrame was
produced using this query: SELECT * FROM invoices\n\nThe following is inform
ation about the resulting pandas DataFrame 'df': \nRunning df.dtypes give
s:\n InvoiceId               int64\nCustomerId              int64\nInvoiceDate
object\nBillingAddress        object\nBillingCity           object\nBillingS
tate          object\nBillingCountry        object\nBillingPostalCode     ob
ject\nTotal                float64\ndtype: object"}, {"role": "user", "conte
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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:30:46.317162451Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\n\n
if len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=df
[\'Total\'].iloc[0]))\nelse:\n    fig = go.Figure()\n    fig.add_trace(go.Sc
atter(x=df[\'InvoiceDate\'], y=df[\'Total\'], mode=\'lines+markers\'))\n
\nfig.show()'}, 'done_reason': 'stop', 'done': True, 'total_duration': 44418
196349, 'load_duration': 10788904, 'prompt_eval_count': 237, 'prompt_eval_du
ration': 20365817000, 'eval_count': 76, 'eval_duration': 23953012000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['Total'].iloc[0]))
else:
    fig = go.Figure()
    fig.add_trace(go.Scatter(x=df['InvoiceDate'], y=df['Total'], mode='lines+markers'))
```



```
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
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 4:  How many customers are there
============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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
INDEX IFK_CustomerSupportRepId ON "customers" (SupportRepId)\n\nCREATE TABLE
"customers"\r\n(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    FirstName NVARCHAR(40)  NOT NULL,\r\n    LastName NVARCHAR(20)  NO
T NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVARCHAR(70),\r\n    Cit
y 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
4),\r\n    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 INDEX IFK_InvoiceCustomerI
d ON "invoices" (CustomerId)\n\nCREATE TABLE "invoice_items"\r\n(\r\n    Inv
oiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    InvoiceId INTE
GER  NOT NULL,\r\n    TrackId INTEGER  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 INDEX IFK_Invoice
LineInvoiceId ON "invoice_items" (InvoiceId)\n\nCREATE TABLE "albums"\r\n(\r
\n    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_InvoiceLineTrackId ON "invoice_items"
(TrackId)\n\nCREATE TABLE "employees"\r\n(\r\n    EmployeeId INTEGER PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    F
irstName 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\n    Co
untry 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\nCREATE TABLE "playlists"\r\n(\r\n    PlaylistId
INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n
\n\n===Additional Context \n\n\n    In the \'customers\' table, address colu
mn names do not have \'Billing\' prefix, \n    e.g. country column name is
\'country\', not \'BillingCountry\'\n    \n\nIn the chinook database invoice
means order\n\n===Response Guidelines \n1. If the provided context is suffic
ient, please generate a valid SQL query without any explanations for the que
stion. \n2. If the provided context is almost sufficient but requires knowle
dge of a specific string in a particular column, please generate an intermed
```

```
iate SQL query to find the distinct strings in that column. Prepend the quer
y with a comment saying intermediate_sql \n3. If the provided context is ins
ufficient, please explain why it can\'t be generated. \n4. Please use the mo
st relevant table(s). \n5. If the question has been asked and answered befor
e, please repeat the answer exactly as it was given before. \n'}, {'role':
'user', 'content': "\n        For the question which table stores customer's
orders, \n        the generated SQL statement invoices results in the follow
ing exception [ERROR-SQL] the generated SQL : invoices\n does not starts wit
h ('select','with') .\n        Please fix the error and re-generate the SQL
\n        "}, {'role': 'assistant', 'content': 'SELECT * FROM invoices'},
{'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': 'How many customers are
there'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
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
\n    PostalCode NVARCHAR(10),\r\n    Phone NVARCHAR(24),\r\n    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
Title NVARCHAR(160)  NOT NULL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOR
EIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tON 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    EmployeeI
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
VARCHAR(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(6
0),\r\n    FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (EmployeeId) \r
\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlis
ts\"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n
Name NVARCHAR(120)\r\n)\n\n\n===Additional Context \n\n\n    In the 'custome
rs' table, address column names do not have 'Billing' prefix, \n    e.g. cou
ntry column name is 'country', not 'BillingCountry'\n    \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. Pl
ease 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        For the question which table st
ores customer's orders, \n        the generated SQL statement invoices resul
ts in the following exception [ERROR-SQL] the generated SQL : invoices\n doe
s not starts with ('select','with') .\n        Please fix the error and re-g
enerate the SQL\n        "}, {"role": "assistant", "content": "SELECT * FROM
invoices"}, {"role": "user", "content": "Can you list all tables in the SQLi
te database catalog?"}, {"role": "assistant", "content": "SELECT name FROM s
qlite_master WHERE type = 'table'"}, {"role": "user", "content": "How many c
ustomers are there"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:32:38.85378886Z', 'mes
sage': {'role': 'assistant', 'content': 'SELECT COUNT(*) FROM customers'},
'done_reason': 'stop', 'done': True, 'total_duration': 112422902035, 'load_d
uration': 12851872, 'prompt_eval_count': 1039, 'prompt_eval_duration': 11032
5709000, 'eval_count': 6, 'eval_duration': 1731025000}

[( LLM Response )]
SELECT COUNT(*) FROM customers

[( SQL )]
generated SQL statement
```

```
SELECT COUNT(*) FROM customers
```

```
[( DATA )]
queried data frame
```

	COUNT(*)
0	59

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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 res
ulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n COUNT(*)    int64
\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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:33:01.191124008Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go
\n\nfig = go.Figure(go.Indicator(mode="number", value=df[\'COUNT(*)\'].iloc
[0]))\nfig.show()'}, 'done_reason': 'stop', 'done': True, 'total_duration': 
22306016918, 'load_duration': 13581611, 'prompt_eval_count': 143, 'prompt_ev
al_duration': 11927786000, 'eval_count': 34, 'eval_duration': 10314918000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objects as go

fig = go.Figure(go.Indicator(mode="number", value=df['COUNT(*)'].iloc[0]))
```

```
59
```

```
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
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 5:  what are the top 5 countries that customers come from?
============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 "customers"\r\n(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT N
OT 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
\n    PostalCode NVARCHAR(10),\r\n    Phone NVARCHAR(24),\r\n    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 DE
LETE 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    In
voiceId INTEGER  NOT NULL,\r\n    TrackId INTEGER  NOT NULL,\r\n    UnitPric
e 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 ACTIO
N ON UPDATE NO ACTION,\r\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (Tra
ckId) \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\nCREATE INDEX IFK_CustomerSupportRepI
d ON "customers" (SupportRepId)\n\nCREATE TABLE "employees"\r\n(\r\n    Empl
oyeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    LastName NVARCHAR
(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NOT NULL,\r\n    Title NVARCH
AR(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    Stat
e NVARCHAR(40),\r\n    Country NVARCHAR(40),\r\n    PostalCode NVARCHAR(1
0),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHAR(24),\r\n    Email NVARCHA
R(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 "album
s"\r\n(\r\n    AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Ti
tle NVARCHAR(160)  NOT NULL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOREI
GN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTIO
N ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist_track"\r\n(\r\n    Play
listId INTEGER  NOT NULL,\r\n    TrackId INTEGER  NOT NULL,\r\n    CONSTRAIN
T PK_PlaylistTrack PRIMARY KEY  (PlaylistId, TrackId),\r\n    FOREIGN KEY (P
laylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\tON DELETE NO ACTION O
N UPDATE 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 TABLE sqli
te_sequence(name,seq)\n\nCREATE TABLE "tracks"\r\n(\r\n    TrackId INTEGER P
RIMARY 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
R,\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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPD
ATE NO ACTION\r\n)\n\n\n===Additional Context \n\n\n    In the \'customers\'
table, address column names do not have \'Billing\' prefix, \n    e.g. count
ry column name is \'country\', not \'BillingCountry\'\n    \n\nIn the chinoo
k database invoice means order\n\n===Response Guidelines \n1. If the provide
d context is sufficient, please generate a valid SQL query without any expla
nations for the question. \n2. If the provided context is almost sufficient
but requires knowledge of a specific string in a particular column, please g
enerate an intermediate SQL query to find the distinct strings in that colum
n. Prepend the query with a comment saying intermediate_sql \n3. If the prov
ided context is insufficient, please explain why it can\'t be generated. \n
4. Please use the most relevant table(s). \n5. If the question has been aske
d and answered before, please repeat the answer exactly as it was given befo
re. \n'}, {'role': 'user', 'content': 'How many customers are there'}, {'rol
e': 'assistant', 'content': 'SELECT COUNT(*) FROM customers'}, {'role': 'use
r', 'content': "\n        For the question which table stores customer's ord
ers, \n        the generated SQL statement invoices results in the following
exception [ERROR-SQL] the generated SQL : invoices\n does not starts with
('select','with') .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT * FROM invoices'}, {'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': 'what are the top 5 countries that
customers come from?'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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 \"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    Address NVARCHAR(70),\r
\n    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    Fax
NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\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
ce_items\"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT N
ULL,\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 NUL
```

```
L,\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 \"media_types\"\r\n(\r\n    MediaTypeId INTEGER PRIMAR
Y KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE INDEX
IFK_CustomerSupportRepId ON \"customers\" (SupportRepId)\n\nCREATE TABLE \"e
mployees\"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NO
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
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
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 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
NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, Track
Id),\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
ks\"\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 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
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\n\n===Additi
onal Context \n\n\n    In the 'customers' table, address column names do not
have 'Billing' prefix, \n    e.g. country column name is 'country', not 'Bil
lingCountry'\n    \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 stri
ng 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 explai
n why it can't be generated. \n4. Please use the most relevant table(s). \n
5. If the question has been asked and answered before, please repeat the ans
wer exactly as it was given before. \n"}, {"role": "user", "content": "How m
any customers are there"}, {"role": "assistant", "content": "SELECT COUNT(*)
FROM customers"}, {"role": "user", "content": "\n        For the question wh
ich table stores customer's orders, \n        the generated SQL statement in
voices results in the following exception [ERROR-SQL] the generated SQL : in
voices\n does not starts with ('select','with') .\n        Please fix the er
ror and re-generate the SQL\n        "}, {"role": "assistant", "content": "S
ELECT * FROM invoices"}, {"role": "user", "content": "Can you list all table
s in the SQLite database catalog?"}, {"role": "assistant", "content": "SELEC
T name FROM sqlite_master WHERE type = 'table'"}, {"role": "user", "conten
t": "what are the top 5 countries that customers come from?"}]
```

```
[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:35:51.173677512Z', 'me
ssage': {'role': 'assistant', 'content': "SELECT BillingCountry, COUNT(*) as
CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Customer
Count DESC \nLIMIT 5; \n\nNote: The original table columns do not have 'Bill
ing' prefix for country. Adjusting to correct column name:\n\nSELECT Countr
y, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY Country \nORDER BY
CustomerCount DESC \nLIMIT 5;"}, 'done_reason': 'stop', 'done': True, 'total
_duration': 169901280985, 'load_duration': 12886444, 'prompt_eval_count': 12
81, 'prompt_eval_duration': 141478563000, 'eval_count': 79, 'eval_duration':
27878705000}

[( LLM Response )]
SELECT BillingCountry, COUNT(*) as CustomerCount
FROM customers
GROUP BY BillingCountry
ORDER BY CustomerCount DESC
LIMIT 5;

Note: The original table columns do not have 'Billing' prefix for country. A
djusting to correct column name:

SELECT Country, COUNT(*) as CustomerCount
FROM customers
GROUP BY Country
ORDER BY CustomerCount DESC
LIMIT 5;

[( Output from LLM )]
 SELECT BillingCountry, COUNT(*) as CustomerCount
FROM customers
GROUP BY BillingCountry
ORDER BY CustomerCount DESC
LIMIT 5;

Note: The original table columns do not have 'Billing' prefix for country. A
djusting to correct column name:

SELECT Country, COUNT(*) as CustomerCount
FROM customers
GROUP BY Country
ORDER BY CustomerCount DESC
LIMIT 5;
[( Extracted SQL )]
 SELECT BillingCountry, COUNT(*) as CustomerCount
FROM customers
GROUP BY BillingCountry
ORDER BY CustomerCount DESC
LIMIT 5

[( SQL )]
generated SQL statement
```

```sql
SELECT BillingCountry, COUNT(*) as CustomerCount
FROM customers
GROUP BY BillingCountry
ORDER BY CustomerCount DESC
LIMIT 5
```

```
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
2, updating n_results = 2
```

```
*** RETRY 1 ***

[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 "customers"\r\n(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT N
OT 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
\n    PostalCode NVARCHAR(10),\r\n    Phone NVARCHAR(24),\r\n    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 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
RCHAR(30),\r\n    ReportsTo INTEGER,\r\n    BirthDate DATETIME,\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
(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHAR(24),\r\n    Email NVARC
HAR(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 sqlite_
sequence(name,seq)\n\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
LL,\r\n    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\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DEL
ETE 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(12
0)\r\n)\n\nCREATE TABLE "genres"\r\n(\r\n    GenreId INTEGER PRIMARY KEY AUT
OINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE TABLE sqlite_s
tat1(tbl,idx,stat)\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
TABLE "playlists"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT N
OT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\n\n===Additional Context \n\n\n
In the \'customers\' table, address column names do not have \'Billing\' pre
fix, \n    e.g. country column name is \'country\', not \'BillingCountry\'\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        For the quest
ion which table stores customer's orders, \n        the generated SQL statem
ent invoices results in the following exception [ERROR-SQL] the generated SQ
L : invoices\n does not starts with ('select','with') .\n        Please fix
the error and re-generate the SQL\n        "}, {'role': 'assistant', 'conten
t': 'SELECT * FROM invoices'}, {'role': 'user', 'content': 'How many custome
rs are there'}, {'role': 'assistant', 'content': 'SELECT COUNT(*) FROM custo
mers'}, {'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        For
the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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 \"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    Address NVARCHAR(70),\r
\n    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    Fax
NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\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 \"emplo
yees\"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r
\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NOT NU
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 TABLE sqlite_sequence(name,seq)\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    FOREI
GN 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 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 \"genres\"\r\n(\r\n
GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(12
0)\r\n)\n\nCREATE TABLE sqlite_stat1(tbl,idx,stat)\n\nCREATE TABLE \"albums
\"\r\n(\r\n    AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Ti
tle NVARCHAR(160)  NOT NULL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOREI
GN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACT
ION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlists\"\r\n(\r\n    Playl
istId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)
\r\n)\n\n\n===Additional Context \n\n\n    In the 'customers' table, address
column names do not have 'Billing' prefix, \n    e.g. country column name is
'country', not 'BillingCountry'\n    \n\nIn the chinook database invoice mea
ns order\n\n===Response Guidelines \n1. If the provided context is sufficien
t, please generate a valid SQL query without any explanations for the questi
on. \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 distinct strings in that column. Prepend the query wit
h a comment saying intermediate_sql \n3. If the provided context is insuffic
ient, please explain why it can't be generated. \n4. Please use the most rel
evant table(s). \n5. If the question has been asked and answered before, ple
ase repeat the answer exactly as it was given before. \n"}, {"role": "user",
"content": "\n        For the question which table stores customer's orders,
\n        the generated SQL statement invoices results in the following exce
ption [ERROR-SQL] the generated SQL : invoices\n does not starts with ('sele
ct','with') .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT * FROM invoices"}, {"role": "us
er", "content": "How many customers are there"}, {"role": "assistant", "cont
ent": "SELECT COUNT(*) FROM customers"}, {"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":
"user", "content": "\n        For the question what are the top 5 countries
that customers come from?, \n        the generated SQL statement SELECT Bill
ingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCou
ntry \nORDER BY CustomerCount DESC \nLIMIT 5 results in the following except
ion [ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as Cus
tomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCou
nt DESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*)
as CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Custo
merCount DESC \nLIMIT 5': no such column: BillingCountry .\n        Please f
ix the error and re-generate the SQL\n        "}]
```

```
[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:37:40.941381976Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS Custom
erCount \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \n
LIMIT 5'}, 'done_reason': 'stop', 'done': True, 'total_duration': 1097110503
42, 'load_duration': 12687483, 'prompt_eval_count': 1204, 'prompt_eval_durat
ion': 100329213000, 'eval_count': 26, 'eval_duration': 8890650000}
```

```
[( LLM Response )]
SELECT Country, COUNT(*) AS CustomerCount
FROM customers
```

```
GROUP BY Country
ORDER BY CustomerCount DESC
LIMIT 5

[( SQL )]
generated SQL statement
```

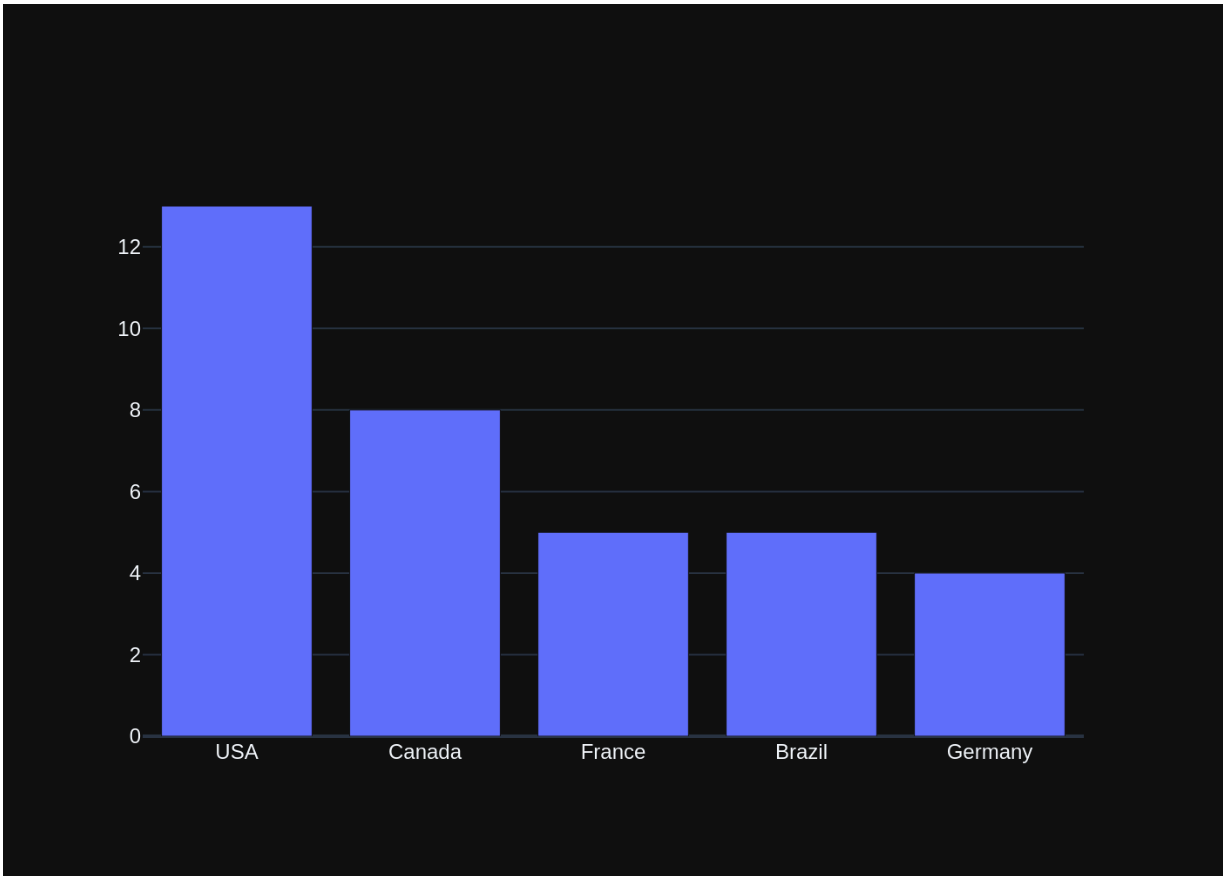
```
SELECT Country, COUNT(*) AS CustomerCount
FROM customers
GROUP BY Country
ORDER BY CustomerCount DESC
LIMIT 5
```

```
[( DATA )]
queried data frame
```

	Country	CustomerCount
0	USA	13
1	Canada	8
2	France	5
3	Brazil	5
4	Germany	4

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
For the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
'\n\nThe DataFrame was produced using this query: SELECT Country, COUNT(*) A
S CustomerCount \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount
DESC \nLIMIT 5\n\nThe following is information about the resulting pandas Da
taFrame 'df': \nRunning df.dtypes gives:\n Country          object\nCustomer
Count     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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:38:29.313209138Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\n\n
if len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=df
[\'CustomerCount\'].iloc[0]))\nelse:\n    fig = go.Figure([go.Bar(x=df[\'Cou
ntry\'], y=df[\'CustomerCount\'])])\n    \nfig.show()'}, 'done_reason': 'sto
p', 'done': True, 'total_duration': 48343544924, 'load_duration': 11960440,
'prompt_eval_count': 307, 'prompt_eval_duration': 27143639000, 'eval_count':
67, 'eval_duration': 21100023000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go


if len(df) == 1:
  fig = go.Figure(go.Indicator(mode="number", value=df['CustomerCount'].iloc[0]))
else:
  fig = go.Figure([go.Bar(x=df['Country'], y=df['CustomerCount'])])
```



```
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
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 6:  List all albums and their corresponding artist names
============================================================================
====



[( SQL Prompt )]
[{'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\n
CREATE 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    FOREIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\t
ON 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 NVARCH
AR(200)  NOT NULL,\r\n    AlbumId INTEGER,\r\n    MediaTypeId INTEGER  NOT N
ULL,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(220),\r\n    Milliseco
nds 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) REFE
RENCES "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_TrackAl
bumId ON "tracks" (AlbumId)\n\nCREATE TABLE "artists"\r\n(\r\n    ArtistId I
NTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n
\nCREATE INDEX IFK_TrackGenreId ON "tracks" (GenreId)\n\nCREATE INDEX IFK_Pl
aylistTrackTrackId ON "playlist_track" (TrackId)\n\nCREATE TABLE "playlist
s"\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 NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE
INDEX IFK_TrackMediaTypeId ON "tracks" (MediaTypeId)\n\n\n===Additional Cont
ext \n\n\n    In the \'customers\' table, address column names do not have
\'Billing\' prefix, \n    e.g. country column name is \'country\', not \'Bil
lingCountry\'\n    \n\nIn the chinook database invoice means order\n\n===Res
ponse 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 stri
ng 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 explai
n why it can\'t be generated. \n4. Please use the most relevant table(s). \n
5. If the question has been asked and answered before, please repeat the ans
wer exactly as it was given before. \n'}, {'role': 'user', 'content': 'Can y
ou 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'}, {'role': 'assistant', 'c
ontent': 'SELECT COUNT(*) FROM customers'}, {'role': 'user', 'content': "\n
For the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
```

```
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5'}, {'role': 'user', 'content': "\n        For the question which table s
tores customer's orders, \n        the generated SQL statement invoices resu
lts in the following exception [ERROR-SQL] the generated SQL : invoices\n do
es not starts with ('select','with') .\n        Please fix the error and re-
generate the SQL\n        "}, {'role': 'assistant', 'content': 'SELECT * FRO
M invoices'}, {'role': 'user', 'content': 'List all albums and their corresp
onding artist names  '}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
\"\r\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Na
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
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
(\r\n    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NV
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\nCREATE TABLE \"genres\"\r
\n(\r\n    GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name N
VARCHAR(120)\r\n)\n\nCREATE INDEX IFK_TrackMediaTypeId ON \"tracks\" (MediaT
ypeId)\n\n\n===Additional Context \n\n\n    In the 'customers' table, addres
s column names do not have 'Billing' prefix, \n    e.g. country column name 
is 'country', not 'BillingCountry'\n    \n\nIn the chinook database invoice 
means order\n\n===Response Guidelines \n1. If the provided context is suffic
ient, please generate a valid SQL query without any explanations for the que
stion. \n2. If the provided context is almost sufficient but requires knowle
dge of a specific string in a particular column, please generate an intermed
iate SQL query to find the distinct strings in that column. Prepend the quer
y with a comment saying intermediate_sql \n3. If the provided context is ins
ufficient, please explain why it can't be generated. \n4. Please use the mos
t relevant table(s). \n5. If the question has been asked and answered befor
e, please repeat the answer exactly as it was given before. \n"}, {"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": "How many customers are ther
e"}, {"role": "assistant", "content": "SELECT COUNT(*) FROM customers"}, {"r
ole": "user", "content": "\n        For the question what are the top 5 coun
tries that customers come from?, \n        the generated SQL statement SELEC
T BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY Bill
ingCountry \nORDER BY CustomerCount DESC \nLIMIT 5 results in the following
exception [ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*)
as CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Custo
merCount DESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, CO
UNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER B
Y CustomerCount DESC \nLIMIT 5': no such column: BillingCountry .\n        P
lease fix the error and re-generate the SQL\n        "}, {"role": "assistan
t", "content": "SELECT Country, COUNT(*) AS CustomerCount \nFROM customers
\nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMIT 5"}, {"role": "use
r", "content": "\n        For the question which table stores customer's ord
ers, \n        the generated SQL statement invoices results in the following
exception [ERROR-SQL] the generated SQL : invoices\n does not starts with
('select','with') .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT * FROM invoices"}, {"role": "us
er", "content": "List all albums and their corresponding artist names  "}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:40:19.308507312Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT a.Title AS AlbumTitle, ar.N
ame AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.Artis
tId;'}, 'done_reason': 'stop', 'done': True, 'total_duration': 109906114810,
'load_duration': 12867555, 'prompt_eval_count': 937, 'prompt_eval_duration':
98572026000, 'eval_count': 32, 'eval_duration': 10619813000}

[( LLM Response )]
SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName
FROM albums a
JOIN artists ar ON a.ArtistId = ar.ArtistId;

[( Output from LLM )]
 SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName
FROM albums a
JOIN artists ar ON a.ArtistId = ar.ArtistId;
[( Extracted SQL )]
 SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName
FROM albums a
JOIN artists ar ON a.ArtistId = ar.ArtistId

[( SQL )]
generated SQL statement
```

```sql
SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName
FROM albums a
JOIN artists ar ON a.ArtistId = ar.ArtistId
```

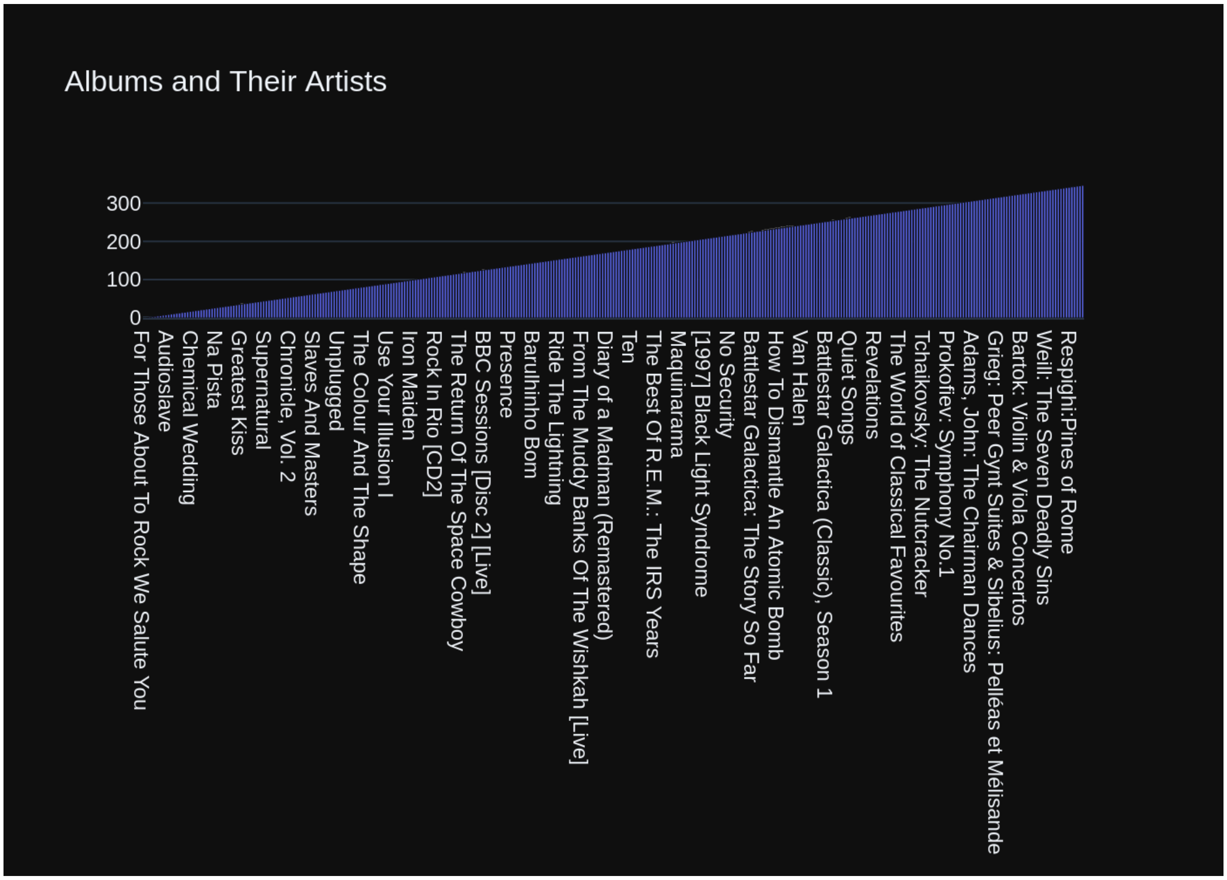
```
[( DATA )]
queried data frame
```

	AlbumTitle	ArtistName
0	For Those About To Rock We Salute You	AC/DC
1	Balls to the Wall	Accept
2	Restless and Wild	Accept
3	Let There Be Rock	AC/DC
4	Big Ones	Aerosmith
...	...	...
342	Respighi:Pines of Rome	Eugene Ormandy
343	Schubert: The Late String Quartets & String Qu...	Emerson String Quartet
344	Monteverdi: L'Orfeo	C. Monteverdi, Nigel Rogers - Chiaroscuro; Lon...
345	Mozart: Chamber Music	Nash Ensemble
346	Koyaanisqatsi (Soundtrack from the Motion Pict...	Philip Glass Ensemble

347 rows × 2 columns

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Li
st all albums and their corresponding artist names  '\n\nThe DataFrame was p
roduced using this query: SELECT a.Title AS AlbumTitle, ar.Name AS ArtistNam
e \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId\n\nThe follo
wing is information about the resulting pandas DataFrame 'df': \nRunning df.
dtypes gives:\n AlbumTitle    object\nArtistName    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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:41:09.441666845Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\nim
port plotly.offline as py\n\nif len(df) == 1:\n    fig = go.Figure(go.Indica
tor(mode="text", value=df[\'AlbumTitle\'][0], title={"text": df[\'ArtistName
\'][0]}))\nelse:\n    fig = go.Figure(data=[go.Bar(x=df[\'AlbumTitle\'], y=d
f.index, text=df[\'ArtistName\'], textposition=\'auto\', name=\'Albums by Ar
tist\')])\nfig.update_layout(title="Albums and Their Artists")\npy.plot(fi
g)'}, 'done_reason': 'stop', 'done': True, 'total_duration': 50087210650, 'l
oad_duration': 10899020, 'prompt_eval_count': 175, 'prompt_eval_duration': 1
4615627000, 'eval_count': 113, 'eval_duration': 35326254000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go
import plotly.offline as py

if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="text", value=df['AlbumTitle'][0], title={"text": df['ArtistName'][0]}))
else:
    fig = go.Figure(data=[go.Bar(x=df['AlbumTitle'], y=df.index, text=df['ArtistName'], textposition='auto', name='Albums by Artist')])
fig.update_layout(title="Albums and Their Artists")
py.plot(fig)
```



```
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
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 7:  Find all tracks with a name containing "What" (case-insensi
tive)
============================================================================
====



[( SQL Prompt )]
[{'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\nCR
EATE INDEX IFK_PlaylistTrackTrackId ON "playlist_track" (TrackId)\n\nCREATE
TABLE "tracks"\r\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    AlbumId INTEGER,\r\n    Media
TypeId INTEGER  NOT NULL,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(2
20),\r\n    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    FOREI
GN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION O
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 INDEX IFK_TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE INDEX IFK_TrackMe
diaTypeId ON "tracks" (MediaTypeId)\n\nCREATE 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    FOREI
GN 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 ACTION\r\n)\n\nCREATE IND
EX IFK_InvoiceLineTrackId ON "invoice_items" (TrackId)\n\nCREATE INDEX IFK_A
lbumArtistId ON "albums" (ArtistId)\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 NULL,\r\n    Name NVARCHAR(120)\r\n)\n\n\n===Additional Co
ntext \n\nIn the chinook database invoice means order\n\n\n    In the \'cust
omers\' table, address column names do not have \'Billing\' prefix, \n    e.
g. country column name is \'country\', not \'BillingCountry\'\n    \n\n===Re
sponse Guidelines \n1. If the provided context is sufficient, please generat
e a valid SQL query without any explanations for the question. \n2. If the p
rovided context is almost sufficient but requires knowledge of a specific st
ring in a particular column, please generate an intermediate SQL query to fi
nd the distinct strings in that column. Prepend the query with a comment say
ing intermediate_sql \n3. If the provided context is insufficient, please ex
plain 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 albums and their corresponding artist names  '}, {'role': 'assista
nt', 'content': 'SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM
albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'role': 'user',
'content': 'Can you list all tables in the SQLite database catalog?'}, {'rol
e': 'assistant', 'content': "SELECT name FROM sqlite_master WHERE type = 'ta
ble'"}, {'role': 'user', 'content': 'How many customers are there'}, {'rol
e': 'assistant', 'content': 'SELECT COUNT(*) FROM customers'}, {'role': 'use
r', 'content': "\n        For the question what are the top 5 countries that
customers come from?, \n        the generated SQL statement SELECT BillingCo
```

```
untry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry
\nORDER BY CustomerCount DESC \nLIMIT 5 results in the following exception
[ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as Custome
rCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount D
ESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*) as
CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Customer
Count DESC \nLIMIT 5': no such column: BillingCountry .\n        Please fix
the error and re-generate the SQL\n        "}, {'role': 'assistant', 'conten
t': 'SELECT Country, COUNT(*) AS CustomerCount \nFROM customers \nGROUP BY C
ountry \nORDER BY CustomerCount DESC \nLIMIT 5'}, {'role': 'user', 'conten
t': "\n        For the question which table stores customer's orders, \n
the generated SQL statement invoices results in the following exception [ERR
OR-SQL] the generated SQL : invoices\n does not starts with ('select','wit
h') .\n        Please fix the error and re-generate the SQL\n        "}, {'r
ole': 'assistant', 'content': 'SELECT * FROM invoices'}, {'role': 'user', 'c
ontent': 'Find all tracks with a name containing "What" (case-insensitive)
'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
ATE TABLE \"tracks\"\r\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT 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    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\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\n    FOREIGN 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
NULL,\r\n    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\n===Additional Context \n\nIn the chinook database invoice means
order\n\n\n    In the 'customers' table, address column names do not have 'B
illing' prefix, \n    e.g. country column name is 'country', not 'BillingCou
ntry'\n    \n\n===Response Guidelines \n1. If the provided context is suffic
ient, please generate a valid SQL query without any explanations for the que
stion. \n2. If the provided context is almost sufficient but requires knowle
```

```
dge of a specific string in a particular column, please generate an intermed
iate SQL query to find the distinct strings in that column. Prepend the quer
y with a comment saying intermediate_sql \n3. If the provided context is ins
ufficient, please explain why it can't be generated. \n4. Please use the mos
t relevant table(s). \n5. If the question has been asked and answered befor
e, please repeat the answer exactly as it was given before. \n"}, {"role":
"user", "content": "List all albums and their corresponding artist names
"}, {"role": "assistant", "content": "SELECT a.Title AS AlbumTitle, ar.Name
AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistI
d"}, {"role": "user", "content": "Can you list all tables in the SQLite data
base catalog?"}, {"role": "assistant", "content": "SELECT name FROM sqlite_m
aster WHERE type = 'table'"}, {"role": "user", "content": "How many customer
s are there"}, {"role": "assistant", "content": "SELECT COUNT(*) FROM custom
ers"}, {"role": "user", "content": "\n        For the question what are the
top 5 countries that customers come from?, \n        the generated SQL state
ment SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5 results in the
following exception [ERROR-DB] Failed to execute SQL: SELECT BillingCountry,
COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER
BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCou
ntry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry
\nORDER BY CustomerCount DESC \nLIMIT 5': no such column: BillingCountry .\n
Please fix the error and re-generate the SQL\n        "}, {"role": "assistan
t", "content": "SELECT Country, COUNT(*) AS CustomerCount \nFROM customers
\nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMIT 5"}, {"role": "use
r", "content": "\n        For the question which table stores customer's ord
ers, \n        the generated SQL statement invoices results in the following
exception [ERROR-SQL] the generated SQL : invoices\n does not starts with
('select','with') .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT * FROM invoices"}, {"role": "us
er", "content": "Find all tracks with a name containing \"What\" (case-insen
sitive) "}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:43:04.206186937Z', 'me
ssage': {'role': 'assistant', 'content': "SELECT TrackId, Name FROM tracks W
HERE LOWER(Name) LIKE '%what%'"}, 'done_reason': 'stop', 'done': True, 'tota
l_duration': 114170074488, 'load_duration': 12867235, 'prompt_eval_count': 1
012, 'prompt_eval_duration': 108019899000, 'eval_count': 16, 'eval_duratio
n': 5269609000}

[( LLM Response )]
SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'

[( SQL )]
generated SQL statement
```

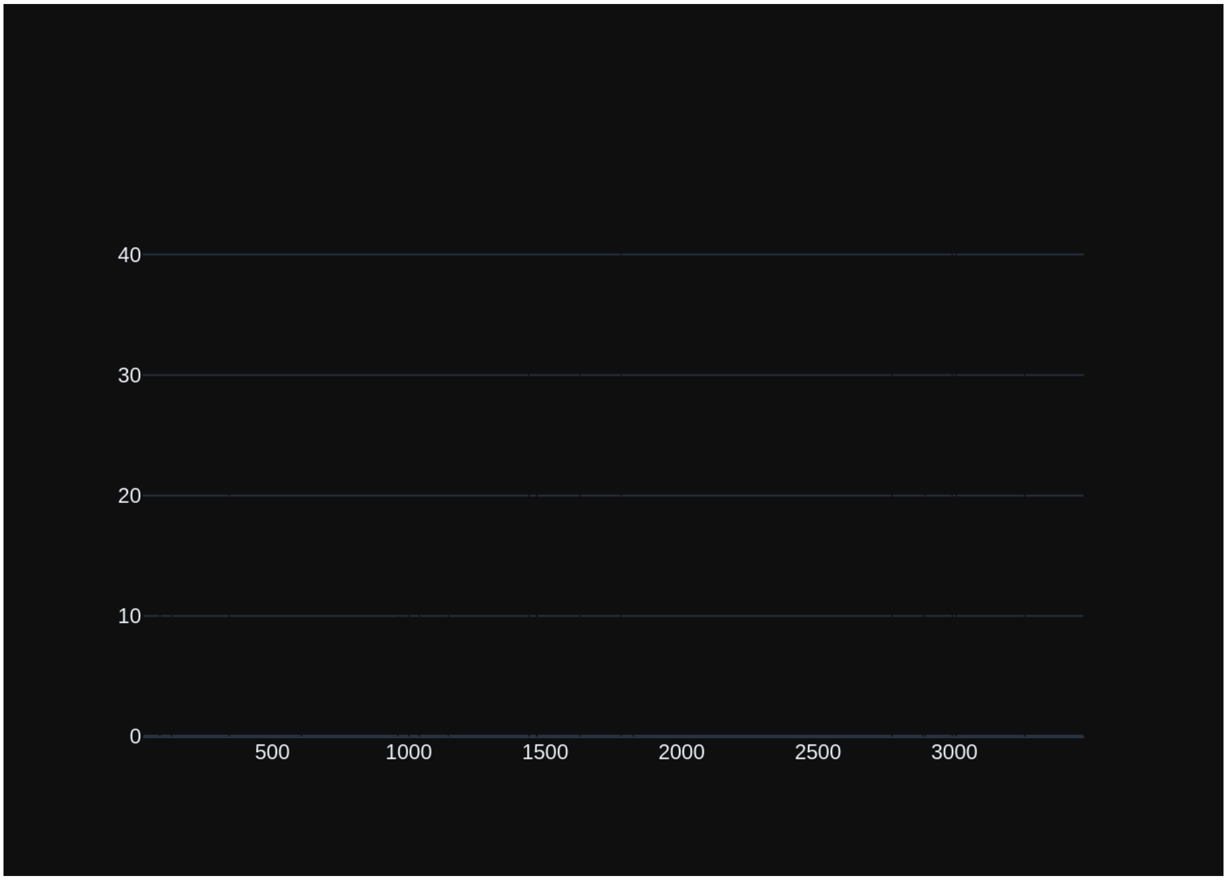
```sql
SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'
```

```
[( DATA )]
queried data frame
```

	TrackId	Name
0	26	What It Takes
1	88	What You Are
2	130	Do what cha wanna
3	342	What is and Should Never Be
4	607	So What
5	960	What A Day
6	1000	What If I Do?
7	1039	What Now My Love
8	1145	Whatsername
9	1440	Whatever It Is, I Just Can't Stop
10	1469	Look What You've Done
11	1470	Get What You Need
12	1628	What Is And What Should Never Be
13	1778	You're What's Happening (In The World Today)
14	1823	So What
15	2772	I Don't Know What To Do With Myself
16	2884	What Kate Did
17	2893	Whatever the Case May Be
18	2992	I Still Haven't Found What I'm Looking for
19	3007	I Still Haven't Found What I'm Looking For
20	3258	Whatever Gets You Thru the Night
21	3475	What Is It About Men

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Fi
nd all tracks with a name containing \"What\" (case-insensitive) '\n\nThe Da
taFrame was produced using this query: SELECT TrackId, Name FROM tracks WHER
E LOWER(Name) LIKE '%what%'\n\nThe following is information about the result
ing pandas DataFrame 'df': \nRunning df.dtypes gives:\n TrackId     int64\nN
ame       object\ndtype: object"}, {"role": "user", "content": "Can you gene
rate the Python plotly code to chart the results of the dataframe? Assume th
e data is in a pandas dataframe called 'df'. If there is only one value in t
he dataframe, use an Indicator. Respond with only Python code. Do not answer
with any explanations -- just the code."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:43:42.109977455Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\nif
len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="text", value=df[\'Name
\'][0]))\nelse:\n    fig = go.Figure(data=[go.Bar(x=df[\'TrackId\'], y=df
[\'Name\'].str.len(), text=df[\'Name\'], textposition=\'auto\')])\nfig.show
()'}, 'done_reason': 'stop', 'done': True, 'total_duration': 37874007949, 'l
oad_duration': 12594084, 'prompt_eval_count': 167, 'prompt_eval_duration': 1
3958564000, 'eval_count': 76, 'eval_duration': 23774227000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go
if len(df) == 1:
  fig = go.Figure(go.Indicator(mode="text", value=df['Name'][0]))
else:
  fig = go.Figure(data=[go.Bar(x=df['TrackId'], y=df['Name'].str.len(), text=df['Name'], textpo
sition='auto')])
```



```
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
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 8:  Get the total number of invoices for each customer
============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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
INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE INDEX IFK_I
nvoiceLineInvoiceId ON "invoice_items" (InvoiceId)\n\nCREATE TABLE "invoice_
items"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\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 "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
INDEX IFK_InvoiceLineTrackId ON "invoice_items" (TrackId)\n\nCREATE TABLE "c
ustomers"\r\n(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    FirstName NVARCHAR(40)  NOT NULL,\r\n    LastName NVARCHAR(20)  NO
T NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVARCHAR(70),\r\n    Cit
y 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
4),\r\n    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 INDEX IFK_CustomerSupportR
epId ON "customers" (SupportRepId)\n\nCREATE TABLE "employees"\r\n(\r\n    E
mployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    LastName NVARCH
AR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NOT NULL,\r\n    Title NVAR
CHAR(30),\r\n    ReportsTo INTEGER,\r\n    BirthDate DATETIME,\r\n    HireDa
te DATETIME,\r\n    Address NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    S
tate NVARCHAR(40),\r\n    Country NVARCHAR(40),\r\n    PostalCode NVARCHAR(1
0),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHAR(24),\r\n    Email NVARCHA
R(60),\r\n    FOREIGN KEY (ReportsTo) REFERENCES "employees" (EmployeeId) \r
\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_Emplo
yeeReportsTo ON "employees" (ReportsTo)\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
L,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(220),\r\n    Millisecond
s INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    UnitPrice NUMERIC(10,2)  N
OT NULL,\r\n    FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\t
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\n\n===Additional Context \n\nIn
the chinook database invoice means order\n\n\n    In the \'customers\' tabl
e, address column names do not have \'Billing\' prefix, \n    e.g. country c
```

```
olumn name is \'country\', not \'BillingCountry\'\n    \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 cust
omers'}, {'role': 'user', 'content': "\n        For the question which table
stores customer's orders, \n        the generated SQL statement invoices res
ults in the following exception [ERROR-SQL] the generated SQL : invoices\n d
oes not starts with ('select','with') .\n        Please fix the error and re
-generate the SQL\n        "}, {'role': 'assistant', 'content': 'SELECT * FR
OM invoices'}, {'role': 'user', 'content': "\n        For the question what
are the top 5 countries that customers come from?, \n        the generated S
QL statement SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM custome
rs \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5 results
in the following exception [ERROR-DB] Failed to execute SQL: SELECT BillingC
ountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry
\nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql 'SELECT Bi
llingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingC
ountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such column: BillingCoun
try .\n        Please fix the error and re-generate the SQL\n        "}, {'r
ole': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCount \nF
ROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMIT 5'},
{'role': 'user', 'content': 'List all albums and their corresponding artist
names  '}, {'role': 'assistant', 'content': 'SELECT a.Title AS AlbumTitle, a
r.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.Ar
tistId'}, {'role': 'user', 'content': 'Find all tracks with a name containin
g "What" (case-insensitive) '}, {'role': 'assistant', 'content': "SELECT Tra
ckId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role': 'user',
'content': 'Can you list all tables in the SQLite database catalog?'}, {'rol
e': 'assistant', 'content': "SELECT name FROM sqlite_master WHERE type = 'ta
ble'"}, {'role': 'user', 'content': 'Get the total number of invoices for ea
ch customer'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
INDEX IFK_InvoiceCustomerId ON \"invoices\" (CustomerId)\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
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) 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    LastNa
me NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVARC
HAR(70),\r\n    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
Fax NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\r\n    SupportRepId I
NTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (Employee
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
\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NOT NU
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    Me
diaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGER,\r\n    Composer NVARCHA
R(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\n===Additional Context \n\nIn the chinook database invoice means ord
er\n\n\n    In the 'customers' table, address column names do not have 'Bill
ing' prefix, \n    e.g. country column name is 'country', not 'BillingCountr
y'\n    \n\n===Response Guidelines \n1. If the provided context is sufficien
t, please generate a valid SQL query without any explanations for the questi
on. \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 distinct strings in that column. Prepend the query wit
h a comment saying intermediate_sql \n3. If the provided context is insuffic
ient, please explain why it can't be generated. \n4. Please use the most rel
evant table(s). \n5. If the question has been asked and answered before, ple
ase repeat the answer exactly as it was given before. \n"}, {"role": "user",
"content": "How many customers are there"}, {"role": "assistant", "content":
"SELECT COUNT(*) FROM customers"}, {"role": "user", "content": "\n        Fo
r the question which table stores customer's orders, \n        the generated
SQL statement invoices results in the following exception [ERROR-SQL] the ge
nerated SQL : invoices\n does not starts with ('select','with') .\n        P
lease fix the error and re-generate the SQL\n        "}, {"role": "assistan
t", "content": "SELECT * FROM invoices"}, {"role": "user", "content": "\n
For the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
```

```
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5"}, {"role": "user", "content": "List all albums and their corresponding
artist names  "}, {"role": "assistant", "content": "SELECT a.Title AS AlbumT
itle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId
= ar.ArtistId"}, {"role": "user", "content": "Find all tracks with a name co
ntaining \"What\" (case-insensitive) "}, {"role": "assistant", "content": "S
ELECT TrackId, Name 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": "Get the total number of invoi
ces for each customer"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:46:41.99681322Z', 'mes
sage': {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName,
c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invo
ices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName,
c.LastName;'}, 'done_reason': 'stop', 'done': True, 'total_duration': 179769
849857, 'load_duration': 11832793, 'prompt_eval_count': 1420, 'prompt_eval_d
uration': 160520963000, 'eval_count': 51, 'eval_duration': 18216246000}

[( LLM Response )]
SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInv
oices
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName;

[( Output from LLM )]
 SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalIn
voices
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName;
[( Extracted SQL )]
 SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalIn
voices
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName

[( SQL )]
generated SQL statement
```

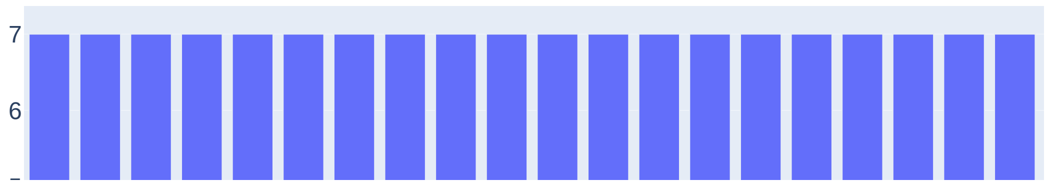
```sql
SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName
```

```
[( DATA )]
queried data frame
```

	CustomerId	FirstName	LastName	TotalInvoices
0	1	Luís	Gonçalves	7
1	2	Leonie	Köhler	7
2	3	François	Tremblay	7
3	4	Bjørn	Hansen	7
4	5	František	Wichterlová	7
5	6	Helena	Holý	7
6	7	Astrid	Gruber	7
7	8	Daan	Peeters	7
8	9	Kara	Nielsen	7
9	10	Eduardo	Martins	7
10	11	Alexandre	Rocha	7
11	12	Roberto	Almeida	7
12	13	Fernanda	Ramos	7
13	14	Mark	Philips	7
14	15	Jennifer	Peterson	7
15	16	Frank	Harris	7
16	17	Jack	Smith	7
17	18	Michelle	Brooks	7
18	19	Tim	Goyer	7
19	20	Dan	Miller	7
20	21	Kathy	Chase	7
21	22	Heather	Leacock	7
22	23	John	Gordon	7
23	24	Frank	Ralston	7
24	25	Victor	Stevens	7
25	26	Richard	Cunningham	7
26	27	Patrick	Gray	7
27	28	Julia	Barnett	7
28	29	Robert	Brown	7
29	30	Edward	Francis	7
30	31	Martha	Silk	7
31	32	Aaron	Mitchell	7
32	33	Ellie	Sullivan	7
33	34	João	Fernandes	7

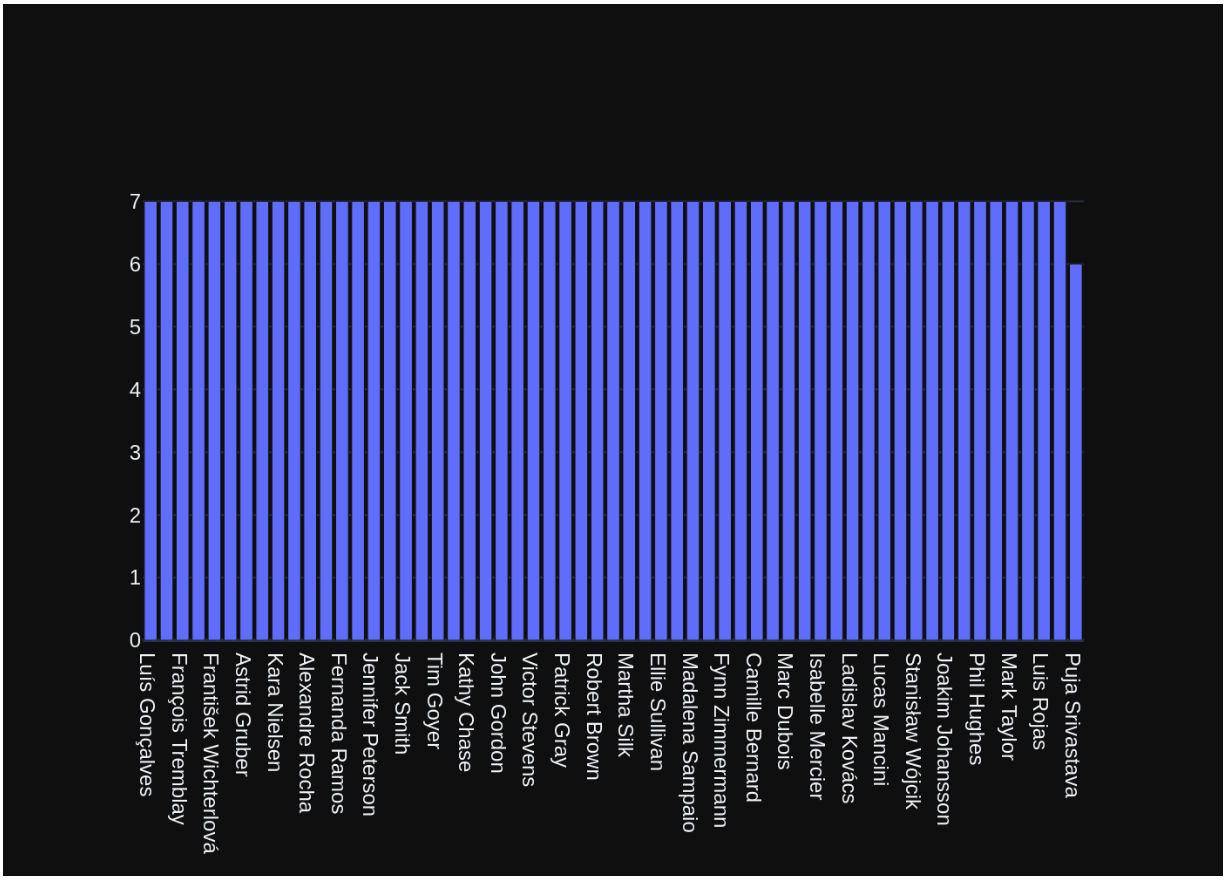
	CustomerId	FirstName	LastName	TotalInvoices
34	35	Madalena	Sampaio	7
35	36	Hannah	Schneider	7
36	37	Fynn	Zimmermann	7
37	38	Niklas	Schröder	7
38	39	Camille	Bernard	7
39	40	Dominique	Lefebvre	7
40	41	Marc	Dubois	7
41	42	Wyatt	Girard	7
42	43	Isabelle	Mercier	7
43	44	Terhi	Hämäläinen	7
44	45	Ladislav	Kovács	7
45	46	Hugh	O'Reilly	7
46	47	Lucas	Mancini	7
47	48	Johannes	Van der Berg	7
48	49	Stanisław	Wójcik	7
49	50	Enrique	Muñoz	7
50	51	Joakim	Johansson	7
51	52	Emma	Jones	7
52	53	Phil	Hughes	7
53	54	Steve	Murray	7
54	55	Mark	Taylor	7
55	56	Diego	Gutiérrez	7
56	57	Luis	Rojas	7
57	58	Manoj	Pareek	7
58	59	Puja	Srivastava	6

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Ge
t the total number of invoices for each customer'\n\nThe DataFrame was produ
ced using this query: SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.
InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.Customer
Id = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\n\nThe fol
lowing is information about the resulting pandas DataFrame 'df': \nRunning d
f.dtypes gives:\n CustomerId        int64\nFirstName        object\nLastName
object\nTotalInvoices     int64\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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:47:26.614526743Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\nim
port plotly.io as pio\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator
(mode="number", value=df[\'TotalInvoices\'].values[0]))\nelse:\n    fig = g
o.Figure(data=[go.Bar(x=df[\'FirstName\'] + \' \' + df[\'LastName\'], y=df
[\'TotalInvoices\'])])\n\npio.show(fig)'}, 'done_reason': 'stop', 'done': Tr
ue, 'total_duration': 44581796224, 'load_duration': 13609759, 'prompt_eval_c
ount': 207, 'prompt_eval_duration': 17549408000, 'eval_count': 86, 'eval_dur
ation': 26930614000}
```



[(PYTHON)]
generated Plotly code

```python
import plotly.graph_objs as go
import plotly.io as pio

if len(df) == 1:
  fig = go.Figure(go.Indicator(mode="number", value=df['TotalInvoices'].values[0]))
else:
  fig = go.Figure(data=[go.Bar(x=df['FirstName'] + ' ' + df['LastName'], y=df['TotalInvoices'])])

pio.show(fig)
```



```
Number of requested results 10 is greater than number of elements in index
7, updating n_results = 7
```

```
============================================================================
====
# QUESTION - 9:  Find the total number of invoices per country
============================================================================
====
```

```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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
INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE TABLE "invo
ice_items"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT N
ULL,\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 NUL
L,\r\n    FOREIGN KEY (InvoiceId) REFERENCES "invoices" (InvoiceId) \r\n\t\t
ON DELETE NO ACTION ON UPDATE NO ACTION,\r\n    FOREIGN KEY (TrackId) REFERE
NCES "tracks" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)
\n\nCREATE INDEX IFK_InvoiceLineInvoiceId ON "invoice_items" (InvoiceId)\n\n
CREATE INDEX IFK_InvoiceLineTrackId ON "invoice_items" (TrackId)\n\nCREATE T
ABLE "employees"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NO
T NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(2
0)  NOT NULL,\r\n    Title NVARCHAR(30),\r\n    ReportsTo INTEGER,\r\n    Bi
rthDate DATETIME,\r\n    HireDate 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(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHA
R(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 A
UTOINCREMENT NOT NULL,\r\n    FirstName NVARCHAR(40)  NOT NULL,\r\n    LastN
ame NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVAR
CHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r\n    Countr
y NVARCHAR(40),\r\n    PostalCode NVARCHAR(10),\r\n    Phone NVARCHAR(24),\r
\n    Fax NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\r\n    SupportR
epId INTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES "employees" (Empl
oyeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX
IFK_EmployeeReportsTo ON "employees" (ReportsTo)\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    FOREIGN K
EY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON
UPDATE NO ACTION\r\n)\n\nCREATE TABLE "tracks"\r\n(\r\n    TrackId INTEGER P
RIMARY 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
R,\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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPD
ATE NO ACTION\r\n)\n\n\n===Additional Context \n\nIn the chinook database in
voice means order\n\n\n    In the \'customers\' table, address column names
do not have \'Billing\' prefix, \n    e.g. country column name is \'country
\', not \'BillingCountry\'\n    \n\n===Response Guidelines \n1. If the provi
ded context is sufficient, please generate a valid SQL query without any exp
lanations for the question. \n2. If the provided context is almost sufficien
t but requires knowledge of a specific string in a particular column, please
```

```
generate an intermediate SQL query to find the distinct strings in that colu
mn. Prepend the query with a comment saying intermediate_sql \n3. If the pro
vided context is insufficient, please explain why it can\'t be generated. \n
4. Please use the most relevant table(s). \n5. If the question has been aske
d and answered before, please repeat the answer exactly as it was given befo
re. \n'}, {'role': 'user', 'content': 'Get the total number of invoices for
each customer'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.Fi
rstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\n
JOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.Fir
stName, c.LastName'}, {'role': 'user', 'content': "\n        For the questio
n which table stores customer's orders, \n        the generated SQL statemen
t invoices results in the following exception [ERROR-SQL] the generated SQL
: invoices\n does not starts with ('select','with') .\n        Please fix th
e error and re-generate the SQL\n        "}, {'role': 'assistant', 'conten
t': 'SELECT * FROM invoices'}, {'role': 'user', 'content': "\n        For th
e question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5'}, {'role': 'user', 'content': 'How many customers are there'}, {'role':
'assistant', 'content': 'SELECT COUNT(*) FROM customers'}, {'role': 'user',
'content': 'List all albums and their corresponding artist names  '}, {'rol
e': 'assistant', 'content': 'SELECT a.Title AS AlbumTitle, ar.Name AS Artist
Name \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'rol
e': 'user', 'content': 'Find all tracks with a name containing "What" (case-
insensitive) '}, {'role': 'assistant', 'content': "SELECT TrackId, Name FROM
tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role': 'user', 'content': 'Can y
ou list all tables in the SQLite database catalog?'}, {'role': 'assistant',
'content': "SELECT name FROM sqlite_master WHERE type = 'table'"}, {'role':
'user', 'content': 'Find the total number of invoices per country'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
INDEX IFK_InvoiceCustomerId ON \"invoices\" (CustomerId)\n\nCREATE TABLE \"i
nvoice_items\"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT N
OT 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
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) RE
FERENCES \"tracks\" (TrackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO
N\r\n)\n\nCREATE INDEX IFK_InvoiceLineInvoiceId ON \"invoice_items\" (Invoic
eId)\n\nCREATE INDEX IFK_InvoiceLineTrackId ON \"invoice_items\" (TrackId)\n
\nCREATE TABLE \"employees\"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY AUTO
INCREMENT NOT NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName
NVARCHAR(20)  NOT NULL,\r\n    Title NVARCHAR(30),\r\n    ReportsTo INTEGE
R,\r\n    BirthDate DATETIME,\r\n    HireDate DATETIME,\r\n    Address NVARC
HAR(70),\r\n    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
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
L,\r\n    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
\n    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 \"employe
es\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCR
EATE INDEX IFK_EmployeeReportsTo ON \"employees\" (ReportsTo)\n\nCREATE TABL
E \"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
L,\r\n    FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tO
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 NVA
RCHAR(200)  NOT NULL,\r\n    AlbumId INTEGER,\r\n    MediaTypeId INTEGER  NO
T NULL,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(220),\r\n    Millis
econds 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 (GenreI
d) REFERENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO
ACTION,\r\n    FOREIGN KEY (MediaTypeId) REFERENCES \"media_types\" (MediaTy
peId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n\n===Additiona
l Context \n\nIn the chinook database invoice means order\n\n\n    In the 'c
ustomers' table, address column names do not have 'Billing' prefix, \n    e.
g. country column name is 'country', not 'BillingCountry'\n    \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 query 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": "Get the t
otal number of invoices for each customer"}, {"role": "assistant", "conten
t": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS Tot
alInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId
\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"role": "user", "conten
t": "\n        For the question which table stores customer's orders, \n
the generated SQL statement invoices results in the following exception [ERR
OR-SQL] the generated SQL : invoices\n does not starts with ('select','wit
h') .\n        Please fix the error and re-generate the SQL\n        "}, {"r
ole": "assistant", "content": "SELECT * FROM invoices"}, {"role": "user", "c
ontent": "\n        For the question what are the top 5 countries that custo
mers come from?, \n        the generated SQL statement SELECT BillingCountr
y, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry \nOR
DER BY CustomerCount DESC \nLIMIT 5 results in the following exception [ERRO
R-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as CustomerCoun
t \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC
\nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*) as Cust
omerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCoun
t DESC \nLIMIT 5': no such column: BillingCountry .\n        Please fix the
error and re-generate the SQL\n        "}, {"role": "assistant", "content":
"SELECT Country, COUNT(*) AS CustomerCount \nFROM customers \nGROUP BY Count
ry \nORDER BY CustomerCount DESC \nLIMIT 5"}, {"role": "user", "content": "H
ow many customers are there"}, {"role": "assistant", "content": "SELECT COUN
T(*) FROM customers"}, {"role": "user", "content": "List all albums and thei
r corresponding artist names  "}, {"role": "assistant", "content": "SELECT
a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists
ar ON a.ArtistId = ar.ArtistId"}, {"role": "user", "content": "Find all trac
ks with a name containing \"What\" (case-insensitive) "}, {"role": "assistan
t", "content": "SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%wh
at%'"}, {"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": "Find the total
number of invoices per country"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:50:37.667644711Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT c.Country, COUNT(i.InvoiceI
d) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.C
ustomerId\nGROUP BY c.Country'}, 'done_reason': 'stop', 'done': True, 'total
_duration': 190804028075, 'load_duration': 21585115, 'prompt_eval_count': 15
35, 'prompt_eval_duration': 176756459000, 'eval_count': 36, 'eval_duration':
12869235000}

[( LLM Response )]
SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.Country

[( SQL )]
generated SQL statement
```

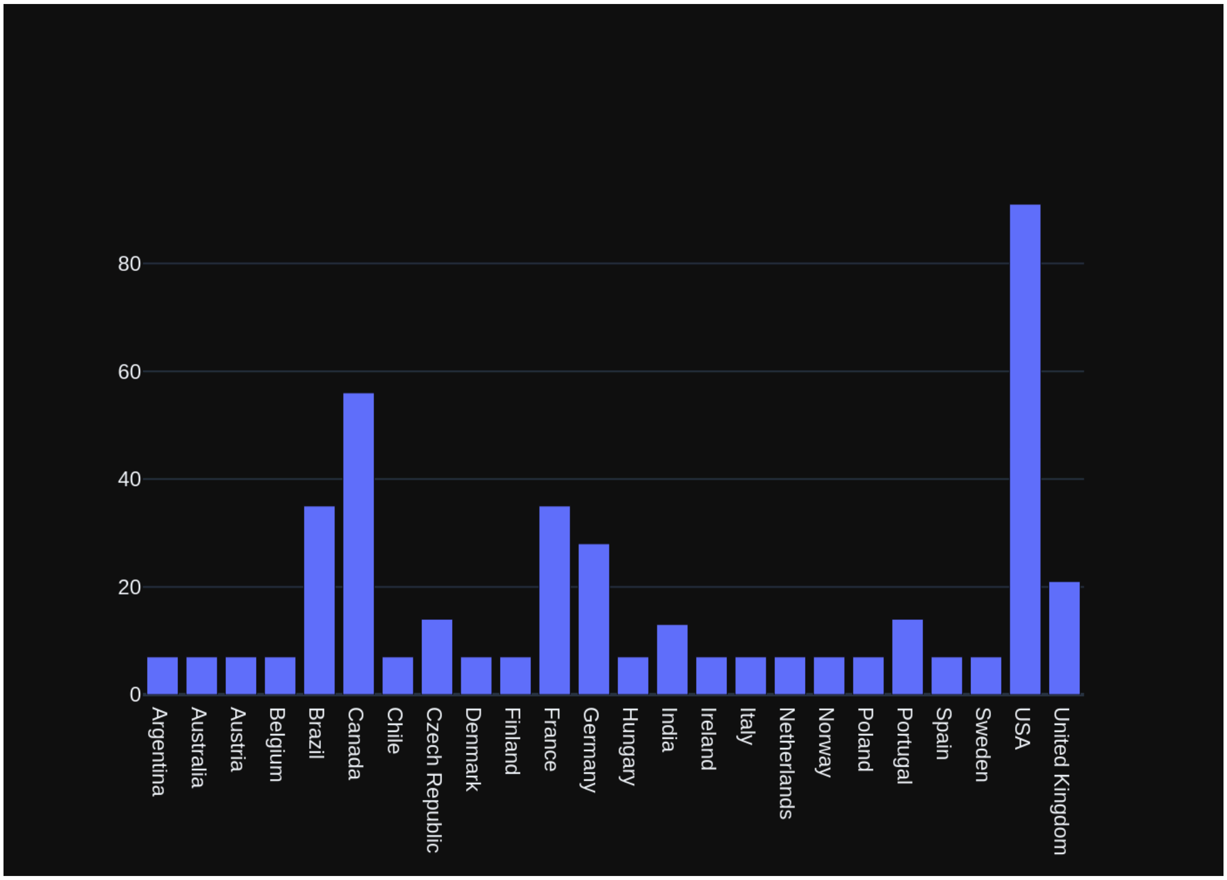
```sql
SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.Country
```

```
[( DATA )]
queried data frame
```

	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

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Fi
nd the total number of invoices per country'\n\nThe DataFrame was produced u
sing this query: SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFROM
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Coun
try\n\nThe following is information about the resulting pandas DataFrame 'd
f': \nRunning df.dtypes gives:\n Country          object\nTotalInvoices     
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 i
n a pandas dataframe called 'df'. If there is only one value in the datafram
e, use an Indicator. Respond with only Python code. Do not answer with any e
xplanations -- just the code."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:51:14.294270474Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go
\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=
df[\'TotalInvoices\'].iloc[0]))\nelse:\n    fig = go.Figure([go.Bar(x=df[\'C
ountry\'], y=df[\'TotalInvoices\'])])\nfig.show()'}, 'done_reason': 'stop',
'done': True, 'total_duration': 36592969742, 'load_duration': 10926912, 'pro
mpt_eval_count': 181, 'prompt_eval_duration': 15202319000, 'eval_count': 68,
'eval_duration': 21244202000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objects as go


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['TotalInvoices'].iloc[0]))
else:
    fig = go.Figure([go.Bar(x=df['Country'], y=df['TotalInvoices'])])
```



```
Number of requested results 10 is greater than number of elements in index
8, updating n_results = 8
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 10:  List all invoices with a total exceeding $10
============================================================================
====



[( SQL Prompt )]
[{'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 IN
TEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    InvoiceId INTEGER  NOT NUL
L,\r\n    TrackId INTEGER  NOT NULL,\r\n    UnitPrice NUMERIC(10,2)  NOT NUL
L,\r\n    Quantity INTEGER  NOT NULL,\r\n    FOREIGN KEY (InvoiceId) REFEREN
CES "invoices" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO
N,\r\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DEL
ETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_InvoiceLineInvoic
eId ON "invoice_items" (InvoiceId)\n\nCREATE TABLE "invoices"\r\n(\r\n    In
voiceId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGE
R  NOT NULL,\r\n    InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NV
ARCHAR(70),\r\n    BillingCity NVARCHAR(40),\r\n    BillingState NVARCHAR(4
0),\r\n    BillingCountry NVARCHAR(40),\r\n    BillingPostalCode NVARCHAR(1
0),\r\n    Total NUMERIC(10,2)  NOT NULL,\r\n    FOREIGN KEY (CustomerId) RE
FERENCES "customers" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO A
CTION\r\n)\n\nCREATE INDEX IFK_InvoiceLineTrackId ON "invoice_items" (TrackI
d)\n\nCREATE INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREAT
E TABLE "tracks"\r\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT N
ULL,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    AlbumId INTEGER,\r\n    Med
iaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR
(220),\r\n    Milliseconds INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    U
nitPrice NUMERIC(10,2)  NOT NULL,\r\n    FOREIGN KEY (AlbumId) REFERENCES "a
lbums" (AlbumId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n    FOR
EIGN KEY (GenreId) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION
ON 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 INDEX IFK_EmployeeReportsTo ON "employees" (ReportsTo)\n\nCREATE TABLE
"customers"\r\n(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    FirstName NVARCHAR(40)  NOT NULL,\r\n    LastName NVARCHAR(20)  NO
T NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVARCHAR(70),\r\n    Cit
y 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
4),\r\n    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
RCHAR(30),\r\n    ReportsTo INTEGER,\r\n    BirthDate DATETIME,\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
(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHAR(24),\r\n    Email NVARC
HAR(60),\r\n    FOREIGN KEY (ReportsTo) REFERENCES "employees" (EmployeeId)
\r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_Cus
tomerSupportRepId ON "customers" (SupportRepId)\n\n\n===Additional Context
\n\nIn the chinook database invoice means order\n\n\n    In the \'customers
\' table, address column names do not have \'Billing\' prefix, \n    e.g. co
```

```
untry column name is \'country\', not \'BillingCountry\'\n    \n\n===Respons
e Guidelines \n1. If the provided context is sufficient, please generate a v
alid SQL query without any explanations for the question. \n2. If the provid
ed 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 query 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': 'Get the t
otal number of invoices for each customer'}, {'role': 'assistant', 'conten
t': 'SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS Tot
alInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId
\nGROUP BY c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user', 'conten
t': 'Find the total number of invoices per country'}, {'role': 'assistant', 
'content': 'SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFROM cust
omers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Countr
y'}, {'role': 'user', 'content': "\n        For the question which table sto
res customer's orders, \n        the generated SQL statement invoices result
s in the following exception [ERROR-SQL] the generated SQL : invoices\n does
not starts with ('select','with') .\n        Please fix the error and re-gen
erate the SQL\n        "}, {'role': 'assistant', 'content': 'SELECT * FROM i
nvoices'}, {'role': 'user', 'content': 'How many customers are there'}, {'ro
le': 'assistant', 'content': 'SELECT COUNT(*) FROM customers'}, {'role': 'us
er', 'content': "\n        For the question what are the top 5 countries tha
t customers come from?, \n        the generated SQL statement SELECT Billing
Country, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountr
y \nORDER BY CustomerCount DESC \nLIMIT 5 results in the following exception
[ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as Custome
rCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount D
ESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*) as 
CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Customer
Count DESC \nLIMIT 5': no such column: BillingCountry .\n        Please fix 
the error and re-generate the SQL\n        "}, {'role': 'assistant', 'conten
t': 'SELECT Country, COUNT(*) AS CustomerCount \nFROM customers \nGROUP BY C
ountry \nORDER BY CustomerCount DESC \nLIMIT 5'}, {'role': 'user', 'conten
t': 'List all albums and their corresponding artist names  '}, {'role': 'ass
istant', 'content': 'SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName \nF
ROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'role': 'use
r', 'content': 'Find all tracks with a name containing "What" (case-insensit
ive) '}, {'role': 'assistant', 'content': "SELECT TrackId, Name FROM tracks 
WHERE LOWER(Name) LIKE '%what%'"}, {'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': 'List all invoices with a total exceeding $10'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
LL,\r\n    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\n    FOREIGN 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
NVARCHAR(70),\r\n    BillingCity NVARCHAR(40),\r\n    BillingState NVARCHAR
(40),\r\n    BillingCountry NVARCHAR(40),\r\n    BillingPostalCode NVARCHAR
(10),\r\n    Total 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)\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
R,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGER,\r\n    Comp
oser NVARCHAR(220),\r\n    Milliseconds INTEGER  NOT NULL,\r\n    Bytes INTE
GER,\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 ACT
ION,\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
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    Last
Name NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVA
RCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r\n    Count
ry 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    Sup
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
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
\n    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    Fax
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\n===Additional Context \n\nIn the chinook database invoice means
order\n\n\n    In the 'customers' table, address column names do not have 'B
illing' prefix, \n    e.g. country column name is 'country', not 'BillingCou
ntry'\n    \n\n===Response Guidelines \n1. If the provided context is suffic
ient, please generate a valid SQL query without any explanations for the que
stion. \n2. If the provided context is almost sufficient but requires knowle
dge of a specific string in a particular column, please generate an intermed
iate SQL query to find the distinct strings in that column. Prepend the quer
y with a comment saying intermediate_sql \n3. If the provided context is ins
ufficient, please explain why it can't be generated. \n4. Please use the mos
t relevant table(s). \n5. If the question has been asked and answered befor
e, please repeat the answer exactly as it was given before. \n"}, {"role":
"user", "content": "Get the total number of invoices for each customer"},
{"role": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.LastNa
```

```
me, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i O
N c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastNam
e"}, {"role": "user", "content": "Find the total number of invoices per coun
try"}, {"role": "assistant", "content": "SELECT c.Country, COUNT(i.InvoiceI
d) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.C
ustomerId\nGROUP BY c.Country"}, {"role": "user", "content": "\n        For 
the question which table stores customer's orders, \n        the generated S
QL statement invoices results in the following exception [ERROR-SQL] the gen
erated SQL : invoices\n does not starts with ('select','with') .\n        Pl
ease fix the error and re-generate the SQL\n        "}, {"role": "assistan
t", "content": "SELECT * FROM invoices"}, {"role": "user", "content": "How m
any customers are there"}, {"role": "assistant", "content": "SELECT COUNT(*)
FROM customers"}, {"role": "user", "content": "\n        For the question wh
at are the top 5 countries that customers come from?, \n        the generate
d SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM cust
omers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5 resu
lts in the following exception [ERROR-DB] Failed to execute SQL: SELECT Bill
ingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCou
ntry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql 'SELE
CT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY Bil
lingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such column: Billin
gCountry .\n        Please fix the error and re-generate the SQL\n        
"}, {"role": "assistant", "content": "SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5"}, {"role": "user", "content": "List all albums and their corresponding 
artist names  "}, {"role": "assistant", "content": "SELECT a.Title AS AlbumT
itle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId 
= ar.ArtistId"}, {"role": "user", "content": "Find all tracks with a name co
ntaining \"What\" (case-insensitive) "}, {"role": "assistant", "content": "S
ELECT TrackId, Name 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": "List all invoices with a tota
l exceeding $10"}]
```

```
[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:54:18.842728059Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT InvoiceId, Total FROM invoi
ces WHERE Total > 10'}, 'done_reason': 'stop', 'done': True, 'total_duratio
n': 184453861217, 'load_duration': 11178852, 'prompt_eval_count': 1542, 'pro
mpt_eval_duration': 178358787000, 'eval_count': 14, 'eval_duration': 4828695
000}

[( LLM Response )]
SELECT InvoiceId, Total FROM invoices WHERE Total > 10

[( SQL )]
generated SQL statement
```

```sql
SELECT InvoiceId, Total FROM invoices WHERE Total > 10
```

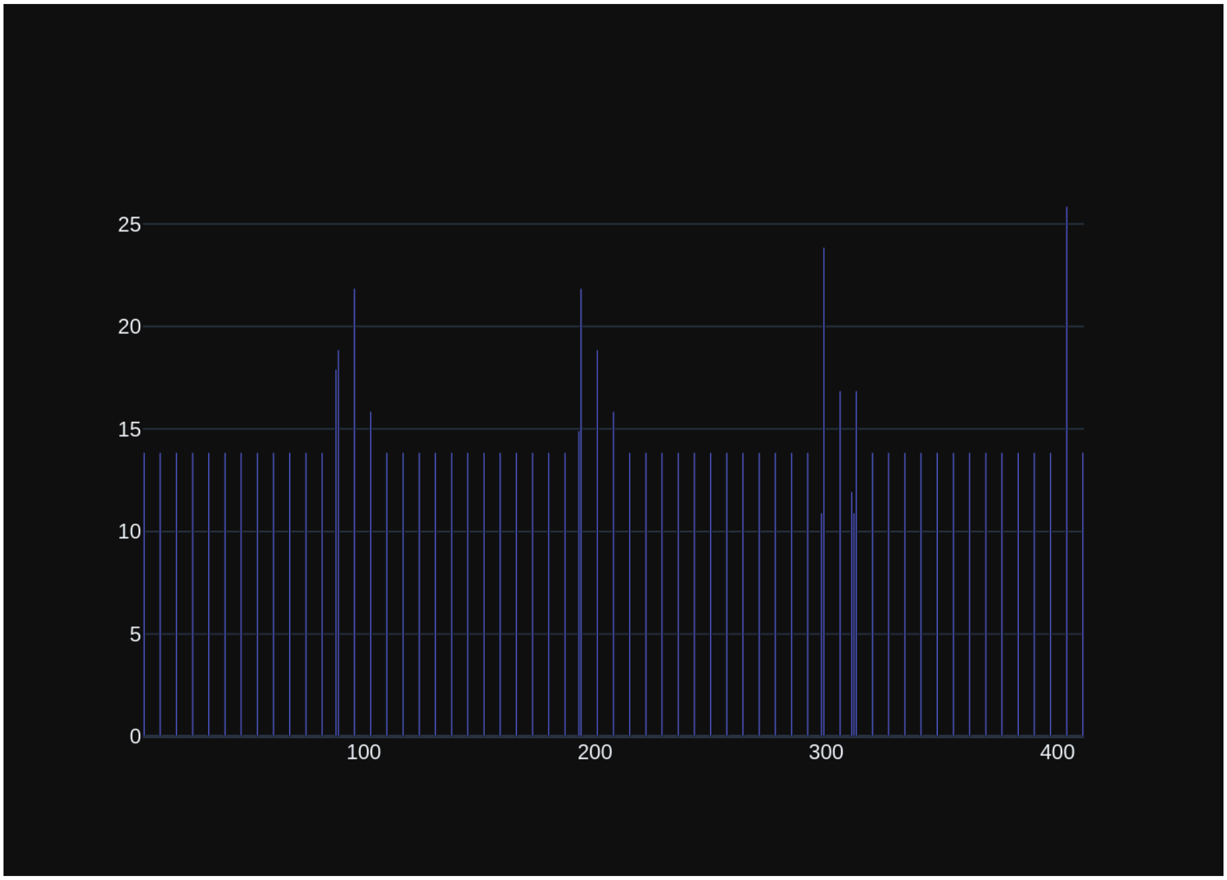
```
[( DATA )]
queried data frame
```

	InvoiceId	Total
0	5	13.86
1	12	13.86
2	19	13.86
3	26	13.86
4	33	13.86
...	...	...
59	383	13.86
60	390	13.86
61	397	13.86
62	404	25.86
63	411	13.86

64 rows × 2 columns

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Li
st all invoices with a total exceeding $10'\n\nThe DataFrame was produced us
ing this query: SELECT InvoiceId, Total FROM invoices WHERE Total > 10\n\nTh
e following is information about the resulting pandas DataFrame 'df': \nRunn
ing df.dtypes gives:\n InvoiceId      int64\nTotal        float64\ndtype: ob
ject"}, {"role": "user", "content": "Can you generate the Python plotly code
to chart the results of the dataframe? Assume the data is in a pandas datafr
ame called 'df'. If there is only one value in the dataframe, use an Indicat
or. Respond with only Python code. Do not answer with any explanations -- ju
st the code."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:54:54.021672117Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go
\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="value", value=d
f[\'Total\'].iloc[0]))\nelse:\n    fig = go.Figure([go.Bar(x=df[\'InvoiceId
\'], y=df[\'Total\'], name=\'Invoice Totals\')])\nfig.show()'}, 'done_reaso
n': 'stop', 'done': True, 'total_duration': 35139896359, 'load_duration': 12
946931, 'prompt_eval_count': 162, 'prompt_eval_duration': 13436904000, 'eval
_count': 70, 'eval_duration': 21641370000}

[( PYTHON )]
generated Plotly code
```

```
import plotly.graph_objects as go

if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="value", value=df['Total'].iloc[0]))
else:
    fig = go.Figure([go.Bar(x=df['InvoiceId'], y=df['Total'], name='Invoice Totals')])
```



```
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
2, updating n_results = 2
```

```
=============================================================================
====
# QUESTION - 11:  Find all invoices since 2010 and the total amount invoice
d:
=============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 AUTOINCR
EMENT 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 "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 AC
TION\r\n)\n\nCREATE INDEX IFK_InvoiceLineInvoiceId ON "invoice_items" (Invoi
ceId)\n\nCREATE INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCR
EATE INDEX IFK_InvoiceLineTrackId ON "invoice_items" (TrackId)\n\nCREATE TAB
LE "employees"\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\n    Title NVARCHAR(30),\r\n    ReportsTo INTEGER,\r\n    BirthD
ate DATETIME,\r\n    HireDate 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(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHA
R(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 A
UTOINCREMENT NOT NULL,\r\n    FirstName NVARCHAR(40)  NOT NULL,\r\n    LastN
ame NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVAR
CHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r\n    Countr
y NVARCHAR(40),\r\n    PostalCode NVARCHAR(10),\r\n    Phone NVARCHAR(24),\r
\n    Fax NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\r\n    SupportR
epId INTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES "employees" (Empl
oyeeId) \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 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
IC(10,2)  NOT NULL,\r\n    FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumI
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
ACTION,\r\n    FOREIGN KEY (MediaTypeId) REFERENCES "media_types" (MediaType
Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "al
bums"\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    FOR
EIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACT
ION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "playlist_track"\r\n(\r\n    Pl
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\tON DELETE NO ACTION 
ON UPDATE NO ACTION,\r\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (Track
Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\n\n\n===Additional 
Context \n\nIn the chinook database invoice means order\n\n\n    In the \'cu
stomers\' table, address column names do not have \'Billing\' prefix, \n    
e.g. country column name is \'country\', not \'BillingCountry\'\n    \n\n===
Response Guidelines \n1. If the provided context is sufficient, please gener
ate 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'}, {'role': 'assistant', 'cont
ent': 'SELECT InvoiceId, Total FROM invoices WHERE Total > 10'}, {'role': 'u
ser', 'content': 'Get the total number of invoices for each customer'}, {'ro
le': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, 
COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.
CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName'},
{'role': 'user', 'content': 'Find the total number of invoices per countr
y'}, {'role': 'assistant', 'content': 'SELECT c.Country, COUNT(i.InvoiceId) 
AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Cust
omerId\nGROUP BY c.Country'}, {'role': 'user', 'content': "\n        For the
question which table stores customer's orders, \n        the generated SQL s
tatement invoices results in the following exception [ERROR-SQL] the generat
ed SQL : invoices\n does not starts with ('select','with') .\n        Please
fix the error and re-generate the SQL\n        "}, {'role': 'assistant', 'co
ntent': 'SELECT * FROM invoices'}, {'role': 'user', 'content': 'How many cus
tomers are there'}, {'role': 'assistant', 'content': 'SELECT COUNT(*) FROM c
ustomers'}, {'role': 'user', 'content': "\n        For the question what are
the top 5 countries that customers come from?, \n        the generated SQL s
tatement SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers 
\nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5 results in
the following exception [ERROR-DB] Failed to execute SQL: SELECT BillingCoun
try, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry \n
ORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql 'SELECT Bill
ingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCou
ntry \nORDER BY CustomerCount DESC \nLIMIT 5': no such column: BillingCountr
y .\n        Please fix the error and re-generate the SQL\n        "}, {'rol
e': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCount \nFRO
M customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMIT 5'},
{'role': 'user', 'content': 'List all albums and their corresponding artist 
names  '}, {'role': 'assistant', 'content': 'SELECT a.Title AS AlbumTitle, a
r.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.Ar
tistId'}, {'role': 'user', 'content': 'Find all tracks with a name containin
g "What" (case-insensitive) '}, {'role': 'assistant', 'content': "SELECT Tra
ckId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role': 'user', 
'content': 'Can you list all tables in the SQLite database catalog?'}, {'rol
e': 'assistant', 'content': "SELECT name FROM sqlite_master WHERE type = 'ta
ble'"}, {'role': 'user', 'content': 'Find all invoices since 2010 and the to
tal amount invoiced:'}]
```

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
CREMENT 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 \"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
\n    BirthDate DATETIME,\r\n    HireDate DATETIME,\r\n    Address NVARCHAR
(70),\r\n    City NVARCHAR(40),\r\n    State 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
L,\r\n    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
\n    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 \"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\nCREATE TABLE \"albums\"\r\n(\r\n    AlbumId INTEGER PRIMARY KEY AUTOI
NCREMENT NOT NULL,\r\n    Title NVARCHAR(160)  NOT NULL,\r\n    ArtistId INT
EGER  NOT NULL,\r\n    FOREIGN KEY (ArtistId) REFERENCES \"artists\" (Artist
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\tON 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\n===Additional Context \n\nIn the chinook database invoic
e means order\n\n\n    In the 'customers' table, address column names do not
have 'Billing' prefix, \n    e.g. country column name is 'country', not 'Bil
lingCountry'\n    \n\n===Response Guidelines \n1. If the provided context is
sufficient, please generate a valid SQL query without any explanations for t
he question. \n2. If the provided context is almost sufficient but requires
knowledge of a specific string in a particular column, please generate an in
termediate SQL query to find the distinct strings in that column. Prepend th
e 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 t
he 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"}, {"rol
e": "user", "content": "List all invoices with a total exceeding $10"}, {"ro
le": "assistant", "content": "SELECT InvoiceId, Total FROM invoices WHERE To
tal > 10"}, {"role": "user", "content": "Get the total number of invoices fo
r each customer"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.
FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c
\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.F
irstName, c.LastName"}, {"role": "user", "content": "Find the total number o
f invoices per country"}, {"role": "assistant", "content": "SELECT c.Countr
y, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "conten
t": "\n        For the question which table stores customer's orders, \n
the generated SQL statement invoices results in the following exception [ERR
OR-SQL] the generated SQL : invoices\n does not starts with ('select','wit
h') .\n        Please fix the error and re-generate the SQL\n        "}, {"r
ole": "assistant", "content": "SELECT * FROM invoices"}, {"role": "user", "c
ontent": "How many customers are there"}, {"role": "assistant", "content":
"SELECT COUNT(*) FROM customers"}, {"role": "user", "content": "\n        Fo
r the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5"}, {"role": "user", "content": "List all albums and their corresponding
artist names  "}, {"role": "assistant", "content": "SELECT a.Title AS AlbumT
itle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId
= ar.ArtistId"}, {"role": "user", "content": "Find all tracks with a name co
ntaining \"What\" (case-insensitive) "}, {"role": "assistant", "content": "S
ELECT TrackId, Name 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": "Find all invoices since 2010
and the total amount invoiced:"}]

[( Ollama Response )]
```

```
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:58:26.356824394Z', 'me
ssage': {'role': 'assistant', 'content': "SELECT InvoiceId, Total \nFROM inv
oices \nWHERE InvoiceDate >= '2010-01-01';"}, 'done_reason': 'stop', 'done':
True, 'total_duration': 212255363879, 'load_duration': 10875672, 'prompt_eva
l_count': 1706, 'prompt_eval_duration': 201404611000, 'eval_count': 26, 'eva
l_duration': 9298631000}
```

```
[( LLM Response )]
SELECT InvoiceId, Total
FROM invoices
WHERE InvoiceDate >= '2010-01-01';

[( Output from LLM )]
 SELECT InvoiceId, Total
FROM invoices
WHERE InvoiceDate >= '2010-01-01';
[( Extracted SQL )]
 SELECT InvoiceId, Total
FROM invoices
WHERE InvoiceDate >= '2010-01-01'

[( SQL )]
generated SQL statement
```

```
SELECT InvoiceId, Total
FROM invoices
WHERE InvoiceDate >= '2010-01-01'
```

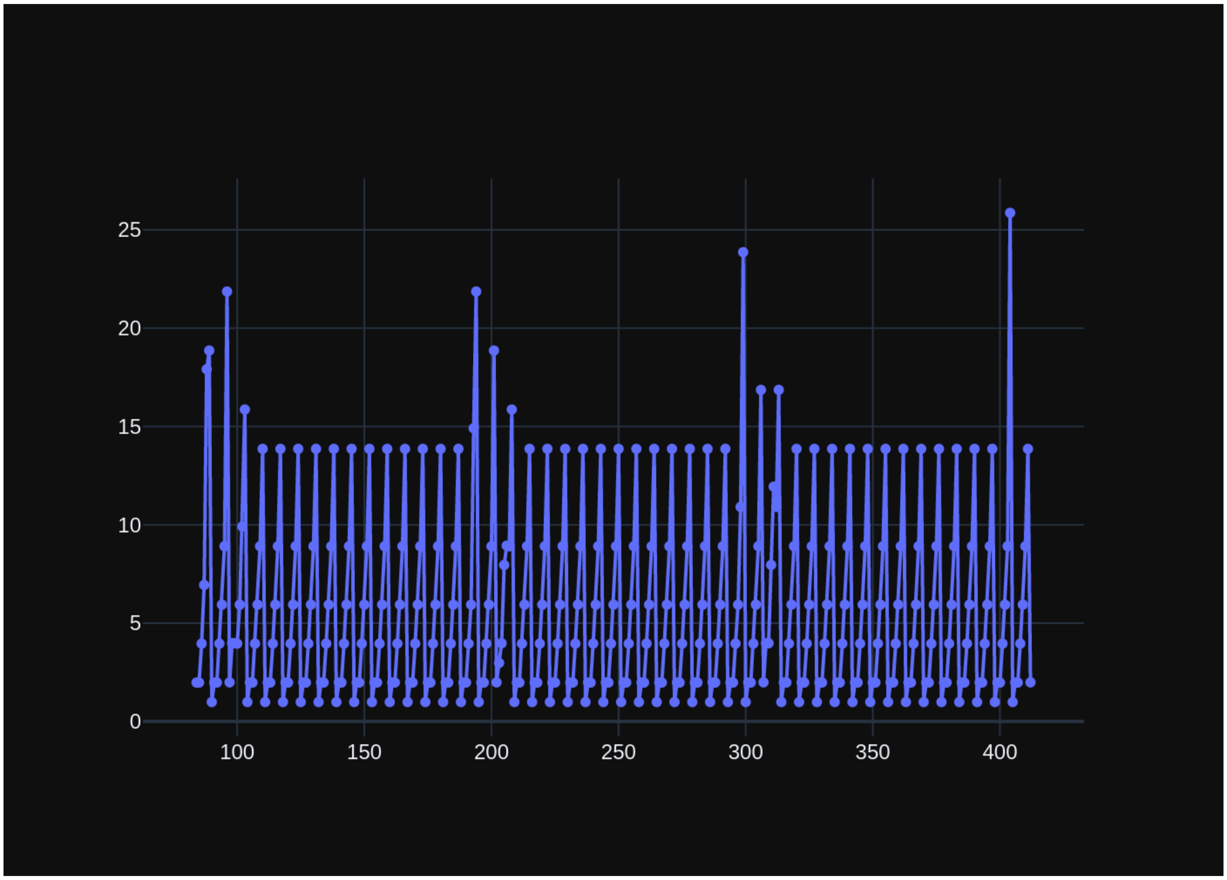
```
[( DATA )]
queried data frame
```

	InvoiceId	Total
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 × 2 columns

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Fi
nd all invoices since 2010 and the total amount invoiced:'\n\nThe DataFrame 
was produced using this query: SELECT InvoiceId, Total \nFROM invoices \nWHE
RE InvoiceDate >= '2010-01-01'\n\nThe following is information about the res
ulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n InvoiceId      in
t64\nTotal        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 va
lue in the dataframe, use an Indicator. Respond with only Python code. Do no
t answer with any explanations -- just the code."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-12T23:59:03.300786165Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\n\n
if len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=df
[\'Total\'].iloc[0]))\nelse:\n    fig = go.Figure([go.Scatter(x=df[\'Invoice
Id\'], y=df[\'Total\'], mode=\'markers+lines\')])\nfig.show()'}, 'done_reaso
n': 'stop', 'done': True, 'total_duration': 36909945193, 'load_duration': 10
682812, 'prompt_eval_count': 179, 'prompt_eval_duration': 14963051000, 'eval
_count': 71, 'eval_duration': 21890570000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go

if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['Total'].iloc[0]))
else:
    fig = go.Figure([go.Scatter(x=df['InvoiceId'], y=df['Total'], mode='markers+lines')])
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 12:  List all employees and their reporting manager's name (if
any):
============================================================================
====



[( SQL Prompt )]
[{'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" (Report
sTo)\n\nCREATE TABLE "employees"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY
AUTOINCREMENT NOT NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    First
Name NVARCHAR(20)  NOT NULL,\r\n    Title NVARCHAR(30),\r\n    ReportsTo INT
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    Coun
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\nCREATE TABLE "customers"\r\n(\r\n    CustomerId
INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    FirstName NVARCHAR(40)  N
OT NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(8
0),\r\n    Address NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVAR
CHAR(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)  NOT
NULL,\r\n    SupportRepId INTEGER,\r\n    FOREIGN KEY (SupportRepId) REFEREN
CES "employees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION
\r\n)\n\nCREATE INDEX IFK_CustomerSupportRepId ON "customers" (SupportRepId)
\n\nCREATE TABLE "invoices"\r\n(\r\n    InvoiceId INTEGER PRIMARY KEY AUTOIN
CREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    InvoiceDate DA
TETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    BillingCity NVA
RCHAR(40),\r\n    BillingState NVARCHAR(40),\r\n    BillingCountry NVARCHAR
(40),\r\n    BillingPostalCode NVARCHAR(10),\r\n    Total 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)\n\nCREATE TABLE "invoice_
items"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\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 "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
ULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE TABLE "tracks"\r\n(\r\n    Tra
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
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 "genr
es" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION,\r\n    FOREIG
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    Albu
mId 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 ACTI
ON\r\n)\n\nCREATE TABLE sqlite_stat1(tbl,idx,stat)\n\n\n===Additional Contex
t \n\n\n    In the \'customers\' table, address column names do not have \'B
illing\' prefix, \n    e.g. country column name is \'country\', not \'Billin
gCountry\'\n    \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 query 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': 'Get the t
otal number of invoices for each customer'}, {'role': 'assistant', 'conten
t': 'SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS Tot
alInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId
\nGROUP BY c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user', 'conten
t': 'Find all invoices since 2010 and the total amount invoiced:'}, {'role':
'assistant', 'content': "SELECT InvoiceId, Total \nFROM invoices \nWHERE Inv
oiceDate >= '2010-01-01'"}, {'role': 'user', 'content': 'Find the total numb
er of invoices per country'}, {'role': 'assistant', 'content': 'SELECT c.Cou
ntry, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i
ON c.CustomerId = i.CustomerId\nGROUP BY c.Country'}, {'role': 'user', 'cont
ent': 'List all albums and their corresponding artist names  '}, {'role': 'a
ssistant', 'content': 'SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName 
\nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'role': 'u
ser', 'content': "\n        For the question what are the top 5 countries th
at customers come from?, \n        the generated SQL statement SELECT Billin
gCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCount
ry \nORDER BY CustomerCount DESC \nLIMIT 5 results in the following exceptio
n [ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as Custo
merCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount
DESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*) as
CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Customer
Count DESC \nLIMIT 5': no such column: BillingCountry .\n        Please fix 
the error and re-generate the SQL\n        "}, {'role': 'assistant', 'conten
t': 'SELECT Country, COUNT(*) AS CustomerCount \nFROM customers \nGROUP BY C
ountry \nORDER BY CustomerCount DESC \nLIMIT 5'}, {'role': 'user', 'conten
t': 'List all invoices with a total exceeding $10'}, {'role': 'assistant', 
'content': 'SELECT InvoiceId, Total FROM invoices WHERE Total > 10'}, {'rol
e': 'user', 'content': 'How many customers are there'}, {'role': 'assistan
t', 'content': 'SELECT COUNT(*) FROM customers'}, {'role': 'user', 'conten
t': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'as
sistant', 'content': "SELECT name FROM sqlite_master WHERE type = 'table'"},
{'role': 'user', 'content': "\n        For the question which table stores c
ustomer's orders, \n        the generated SQL statement invoices results in 
the following exception [ERROR-SQL] the generated SQL : invoices\n does not 
starts with ('select','with') .\n        Please fix the error and re-generat
e the SQL\n        "}, {'role': 'assistant', 'content': 'SELECT * FROM invoi
ces'}, {'role': 'user', 'content': 'Find all tracks with a name containing 
"What" (case-insensitive) '}, {'role': 'assistant', 'content': "SELECT Track
Id, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role': 'user', 'co
ntent': "List all employees and their reporting manager's name (if any):"}]

[Ollama parameters]
```

```
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    F
irstName 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\n    Co
untry 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 ACTIO
N ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"customers\"\r\n(\r\n    Custome
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
R(80),\r\n    Address NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State N
VARCHAR(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)
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
KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    Invo
iceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    Billi
ngCity NVARCHAR(40),\r\n    BillingState NVARCHAR(40),\r\n    BillingCountry
NVARCHAR(40),\r\n    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
OT 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 TABLE \"artists\"\r\n(\r\n    ArtistId INTEGER PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\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    MediaType
Id INTEGER  NOT NULL,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(22
0),\r\n    Milliseconds INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    Unit
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    FORE
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
\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 sqlite_st
at1(tbl,idx,stat)\n\n\n===Additional Context \n\n\n    In the 'customers' ta
ble, address column names do not have 'Billing' prefix, \n    e.g. country c
```

```
olumn name is 'country', not 'BillingCountry'\n    \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). \n5. If the question has been asked and answ
ered before, please repeat the answer exactly as it was given before. \n"},
{"role": "user", "content": "Get the total number of invoices for each custo
mer"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstName,
c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invo
ices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName,
c.LastName"}, {"role": "user", "content": "Find all invoices since 2010 and
the total amount invoiced:"}, {"role": "assistant", "content": "SELECT Invoi
ceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"role":
"user", "content": "Find the total number of invoices per country"}, {"rol
e": "assistant", "content": "SELECT c.Country, COUNT(i.InvoiceId) AS TotalIn
voices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGR
OUP BY c.Country"}, {"role": "user", "content": "List all albums and their c
orresponding artist names  "}, {"role": "assistant", "content": "SELECT a.Ti
tle AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar O
N a.ArtistId = ar.ArtistId"}, {"role": "user", "content": "\n        For the
question what are the top 5 countries that customers come from?, \n        t
he generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5"}, {"role": "user", "content": "List all invoices with a total exceeding
$10"}, {"role": "assistant", "content": "SELECT InvoiceId, Total FROM invoic
es WHERE Total > 10"}, {"role": "user", "content": "How many customers are t
here"}, {"role": "assistant", "content": "SELECT COUNT(*) FROM customers"},
{"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": "\n        For the quest
ion which table stores customer's orders, \n        the generated SQL statem
ent invoices results in the following exception [ERROR-SQL] the generated SQ
L : invoices\n does not starts with ('select','with') .\n        Please fix
the error and re-generate the SQL\n        "}, {"role": "assistant", "conten
t": "SELECT * FROM invoices"}, {"role": "user", "content": "Find all tracks
with a name containing \"What\" (case-insensitive) "}, {"role": "assistant",
"content": "SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%wha
t%'"}, {"role": "user", "content": "List all employees and their reporting m
anager's name (if any):"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:02:45.195380495Z', 'me
ssage': {'role': 'assistant', 'content': "SELECT e1.EmployeeId, e1.FirstName
|| ' ' || e1.LastName AS EmployeeName, \n       COALESCE(e2.FirstName || ' '
|| e2.LastName, 'None') AS ManagerName \nFROM employees e1 \nLEFT JOIN emplo
yees e2 ON e1.ReportsTo = e2.EmployeeId"}, 'done_reason': 'stop', 'done': Tr
ue, 'total_duration': 221804150048, 'load_duration': 12474051, 'prompt_eval_
count': 1681, 'prompt_eval_duration': 196428500000, 'eval_count': 65, 'eval_
duration': 23780328000}

[( LLM Response )]
SELECT e1.EmployeeId, e1.FirstName || ' ' || e1.LastName AS EmployeeName,
       COALESCE(e2.FirstName || ' ' || e2.LastName, 'None') AS ManagerName
FROM employees e1
LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeId

[( SQL )]
generated SQL statement
```

```sql
SELECT e1.EmployeeId, e1.FirstName || ' ' || e1.LastName AS EmployeeName,
   COALESCE(e2.FirstName || ' ' || e2.LastName, 'None') AS ManagerName
FROM employees e1
LEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeId
```

```
[( DATA )]
queried data frame
```

	EmployeeId	EmployeeName	ManagerName
0	1	Andrew Adams	None
1	2	Nancy Edwards	Andrew Adams
2	3	Jane Peacock	Nancy Edwards
3	4	Margaret Park	Nancy Edwards
4	5	Steve Johnson	Nancy Edwards
5	6	Michael Mitchell	Andrew Adams
6	7	Robert King	Michael Mitchell
7	8	Laura Callahan	Michael Mitchell

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Li
st all employees and their reporting manager's name (if any):'\n\nThe DataFr
ame was produced using this query: SELECT e1.EmployeeId, e1.FirstName || ' '
|| e1.LastName AS EmployeeName, \n       COALESCE(e2.FirstName || ' ' || e2.
LastName, 'None') AS ManagerName \nFROM employees e1 \nLEFT JOIN employees e
2 ON e1.ReportsTo = e2.EmployeeId\n\nThe following is information about the
resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n EmployeeId
int64\nEmployeeName    object\nManagerName     object\ndtype: object"}, {"ro
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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:03:26.197317355Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\nim
port plotly.figure_factory as ff\n\nif len(df) == 1:\n    fig = go.Figure(g
o.Indicator(mode="text", value=df[\'EmployeeName\'].iloc[0], text=df[\'Manag
erName\'].iloc[0]))\nelse:\n    fig = ff.create_table(df)\n    \nfig.show
()'}, 'done_reason': 'stop', 'done': True, 'total_duration': 40969431107, 'l
oad_duration': 12212825, 'prompt_eval_count': 220, 'prompt_eval_duration': 1
8565716000, 'eval_count': 72, 'eval_duration': 22345310000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go
import plotly.figure_factory as ff


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="text", value=df['EmployeeName'].iloc[0], text=df['ManagerName'].iloc[0]))
else:
    fig = ff.create_table(df)
```

EmployeeId	EmployeeName	ManagerName
1	Andrew Adams	None
2	Nancy Edwards	Andrew Adams
3	Jane Peacock	Nancy Edwards
4	Margaret Park	Nancy Edwards
5	Steve Johnson	Nancy Edwards
6	Michael Mitchell	Andrew Adams
7	Robert King	Michael Mitchell
8	Laura Callahan	Michael Mitchell

```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 13:   Get the average invoice total for each customer:
============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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
INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE INDEX IFK_I
nvoiceLineInvoiceId ON "invoice_items" (InvoiceId)\n\nCREATE TABLE "invoice_
items"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\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 "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
INDEX IFK_InvoiceLineTrackId ON "invoice_items" (TrackId)\n\nCREATE TABLE sq
lite_stat1(tbl,idx,stat)\n\nCREATE INDEX IFK_CustomerSupportRepId ON "custom
ers" (SupportRepId)\n\nCREATE TABLE "customers"\r\n(\r\n    CustomerId INTEG
ER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    FirstName NVARCHAR(40)  NOT NU
LL,\r\n    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
\n    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 INDEX IFK_EmployeeReportsTo ON "employees" (ReportsTo)\n\nCREATE TABLE "e
mployees"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NO
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
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
4),\r\n    Email NVARCHAR(60),\r\n    FOREIGN KEY (ReportsTo) REFERENCES "em
ployees" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n
\n\n===Additional Context \n\nIn the chinook database invoice means order\n
\n\n    In the \'customers\' table, address column names do not have \'Billi
ng\' prefix, \n    e.g. country column name is \'country\', not \'BillingCou
ntry\'\n    \n\n===Response Guidelines \n1. If the provided context is suffi
cient, please generate a valid SQL query without any explanations for the qu
estion. \n2. If the provided context is almost sufficient but requires knowl
edge of a specific string in a particular column, please generate an interme
diate SQL query to find the distinct strings in that column. Prepend the que
ry with a comment saying intermediate_sql \n3. If the provided context is in
sufficient, 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': 'Get the total number of invoices for each customer'},
{'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastNa
me, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i O
N c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastNam
e'}, {'role': 'user', 'content': 'Find the total number of invoices per coun
try'}, {'role': 'assistant', 'content': 'SELECT c.Country, COUNT(i.InvoiceI
d) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.C
ustomerId\nGROUP BY c.Country'}, {'role': 'user', 'content': 'List all invoi
ces with a total exceeding $10'}, {'role': 'assistant', 'content': 'SELECT I
nvoiceId, Total FROM invoices WHERE Total > 10'}, {'role': 'user', 'conten
t': 'Find all invoices since 2010 and the total amount invoiced:'}, {'role':
'assistant', 'content': "SELECT InvoiceId, Total \nFROM invoices \nWHERE Inv
oiceDate >= '2010-01-01'"}, {'role': 'user', 'content': 'How many customers
are there'}, {'role': 'assistant', 'content': 'SELECT COUNT(*) FROM customer
s'}, {'role': 'user', 'content': "\n        For the question which table sto
res customer's orders, \n        the generated SQL statement invoices result
s in the following exception [ERROR-SQL] the generated SQL : invoices\n does
not starts with ('select','with') .\n        Please fix the error and re-gen
erate the SQL\n        "}, {'role': 'assistant', 'content': 'SELECT * FROM i
nvoices'}, {'role': 'user', 'content': "\n        For the question what are
the top 5 countries that customers come from?, \n        the generated SQL s
tatement SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers
\nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5 results in
the following exception [ERROR-DB] Failed to execute SQL: SELECT BillingCoun
try, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry \n
ORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql 'SELECT Bill
ingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCou
ntry \nORDER BY CustomerCount DESC \nLIMIT 5': no such column: BillingCountr
y .\n        Please fix the error and re-generate the SQL\n        "}, {'rol
e': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCount \nFRO
M customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMIT 5'},
{'role': 'user', 'content': "List all employees and their reporting manage
r's name (if any):"}, {'role': 'assistant', 'content': "SELECT e1.EmployeeI
d, e1.FirstName || ' ' || e1.LastName AS EmployeeName, \n       COALESCE(e2.
FirstName || ' ' || e2.LastName, 'None') AS ManagerName \nFROM employees e1
\nLEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeId"}, {'role': 'user',
'content': 'List all albums and their corresponding artist names  '}, {'rol
e': 'assistant', 'content': 'SELECT a.Title AS AlbumTitle, ar.Name AS Artist
Name \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'rol
e': 'user', 'content': 'Find all tracks with a name containing "What" (case-
insensitive) '}, {'role': 'assistant', 'content': "SELECT TrackId, Name FROM
tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role': 'user', 'content': ' Get
the average invoice total for each customer:'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
INDEX IFK_InvoiceCustomerId ON \"invoices\" (CustomerId)\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
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) 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
(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    First
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    E
mail NVARCHAR(60)  NOT NULL,\r\n    SupportRepId INTEGER,\r\n    FOREIGN KEY
(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
NULL,\r\n    FirstName NVARCHAR(20)  NOT NULL,\r\n    Title NVARCHAR(30),\r
\n    ReportsTo INTEGER,\r\n    BirthDate DATETIME,\r\n    HireDate DATETIM
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\n===Additional Context \n\nIn the
chinook database invoice means order\n\n\n    In the 'customers' table, addr
ess column names do not have 'Billing' prefix, \n    e.g. country column nam
e is 'country', not 'BillingCountry'\n    \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": "Get the total number of invoi
ces for each customer"}, {"role": "assistant", "content": "SELECT c.Customer
Id, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM custo
mers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerI
d, c.FirstName, c.LastName"}, {"role": "user", "content": "Find the total nu
mber of invoices per country"}, {"role": "assistant", "content": "SELECT c.C
ountry, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices
i ON c.CustomerId = i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "co
ntent": "List all invoices with a total exceeding $10"}, {"role": "assistan
t", "content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"},
{"role": "user", "content": "Find all invoices since 2010 and the total amou
nt invoiced:"}, {"role": "assistant", "content": "SELECT InvoiceId, Total \n
```

```
FROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"role": "user", "conte
nt": "How many customers are there"}, {"role": "assistant", "content": "SELE
CT COUNT(*) FROM customers"}, {"role": "user", "content": "\n        For the
question which table stores customer's orders, \n        the generated SQL s
tatement invoices results in the following exception [ERROR-SQL] the generat
ed SQL : invoices\n does not starts with ('select','with') .\n        Please
fix the error and re-generate the SQL\n        "}, {"role": "assistant", "co
ntent": "SELECT * FROM invoices"}, {"role": "user", "content": "\n        Fo
r the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5"}, {"role": "user", "content": "List all employees and their reporting m
anager's name (if any):"}, {"role": "assistant", "content": "SELECT e1.Emplo
yeeId, e1.FirstName || ' ' || e1.LastName AS EmployeeName, \n       COALESCE
(e2.FirstName || ' ' || e2.LastName, 'None') AS ManagerName \nFROM employees
e1 \nLEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeId"}, {"role": "use
r", "content": "List all albums and their corresponding artist names  "},
{"role": "assistant", "content": "SELECT a.Title AS AlbumTitle, ar.Name AS A
rtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId"},
{"role": "user", "content": "Find all tracks with a name containing \"What\"
(case-insensitive) "}, {"role": "assistant", "content": "SELECT TrackId, Nam
e FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {"role": "user", "content":
" Get the average invoice total for each customer:"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:06:37.580091661Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName,
c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers c\nJOIN invo
ices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName,
c.LastName'}, 'done_reason': 'stop', 'done': True, 'total_duration': 1912429
12045, 'load_duration': 11432972, 'prompt_eval_count': 1526, 'prompt_eval_du
ration': 172660714000, 'eval_count': 48, 'eval_duration': 16870680000}

[( LLM Response )]
SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoice
Total
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName

[( SQL )]
generated SQL statement
```

```sql
SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName
```

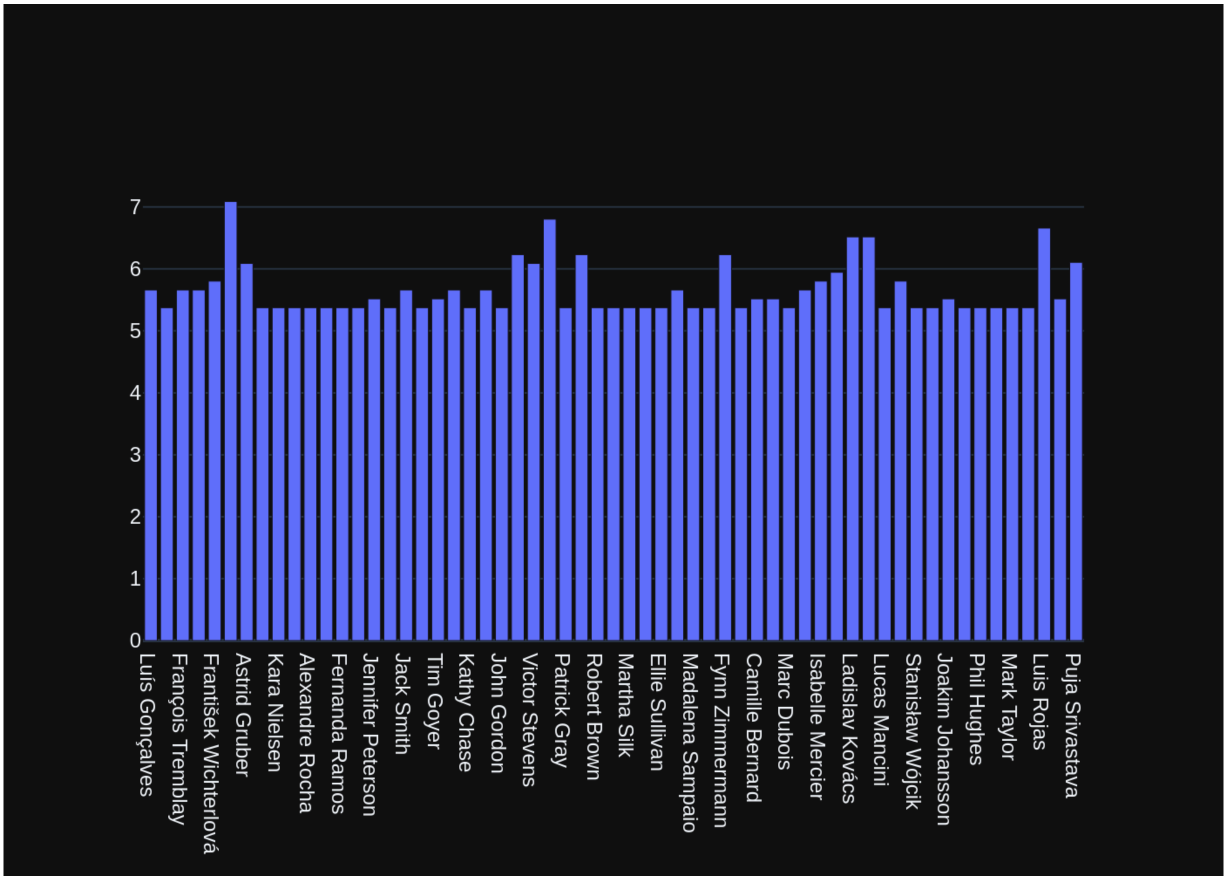
```
[( DATA )]
queried data frame
```

	CustomerId	FirstName	LastName	AverageInvoiceTotal
0	1	Luís	Gonçalves	5.660000
1	2	Leonie	Köhler	5.374286
2	3	François	Tremblay	5.660000
3	4	Bjørn	Hansen	5.660000
4	5	František	Wichterlová	5.802857
5	6	Helena	Holý	7.088571
6	7	Astrid	Gruber	6.088571
7	8	Daan	Peeters	5.374286
8	9	Kara	Nielsen	5.374286
9	10	Eduardo	Martins	5.374286
10	11	Alexandre	Rocha	5.374286
11	12	Roberto	Almeida	5.374286
12	13	Fernanda	Ramos	5.374286
13	14	Mark	Philips	5.374286
14	15	Jennifer	Peterson	5.517143
15	16	Frank	Harris	5.374286
16	17	Jack	Smith	5.660000
17	18	Michelle	Brooks	5.374286
18	19	Tim	Goyer	5.517143
19	20	Dan	Miller	5.660000
20	21	Kathy	Chase	5.374286
21	22	Heather	Leacock	5.660000
22	23	John	Gordon	5.374286
23	24	Frank	Ralston	6.231429
24	25	Victor	Stevens	6.088571
25	26	Richard	Cunningham	6.802857
26	27	Patrick	Gray	5.374286
27	28	Julia	Barnett	6.231429
28	29	Robert	Brown	5.374286
29	30	Edward	Francis	5.374286
30	31	Martha	Silk	5.374286
31	32	Aaron	Mitchell	5.374286
32	33	Ellie	Sullivan	5.374286
33	34	João	Fernandes	5.660000

	CustomerId	FirstName	LastName	AverageInvoiceTotal
34	35	Madalena	Sampaio	5.374286
35	36	Hannah	Schneider	5.374286
36	37	Fynn	Zimmermann	6.231429
37	38	Niklas	Schröder	5.374286
38	39	Camille	Bernard	5.517143
39	40	Dominique	Lefebvre	5.517143
40	41	Marc	Dubois	5.374286
41	42	Wyatt	Girard	5.660000
42	43	Isabelle	Mercier	5.802857
43	44	Terhi	Hämäläinen	5.945714
44	45	Ladislav	Kovács	6.517143
45	46	Hugh	O'Reilly	6.517143
46	47	Lucas	Mancini	5.374286
47	48	Johannes	Van der Berg	5.802857
48	49	Stanisław	Wójcik	5.374286
49	50	Enrique	Muñoz	5.374286
50	51	Joakim	Johansson	5.517143
51	52	Emma	Jones	5.374286
52	53	Phil	Hughes	5.374286
53	54	Steve	Murray	5.374286
54	55	Mark	Taylor	5.374286
55	56	Diego	Gutiérrez	5.374286
56	57	Luis	Rojas	6.660000
57	58	Manoj	Pareek	5.517143
58	59	Puja	Srivastava	6.106667

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: ' G
et the average invoice total for each customer:'\n\nThe DataFrame was produc
ed using this query: SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Tot
al) AS AverageInvoiceTotal\nFROM customers c\nJOIN invoices i ON c.CustomerI
d = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\n\nThe foll
owing is information about the resulting pandas DataFrame 'df': \nRunning d
f.dtypes gives:\n CustomerId               int64\nFirstName               ob
ject\nLastName                object\nAverageInvoiceTotal    float64\ndtype:
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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:07:18.082157506Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\n\n
if len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=df
[\'AverageInvoiceTotal\'].iloc[0]))\nelse:\n    fig = go.Figure([go.Bar(x=df
[\'FirstName\'] + \' \' + df[\'LastName\'], y=df[\'AverageInvoiceTotal\'])])
\nfig.show()'}, 'done_reason': 'stop', 'done': True, 'total_duration': 40466
546836, 'load_duration': 10630849, 'prompt_eval_count': 205, 'prompt_eval_du
ration': 17115270000, 'eval_count': 76, 'eval_duration': 23212296000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['AverageInvoiceTotal'].iloc[0]))
else:
    fig = go.Figure([go.Bar(x=df['FirstName'] + ' ' + df['LastName'], y=df['AverageInvoiceTotal'])])
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 14:  Find the top 5 most expensive tracks (based on unit pric
e):
============================================================================
====



[( SQL Prompt )]
[{'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 PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    Albu
mId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId 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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPD
ATE NO ACTION\r\n)\n\nCREATE INDEX IFK_TrackAlbumId ON "tracks" (AlbumId)\n
\nCREATE INDEX IFK_TrackGenreId ON "tracks" (GenreId)\n\nCREATE INDEX IFK_Pl
aylistTrackTrackId ON "playlist_track" (TrackId)\n\nCREATE INDEX IFK_Invoice
LineTrackId ON "invoice_items" (TrackId)\n\nCREATE INDEX IFK_TrackMediaTypeI
d ON "tracks" (MediaTypeId)\n\nCREATE TABLE "invoice_items"\r\n(\r\n    Invo
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,
2)  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 
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_tra
ck"\r\n(\r\n    PlaylistId INTEGER  NOT NULL,\r\n    TrackId INTEGER  NOT NU
LL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, TrackId),\r
\n    FOREIGN KEY (PlaylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\tO
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_AlbumArtistId ON "albums" (ArtistId)\n\nCREATE TABLE "a
lbums"\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    FOR
EIGN KEY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACT
ION ON UPDATE NO ACTION\r\n)\n\n\n===Additional Context \n\nIn the chinook d
atabase invoice means order\n\n\n    In the \'customers\' table, address col
umn names do not have \'Billing\' prefix, \n    e.g. country column name is 
\'country\', not \'BillingCountry\'\n    \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': 'Find all tracks with a name 
containing "What" (case-insensitive) '}, {'role': 'assistant', 'content': "S
ELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role':
```

```
'user', 'content': 'List all invoices with a total exceeding $10'}, {'role':
'assistant', 'content': 'SELECT InvoiceId, Total FROM invoices WHERE Total >
10'}, {'role': 'user', 'content': 'List all albums and their corresponding a
rtist names  '}, {'role': 'assistant', 'content': 'SELECT a.Title AS AlbumTi
tle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId =
ar.ArtistId'}, {'role': 'user', 'content': ' Get the average invoice total f
or each customer:'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId,
c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers
c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.
FirstName, c.LastName'}, {'role': 'user', 'content': 'Find all invoices sinc
e 2010 and the total amount invoiced:'}, {'role': 'assistant', 'content': "S
ELECT InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01-0
1'"}, {'role': 'user', 'content': 'Find the total number of invoices per cou
ntry'}, {'role': 'assistant', 'content': 'SELECT c.Country, COUNT(i.InvoiceI
d) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.C
ustomerId\nGROUP BY c.Country'}, {'role': 'user', 'content': 'Get the total
number of invoices for each customer'}, {'role': 'assistant', 'content': 'SE
LECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoi
ces\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP
BY c.CustomerId, c.FirstName, c.LastName'}, {'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': 'How many customers are there'}, {'role': 'assistant', 'c
ontent': 'SELECT COUNT(*) FROM customers'}, {'role': 'user', 'content': "\n
For the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5'}, {'role': 'user', 'content': 'Find the top 5 most expensive tracks (ba
sed on unit price):'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    A
lbumId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGE
R,\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 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\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    FOREI
GN 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 ACTION\r\n)\n\nCREATE
TABLE \"playlist_track\"\r\n(\r\n    PlaylistId INTEGER  NOT NULL,\r\n    Tr
ackId INTEGER  NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (Pl
aylistId, TrackId),\r\n    FOREIGN 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 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
INCREMENT NOT NULL,\r\n    Title NVARCHAR(160)  NOT NULL,\r\n    ArtistId IN
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\n===Additional
Context \n\nIn the chinook database invoice means order\n\n\n    In the 'cus
tomers' table, address column names do not have 'Billing' prefix, \n    e.g.
country column name is 'country', not 'BillingCountry'\n    \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": "Find all tr
acks with a name containing \"What\" (case-insensitive) "}, {"role": "assist
ant", "content": "SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%
what%'"}, {"role": "user", "content": "List all invoices with a total exceed
ing $10"}, {"role": "assistant", "content": "SELECT InvoiceId, Total FROM in
voices WHERE Total > 10"}, {"role": "user", "content": "List all albums and
their corresponding artist names  "}, {"role": "assistant", "content": "SELE
CT a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artis
ts ar ON a.ArtistId = ar.ArtistId"}, {"role": "user", "content": " Get the a
verage invoice total for each customer:"}, {"role": "assistant", "content":
"SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoic
eTotal\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGR
OUP BY c.CustomerId, c.FirstName, c.LastName"}, {"role": "user", "content":
"Find all invoices since 2010 and the total amount invoiced:"}, {"role": "as
sistant", "content": "SELECT InvoiceId, Total \nFROM invoices \nWHERE Invoic
eDate >= '2010-01-01'"}, {"role": "user", "content": "Find the total number
of invoices per country"}, {"role": "assistant", "content": "SELECT c.Countr
y, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "conten
t": "Get the total number of invoices for each customer"}, {"role": "assista
nt", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.Invoi
ceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId =
i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"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": "How many customers are there"},
{"role": "assistant", "content": "SELECT COUNT(*) FROM customers"}, {"role":
"user", "content": "\n        For the question what are the top 5 countries
that customers come from?, \n        the generated SQL statement SELECT Bill
ingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCou
ntry \nORDER BY CustomerCount DESC \nLIMIT 5 results in the following except
ion [ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as Cus
tomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCou
nt DESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*)
as CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Custo
merCount DESC \nLIMIT 5': no such column: BillingCountry .\n        Please f
ix the error and re-generate the SQL\n        "}, {"role": "assistant", "con
tent": "SELECT Country, COUNT(*) AS CustomerCount \nFROM customers \nGROUP B
Y Country \nORDER BY CustomerCount DESC \nLIMIT 5"}, {"role": "user", "conte
nt": "Find the top 5 most expensive tracks (based on unit price):"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:09:57.606336253Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT TrackId, Name, UnitPrice \n
FROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5'}, 'done_reason': 'stop', 'd
one': True, 'total_duration': 159431217528, 'load_duration': 13083517, 'prom
pt_eval_count': 1371, 'prompt_eval_duration': 150324079000, 'eval_count': 2
2, 'eval_duration': 7440719000}

[( LLM Response )]
SELECT TrackId, Name, UnitPrice
FROM tracks
ORDER BY UnitPrice DESC
LIMIT 5

[( SQL )]
generated SQL statement
```

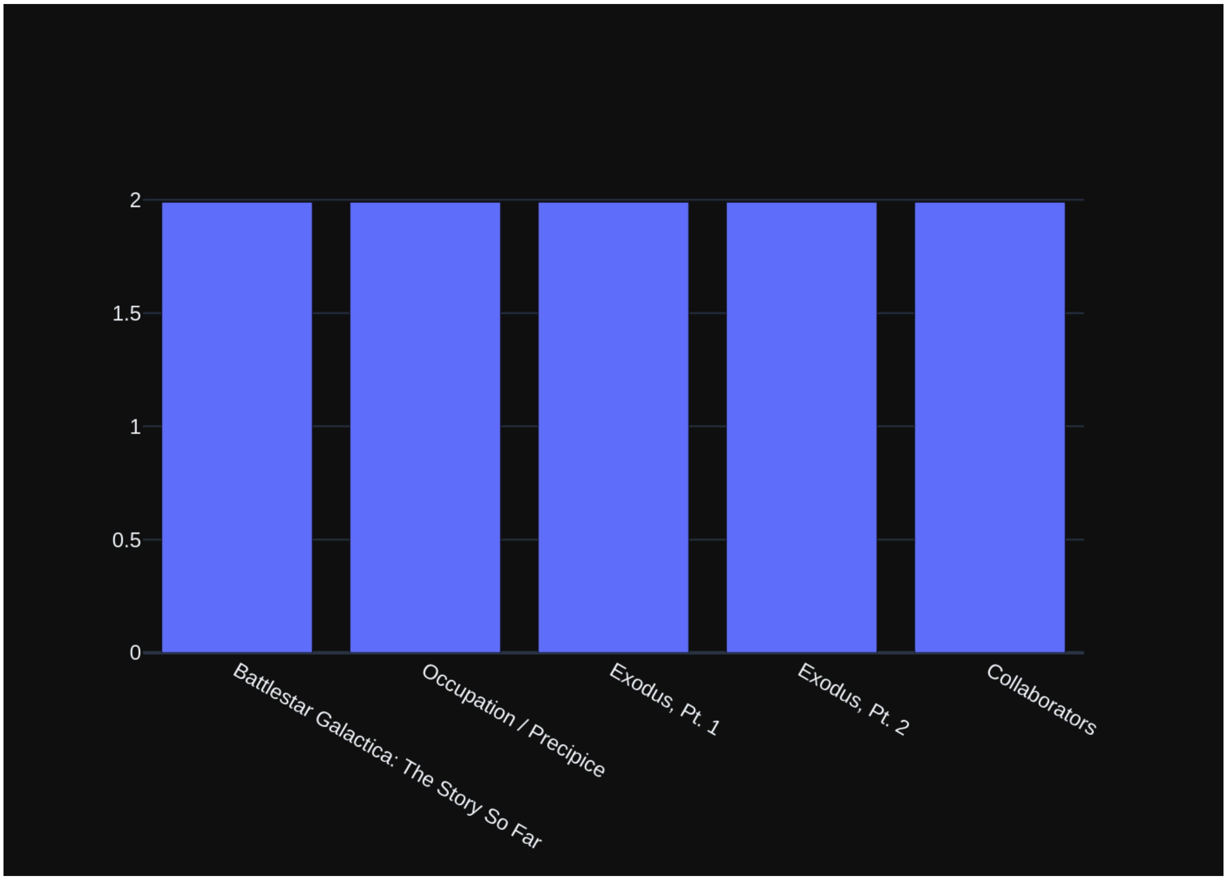
```sql
SELECT TrackId, Name, UnitPrice
FROM tracks
ORDER BY UnitPrice DESC
LIMIT 5
```

```
[( DATA )]
queried data frame
```

	TrackId	Name	UnitPrice
0	2819	Battlestar Galactica: The Story So Far	1.99
1	2820	Occupation / Precipice	1.99
2	2821	Exodus, Pt. 1	1.99
3	2822	Exodus, Pt. 2	1.99
4	2823	Collaborators	1.99

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Fi
nd the top 5 most expensive tracks (based on unit price):'\n\nThe DataFrame
was produced using this query: SELECT TrackId, Name, UnitPrice \nFROM tracks
\nORDER BY UnitPrice DESC \nLIMIT 5\n\nThe following is information about th
e resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n TrackId
int64\nName          object\nUnitPrice    float64\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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:10:32.65555734Z', 'mes
sage': {'role': 'assistant', 'content': "import plotly.graph_objs as go\nif
len(df) == 1:\n    fig = go.Figure(go.Indicator(mode='number', value=df['Uni
tPrice'].values[0]))\nelse:\n    fig = go.Figure([go.Bar(x=df['Name'], y=df
['UnitPrice'])])\nfig.show()"}, 'done_reason': 'stop', 'done': True, 'total_
duration': 35016760365, 'load_duration': 10415415, 'prompt_eval_count': 179,
'prompt_eval_duration': 14705884000, 'eval_count': 66, 'eval_duration': 2016
7916000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go
if len(df) == 1:
    fig = go.Figure(go.Indicator(mode='number', value=df['UnitPrice'].values[0]))
else:
    fig = go.Figure([go.Bar(x=df['Name'], y=df['UnitPrice'])])
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 15:  List all genres and the number of tracks in each genre:
============================================================================
====



[( SQL Prompt )]
[{'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 PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    Albu
mId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId 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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPD
ATE NO ACTION\r\n)\n\nCREATE INDEX IFK_TrackGenreId ON "tracks" (GenreId)\n
\nCREATE TABLE "genres"\r\n(\r\n    GenreId INTEGER PRIMARY KEY AUTOINCREMEN
T NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK_PlaylistTrack
TrackId ON "playlist_track" (TrackId)\n\nCREATE INDEX IFK_TrackAlbumId ON "t
racks" (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
INDEX IFK_TrackMediaTypeId ON "tracks" (MediaTypeId)\n\nCREATE TABLE "playli
st_track"\r\n(\r\n    PlaylistId INTEGER  NOT NULL,\r\n    TrackId INTEGER  
NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, Track
Id),\r\n    FOREIGN 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 ACTIO
N\r\n)\n\nCREATE TABLE "albums"\r\n(\r\n    AlbumId INTEGER PRIMARY KEY AUTO
INCREMENT NOT NULL,\r\n    Title NVARCHAR(160)  NOT NULL,\r\n    ArtistId IN
TEGER  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\nCREATE INDEX IFK_
AlbumArtistId ON "albums" (ArtistId)\n\n\n===Additional Context \n\nIn the c
hinook database invoice means order\n\n\n    In the \'customers\' table, add
ress column names do not have \'Billing\' prefix, \n    e.g. country column 
name is \'country\', not \'BillingCountry\'\n    \n\n===Response Guidelines 
\n1. If the provided context is sufficient, please generate a valid SQL quer
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': 'Find the top 5 most e
xpensive tracks (based on unit price):'}, {'role': 'assistant', 'content': 
'SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice DESC \nL
IMIT 5'}, {'role': 'user', 'content': 'List all albums and their correspondi
ng artist names  '}, {'role': 'assistant', 'content': 'SELECT a.Title AS Alb
umTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.Artist
Id = ar.ArtistId'}, {'role': 'user', 'content': 'Find all tracks with a name
containing "What" (case-insensitive) '}, {'role': 'assistant', 'content': "S
```

```
ELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role':
'user', 'content': 'Find the total number of invoices per country'}, {'rol
e': 'assistant', 'content': 'SELECT c.Country, COUNT(i.InvoiceId) AS TotalIn
voices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGR
OUP BY c.Country'}, {'role': 'user', 'content': 'Can you list all tables in
the SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT nam
e FROM sqlite_master WHERE type = 'table'"}, {'role': 'user', 'content': 'Li
st all invoices with a total exceeding $10'}, {'role': 'assistant', 'conten
t': 'SELECT InvoiceId, Total FROM invoices WHERE Total > 10'}, {'role': 'use
r', 'content': 'Get the total number of invoices for each customer'}, {'rol
e': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, C
OUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.C
ustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName'},
{'role': 'user', 'content': 'Find all invoices since 2010 and the total amou
nt invoiced:'}, {'role': 'assistant', 'content': "SELECT InvoiceId, Total \n
FROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {'role': 'user', 'conte
nt': 'How many customers are there'}, {'role': 'assistant', 'content': 'SELE
CT COUNT(*) FROM customers'}, {'role': 'user', 'content': ' Get the average
invoice total for each customer:'}, {'role': 'assistant', 'content': 'SELECT
c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\n
FROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY
c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user', 'content': 'List a
ll genres and the number of tracks in each genre:'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    A
lbumId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGE
R,\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 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\tON DELETE NO ACTION O
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    Playl
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    FOR
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    AlbumId I
NTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Title NVARCHAR(160)  NOT N
ULL,\r\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\n===Add
itional Context \n\nIn the chinook database invoice means order\n\n\n    In
the 'customers' table, address column names do not have 'Billing' prefix, \n
e.g. country column name is 'country', not 'BillingCountry'\n    \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 stri
ng 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 explai
n why it can't be generated. \n4. Please use the most relevant table(s). \n
5. If the question has been asked and answered before, please repeat the ans
wer exactly as it was given before. \n"}, {"role": "user", "content": "Find
the top 5 most expensive tracks (based on unit price):"}, {"role": "assistan
t", "content": "SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY Uni
tPrice DESC \nLIMIT 5"}, {"role": "user", "content": "List all albums and th
eir corresponding artist names  "}, {"role": "assistant", "content": "SELECT
a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists
ar ON a.ArtistId = ar.ArtistId"}, {"role": "user", "content": "Find all trac
ks with a name containing \"What\" (case-insensitive) "}, {"role": "assistan
t", "content": "SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%wh
at%'"}, {"role": "user", "content": "Find the total number of invoices per c
ountry"}, {"role": "assistant", "content": "SELECT c.Country, COUNT(i.Invoic
eId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId =
i.CustomerId\nGROUP BY c.Country"}, {"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": "use
r", "content": "List all invoices with a total exceeding $10"}, {"role": "as
sistant", "content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 1
0"}, {"role": "user", "content": "Get the total number of invoices for each
customer"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstNa
me, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN
invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstNam
e, c.LastName"}, {"role": "user", "content": "Find all invoices since 2010 a
nd the total amount invoiced:"}, {"role": "assistant", "content": "SELECT In
voiceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"rol
e": "user", "content": "How many customers are there"}, {"role": "assistan
t", "content": "SELECT COUNT(*) FROM customers"}, {"role": "user", "conten
t": " Get the average invoice total for each customer:"}, {"role": "assistan
t", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) A
S AverageInvoiceTotal\nFROM customers c\nJOIN invoices i ON c.CustomerId =
i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"role": "us
er", "content": "List all genres and the number of tracks in each genre:"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:12:50.540476796Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT g.Name AS GenreName, COUNT
(t.TrackId) AS NumberOfTracks\nFROM genres g\nJOIN tracks t ON g.GenreId =
t.GenreId\nGROUP BY g.Name'}, 'done_reason': 'stop', 'done': True, 'total_du
ration': 137795560710, 'load_duration': 10677076, 'prompt_eval_count': 1161,
'prompt_eval_duration': 123040277000, 'eval_count': 39, 'eval_duration': 131
15316000}

[( LLM Response )]
```

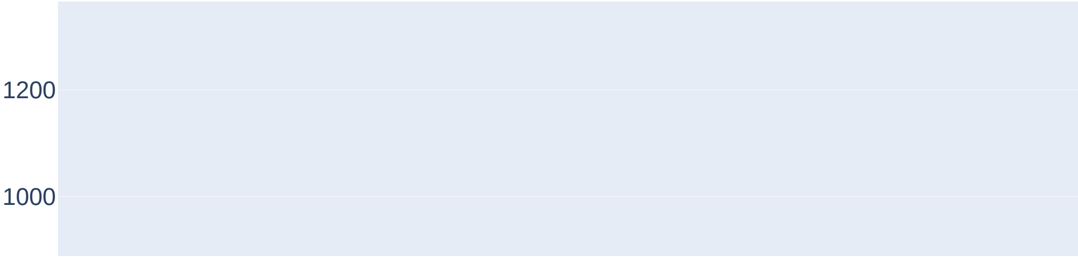
```
SELECT g.Name AS GenreName, COUNT(t.TrackId) AS NumberOfTracks
FROM genres g
JOIN tracks t ON g.GenreId = t.GenreId
GROUP BY g.Name

[( SQL )]
generated SQL statement
```

```sql
SELECT g.Name AS GenreName, COUNT(t.TrackId) AS NumberOfTracks
FROM genres g
JOIN tracks t ON g.GenreId = t.GenreId
GROUP BY g.Name
```

```
[( DATA )]
queried data frame
```

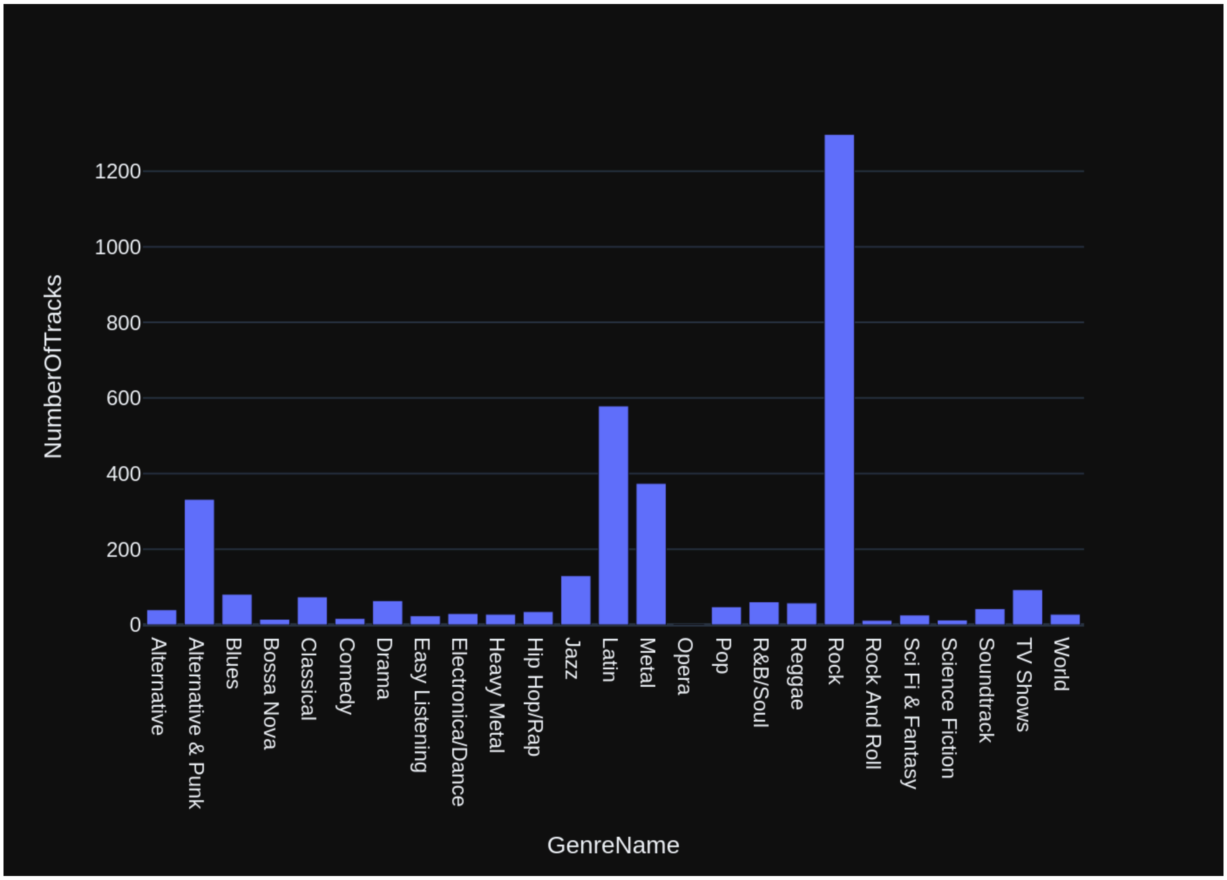
	GenreName	NumberOfTracks
0	Alternative	40
1	Alternative & Punk	332
2	Blues	81
3	Bossa Nova	15
4	Classical	74
5	Comedy	17
6	Drama	64
7	Easy Listening	24
8	Electronica/Dance	30
9	Heavy Metal	28
10	Hip Hop/Rap	35
11	Jazz	130
12	Latin	579
13	Metal	374
14	Opera	1
15	Pop	48
16	R&B/Soul	61
17	Reggae	58
18	Rock	1297
19	Rock And Roll	12
20	Sci Fi & Fantasy	26
21	Science Fiction	13
22	Soundtrack	43
23	TV Shows	93
24	World	28

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Li
st all genres and the number of tracks in each genre:'\n\nThe DataFrame was
produced using this query: SELECT g.Name AS GenreName, COUNT(t.TrackId) AS N
umberOfTracks\nFROM genres g\nJOIN tracks t ON g.GenreId = t.GenreId\nGROUP
BY g.Name\n\nThe following is information about the resulting pandas DataFra
me 'df': \nRunning df.dtypes gives:\n GenreName         object\nNumberOfTrac
ks     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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:13:27.763475332Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\nim
port plotly.io as pio\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator
(mode="number", value=df[\'NumberOfTracks\'].values[0]))\nelse:\n    fig = p
x.bar(df, x=\'GenreName\', y=\'NumberOfTracks\')\n\npio.show(fig)'}, 'done_r
eason': 'stop', 'done': True, 'total_duration': 37193200691, 'load_duratio
n': 10767998, 'prompt_eval_count': 188, 'prompt_eval_duration': 15485035000,
'eval_count': 71, 'eval_duration': 21565869000}
```



```
[( PYTHON )]
generated Plotly code
```

```
import plotly.graph_objs as go
import plotly.io as pio

if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['NumberOfTracks'].values[0]))
else:
    fig = px.bar(df, x='GenreName', y='NumberOfTracks')

pio.show(fig)
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 16:  Get all genres that do not have any tracks associated with
them:
============================================================================
====



[( SQL Prompt )]
[{'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\nCR
EATE TABLE "tracks"\r\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NO
T 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    F
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_PlaylistTrackTrackId ON "playlist_track" (TrackId)\n\nCREAT
E INDEX IFK_TrackMediaTypeId ON "tracks" (MediaTypeId)\n\nCREATE INDEX IFK_T
rackAlbumId ON "tracks" (AlbumId)\n\nCREATE TABLE "genres"\r\n(\r\n    Genre
Id INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r
\n)\n\nCREATE TABLE "albums"\r\n(\r\n    AlbumId INTEGER PRIMARY KEY AUTOINC
REMENT NOT NULL,\r\n    Title NVARCHAR(160)  NOT NULL,\r\n    ArtistId INTEG
ER  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 "playli
st_track"\r\n(\r\n    PlaylistId INTEGER  NOT NULL,\r\n    TrackId INTEGER
NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, Track
Id),\r\n    FOREIGN 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 ACTIO
N\r\n)\n\nCREATE INDEX IFK_AlbumArtistId ON "albums" (ArtistId)\n\nCREATE TA
BLE "playlists"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT
NULL,\r\n    Name NVARCHAR(120)\r\n)\n\n\n===Additional Context \n\n\n    In
the \'customers\' table, address column names do not have \'Billing\' prefi
x, \n    e.g. country column name is \'country\', not \'BillingCountry\'\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': 'List all genres and the
number of tracks in each genre:'}, {'role': 'assistant', 'content': 'SELECT
g.Name AS GenreName, COUNT(t.TrackId) AS NumberOfTracks\nFROM genres g\nJOIN
tracks t ON g.GenreId = t.GenreId\nGROUP BY g.Name'}, {'role': 'user', 'cont
ent': 'Find all tracks with a name containing "What" (case-insensitive) '},
{'role': 'assistant', 'content': "SELECT TrackId, Name FROM tracks WHERE LOW
ER(Name) LIKE '%what%'"}, {'role': 'user', 'content': 'List all albums and t
```

```
heir corresponding artist names  '}, {'role': 'assistant', 'content': 'SELEC
T a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artist
s ar ON a.ArtistId = ar.ArtistId'}, {'role': 'user', 'content': 'Find the to
p 5 most expensive tracks (based on unit price):'}, {'role': 'assistant', 'c
ontent': 'SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice
DESC \nLIMIT 5'}, {'role': 'user', 'content': 'Can you list all tables in th
e SQLite database catalog?'}, {'role': 'assistant', 'content': "SELECT name
FROM sqlite_master WHERE type = 'table'"}, {'role': 'user', 'content': 'Find
all invoices since 2010 and the total amount invoiced:'}, {'role': 'assistan
t', 'content': "SELECT InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate
>= '2010-01-01'"}, {'role': 'user', 'content': 'List all invoices with a tot
al exceeding $10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId, Tota
l FROM invoices WHERE Total > 10'}, {'role': 'user', 'content': "List all em
ployees and their reporting manager's name (if any):"}, {'role': 'assistan
t', 'content': "SELECT e1.EmployeeId, e1.FirstName || ' ' || e1.LastName AS
EmployeeName, \n       COALESCE(e2.FirstName || ' ' || e2.LastName, 'None')
AS ManagerName \nFROM employees e1 \nLEFT JOIN employees e2 ON e1.ReportsTo
= e2.EmployeeId"}, {'role': 'user', 'content': 'Find the total number of inv
oices per country'}, {'role': 'assistant', 'content': 'SELECT c.Country, COU
NT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.Cus
tomerId = i.CustomerId\nGROUP BY c.Country'}, {'role': 'user', 'content': '
Get the average invoice total for each customer:'}, {'role': 'assistant', 'c
ontent': 'SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) AS Aver
ageInvoiceTotal\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Custo
merId\nGROUP BY c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user', 'c
ontent': 'Get all genres that do not have any tracks associated with the
m:'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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 TABLE \"tracks\"\r\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMEN
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
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_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    Name 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
ArtistId INTEGER  NOT NULL,\r\n    FOREIGN KEY (ArtistId) REFERENCES \"artis
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    FOR
EIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t\tON 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\n===Addit
ional Context \n\n\n    In the 'customers' table, address column names do no
t have 'Billing' prefix, \n    e.g. country column name is 'country', not 'B
illingCountry'\n    \n\nIn the chinook database invoice means order\n\n===Re
sponse Guidelines \n1. If the provided context is sufficient, please generat
e a valid SQL query without any explanations for the question. \n2. If the p
rovided context is almost sufficient but requires knowledge of a specific st
ring in a particular column, please generate an intermediate SQL query to fi
nd the distinct strings in that column. Prepend the query with a comment say
ing intermediate_sql \n3. If the provided context is insufficient, please ex
plain 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 a
nswer exactly as it was given before. \n"}, {"role": "user", "content": "Lis
t all genres and the number of tracks in each genre:"}, {"role": "assistan
t", "content": "SELECT g.Name AS GenreName, COUNT(t.TrackId) AS NumberOfTrac
ks\nFROM genres g\nJOIN tracks t ON g.GenreId = t.GenreId\nGROUP BY g.Nam
e"}, {"role": "user", "content": "Find all tracks with a name containing \"W
hat\" (case-insensitive) "}, {"role": "assistant", "content": "SELECT TrackI
d, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {"role": "user", "con
tent": "List all albums and their corresponding artist names  "}, {"role":
"assistant", "content": "SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName
\nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId"}, {"role": "u
ser", "content": "Find the top 5 most expensive tracks (based on unit pric
e):"}, {"role": "assistant", "content": "SELECT TrackId, Name, UnitPrice \nF
ROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5"}, {"role": "user", "conten
t": "Can you list all tables in the SQLite database catalog?"}, {"role": "as
sistant", "content": "SELECT name FROM sqlite_master WHERE type = 'table'"},
{"role": "user", "content": "Find all invoices since 2010 and the total amou
nt invoiced:"}, {"role": "assistant", "content": "SELECT InvoiceId, Total \n
FROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"role": "user", "conte
nt": "List all invoices with a total exceeding $10"}, {"role": "assistant",
"content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"}, {"rol
e": "user", "content": "List all employees and their reporting manager's nam
e (if any):"}, {"role": "assistant", "content": "SELECT e1.EmployeeId, e1.Fi
rstName || ' ' || e1.LastName AS EmployeeName, \n       COALESCE(e2.FirstNam
e || ' ' || e2.LastName, 'None') AS ManagerName \nFROM employees e1 \nLEFT J
OIN employees e2 ON e1.ReportsTo = e2.EmployeeId"}, {"role": "user", "conten
t": "Find the total number of invoices per country"}, {"role": "assistant",
"content": "SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFROM cust
omers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Countr
y"}, {"role": "user", "content": " Get the average invoice total for each cu
stomer:"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstNam
e, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers c\nJOIN i
nvoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstNam
e, c.LastName"}, {"role": "user", "content": "Get all genres that do not hav
e any tracks associated with them:"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:15:46.381614615Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT Name \nFROM genres \nWHERE
```

```
GenreId NOT IN (SELECT GenreId FROM tracks)'}, 'done_reason': 'stop', 'don
e': True, 'total_duration': 138469969604, 'load_duration': 9790656, 'prompt_
eval_count': 1221, 'prompt_eval_duration': 130532726000, 'eval_count': 19,
'eval_duration': 6292850000}

[( LLM Response )]
SELECT Name
FROM genres
WHERE GenreId NOT IN (SELECT GenreId FROM tracks)

[( SQL )]
generated SQL statement
```

```
SELECT Name
FROM genres
WHERE GenreId NOT IN (SELECT GenreId FROM tracks)
```

```
[( DATA )]
queried data frame
```

Name

```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 17:  List all customers who have not placed any orders:
============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 "customers"\r\n(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT N
OT 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
\n    PostalCode NVARCHAR(10),\r\n    Phone NVARCHAR(24),\r\n    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 DE
LETE 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    In
voiceId INTEGER  NOT NULL,\r\n    TrackId INTEGER  NOT NULL,\r\n    UnitPric
e 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 ACTIO
N ON UPDATE NO ACTION,\r\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (Tra
ckId) \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 AUTOINCREMENT NOT NUL
L,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NO
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
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
4),\r\n    Email NVARCHAR(60),\r\n    FOREIGN KEY (ReportsTo) REFERENCES "em
ployees" (EmployeeId) \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    TrackId INTEGER  NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY 
KEY  (PlaylistId, TrackId),\r\n    FOREIGN KEY (PlaylistId) REFERENCES "play
lists" (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 ACT
ION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "albums"\r\n(\r\n    AlbumId IN
TEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Title NVARCHAR(160)  NOT NU
LL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOREIGN KEY (ArtistId) REFEREN
CES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r
\n)\n\nCREATE INDEX IFK_CustomerSupportRepId ON "customers" (SupportRepId)\n
\nCREATE TABLE "playlists"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOIN
CREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE TABLE "tracks"\r
\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name 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    Mill
iseconds INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    UnitPrice NUMERIC(1
0,2)  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 (GenreI
d) REFERENCES "genres" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO AC
TION,\r\n    FOREIGN KEY (MediaTypeId) REFERENCES "media_types" (MediaTypeI
d) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_
InvoiceCustomerId ON "invoices" (CustomerId)\n\n\n===Additional Context \n\n
\n    In the \'customers\' table, address column names do not have \'Billing
\' prefix, \n    e.g. country column name is \'country\', not \'BillingCount
ry\'\n    \n\nIn the chinook database invoice means order\n\n===Response Gui
delines \n1. If the provided context is sufficient, please generate a valid 
SQL query without any explanations for the question. \n2. If the provided co
ntext is almost sufficient but requires knowledge of a specific string in a 
particular column, please generate an intermediate SQL query to find the dis
tinct strings in that column. Prepend the query with a comment saying interm
ediate_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 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': 'Get the total number of invoices f
or each customer'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, 
c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers
c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.
FirstName, c.LastName'}, {'role': 'user', 'content': "\n        For the ques
tion what are the top 5 countries that customers come from?, \n        the g
enerated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount \nFR
OM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT
5 results in the following exception [ERROR-DB] Failed to execute SQL: SELEC
T BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY Bill
ingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql
'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP B
Y BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such column: B
illingCountry .\n        Please fix the error and re-generate the SQL\n      
"}, {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5'}, {'role': 'user', 'content': ' Get the average invoice total for each 
customer:'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstN
ame, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers c\nJOIN
invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstNam
e, c.LastName'}, {'role': 'user', 'content': 'Find the total number of invoi
ces per country'}, {'role': 'assistant', 'content': 'SELECT c.Country, COUNT
(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.Custo
merId = i.CustomerId\nGROUP BY c.Country'}, {'role': 'user', 'content': "Lis
t all employees and their reporting manager's name (if any):"}, {'role': 'as
sistant', 'content': "SELECT e1.EmployeeId, e1.FirstName || ' ' || e1.LastNa
me AS EmployeeName, \n       COALESCE(e2.FirstName || ' ' || e2.LastName, 'N
one') AS ManagerName \nFROM employees e1 \nLEFT JOIN employees e2 ON e1.Repo
rtsTo = e2.EmployeeId"}, {'role': 'user', 'content': 'Find all invoices sinc
e 2010 and the total amount invoiced:'}, {'role': 'assistant', 'content': "S
ELECT InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01-0
1'"}, {'role': 'user', 'content': "\n        For the question which table st
ores customer's orders, \n        the generated SQL statement invoices resul
ts in the following exception [ERROR-SQL] the generated SQL : invoices\n doe
s not starts with ('select','with') .\n        Please fix the error and re-g
enerate the SQL\n        "}, {'role': 'assistant', 'content': 'SELECT * FROM
invoices'}, {'role': 'user', 'content': 'List all invoices with a total exce
```

```
eding $10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId, Total FROM
invoices WHERE Total > 10'}, {'role': 'user', 'content': 'List all albums an
d their corresponding artist names  '}, {'role': 'assistant', 'content': 'SE
LECT a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN art
ists ar ON a.ArtistId = ar.ArtistId'}, {'role': 'user', 'content': 'List all
customers who have not placed any orders:'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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 \"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    Address NVARCHAR(70),\r
\n    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    Fax
NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\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
ce_items\"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT N
ULL,\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 NUL
L,\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 K
EY AUTOINCREMENT NOT NULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    Fi
rstName 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\n    Co
untry 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 ACTIO
N ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"playlist_track\"\r\n(\r\n    Pl
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\tON DELETE NO ACTI
ON 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
L,\r\n    Title NVARCHAR(160)  NOT NULL,\r\n    ArtistId INTEGER  NOT NUL
L,\r\n    FOREIGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tO
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
```

```
(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name
NVARCHAR(120)\r\n)\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
AlbumId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGE
R,\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 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\tON DELETE NO ACTION O
N UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_InvoiceCustomerId ON \"invoices
\" (CustomerId)\n\n\n===Additional Context \n\n\n    In the 'customers' tabl
e, address column names do not have 'Billing' prefix, \n    e.g. country col
umn name is 'country', not 'BillingCountry'\n    \n\nIn the chinook database
invoice means order\n\n===Response Guidelines \n1. If the provided context i
s 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 in
termediate SQL query to find the distinct strings in that column. Prepend th
e 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 t
he 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"}, {"rol
e": "user", "content": "How many customers are there"}, {"role": "assistan
t", "content": "SELECT COUNT(*) FROM customers"}, {"role": "user", "conten
t": "Get the total number of invoices for each customer"}, {"role": "assista
nt", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.Invoi
ceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId =
i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"role": "us
er", "content": "\n        For the question what are the top 5 countries tha
t customers come from?, \n        the generated SQL statement SELECT Billing
Country, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountr
y \nORDER BY CustomerCount DESC \nLIMIT 5 results in the following exception
[ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as Custome
rCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount D
ESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*) as
CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Customer
Count DESC \nLIMIT 5': no such column: BillingCountry .\n        Please fix
the error and re-generate the SQL\n        "}, {"role": "assistant", "conten
t": "SELECT Country, COUNT(*) AS CustomerCount \nFROM customers \nGROUP BY C
ountry \nORDER BY CustomerCount DESC \nLIMIT 5"}, {"role": "user", "conten
t": " Get the average invoice total for each customer:"}, {"role": "assistan
t", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) A
S AverageInvoiceTotal\nFROM customers c\nJOIN invoices i ON c.CustomerId =
i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"role": "us
er", "content": "Find the total number of invoices per country"}, {"role":
"assistant", "content": "SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoic
es\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP
BY c.Country"}, {"role": "user", "content": "List all employees and their re
porting manager's name (if any):"}, {"role": "assistant", "content": "SELECT
e1.EmployeeId, e1.FirstName || ' ' || e1.LastName AS EmployeeName, \n
COALESCE(e2.FirstName || ' ' || e2.LastName, 'None') AS ManagerName \nFROM e
mployees e1 \nLEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeId"}, {"ro
le": "user", "content": "Find all invoices since 2010 and the total amount i
nvoiced:"}, {"role": "assistant", "content": "SELECT InvoiceId, Total \nFROM
invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"role": "user", "content":
```

```
"\n        For the question which table stores customer's orders, \n
the generated SQL statement invoices results in the following exception [ERR
OR-SQL] the generated SQL : invoices\n does not starts with ('select','wit
h') .\n        Please fix the error and re-generate the SQL\n        "}, {"r
ole": "assistant", "content": "SELECT * FROM invoices"}, {"role": "user", "c
ontent": "List all invoices with a total exceeding $10"}, {"role": "assistan
t", "content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"},
{"role": "user", "content": "List all albums and their corresponding artist
names  "}, {"role": "assistant", "content": "SELECT a.Title AS AlbumTitle, a
r.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.Ar
tistId"}, {"role": "user", "content": "List all customers who have not place
d any orders:"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:19:29.713016273Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT CustomerId, FirstName, Last
Name \nFROM customers \nWHERE CustomerId NOT IN (SELECT CustomerId FROM invo
ices)'}, 'done_reason': 'stop', 'done': True, 'total_duration': 22328808152
7, 'load_duration': 13096218, 'prompt_eval_count': 1840, 'prompt_eval_durati
on': 213106704000, 'eval_count': 24, 'eval_duration': 8560430000}

[( LLM Response )]
SELECT CustomerId, FirstName, LastName
FROM customers
WHERE CustomerId NOT IN (SELECT CustomerId FROM invoices)

[( SQL )]
generated SQL statement
```

```
SELECT CustomerId, FirstName, LastName
FROM customers
WHERE CustomerId NOT IN (SELECT CustomerId FROM invoices)
```

```
[( DATA )]
queried data frame
```

CustomerId	FirstName	LastName

```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 18:
        Can you find the top 10 most popular artists based on the number of
tracks?
        Hint: There are 3 tables - artists, albums and tracks,
        where albums and artists are linked by ArtistId, albums and tracks a
re linked by AlbumId,

============================================================================
====



[( SQL Prompt )]
[{'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 PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    Albu
mId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId 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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \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\nCREATE TABLE "artists"\r\n
(\r\n    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NV
ARCHAR(120)\r\n)\n\nCREATE INDEX IFK_TrackAlbumId ON "tracks" (AlbumId)\n\nC
REATE TABLE "playlists"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY AUTOINCRE
MENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE TABLE "genres"\r\n
(\r\n    GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVA
RCHAR(120)\r\n)\n\nCREATE TABLE "playlist_track"\r\n(\r\n    PlaylistId INTE
GER  NOT NULL,\r\n    TrackId INTEGER  NOT NULL,\r\n    CONSTRAINT PK_Playli
stTrack PRIMARY KEY  (PlaylistId, TrackId),\r\n    FOREIGN 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\tO
N DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_TrackGenreId
ON "tracks" (GenreId)\n\nCREATE INDEX IFK_PlaylistTrackTrackId ON "playlist_
track" (TrackId)\n\n\n===Additional Context \n\n\n    In the \'customers\' t
able, address column names do not have \'Billing\' prefix, \n    e.g. countr
y column name is \'country\', not \'BillingCountry\'\n    \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.
\n'}, {'role': 'user', 'content': 'List all genres and the number of tracks
```

```
in each genre:'}, {'role': 'assistant', 'content': 'SELECT g.Name AS GenreNa
me, COUNT(t.TrackId) AS NumberOfTracks\nFROM genres g\nJOIN tracks t ON g.Ge
nreId = t.GenreId\nGROUP BY g.Name'}, {'role': 'user', 'content': 'Find the
top 5 most expensive tracks (based on unit price):'}, {'role': 'assistant',
'content': 'SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPri
ce DESC \nLIMIT 5'}, {'role': 'user', 'content': 'List all albums and their
corresponding artist names  '}, {'role': 'assistant', 'content': 'SELECT a.T
itle AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar
ON a.ArtistId = ar.ArtistId'}, {'role': 'user', 'content': 'Find all tracks
with a name containing "What" (case-insensitive) '}, {'role': 'assistant',
'content': "SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%wha
t%'"}, {'role': 'user', 'content': 'Find the total number of invoices per co
untry'}, {'role': 'assistant', 'content': 'SELECT c.Country, COUNT(i.Invoice
Id) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.
CustomerId\nGROUP BY c.Country'}, {'role': 'user', 'content': "\n        For
the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5'}, {'role': 'user', 'content': 'List all invoices with a total exceeding
$10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId, Total FROM invoic
es WHERE Total > 10'}, {'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':
'Get the total number of invoices for each customer'}, {'role': 'assistant',
'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId)
AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Cust
omerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user',
'content': 'How many customers are there'}, {'role': 'assistant', 'content':
'SELECT COUNT(*) FROM customers'}, {'role': 'user', 'content': ' \n       C
an you find the top 10 most popular artists based on the number of tracks?\n
Hint: There are 3 tables - artists, albums and tracks, \n        where album
s and artists are linked by ArtistId, albums and tracks are linked by AlbumI
d,\n    '}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    A
lbumId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGE
R,\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 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\tON DELETE NO ACTION O
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
L,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOREIGN KEY (ArtistId) REFERENC
ES \"artists\" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r
\n)\n\nCREATE INDEX IFK_AlbumArtistId ON \"albums\" (ArtistId)\n\nCREATE TAB
LE \"artists\"\r\n(\r\n    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NU
LL,\r\n    Name NVARCHAR(120)\r\n)\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
ULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE 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    FOREI
GN KEY (PlaylistId) REFERENCES \"playlists\" (PlaylistId) \r\n\t\tON 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\n===Additional Context \n
\n\n    In the 'customers' table, address column names do not have 'Billing'
prefix, \n    e.g. country column name is 'country', not 'BillingCountry'\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 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": "List all genres and the
number of tracks in each genre:"}, {"role": "assistant", "content": "SELECT
g.Name AS GenreName, COUNT(t.TrackId) AS NumberOfTracks\nFROM genres g\nJOIN
tracks t ON g.GenreId = t.GenreId\nGROUP BY g.Name"}, {"role": "user", "cont
ent": "Find the top 5 most expensive tracks (based on unit price):"}, {"rol
e": "assistant", "content": "SELECT TrackId, Name, UnitPrice \nFROM tracks
\nORDER BY UnitPrice DESC \nLIMIT 5"}, {"role": "user", "content": "List all
albums and their corresponding artist names  "}, {"role": "assistant", "cont
ent": "SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a
\nJOIN artists ar ON a.ArtistId = ar.ArtistId"}, {"role": "user", "content":
"Find all tracks with a name containing \"What\" (case-insensitive) "}, {"ro
le": "assistant", "content": "SELECT TrackId, Name FROM tracks WHERE LOWER(N
ame) LIKE '%what%'"}, {"role": "user", "content": "Find the total number of
invoices per country"}, {"role": "assistant", "content": "SELECT c.Country,
COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.
CustomerId = i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "content":
"\n        For the question what are the top 5 countries that customers come
from?, \n        the generated SQL statement SELECT BillingCountry, COUNT(*)
as CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Custo
merCount DESC \nLIMIT 5 results in the following exception [ERROR-DB] Failed
to execute SQL: SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM cust
omers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Ex
ecution failed on sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFR
```

```
OM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT
5': no such column: BillingCountry .\n        Please fix the error and re-ge
nerate the SQL\n        "}, {"role": "assistant", "content": "SELECT Countr
y, COUNT(*) AS CustomerCount \nFROM customers \nGROUP BY Country \nORDER BY
CustomerCount DESC \nLIMIT 5"}, {"role": "user", "content": "List all invoic
es with a total exceeding $10"}, {"role": "assistant", "content": "SELECT In
voiceId, Total FROM invoices WHERE Total > 10"}, {"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'"}, {"r
ole": "user", "content": "Get the total number of invoices for each custome
r"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.L
astName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoice
s i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.La
stName"}, {"role": "user", "content": "How many customers are there"}, {"rol
e": "assistant", "content": "SELECT COUNT(*) FROM customers"}, {"role": "use
r", "content": " \n        Can you find the top 10 most popular artists base
d on the number of tracks?\n        Hint: There are 3 tables - artists, albu
ms and tracks, \n        where albums and artists are linked by ArtistId, al
bums and tracks are linked by AlbumId,\n    "}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:22:16.798191821Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT a.Name AS ArtistName, COUNT
(t.TrackId) AS NumberOfTracks\nFROM artists a\nJOIN albums al ON a.ArtistId
= al.ArtistId\nJOIN tracks t ON al.AlbumId = t.AlbumId\nGROUP BY a.ArtistId,
a.Name\nORDER BY NumberOfTracks DESC\nLIMIT 10'}, 'done_reason': 'stop', 'do
ne': True, 'total_duration': 167045859680, 'load_duration': 11765484, 'promp
t_eval_count': 1339, 'prompt_eval_duration': 141431954000, 'eval_count': 69,
'eval_duration': 24016703000}

[( LLM Response )]
SELECT a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfTracks
FROM artists a
JOIN albums al ON a.ArtistId = al.ArtistId
JOIN tracks t ON al.AlbumId = t.AlbumId
GROUP BY a.ArtistId, a.Name
ORDER BY NumberOfTracks DESC
LIMIT 10

[( SQL )]
generated SQL statement
```

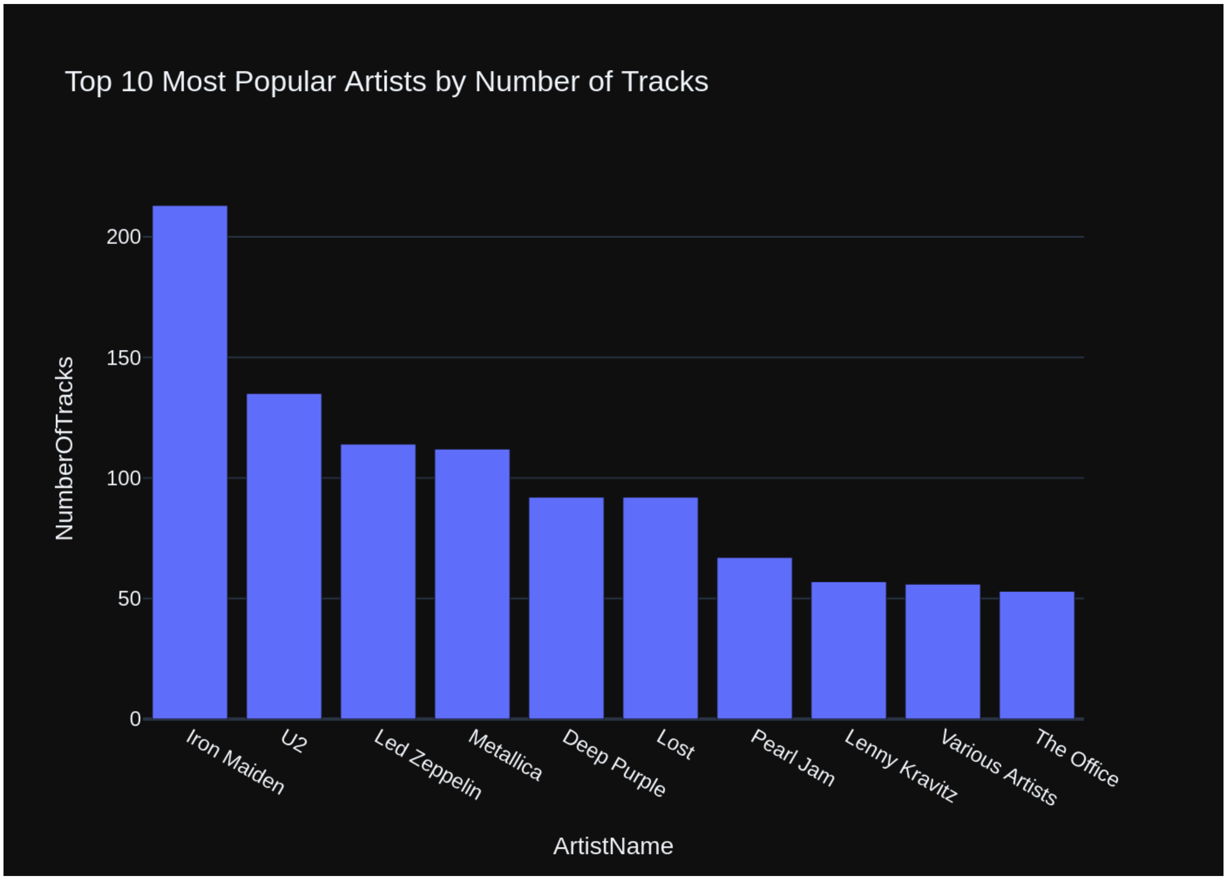
```sql
SELECT a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfTracks
FROM artists a
JOIN albums al ON a.ArtistId = al.ArtistId
JOIN tracks t ON al.AlbumId = t.AlbumId
GROUP BY a.ArtistId, a.Name
ORDER BY NumberOfTracks DESC
LIMIT 10
```

```
[( DATA )]
queried data frame
```

	ArtistName	NumberOfTracks
0	Iron Maiden	213
1	U2	135
2	Led Zeppelin	114
3	Metallica	112
4	Deep Purple	92
5	Lost	92
6	Pearl Jam	67
7	Lenny Kravitz	57
8	Various Artists	56
9	The Office	53

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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        Can you find the top 10 most popular artists based on the number o
f tracks?\n        Hint: There are 3 tables - artists, albums and tracks, \n
where albums and artists are linked by ArtistId, albums and tracks are linke
d by AlbumId,\n    '\n\nThe DataFrame was produced using this query: SELECT
a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfTracks\nFROM artists a\nJO
IN albums al ON a.ArtistId = al.ArtistId\nJOIN tracks t ON al.AlbumId = t.Al
bumId\nGROUP BY a.ArtistId, a.Name\nORDER BY NumberOfTracks DESC\nLIMIT 10\n
\nThe following is information about the resulting pandas DataFrame 'df': \n
Running df.dtypes gives:\n ArtistName        object\nNumberOfTracks     int6
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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:23:10.487929974Z', 'me
ssage': {'role': 'assistant', 'content': 'if len(df) == 1:\n    import plotl
y.graph_objects as go\n    fig = go.Figure(go.Indicator(mode="number", value
=df[\'NumberOfTracks\'].iloc[0], title={"text": df[\'ArtistName\'].iloc
[0]}))\nelse:\n    import plotly.express as px\n    fig = px.bar(df, x=\'Art
istName\', y=\'NumberOfTracks\', title=\'Top 10 Most Popular Artists by Numb
er of Tracks\')\nfig.show()'}, 'done_reason': 'stop', 'done': True, 'total_d
uration': 53658462691, 'load_duration': 10857720, 'prompt_eval_count': 263,
'prompt_eval_duration': 22599044000, 'eval_count': 100, 'eval_duration': 309
10440000}

[( PYTHON )]
generated Plotly code
```

```
if len(df) == 1:
  import plotly.graph_objects as go
  fig = go.Figure(go.Indicator(mode="number", value=df['NumberOfTracks'].iloc[0], title={"text": df['ArtistName'].iloc[0]}))
else:
  import plotly.express as px
  fig = px.bar(df, x='ArtistName', y='NumberOfTracks', title='Top 10 Most Popular Artists by Number of Tracks')
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 19:  List all customers from Canada and their email addresses:
============================================================================
====



[( SQL Prompt )]
[{'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" (Sup
portRepId)\n\nCREATE TABLE "customers"\r\n(\r\n    CustomerId INTEGER PRIMAR
Y 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    Address
NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r\n    Co
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    Sup
portRepId INTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES "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 AUTOINCREMENT NOT
NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    InvoiceDate DATETIME  NOT
NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    BillingCity NVARCHAR(40),\r
\n    BillingState NVARCHAR(40),\r\n    BillingCountry NVARCHAR(40),\r\n
BillingPostalCode NVARCHAR(10),\r\n    Total NUMERIC(10,2)  NOT NULL,\r\n
FOREIGN KEY (CustomerId) REFERENCES "customers" (CustomerId) \r\n\t\tON DELE
TE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_InvoiceCustomerId
ON "invoices" (CustomerId)\n\nCREATE TABLE "employees"\r\n(\r\n    EmployeeI
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
VARCHAR(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(6
0),\r\n    FOREIGN KEY (ReportsTo) REFERENCES "employees" (EmployeeId) \r\n
\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "invoice_it
ems"\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 "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 sqlite_sequence(name,seq)\n\nCREATE TABLE "playlist_track"\r\n(\r\n
PlaylistId INTEGER  NOT NULL,\r\n    TrackId INTEGER  NOT NULL,\r\n    CONST
RAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, TrackId),\r\n    FOREIGN KE
Y (PlaylistId) REFERENCES "playlists" (PlaylistId) \r\n\t\tON DELETE NO ACTI
ON ON UPDATE NO ACTION,\r\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (Tr
ackId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX
IFK_EmployeeReportsTo ON "employees" (ReportsTo)\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    FOREIGN K
EY (ArtistId) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON
UPDATE NO ACTION\r\n)\n\n\n===Additional Context \n\n\n    In the \'customer
s\' table, address column names do not have \'Billing\' prefix, \n    e.g. c
ountry column name is \'country\', not \'BillingCountry\'\n    \n\nIn the ch
inook database invoice means order\n\n===Response Guidelines \n1. If the pro
vided context is sufficient, please generate a valid SQL query without any e
xplanations for the question. \n2. If the provided context is almost suffici
ent but requires knowledge of a specific string in a particular column, plea
se generate an intermediate SQL query to find the distinct strings in that c
olumn. 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        For the question what are
the top 5 countries that customers come from?, \n        the generated SQL s
tatement SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers
\nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5 results in
the following exception [ERROR-DB] Failed to execute SQL: SELECT BillingCoun
try, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry \n
ORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql 'SELECT Bill
ingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCou
ntry \nORDER BY CustomerCount DESC \nLIMIT 5': no such column: BillingCountr
y .\n        Please fix the error and re-generate the SQL\n        "}, {'rol
e': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCount \nFRO
M customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMIT 5'},
{'role': 'user', 'content': 'How many customers are there'}, {'role': 'assis
tant', 'content': 'SELECT COUNT(*) FROM customers'}, {'role': 'user', 'conte
nt': 'Find the total number of invoices per country'}, {'role': 'assistant',
'content': 'SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFROM cust
omers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Countr
y'}, {'role': 'user', 'content': 'Get the total number of invoices for each
customer'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstNa
me, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN
invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstNam
e, c.LastName'}, {'role': 'user', 'content': ' Get the average invoice total
for each customer:'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId,
c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers
c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.
FirstName, c.LastName'}, {'role': 'user', 'content': "List all employees and
their reporting manager's name (if any):"}, {'role': 'assistant', 'content':
"SELECT e1.EmployeeId, e1.FirstName || ' ' || e1.LastName AS EmployeeName,
\n       COALESCE(e2.FirstName || ' ' || e2.LastName, 'None') AS ManagerName
\nFROM employees e1 \nLEFT JOIN employees e2 ON e1.ReportsTo = e2.EmployeeI
d"}, {'role': 'user', 'content': 'Find all invoices since 2010 and the total
amount invoiced:'}, {'role': 'assistant', 'content': "SELECT InvoiceId, Tota
l \nFROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {'role': 'user', 'c
ontent': "\n        For the question which table stores customer's orders,
\n        the generated SQL statement invoices results in the following exce
ption [ERROR-SQL] the generated SQL : invoices\n does not starts with ('sele
ct','with') .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT * FROM invoices'}, {'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': 'List all invoices with a total exc
eeding $10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId, Total FROM
invoices WHERE Total > 10'}, {'role': 'user', 'content': 'List all customers
from Canada and their email addresses:'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
\n    LastName NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    A
ddress NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r
\n    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 \"employe
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
ULL,\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\n    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Las
tName NVARCHAR(20)  NOT NULL,\r\n    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\n    Country NVARCHAR(40),\r\n    PostalCode NVA
RCHAR(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHAR(24),\r\n    Email
NVARCHAR(60),\r\n    FOREIGN KEY (ReportsTo) REFERENCES \"employees\" (Emplo
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
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 (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
NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, Track
Id),\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 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\n===Additional C
ontext \n\n\n    In the 'customers' table, address column names do not have
'Billing' prefix, \n    e.g. country column name is 'country', not 'BillingC
ountry'\n    \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        F
or the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5"}, {"role": "user", "content": "How many customers are there"}, {"role":
"assistant", "content": "SELECT COUNT(*) FROM customers"}, {"role": "user",
"content": "Find the total number of invoices per country"}, {"role": "assis
tant", "content": "SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFR
OM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.C
ountry"}, {"role": "user", "content": "Get the total number of invoices for
each customer"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.Fi
rstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\n
JOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.Fir
stName, c.LastName"}, {"role": "user", "content": " Get the average invoice
total for each customer:"}, {"role": "assistant", "content": "SELECT c.Custo
merId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM cu
stomers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Custom
erId, c.FirstName, c.LastName"}, {"role": "user", "content": "List all emplo
yees and their reporting manager's name (if any):"}, {"role": "assistant",
"content": "SELECT e1.EmployeeId, e1.FirstName || ' ' || e1.LastName AS Empl
oyeeName, \n       COALESCE(e2.FirstName || ' ' || e2.LastName, 'None') AS M
anagerName \nFROM employees e1 \nLEFT JOIN employees e2 ON e1.ReportsTo = e
2.EmployeeId"}, {"role": "user", "content": "Find all invoices since 2010 an
d the total amount invoiced:"}, {"role": "assistant", "content": "SELECT Inv
oiceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"rol
e": "user", "content": "\n        For the question which table stores custom
er's orders, \n        the generated SQL statement invoices results in the f
ollowing exception [ERROR-SQL] the generated SQL : invoices\n does not start
s with ('select','with') .\n        Please fix the error and re-generate the
SQL\n        "}, {"role": "assistant", "content": "SELECT * FROM invoices"},
{"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": "List all invoices with
a total exceeding $10"}, {"role": "assistant", "content": "SELECT InvoiceId,
Total FROM invoices WHERE Total > 10"}, {"role": "user", "content": "List al
l customers from Canada and their email addresses:"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:26:29.684665587Z', 'me
ssage': {'role': 'assistant', 'content': "SELECT CustomerId, FirstName, Last
Name, Email \nFROM customers \nWHERE Country = 'Canada'"}, 'done_reason': 's
top', 'done': True, 'total_duration': 199097973645, 'load_duration': 1070855
1, 'prompt_eval_count': 1655, 'prompt_eval_duration': 190436046000, 'eval_co
unt': 20, 'eval_duration': 7028007000}
```

```
[( LLM Response )]
SELECT CustomerId, FirstName, LastName, Email
FROM customers
WHERE Country = 'Canada'

[( SQL )]
generated SQL statement
```

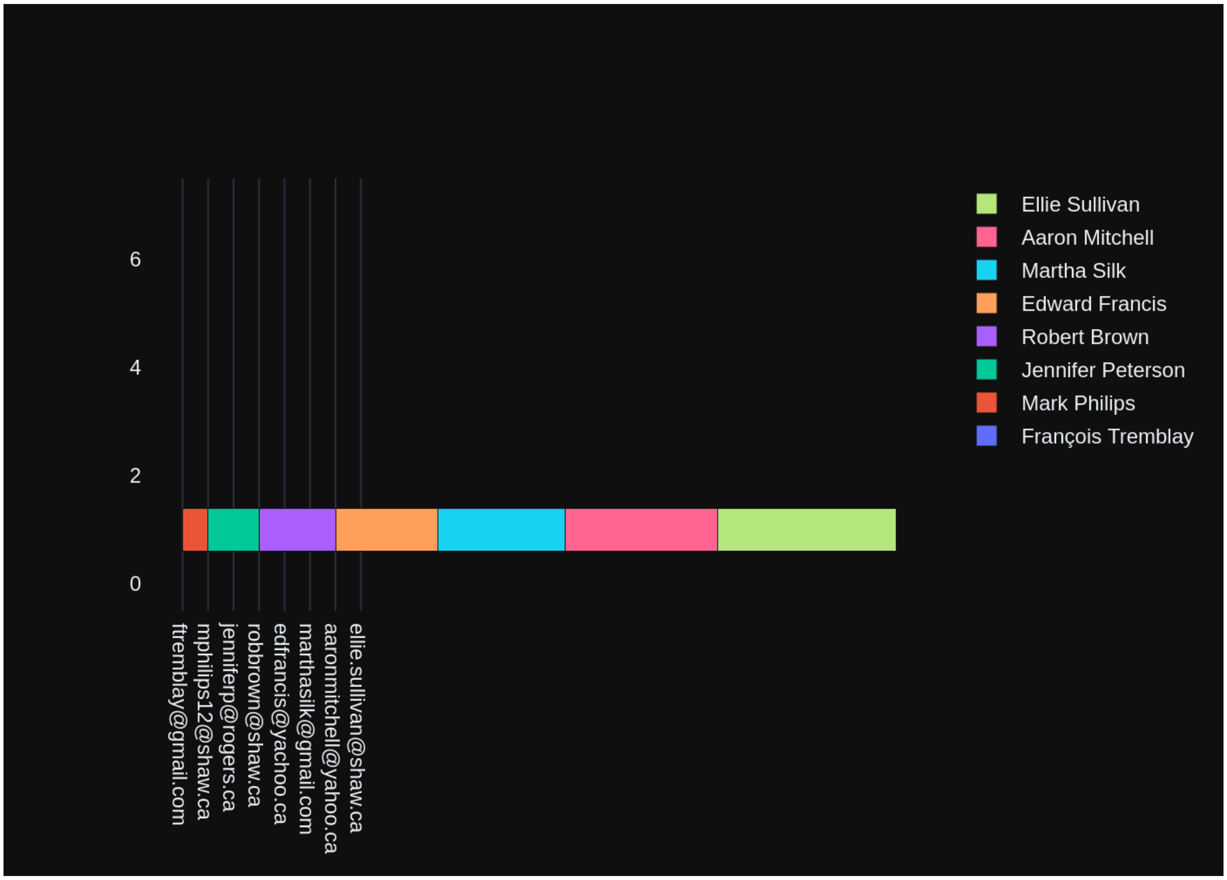
```sql
SELECT CustomerId, FirstName, LastName, Email
FROM customers
WHERE Country = 'Canada'
```

```
[( DATA )]
queried data frame
```

	CustomerId	FirstName	LastName	Email
0	3	François	Tremblay	ftremblay@gmail.com
1	14	Mark	Philips	mphilips12@shaw.ca
2	15	Jennifer	Peterson	jenniferp@rogers.ca
3	29	Robert	Brown	robbrown@shaw.ca
4	30	Edward	Francis	edfrancis@yachoo.ca
5	31	Martha	Silk	marthasilk@gmail.com
6	32	Aaron	Mitchell	aaronmitchell@yahoo.ca
7	33	Ellie	Sullivan	ellie.sullivan@shaw.ca

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Li
st all customers from Canada and their email addresses:'\n\nThe DataFrame wa
s produced using this query: SELECT CustomerId, FirstName, LastName, Email
\nFROM customers \nWHERE Country = 'Canada'\n\nThe following is information
about the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n Cust
omerId     int64\nFirstName     object\nLastName      object\nEmail
object\ndtype: object"}, {"role": "user", "content": "Can you generate the P
ython 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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:27:27.143048192Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go
\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="text", value=df
[\'FirstName\'].iloc[0] + \' \' + df[\'LastName\'].iloc[0]))\nelse:\n    fig
= go.Figure()\n    for index, row in df.iterrows():\n        fig.add_trace(g
o.Bar(x=[row[\'Email\']], y=[1], name=f"{row[\'FirstName\']} {row[\'LastName
\']}", orientation=\'h\'))\n    fig.update_layout(barmode=\'stack\', yaxis=d
ict(showgrid=False, range=[-0.5, len(df)-0.5]))\n\nfig.show()'}, 'done_reaso
n': 'stop', 'done': True, 'total_duration': 57416642191, 'load_duration': 13
398650, 'prompt_eval_count': 173, 'prompt_eval_duration': 14298635000, 'eval
_count': 137, 'eval_duration': 42966739000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objects as go


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="text", value=df['FirstName'].iloc[0] + ' ' + df['LastName'].iloc[0]))
else:
    fig = go.Figure()
    for index, row in df.iterrows():
        fig.add_trace(go.Bar(x=[row['Email']], y=[1], name=f"{row['FirstName']} {row['LastName']}", orientation='h'))
    fig.update_layout(barmode='stack', yaxis=dict(showgrid=False, range=[-0.5, len(df)-0.5]))
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 20:  Find the customer with the most invoices
============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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
INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREATE INDEX IFK_I
nvoiceLineInvoiceId ON "invoice_items" (InvoiceId)\n\nCREATE TABLE "invoice_
items"\r\n(\r\n    InvoiceLineId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\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 "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
INDEX IFK_InvoiceLineTrackId ON "invoice_items" (TrackId)\n\nCREATE TABLE "c
ustomers"\r\n(\r\n    CustomerId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    FirstName NVARCHAR(40)  NOT NULL,\r\n    LastName NVARCHAR(20)  NO
T NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVARCHAR(70),\r\n    Cit
y 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
4),\r\n    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 INDEX IFK_CustomerSupportR
epId ON "customers" (SupportRepId)\n\nCREATE TABLE "employees"\r\n(\r\n    E
mployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    LastName NVARCH
AR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NOT NULL,\r\n    Title NVAR
CHAR(30),\r\n    ReportsTo INTEGER,\r\n    BirthDate DATETIME,\r\n    HireDa
te DATETIME,\r\n    Address NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    S
tate NVARCHAR(40),\r\n    Country NVARCHAR(40),\r\n    PostalCode NVARCHAR(1
0),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHAR(24),\r\n    Email NVARCHA
R(60),\r\n    FOREIGN KEY (ReportsTo) REFERENCES "employees" (EmployeeId) \r
\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_Emplo
yeeReportsTo ON "employees" (ReportsTo)\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
L,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(220),\r\n    Millisecond
s INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    UnitPrice NUMERIC(10,2)  N
OT NULL,\r\n    FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\t
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\n\n===Additional Context \n\nIn
the chinook database invoice means order\n\n\n    In the \'customers\' tabl
e, address column names do not have \'Billing\' prefix, \n    e.g. country c
olumn name is \'country\', not \'BillingCountry\'\n    \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': 'Get the total n
umber of invoices for each customer'}, {'role': 'assistant', 'content': 'SEL
ECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoic
es\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP
BY c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user', 'content': ' Ge
t the average invoice total for each customer:'}, {'role': 'assistant', 'con
tent': 'SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) AS Averag
eInvoiceTotal\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Custome
rId\nGROUP BY c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user', 'con
tent': 'Find the total number of invoices per country'}, {'role': 'assistan
t', 'content': 'SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFROM
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Coun
try'}, {'role': 'user', 'content': 'List all invoices with a total exceeding
$10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId, Total FROM invoic
es WHERE Total > 10'}, {'role': 'user', 'content': 'Find all invoices since
2010 and the total amount invoiced:'}, {'role': 'assistant', 'content': "SEL
ECT InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01-01'"},
{'role': 'user', 'content': 'Find the top 5 most expensive tracks (based on
unit price):'}, {'role': 'assistant', 'content': 'SELECT TrackId, Name, Unit
Price \nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5'}, {'role': 'user',
'content': "\n        For the question which table stores customer's orders,
\n        the generated SQL statement invoices results in the following exce
ption [ERROR-SQL] the generated SQL : invoices\n does not starts with ('sele
ct','with') .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT * FROM invoices'}, {'role': 'us
er', 'content': 'How many customers are there'}, {'role': 'assistant', 'cont
ent': 'SELECT COUNT(*) FROM customers'}, {'role': 'user', 'content': 'List a
ll customers from Canada and their email addresses:'}, {'role': 'assistant',
'content': "SELECT CustomerId, FirstName, LastName, Email \nFROM customers
\nWHERE Country = 'Canada'"}, {'role': 'user', 'content': "\n        For the
question what are the top 5 countries that customers come from?, \n        t
he generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5'}, {'role': 'user', 'content': 'Find the customer with the most invoices
'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
INDEX IFK_InvoiceCustomerId ON \"invoices\" (CustomerId)\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
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) 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    LastNa
me NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVARC
HAR(70),\r\n    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
Fax NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\r\n    SupportRepId I
NTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (Employee
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
\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NOT NU
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    Me
diaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGER,\r\n    Composer NVARCHA
R(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\n===Additional Context \n\nIn the chinook database invoice means ord
er\n\n\n    In the 'customers' table, address column names do not have 'Bill
ing' prefix, \n    e.g. country column name is 'country', not 'BillingCountr
y'\n    \n\n===Response Guidelines \n1. If the provided context is sufficien
t, please generate a valid SQL query without any explanations for the questi
on. \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 distinct strings in that column. Prepend the query wit
h a comment saying intermediate_sql \n3. If the provided context is insuffic
ient, please explain why it can't be generated. \n4. Please use the most rel
evant table(s). \n5. If the question has been asked and answered before, ple
ase repeat the answer exactly as it was given before. \n"}, {"role": "user",
"content": "Get the total number of invoices for each customer"}, {"role":
"assistant", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT
(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.Custo
merId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"ro
le": "user", "content": " Get the average invoice total for each custome
r:"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.
LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers c\nJOIN invoic
es i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.L
astName"}, {"role": "user", "content": "Find the total number of invoices pe
r country"}, {"role": "assistant", "content": "SELECT c.Country, COUNT(i.Inv
oiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId
= i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "content": "List all
invoices with a total exceeding $10"}, {"role": "assistant", "content": "SEL
ECT InvoiceId, Total FROM invoices WHERE Total > 10"}, {"role": "user", "con
tent": "Find all invoices since 2010 and the total amount invoiced:"}, {"rol
e": "assistant", "content": "SELECT InvoiceId, Total \nFROM invoices \nWHERE
InvoiceDate >= '2010-01-01'"}, {"role": "user", "content": "Find the top 5 m
ost expensive tracks (based on unit price):"}, {"role": "assistant", "conten
t": "SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice DESC
\nLIMIT 5"}, {"role": "user", "content": "\n        For the question which t
able stores customer's orders, \n        the generated SQL statement invoice
s results in the following exception [ERROR-SQL] the generated SQL : invoice
s\n does not starts with ('select','with') .\n        Please fix the error a
nd re-generate the SQL\n        "}, {"role": "assistant", "content": "SELECT
* FROM invoices"}, {"role": "user", "content": "How many customers are ther
e"}, {"role": "assistant", "content": "SELECT COUNT(*) FROM customers"}, {"r
ole": "user", "content": "List all customers from Canada and their email add
resses:"}, {"role": "assistant", "content": "SELECT CustomerId, FirstName, L
astName, Email \nFROM customers \nWHERE Country = 'Canada'"}, {"role": "use
r", "content": "\n        For the question what are the top 5 countries that
customers come from?, \n        the generated SQL statement SELECT BillingCo
untry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY BillingCountry
\nORDER BY CustomerCount DESC \nLIMIT 5 results in the following exception
[ERROR-DB] Failed to execute SQL: SELECT BillingCountry, COUNT(*) as Custome
rCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount D
ESC \nLIMIT 5\n Execution failed on sql 'SELECT BillingCountry, COUNT(*) as
CustomerCount \nFROM customers \nGROUP BY BillingCountry \nORDER BY Customer
Count DESC \nLIMIT 5': no such column: BillingCountry .\n        Please fix
the error and re-generate the SQL\n        "}, {"role": "assistant", "conten
t": "SELECT Country, COUNT(*) AS CustomerCount \nFROM customers \nGROUP BY C
ountry \nORDER BY CustomerCount DESC \nLIMIT 5"}, {"role": "user", "conten
t": "Find the customer with the most invoices "}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:31:04.970710903Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName,
c.LastName, COUNT(i.InvoiceId) AS InvoiceCount\nFROM customers c\nJOIN invoi
ces i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.
LastName\nORDER BY InvoiceCount DESC\nLIMIT 1'}, 'done_reason': 'stop', 'don
e': True, 'total_duration': 217711179011, 'load_duration': 10866372, 'prompt
_eval_count': 1652, 'prompt_eval_duration': 194130659000, 'eval_count': 59,
'eval_duration': 21873221000}

[( LLM Response )]
SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS InvoiceC
ount
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY InvoiceCount DESC
LIMIT 1

[( SQL )]
generated SQL statement
```

```sql
SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS InvoiceCount
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY InvoiceCount DESC
LIMIT 1
```

```
[( DATA )]
queried data frame
```

	CustomerId	FirstName	LastName	InvoiceCount
0	1	Luís	Gonçalves	7

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Fi
nd the customer with the most invoices '\n\nThe DataFrame was produced using
this query: SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId)
AS InvoiceCount\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Custo
merId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY InvoiceCount
DESC\nLIMIT 1\n\nThe following is information about the resulting pandas Dat
aFrame 'df': \nRunning df.dtypes gives:\n CustomerId       int64\nFirstName
object\nLastName        object\nInvoiceCount     int64\ndtype: object"}, {"r
ole": "user", "content": "Can you generate the Python plotly code to chart t
he 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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:32:17.692019296Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objs as go\n\n
if len(df) == 1:\n    figure = {\n        \'data\': [go.Indicator(\n
mode=\'number+delta\',\n            value=df[\'InvoiceCount\'].iloc[0],\n
number={\'suffix\': " Invoices"},\n            delta={\'position\': \'right
\'}\n        )]\n    }\nelse:\n    figure = {\n        \'data\': [\n
go.Bar(x=df[\'FirstName\'] + \' \' + df[\'LastName\'], y=df[\'InvoiceCount
\'])\n        ]\n    }\n\nfigure[\'layout\'] = go.Layout(title=\'Customer wi
th the Most Invoices\', xaxis=dict(title=\'Customer\'), yaxis=dict(title=\'N
umber of Invoices\'))\n\nfigure[\'layout\'].update(margin=dict(l=50, r=50, b
=100))\n\ngo.Figure(figure).show()'}, 'done_reason': 'stop', 'done': True,
'total_duration': 72672863955, 'load_duration': 10476149, 'prompt_eval_coun
t': 213, 'prompt_eval_duration': 18045478000, 'eval_count': 171, 'eval_durat
ion': 54479712000}
```

Customer with the Most Invoices

```
[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go

if len(df) == 1:
    figure = {
        'data': [go.Indicator(
            mode='number+delta',
            value=df['InvoiceCount'].iloc[0],
            number={'suffix': " Invoices"},
            delta={'position': 'right'}
        )]
    }
else:
    figure = {
        'data': [
            go.Bar(x=df['FirstName'] + ' ' + df['LastName'], y=df['InvoiceCount'])
        ]
    }

figure['layout'] = go.Layout(title='Customer with the Most Invoices', xaxis=dict(title='Customer'), yaxis=dict(title='Number of Invoices'))

figure['layout'].update(margin=dict(l=50, r=50, b=100))

go.Figure(figure).show()
```

```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
=============================================================================
====
# QUESTION - 21:  Find the customer who bought the most albums in total quan
tity (across all invoices):
=============================================================================
====



[( SQL Prompt )]
[{'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 PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    Albu
mId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId 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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPD
ATE 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 NU
LL,\r\n    TrackId INTEGER  NOT NULL,\r\n    UnitPrice NUMERIC(10,2)  NOT NU
LL,\r\n    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\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DEL
ETE 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    Title NVARCHAR(16
0)  NOT NULL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOREIGN KEY (ArtistI
d) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO
ACTION\r\n)\n\nCREATE INDEX IFK_AlbumArtistId ON "albums" (ArtistId)\n\nCREA
TE TABLE "invoices"\r\n(\r\n    InvoiceId INTEGER PRIMARY KEY AUTOINCREMENT
NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    InvoiceDate DATETIME
NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    BillingCity NVARCHAR(4
0),\r\n    BillingState NVARCHAR(40),\r\n    BillingCountry NVARCHAR(40),\r
\n    BillingPostalCode NVARCHAR(10),\r\n    Total NUMERIC(10,2)  NOT NUL
L,\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_Invoice
LineTrackId ON "invoice_items" (TrackId)\n\nCREATE INDEX IFK_InvoiceLineInvo
iceId ON "invoice_items" (InvoiceId)\n\nCREATE INDEX IFK_InvoiceCustomerId O
N "invoices" (CustomerId)\n\nCREATE INDEX IFK_TrackAlbumId ON "tracks" (Albu
mId)\n\nCREATE TABLE "artists"\r\n(\r\n    ArtistId INTEGER PRIMARY KEY AUTO
INCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\n\n===Additional Contex
t \n\nIn the chinook database invoice means order\n\n\n    In the \'customer
s\' table, address column names do not have \'Billing\' prefix, \n    e.g. c
ountry column name is \'country\', not \'BillingCountry\'\n    \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 query 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': 'Find the
```

```
customer with the most invoices '}, {'role': 'assistant', 'content': 'SELECT
c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS InvoiceCount\nF
ROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.
CustomerId, c.FirstName, c.LastName\nORDER BY InvoiceCount DESC\nLIMIT 1'},
{'role': 'user', 'content': ' \n        Can you find the top 10 most popular
artists based on the number of tracks?\n        Hint: There are 3 tables - a
rtists, albums and tracks, \n        where albums and artists are linked by
ArtistId, albums and tracks are linked by AlbumId,\n    '}, {'role': 'assist
ant', 'content': 'SELECT a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfT
racks\nFROM artists a\nJOIN albums al ON a.ArtistId = al.ArtistId\nJOIN trac
ks t ON al.AlbumId = t.AlbumId\nGROUP BY a.ArtistId, a.Name\nORDER BY Number
OfTracks DESC\nLIMIT 10'}, {'role': 'user', 'content': 'Get the total number
of invoices for each customer'}, {'role': 'assistant', 'content': 'SELECT c.
CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFR
OM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.C
ustomerId, c.FirstName, c.LastName'}, {'role': 'user', 'content': 'List all
invoices with a total exceeding $10'}, {'role': 'assistant', 'content': 'SEL
ECT InvoiceId, Total FROM invoices WHERE Total > 10'}, {'role': 'user', 'con
tent': ' Get the average invoice total for each customer:'}, {'role': 'assis
tant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, AVG(i.Tota
l) AS AverageInvoiceTotal\nFROM customers c\nJOIN invoices i ON c.CustomerId
= i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName'}, {'role':
'user', 'content': 'Find the total number of invoices per country'}, {'rol
e': 'assistant', 'content': 'SELECT c.Country, COUNT(i.InvoiceId) AS TotalIn
voices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGR
OUP BY c.Country'}, {'role': 'user', 'content': 'Find all invoices since 201
0 and the total amount invoiced:'}, {'role': 'assistant', 'content': "SELECT
InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {'ro
le': 'user', 'content': 'Find the top 5 most expensive tracks (based on unit
price):'}, {'role': 'assistant', 'content': 'SELECT TrackId, Name, UnitPrice
\nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5'}, {'role': 'user', 'conte
nt': 'List all albums and their corresponding artist names  '}, {'role': 'as
sistant', 'content': 'SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName \n
FROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'role': 'use
r', 'content': 'List all genres and the number of tracks in each genre:'},
{'role': 'assistant', 'content': 'SELECT g.Name AS GenreName, COUNT(t.TrackI
d) AS NumberOfTracks\nFROM genres g\nJOIN tracks t ON g.GenreId = t.GenreId
\nGROUP BY g.Name'}, {'role': 'user', 'content': 'Find the customer who boug
ht the most albums in total quantity (across all invoices):'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    A
lbumId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGE
R,\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 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\tON DELETE NO ACTION O
N UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"invoice_items\"\r\n(\r\n    Invoic
eLineId 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 \"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 ACTION\r\n)\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    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    Invoi
ceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    Billin
gCity NVARCHAR(40),\r\n    BillingState NVARCHAR(40),\r\n    BillingCountry
NVARCHAR(40),\r\n    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 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    ArtistId
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\n    In the 'customers' table, address column names do not have 'Billing'
prefix, \n    e.g. country column name is 'country', not 'BillingCountry'\n
\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": "Find the customer with the most invoices "}, {"role": "assistant", "co
ntent": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS
InvoiceCount\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Customer
Id\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY InvoiceCount DE
SC\nLIMIT 1"}, {"role": "user", "content": " \n        Can you find the top
10 most popular artists based on the number of tracks?\n        Hint: There
are 3 tables - artists, albums and tracks, \n        where albums and artist
s are linked by ArtistId, albums and tracks are linked by AlbumId,\n    "},
{"role": "assistant", "content": "SELECT a.Name AS ArtistName, COUNT(t.Track
Id) AS NumberOfTracks\nFROM artists a\nJOIN albums al ON a.ArtistId = al.Art
istId\nJOIN tracks t ON al.AlbumId = t.AlbumId\nGROUP BY a.ArtistId, a.Name
\nORDER BY NumberOfTracks DESC\nLIMIT 10"}, {"role": "user", "content": "Get
the total number of invoices for each customer"}, {"role": "assistant", "con
tent": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS
TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Custome
rId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"role": "user", "con
tent": "List all invoices with a total exceeding $10"}, {"role": "assistan
t", "content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"},
{"role": "user", "content": " Get the average invoice total for each custome
```

```
r:"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.
LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers c\nJOIN invoic
es i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.L
astName"}, {"role": "user", "content": "Find the total number of invoices pe
r country"}, {"role": "assistant", "content": "SELECT c.Country, COUNT(i.Inv
oiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId
= i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "content": "Find all
invoices since 2010 and the total amount invoiced:"}, {"role": "assistant",
"content": "SELECT InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate >=
'2010-01-01'"}, {"role": "user", "content": "Find the top 5 most expensive t
racks (based on unit price):"}, {"role": "assistant", "content": "SELECT Tra
ckId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5"},
{"role": "user", "content": "List all albums and their corresponding artist
names  "}, {"role": "assistant", "content": "SELECT a.Title AS AlbumTitle, a
r.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.Ar
tistId"}, {"role": "user", "content": "List all genres and the number of tra
cks in each genre:"}, {"role": "assistant", "content": "SELECT g.Name AS Gen
reName, COUNT(t.TrackId) AS NumberOfTracks\nFROM genres g\nJOIN tracks t ON
g.GenreId = t.GenreId\nGROUP BY g.Name"}, {"role": "user", "content": "Find
the customer who bought the most albums in total quantity (across all invoic
es):"}]
```

```
[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:35:42.660106588Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName,
c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN in
voices i ON c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceI
d = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON
t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDE
R BY TotalAlbumsBought DESC\nLIMIT 1'}, 'done_reason': 'stop', 'done': True,
'total_duration': 204907743343, 'load_duration': 12943331, 'prompt_eval_coun
t': 1451, 'prompt_eval_duration': 164861583000, 'eval_count': 104, 'eval_dur
ation': 38366939000}

[( LLM Response )]
SELECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbum
sBought
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
JOIN invoice_items ii ON i.InvoiceId = ii.InvoiceId
JOIN tracks t ON ii.TrackId = t.TrackId
JOIN albums al ON t.AlbumId = al.AlbumId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY TotalAlbumsBought DESC
LIMIT 1

[( SQL )]
generated SQL statement
```

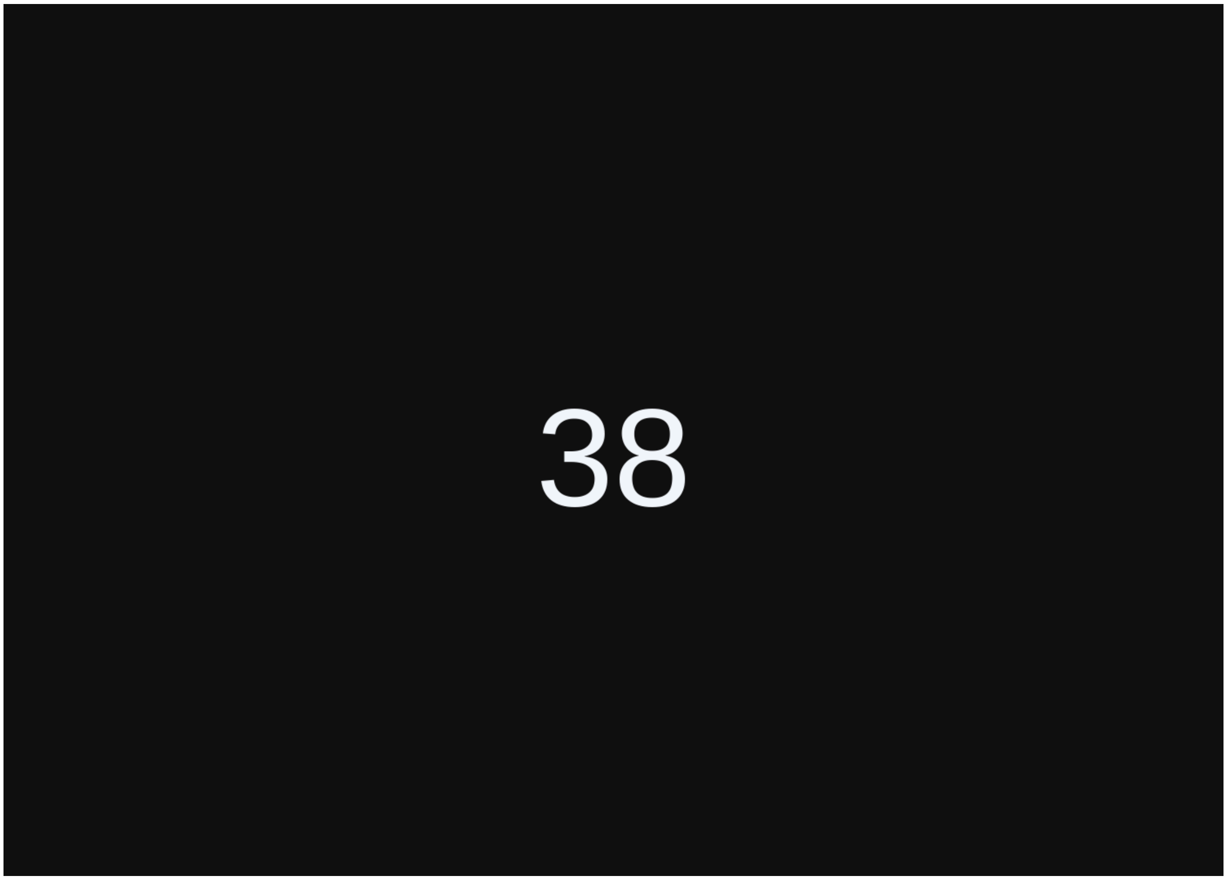
```sql
SELECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
JOIN invoice_items ii ON i.InvoiceId = ii.InvoiceId
JOIN tracks t ON ii.TrackId = t.TrackId
JOIN albums al ON t.AlbumId = al.AlbumId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY TotalAlbumsBought DESC
LIMIT 1
```

```
[( DATA )]
queried data frame
```

	CustomerId	FirstName	LastName	TotalAlbumsBought
0	1	Luís	Gonçalves	38

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Fi
nd the customer who bought the most albums in total quantity (across all inv
oices):'\n\nThe DataFrame was produced using this query: SELECT c.CustomerI
d, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM cust
omers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_items
ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJ
OIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName,
c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 1\n\nThe following is inf
ormation about the resulting pandas DataFrame 'df': \nRunning df.dtypes give
s:\n CustomerId            int64\nFirstName            object\nLastName
object\nTotalAlbumsBought     int64\ndtype: object"}, {"role": "user", "cont
ent": "Can you generate the Python plotly code to chart the results of the d
ataframe? 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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:36:31.07318783Z', 'mes
sage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go\n
\nif len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=df
[\'TotalAlbumsBought\'].iloc[0]))\nelse:\n    fig = go.Figure(go.Bar(x=df
[\'FirstName\'] + \' \' + df[\'LastName\'], y=df[\'TotalAlbumsBought\']))\nf
ig.show()'}, 'done_reason': 'stop', 'done': True, 'total_duration': 48371779
427, 'load_duration': 12420849, 'prompt_eval_count': 271, 'prompt_eval_durat
ion': 23637453000, 'eval_count': 78, 'eval_duration': 24590852000}

[( PYTHON )]
generated Plotly code
```

```
import plotly.graph_objects as go

if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['TotalAlbumsBought'].iloc[0]))
else:
    fig = go.Figure(go.Bar(x=df['FirstName'] + ' ' + df['LastName'], y=df['TotalAlbumsBought']))
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
=============================================================================
====
# QUESTION - 22:
        Find the top 5 customers who bought the most albums in total quantit
y (across all invoices):
        Hint: album quantity is found in invoice_items,

=============================================================================
====



[( SQL Prompt )]
[{'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 IN
TEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    InvoiceId INTEGER  NOT NUL
L,\r\n    TrackId INTEGER  NOT NULL,\r\n    UnitPrice NUMERIC(10,2)  NOT NUL
L,\r\n    Quantity INTEGER  NOT NULL,\r\n    FOREIGN KEY (InvoiceId) REFEREN
CES "invoices" (InvoiceId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO
N,\r\n    FOREIGN KEY (TrackId) REFERENCES "tracks" (TrackId) \r\n\t\tON DEL
ETE 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
L,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(220),\r\n    Millisecond
s INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    UnitPrice NUMERIC(10,2)  N
OT NULL,\r\n    FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumId) \r\n\t\t
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 TABLE "albums"\r\n(\r\n
AlbumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Title NVARCHAR(16
0)  NOT NULL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FOREIGN KEY (ArtistI
d) REFERENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO
ACTION\r\n)\n\nCREATE INDEX IFK_InvoiceLineInvoiceId ON "invoice_items" (Inv
oiceId)\n\nCREATE TABLE "invoices"\r\n(\r\n    InvoiceId INTEGER PRIMARY KEY
AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    InvoiceD
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" (CustomerI
d) \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_AlbumArt
istId ON "albums" (ArtistId)\n\nCREATE INDEX IFK_InvoiceCustomerId ON "invoi
ces" (CustomerId)\n\nCREATE TABLE "artists"\r\n(\r\n    ArtistId INTEGER PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE IN
DEX IFK_TrackAlbumId ON "tracks" (AlbumId)\n\n\n===Additional Context \n\nIn
the chinook database invoice means order\n\n\n    In the \'customers\' tabl
e, address column names do not have \'Billing\' prefix, \n    e.g. country c
olumn name is \'country\', not \'BillingCountry\'\n    \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': 'Find the custom
er who bought the most albums in total quantity (across all invoices):'},
{'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastNa
me, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoices i
ON c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId = ii.In
voiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.AlbumI
d = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY Tot
alAlbumsBought DESC\nLIMIT 1'}, {'role': 'user', 'content': ' \n        Can
you find the top 10 most popular artists based on the number of tracks?\n
Hint: There are 3 tables - artists, albums and tracks, \n        where album
s and artists are linked by ArtistId, albums and tracks are linked by AlbumI
d,\n    '}, {'role': 'assistant', 'content': 'SELECT a.Name AS ArtistName, C
OUNT(t.TrackId) AS NumberOfTracks\nFROM artists a\nJOIN albums al ON a.Artis
tId = al.ArtistId\nJOIN tracks t ON al.AlbumId = t.AlbumId\nGROUP BY a.Artis
tId, a.Name\nORDER BY NumberOfTracks DESC\nLIMIT 10'}, {'role': 'user', 'con
tent': 'Find the customer with the most invoices '}, {'role': 'assistant',
'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId)
AS InvoiceCount\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Custo
merId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY InvoiceCount
DESC\nLIMIT 1'}, {'role': 'user', 'content': 'List all invoices with a total
exceeding $10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId, Total F
ROM invoices WHERE Total > 10'}, {'role': 'user', 'content': 'Find the top 5
most expensive tracks (based on unit price):'}, {'role': 'assistant', 'conte
nt': 'SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice DES
C \nLIMIT 5'}, {'role': 'user', 'content': 'Get the total number of invoices
for each customer'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId,
c.FirstName, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers
c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.
FirstName, c.LastName'}, {'role': 'user', 'content': ' Get the average invoi
ce total for each customer:'}, {'role': 'assistant', 'content': 'SELECT c.Cu
stomerId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Cust
omerId, c.FirstName, c.LastName'}, {'role': 'user', 'content': 'Find the tot
al number of invoices per country'}, {'role': 'assistant', 'content': 'SELEC
T c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN inv
oices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Country'}, {'role': 'use
r', 'content': 'Find all invoices since 2010 and the total amount invoice
d:'}, {'role': 'assistant', 'content': "SELECT InvoiceId, Total \nFROM invoi
ces \nWHERE InvoiceDate >= '2010-01-01'"}, {'role': 'user', 'content': 'List
all albums and their corresponding artist names  '}, {'role': 'assistant',
'content': 'SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM album
s a \nJOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'role': 'user', 'conte
nt': '      \n        Find the top 5 customers who bought the most albums in
total quantity (across all invoices):\n        Hint: album quantity is found
in invoice_items, \n    '}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
LL,\r\n    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\n    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
L,\r\n    GenreId INTEGER,\r\n    Composer NVARCHAR(220),\r\n    Millisecond
s INTEGER  NOT NULL,\r\n    Bytes INTEGER,\r\n    UnitPrice NUMERIC(10,2)  N
OT 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) REFE
RENCES \"genres\" (GenreId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTIO
N,\r\n    FOREIGN KEY (MediaTypeId) REFERENCES \"media_types\" (MediaTypeId)
\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    T
itle NVARCHAR(160)  NOT NULL,\r\n    ArtistId INTEGER  NOT NULL,\r\n    FORE
IGN KEY (ArtistId) REFERENCES \"artists\" (ArtistId) \r\n\t\tON DELETE NO AC
TION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_InvoiceLineInvoiceId ON
\"invoice_items\" (InvoiceId)\n\nCREATE TABLE \"invoices\"\r\n(\r\n    Invoi
ceId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER
NOT NULL,\r\n    InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARC
HAR(70),\r\n    BillingCity NVARCHAR(40),\r\n    BillingState NVARCHAR(4
0),\r\n    BillingCountry NVARCHAR(40),\r\n    BillingPostalCode NVARCHAR(1
0),\r\n    Total NUMERIC(10,2)  NOT NULL,\r\n    FOREIGN KEY (CustomerId) RE
FERENCES \"customers\" (CustomerId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO
ACTION\r\n)\n\nCREATE INDEX IFK_InvoiceLineTrackId ON \"invoice_items\" (Tra
ckId)\n\nCREATE INDEX IFK_AlbumArtistId ON \"albums\" (ArtistId)\n\nCREATE I
NDEX IFK_InvoiceCustomerId ON \"invoices\" (CustomerId)\n\nCREATE TABLE \"ar
tists\"\r\n(\r\n    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n
Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK_TrackAlbumId ON \"tracks\" (Albu
mId)\n\n\n===Additional Context \n\nIn the chinook database invoice means or
der\n\n\n    In the 'customers' table, address column names do not have 'Bil
ling' prefix, \n    e.g. country column name is 'country', not 'BillingCount
ry'\n    \n\n===Response Guidelines \n1. If the provided context is sufficie
nt, please generate a valid SQL query without any explanations for the quest
ion. \n2. If the provided context is almost sufficient but requires knowledg
e of a specific string in a particular column, please generate an intermedia
te 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 insuf
ficient, 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": "use
r", "content": "Find the customer who bought the most albums in total quanti
ty (across all invoices):"}, {"role": "assistant", "content": "SELECT c.Cust
omerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_it
ems ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackI
d\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstN
ame, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 1"}, {"role": "use
r", "content": " \n        Can you find the top 10 most popular artists base
d on the number of tracks?\n        Hint: There are 3 tables - artists, albu
ms and tracks, \n        where albums and artists are linked by ArtistId, al
bums and tracks are linked by AlbumId,\n    "}, {"role": "assistant", "conte
```

```
nt": "SELECT a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfTracks\nFROM
artists a\nJOIN albums al ON a.ArtistId = al.ArtistId\nJOIN tracks t ON al.A
lbumId = t.AlbumId\nGROUP BY a.ArtistId, a.Name\nORDER BY NumberOfTracks DES
C\nLIMIT 10"}, {"role": "user", "content": "Find the customer with the most
invoices "}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstN
ame, c.LastName, COUNT(i.InvoiceId) AS InvoiceCount\nFROM customers c\nJOIN
invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstNam
e, c.LastName\nORDER BY InvoiceCount DESC\nLIMIT 1"}, {"role": "user", "cont
ent": "List all invoices with a total exceeding $10"}, {"role": "assistant",
"content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"}, {"rol
e": "user", "content": "Find the top 5 most expensive tracks (based on unit
price):"}, {"role": "assistant", "content": "SELECT TrackId, Name, UnitPrice
\nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5"}, {"role": "user", "conte
nt": "Get the total number of invoices for each customer"}, {"role": "assist
ant", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.Invo
iceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId =
i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"}, {"role": "us
er", "content": " Get the average invoice total for each customer:"}, {"rol
e": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, A
VG(i.Total) AS AverageInvoiceTotal\nFROM customers c\nJOIN invoices i ON c.C
ustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName"},
{"role": "user", "content": "Find the total number of invoices per countr
y"}, {"role": "assistant", "content": "SELECT c.Country, COUNT(i.InvoiceId)
AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Cust
omerId\nGROUP BY c.Country"}, {"role": "user", "content": "Find all invoices
since 2010 and the total amount invoiced:"}, {"role": "assistant", "conten
t": "SELECT InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate >= '2010-01
-01'"}, {"role": "user", "content": "List all albums and their corresponding
artist names  "}, {"role": "assistant", "content": "SELECT a.Title AS AlbumT
itle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId
= ar.ArtistId"}, {"role": "user", "content": "      \n       Find the top 5
customers who bought the most albums in total quantity (across all invoice
s):\n        Hint: album quantity is found in invoice_items, \n    "}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:40:07.613175509Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName,
c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN in
voices i ON c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceI
d = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON
t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDE
R BY TotalAlbumsBought DESC\nLIMIT 5'}, 'done_reason': 'stop', 'done': True,
'total_duration': 216465913729, 'load_duration': 11337852, 'prompt_eval_coun
t': 1538, 'prompt_eval_duration': 176778325000, 'eval_count': 104, 'eval_dur
ation': 37992573000}

[( LLM Response )]
SELECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbum
sBought
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
JOIN invoice_items ii ON i.InvoiceId = ii.InvoiceId
JOIN tracks t ON ii.TrackId = t.TrackId
JOIN albums al ON t.AlbumId = al.AlbumId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY TotalAlbumsBought DESC
```

```
LIMIT 5

[( SQL )]
generated SQL statement
```

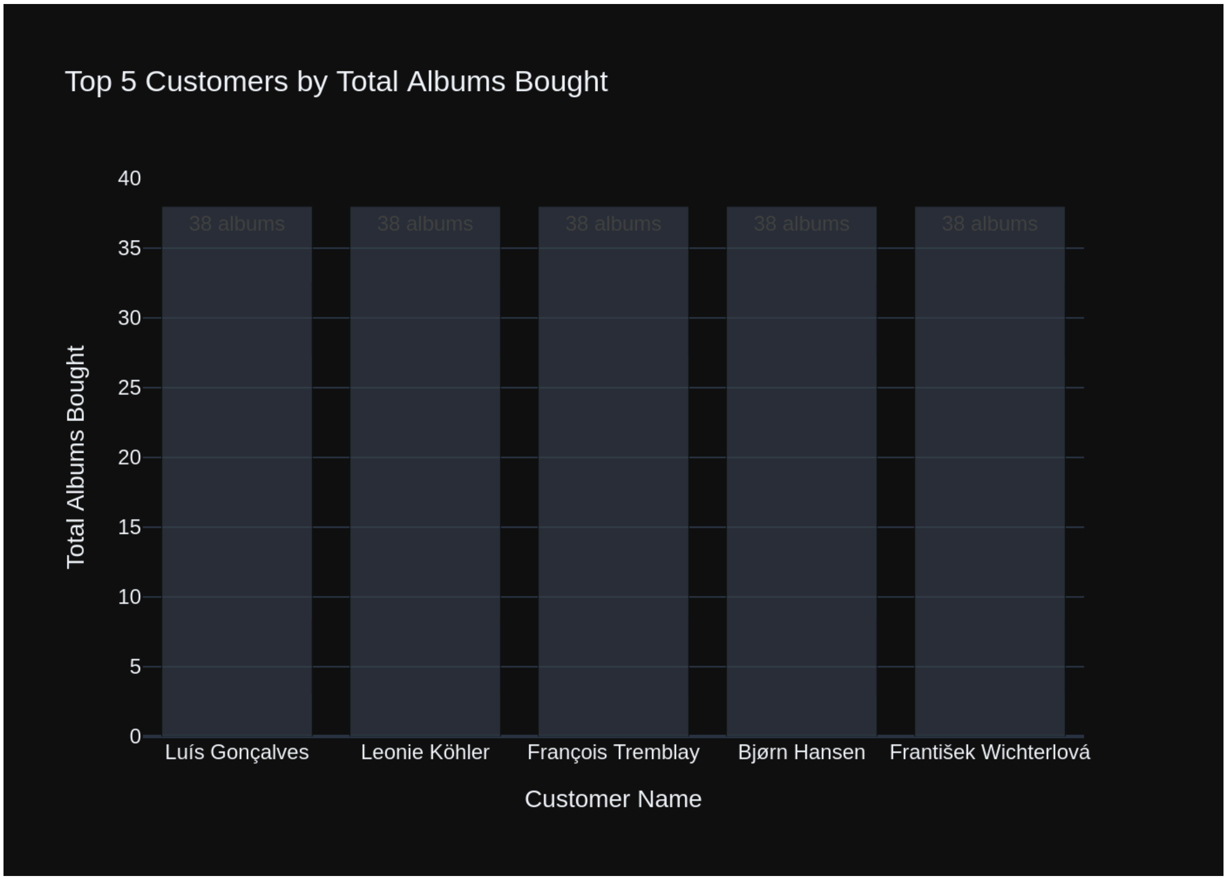
```
SELECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
JOIN invoice_items ii ON i.InvoiceId = ii.InvoiceId
JOIN tracks t ON ii.TrackId = t.TrackId
JOIN albums al ON t.AlbumId = al.AlbumId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY TotalAlbumsBought DESC
LIMIT 5
```

```
[( DATA )]
queried data frame
```

	CustomerId	FirstName	LastName	TotalAlbumsBought
0	1	Luís	Gonçalves	38
1	2	Leonie	Köhler	38
2	3	François	Tremblay	38
3	4	Bjørn	Hansen	38
4	5	František	Wichterlová	38

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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 the top 5 customers who bought the most albums in total quant
ity (across all invoices):\n        Hint: album quantity is found in invoice
_items, \n    '\n\nThe DataFrame was produced using this query: SELECT c.Cus
tomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFRO
M customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_
items ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.Trac
kId\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.Firs
tName, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 5\n\nThe following
is information about the resulting pandas DataFrame 'df': \nRunning df.dtype
s gives:\n CustomerId            int64\nFirstName            object\nLastNam
e             object\nTotalAlbumsBought     int64\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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:41:23.612999691Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go
\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=
df[\'TotalAlbumsBought\'].iloc[0]))\nelse:\n    fig = go.Figure(go.Bar(x=df
[\'FirstName\'] + \' \' + df[\'LastName\'], y=df[\'TotalAlbumsBought\'],\n
marker=dict(color=\'rgba(58, 71, 80, 0.6)\'),\n                            t
ext=df[\'TotalAlbumsBought\'].apply(lambda x: f\'{x} albums\'),\n
textposition=\'auto\'))\n    fig.update_layout(title=\'Top 5 Customers by To
tal Albums Bought\',\n                      xaxis_title=\'Customer Name\', y
axis_title=\'Total Albums Bought\')\nfig.show()'}, 'done_reason': 'stop', 'd
one': True, 'total_duration': 75967171962, 'load_duration': 13994231, 'promp
t_eval_count': 289, 'prompt_eval_duration': 25454924000, 'eval_count': 158,
'eval_duration': 50364622000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objects as go


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['TotalAlbumsBought'].iloc[0]))
else:
    fig = go.Figure(go.Bar(x=df['FirstName'] + ' ' + df['LastName'], y=df['TotalAlbumsBought'],
                           marker=dict(color='rgba(58, 71, 80, 0.6)'),
                           text=df['TotalAlbumsBought'].apply(lambda x: f'{x} albums'),
                           textposition='auto'))
    fig.update_layout(title='Top 5 Customers by Total Albums Bought',
                      xaxis_title='Customer Name', yaxis_title='Total Albums Bought')
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 23:
         Find the top 5 customers who spent the most money overall,
         Hint: order total can be found on invoices table, calculation using
invoice_items detail table is unnecessary

============================================================================
====



[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 AUTOINCR
EMENT 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 "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 AC
TION\r\n)\n\nCREATE INDEX IFK_InvoiceLineInvoiceId ON "invoice_items" (Invoi
ceId)\n\nCREATE INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCR
EATE INDEX IFK_InvoiceLineTrackId ON "invoice_items" (TrackId)\n\nCREATE TAB
LE "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    Address NVARCHAR(70),\r\n    C
ity 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 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 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
RCHAR(30),\r\n    ReportsTo INTEGER,\r\n    BirthDate DATETIME,\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
(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHAR(24),\r\n    Email NVARC
HAR(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 "track
s"\r\n(\r\n    TrackId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Na
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
IC(10,2)  NOT NULL,\r\n    FOREIGN KEY (AlbumId) REFERENCES "albums" (AlbumI
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
ACTION,\r\n    FOREIGN KEY (MediaTypeId) REFERENCES "media_types" (MediaType
Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE "pl
```

```
aylist_track"\r\n(\r\n    PlaylistId INTEGER  NOT NULL,\r\n    TrackId INTEG
ER  NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (PlaylistId, T
rackId),\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 AC
TION\r\n)\n\nCREATE INDEX IFK_EmployeeReportsTo ON "employees" (ReportsTo)\n
\n\n===Additional Context \n\nIn the chinook database invoice means order\n
\n\n    In the \'customers\' table, address column names do not have \'Billi
ng\' prefix, \n    e.g. country column name is \'country\', not \'BillingCou
ntry\'\n    \n\n===Response Guidelines \n1. If the provided context is suffi
cient, please generate a valid SQL query without any explanations for the qu
estion. \n2. If the provided context is almost sufficient but requires knowl
edge of a specific string in a particular column, please generate an interme
diate SQL query to find the distinct strings in that column. Prepend the que
ry with a comment saying intermediate_sql \n3. If the provided context is in
sufficient, 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        Find the top 5 customers who bought the
most albums in total quantity (across all invoices):\n        Hint: album qu
antity is found in invoice_items, \n    '}, {'role': 'assistant', 'content':
'SELECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbu
msBought\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\n
JOIN invoice_items ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.Tra
ckId = t.TrackId\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.Custo
merId, c.FirstName, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 5'},
{'role': 'user', 'content': 'Find the customer who bought the most albums in
total quantity (across all invoices):'}, {'role': 'assistant', 'content': 'S
ELECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbums
Bought\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJO
IN invoice_items ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.Track
Id = t.TrackId\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.Custome
rId, c.FirstName, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 1'},
{'role': 'user', 'content': ' Get the average invoice total for each custome
r:'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.
LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers c\nJOIN invoic
es i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.L
astName'}, {'role': 'user', 'content': 'Find the customer with the most invo
ices '}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName,
c.LastName, COUNT(i.InvoiceId) AS InvoiceCount\nFROM customers c\nJOIN invoi
ces i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.
LastName\nORDER BY InvoiceCount DESC\nLIMIT 1'}, {'role': 'user', 'content':
'Get the total number of invoices for each customer'}, {'role': 'assistant',
'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId)
AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Cust
omerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName'}, {'role': 'user',
'content': 'Find the total number of invoices per country'}, {'role': 'assis
tant', 'content': 'SELECT c.Country, COUNT(i.InvoiceId) AS TotalInvoices\nFR
OM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.C
ountry'}, {'role': 'user', 'content': 'List all invoices with a total exceed
ing $10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId, Total FROM in
voices WHERE Total > 10'}, {'role': 'user', 'content': 'Find the top 5 most
expensive tracks (based on unit price):'}, {'role': 'assistant', 'content':
'SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice DESC \nL
IMIT 5'}, {'role': 'user', 'content': ' \n        Can you find the top 10 mo
st popular artists based on the number of tracks?\n        Hint: There are 3
```

```
tables - artists, albums and tracks, \n        where albums and artists are
linked by ArtistId, albums and tracks are linked by AlbumId,\n    '}, {'rol
e': 'assistant', 'content': 'SELECT a.Name AS ArtistName, COUNT(t.TrackId) A
S NumberOfTracks\nFROM artists a\nJOIN albums al ON a.ArtistId = al.ArtistId
\nJOIN tracks t ON al.AlbumId = t.AlbumId\nGROUP BY a.ArtistId, a.Name\nORDE
R BY NumberOfTracks DESC\nLIMIT 10'}, {'role': 'user', 'content': 'Find all
invoices since 2010 and the total amount invoiced:'}, {'role': 'assistant',
'content': "SELECT InvoiceId, Total \nFROM invoices \nWHERE InvoiceDate >=
'2010-01-01'"}, {'role': 'user', 'content': '  \n         Find the top 5 cus
tomers who spent the most money overall,  \n         Hint: order total can b
e found on invoices table, calculation using invoice_items detail table is u
nnecessary \n    '}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
CREMENT 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 \"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    LastName NVA
RCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    Address NVARCHAR(7
0),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r\n    Country NVAR
CHAR(40),\r\n    PostalCode NVARCHAR(10),\r\n    Phone NVARCHAR(24),\r\n
Fax NVARCHAR(24),\r\n    Email NVARCHAR(60)  NOT NULL,\r\n    SupportRepId I
NTEGER,\r\n    FOREIGN KEY (SupportRepId) REFERENCES \"employees\" (Employee
Id) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE TABLE \"e
mployees\"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  NO
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
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
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 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
R,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGER,\r\n    Comp
oser NVARCHAR(220),\r\n    Milliseconds INTEGER  NOT NULL,\r\n    Bytes INTE
GER,\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 ACT
ION,\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
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
ACTION,\r\n    FOREIGN KEY (TrackId) REFERENCES \"tracks\" (TrackId) \r\n\t
\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCREATE INDEX IFK_EmployeeR
eportsTo ON \"employees\" (ReportsTo)\n\n\n===Additional Context \n\nIn the
chinook database invoice means order\n\n\n    In the 'customers' table, addr
ess column names do not have 'Billing' prefix, \n    e.g. country column nam
e is 'country', not 'BillingCountry'\n    \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": "      \n        Find the top
5 customers who bought the most albums in total quantity (across all invoice
s):\n        Hint: album quantity is found in invoice_items, \n    "}, {"rol
e": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, S
UM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId = ii.Invoi
ceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.AlbumId =
al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY TotalAl
bumsBought DESC\nLIMIT 5"}, {"role": "user", "content": "Find the customer w
ho bought the most albums in total quantity (across all invoices):"}, {"rol
e": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, S
UM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId = ii.Invoi
ceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.AlbumId =
al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY TotalAl
bumsBought DESC\nLIMIT 1"}, {"role": "user", "content": " Get the average in
voice total for each customer:"}, {"role": "assistant", "content": "SELECT
c.CustomerId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\n
FROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY
c.CustomerId, c.FirstName, c.LastName"}, {"role": "user", "content": "Find t
he customer with the most invoices "}, {"role": "assistant", "content": "SEL
ECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS InvoiceCoun
t\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP B
Y c.CustomerId, c.FirstName, c.LastName\nORDER BY InvoiceCount DESC\nLIMIT
1"}, {"role": "user", "content": "Get the total number of invoices for each
customer"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstNa
me, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN
invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstNam
e, c.LastName"}, {"role": "user", "content": "Find the total number of invoi
ces per country"}, {"role": "assistant", "content": "SELECT c.Country, COUNT
(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.Custo
```

```
merId = i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "content": "Lis
t all invoices with a total exceeding $10"}, {"role": "assistant", "conten
t": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"}, {"role": "use
r", "content": "Find the top 5 most expensive tracks (based on unit pric
e):"}, {"role": "assistant", "content": "SELECT TrackId, Name, UnitPrice \nF
ROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5"}, {"role": "user", "conten
t": " \n        Can you find the top 10 most popular artists based on the nu
mber of tracks?\n         Hint: There are 3 tables - artists, albums and trac
ks, \n        where albums and artists are linked by ArtistId, albums and tr
acks are linked by AlbumId,\n    "}, {"role": "assistant", "content": "SELEC
T a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfTracks\nFROM artists a\n
JOIN albums al ON a.ArtistId = al.ArtistId\nJOIN tracks t ON al.AlbumId = t.
AlbumId\nGROUP BY a.ArtistId, a.Name\nORDER BY NumberOfTracks DESC\nLIMIT 1
0"}, {"role": "user", "content": "Find all invoices since 2010 and the total
amount invoiced:"}, {"role": "assistant", "content": "SELECT InvoiceId, Tota
l \nFROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"role": "user", "c
ontent": "  \n         Find the top 5 customers who spent the most money ove
rall,  \n         Hint: order total can be found on invoices table, calculat
ion using invoice_items detail table is unnecessary \n    "}]
```

```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
[ERROR-SQL] Failed to generate SQL for prompt:
         Find the top 5 customers who spent the most money overall,
         Hint: order total can be found on invoices table, calculation using
invoice_items detail table is unnecessary
     with the following exception:
timed out
*** RETRY 1 ***

[( SQL Prompt )]
[{'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 PRI
MARY KEY AUTOINCREMENT NOT NULL,\r\n    CustomerId INTEGER  NOT NULL,\r\n    
InvoiceDate DATETIME  NOT NULL,\r\n    BillingAddress NVARCHAR(70),\r\n    B
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 AUTOINCR
EMENT 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 "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 AC
TION\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    Address
NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r\n    Co
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    Sup
portRepId 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_InvoiceLineInvoiceId ON "invoice_items" (InvoiceId)\n\nCREATE TABL
E "employees"\r\n(\r\n    EmployeeId INTEGER PRIMARY KEY AUTOINCREMENT NOT N
ULL,\r\n    LastName NVARCHAR(20)  NOT NULL,\r\n    FirstName NVARCHAR(20)  
NOT NULL,\r\n    Title NVARCHAR(30),\r\n    ReportsTo INTEGER,\r\n    BirthD
ate DATETIME,\r\n    HireDate 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(10),\r\n    Phone NVARCHAR(24),\r\n    Fax NVARCHA
R(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 INDEX IFK_InvoiceCustomerId ON "invoices" (CustomerId)\n\nCREA
TE TABLE "artists"\r\n(\r\n    ArtistId INTEGER PRIMARY KEY AUTOINCREMENT NO
T NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK_InvoiceLineTrackI
d ON "invoice_items" (TrackId)\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    FOREIGN KEY (ArtistId) REFER
ENCES "artists" (ArtistId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r
\n)\n\nCREATE TABLE "playlists"\r\n(\r\n    PlaylistId INTEGER PRIMARY KEY A
UTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\n\n===Additional Con
text \n\nIn the chinook database invoice means order\n\n\n    In the \'custo
mers\' table, address column names do not have \'Billing\' prefix, \n    e.
g. country column name is \'country\', not \'BillingCountry\'\n    \n\n===Re
sponse Guidelines \n1. If the provided context is sufficient, please generat
e a valid SQL query without any explanations for the question. \n2. If the p
```

```
rovided context is almost sufficient but requires knowledge of a specific st
ring in a particular column, please generate an intermediate SQL query to fi
nd the distinct strings in that column. Prepend the query with a comment say
ing intermediate_sql \n3. If the provided context is insufficient, please ex
plain 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        Find the top 5 customers who bought the most albums in tota
l quantity (across all invoices):\n        Hint: album quantity is found in
invoice_items, \n    '}, {'role': 'assistant', 'content': 'SELECT c.Customer
Id, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM cus
tomers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_items
ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJ
OIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName,
c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 5'}, {'role': 'user', 'co
ntent': 'Find the customer who bought the most albums in total quantity (acr
oss all invoices):'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId,
c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM custome
rs c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_items ii
ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN
albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.L
astName\nORDER BY TotalAlbumsBought DESC\nLIMIT 1'}, {'role': 'user', 'conte
nt': 'Find the customer with the most invoices '}, {'role': 'assistant', 'co
ntent': 'SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.InvoiceId) AS
InvoiceCount\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.Customer
Id\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY InvoiceCount DE
SC\nLIMIT 1'}, {'role': 'user', 'content': ' Get the average invoice total f
or each customer:'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId,
c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM customers
c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.
FirstName, c.LastName'}, {'role': 'user', 'content': "\n        For the ques
tion what are the top 5 countries that customers come from?, \n        the g
enerated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount \nFR
OM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT
5 results in the following exception [ERROR-DB] Failed to execute SQL: SELEC
T BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY Bill
ingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on sql
'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP B
Y BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such column: B
illingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {'role': 'assistant', 'content': 'SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5'}, {'role': 'user', 'content': 'Get the total number of invoices for eac
h customer'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.First
Name, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOI
N invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstN
ame, c.LastName'}, {'role': 'user', 'content': 'Find the total number of inv
oices per country'}, {'role': 'assistant', 'content': 'SELECT c.Country, COU
NT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.Cus
tomerId = i.CustomerId\nGROUP BY c.Country'}, {'role': 'user', 'content':
"\n        For the question which table stores customer's orders, \n
the generated SQL statement invoices results in the following exception [ERR
OR-SQL] the generated SQL : invoices\n does not starts with ('select','wit
h') .\n        Please fix the error and re-generate the SQL\n        "}, {'r
ole': 'assistant', 'content': 'SELECT * FROM invoices'}, {'role': 'user', 'c
ontent': 'List all invoices with a total exceeding $10'}, {'role': 'assistan
```

```
t', 'content': 'SELECT InvoiceId, Total FROM invoices WHERE Total > 10'},
{'role': 'user', 'content': 'Find the top 5 most expensive tracks (based on
unit price):'}, {'role': 'assistant', 'content': 'SELECT TrackId, Name, Unit
Price \nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5'}, {'role': 'user',
'content': '\n        For the question   \n         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 unnecessa
ry \n    , \n        the generated SQL statement None results in the followi
ng exception [ERROR-SQL] Failed to generate SQL for prompt:   \n         Fin
d the top 5 customers who spent the most money overall,  \n         Hint: or
der total can be found on invoices table, calculation using invoice_items de
tail table is unnecessary \n     with the following exception: \ntimed out
.\n        Please fix the error and re-generate the SQL\n        '}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    B
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
CREMENT 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 \"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
\n    LastName NVARCHAR(20)  NOT NULL,\r\n    Company NVARCHAR(80),\r\n    A
ddress NVARCHAR(70),\r\n    City NVARCHAR(40),\r\n    State NVARCHAR(40),\r
\n    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 \"employe
es\" (EmployeeId) \r\n\t\tON DELETE NO ACTION ON UPDATE NO ACTION\r\n)\n\nCR
EATE INDEX IFK_InvoiceLineInvoiceId ON \"invoice_items\" (InvoiceId)\n\nCREA
TE 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
\n    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    Fax
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_InvoiceCustomerId ON \"invoices\" (CustomerI
d)\n\nCREATE TABLE \"artists\"\r\n(\r\n    ArtistId INTEGER PRIMARY KEY AUTO
INCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK_Invoi
```

```
ceLineTrackId ON \"invoice_items\" (TrackId)\n\nCREATE TABLE \"albums\"\r\n
(\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 TABLE \"playlists\"\r\n(\r\n    PlaylistId I
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\n    In the 'customers' table, address column names do not have 'Billing'
prefix, \n    e.g. country column name is 'country', not 'BillingCountry'\n
\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 customers who bought the most albums in
total quantity (across all invoices):\n        Hint: album quantity is found
in invoice_items, \n    "}, {"role": "assistant", "content": "SELECT c.Custo
merId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_it
ems ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackI
d\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstN
ame, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 5"}, {"role": "use
r", "content": "Find the customer who bought the most albums in total quanti
ty (across all invoices):"}, {"role": "assistant", "content": "SELECT c.Cust
omerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_it
ems ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackI
d\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstN
ame, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 1"}, {"role": "use
r", "content": "Find the customer with the most invoices "}, {"role": "assis
tant", "content": "SELECT c.CustomerId, c.FirstName, c.LastName, COUNT(i.Inv
oiceId) AS InvoiceCount\nFROM customers c\nJOIN invoices i ON c.CustomerId =
i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY Invoi
ceCount DESC\nLIMIT 1"}, {"role": "user", "content": " Get the average invoi
ce total for each customer:"}, {"role": "assistant", "content": "SELECT c.Cu
stomerId, c.FirstName, c.LastName, AVG(i.Total) AS AverageInvoiceTotal\nFROM
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.Cust
omerId, c.FirstName, c.LastName"}, {"role": "user", "content": "\n        Fo
r the question what are the top 5 countries that customers come from?, \n
the generated SQL statement SELECT BillingCountry, COUNT(*) as CustomerCount
\nFROM customers \nGROUP BY BillingCountry \nORDER BY CustomerCount DESC \nL
IMIT 5 results in the following exception [ERROR-DB] Failed to execute SQL:
SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGROUP BY
BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5\n Execution failed on
sql 'SELECT BillingCountry, COUNT(*) as CustomerCount \nFROM customers \nGRO
UP BY BillingCountry \nORDER BY CustomerCount DESC \nLIMIT 5': no such colum
n: BillingCountry .\n        Please fix the error and re-generate the SQL\n
"}, {"role": "assistant", "content": "SELECT Country, COUNT(*) AS CustomerCo
unt \nFROM customers \nGROUP BY Country \nORDER BY CustomerCount DESC \nLIMI
T 5"}, {"role": "user", "content": "Get the total number of invoices for eac
h customer"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.First
Name, c.LastName, COUNT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOI
```

```
N invoices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstN
ame, c.LastName"}, {"role": "user", "content": "Find the total number of inv
oices per country"}, {"role": "assistant", "content": "SELECT c.Country, COU
NT(i.InvoiceId) AS TotalInvoices\nFROM customers c\nJOIN invoices i ON c.Cus
tomerId = i.CustomerId\nGROUP BY c.Country"}, {"role": "user", "content":
"\n        For the question which table stores customer's orders, \n
the generated SQL statement invoices results in the following exception [ERR
OR-SQL] the generated SQL : invoices\n does not starts with ('select','wit
h') .\n        Please fix the error and re-generate the SQL\n        "}, {"r
ole": "assistant", "content": "SELECT * FROM invoices"}, {"role": "user", "c
ontent": "List all invoices with a total exceeding $10"}, {"role": "assistan
t", "content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"},
{"role": "user", "content": "Find the top 5 most expensive tracks (based on
unit price):"}, {"role": "assistant", "content": "SELECT TrackId, Name, Unit
Price \nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5"}, {"role": "user",
"content": "\n        For the question   \n         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 unnecessa
ry \n    , \n        the generated SQL statement None results in the followi
ng exception [ERROR-SQL] Failed to generate SQL for prompt:   \n         Fin
d the top 5 customers who spent the most money overall,  \n         Hint: or
der total can be found on invoices table, calculation using invoice_items de
tail table is unnecessary \n     with the following exception: \ntimed out
.\n        Please fix the error and re-generate the SQL\n        "}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:49:19.226868324Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName,
c.LastName, SUM(i.Total) AS TotalSpent\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName
\nORDER BY TotalSpent DESC\nLIMIT 5'}, 'done_reason': 'stop', 'done': True,
'total_duration': 235328467144, 'load_duration': 74192663, 'prompt_eval_coun
t': 1938, 'prompt_eval_duration': 210795433000, 'eval_count': 59, 'eval_dura
tion': 22380767000}

[( LLM Response )]
SELECT c.CustomerId, c.FirstName, c.LastName, SUM(i.Total) AS TotalSpent
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY TotalSpent DESC
LIMIT 5

[( SQL )]
generated SQL statement
```

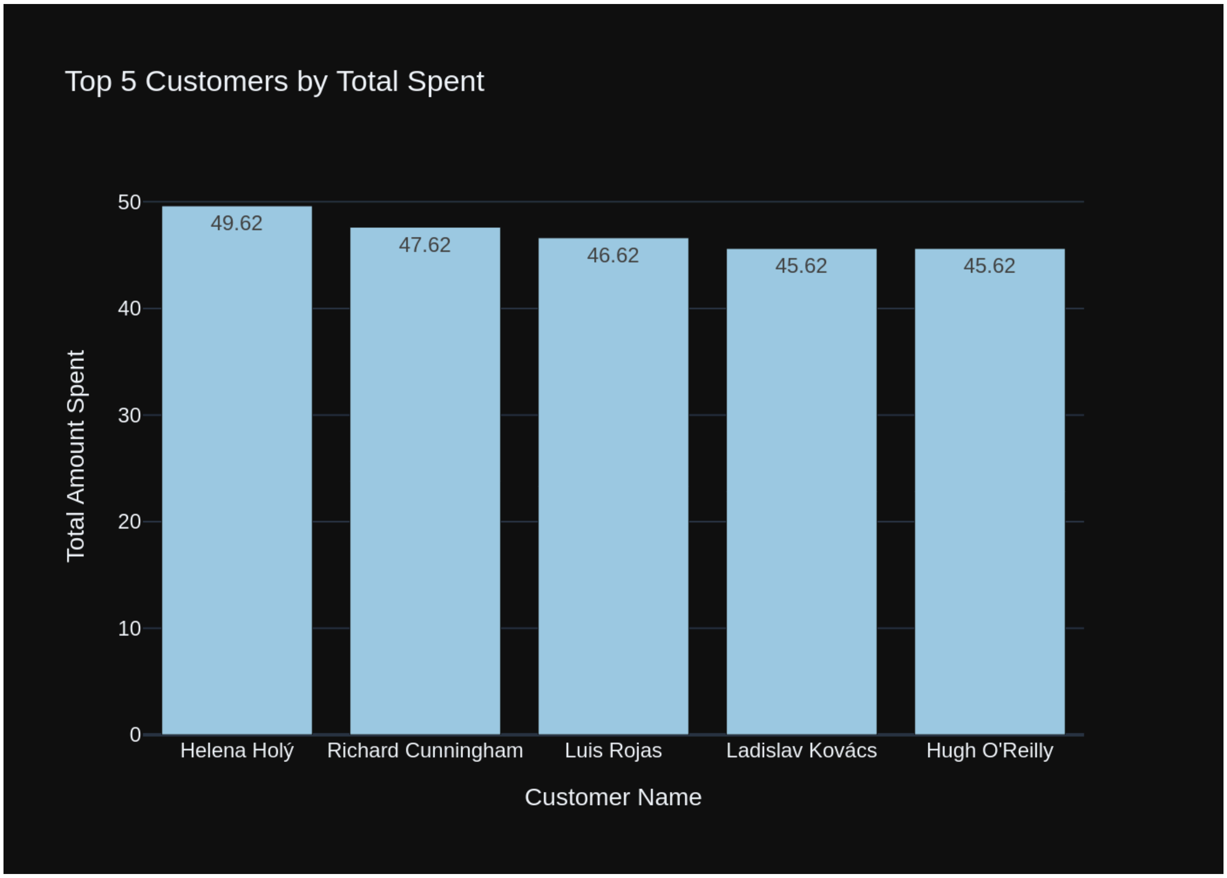
```sql
SELECT c.CustomerId, c.FirstName, c.LastName, SUM(i.Total) AS TotalSpent
FROM customers c
JOIN invoices i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId, c.FirstName, c.LastName
ORDER BY TotalSpent DESC
LIMIT 5
```

```
[( DATA )]
queried data frame
```

	CustomerId	FirstName	LastName	TotalSpent
0	6	Helena	Holý	49.62
1	26	Richard	Cunningham	47.62
2	57	Luis	Rojas	46.62
3	45	Ladislav	Kovács	45.62
4	46	Hugh	O'Reilly	45.62

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
For the question   \n         Find the top 5 customers who spent the most mo
ney overall,  \n         Hint: order total can be found on invoices table, c
alculation using invoice_items detail table is unnecessary \n    , \n
the generated SQL statement None results in the following exception [ERROR-S
QL] Failed to generate SQL for prompt:   \n         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 unnecessa
ry \n     with the following exception: \ntimed out .\n        Please fix th
e error and re-generate the SQL\n        '\n\nThe DataFrame was produced usi
ng this query: SELECT c.CustomerId, c.FirstName, c.LastName, SUM(i.Total) AS
TotalSpent\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId
\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY TotalSpent DESC\n
LIMIT 5\n\nThe following is information about the resulting pandas DataFrame
'df': \nRunning df.dtypes gives:\n CustomerId      int64\nFirstName      obj
ect\nLastName       object\nTotalSpent    float64\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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:50:39.642525085Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go
\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=
df[\'TotalSpent\'].iloc[0]))\nelse:\n    fig = go.Figure(go.Bar(x=df[\'First
Name\'] + \' \' + df[\'LastName\'], y=df[\'TotalSpent\'],\n
text=df[\'TotalSpent\'].apply(lambda x: f\'{x:.2f}\'),\n
textposition=\'auto\',\n                            marker=dict(color=\'rgb(1
58,202,225)\'),\n                             orientation=\'v\'))\n    fig.upd
ate_layout(title=\'Top 5 Customers by Total Spent\', xaxis_title=\'Customer
Name\', yaxis_title=\'Total Amount Spent\')\n\nfig.show()'}, 'done_reason':
'stop', 'done': True, 'total_duration': 80383603665, 'load_duration': 124765
99, 'prompt_eval_count': 335, 'prompt_eval_duration': 30062140000, 'eval_cou
nt': 155, 'eval_duration': 50176937000}

[( PYTHON )]
generated Plotly code
```

```
import plotly.graph_objects as go

if len(df) == 1:
   fig = go.Figure(go.Indicator(mode="number", value=df['TotalSpent'].iloc[0]))
else:
   fig = go.Figure(go.Bar(x=df['FirstName'] + ' ' + df['LastName'], y=df['TotalSpent'],
                  text=df['TotalSpent'].apply(lambda x: f'{x:.2f}'),
                  textposition='auto',
                  marker=dict(color='rgb(158,202,225)'),
                  orientation='v'))
   fig.update_layout(title='Top 5 Customers by Total Spent', xaxis_title='Customer Name', yax
is_title='Total Amount Spent')
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
==============================================================================
====
# QUESTION - 24:  Get all playlists containing at least 10 tracks and the to
tal duration of those tracks:
==============================================================================
====



[( SQL Prompt )]
[{'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 PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE TABLE
"playlist_track"\r\n(\r\n    PlaylistId INTEGER  NOT NULL,\r\n    TrackId IN
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 TABLE "tracks"\r\n(\r\n    TrackId INTEGER PRIMARY K
EY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    Album
Id INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId 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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPD
ATE NO ACTION\r\n)\n\nCREATE INDEX IFK_TrackGenreId ON "tracks" (GenreId)\n
\nCREATE INDEX IFK_TrackAlbumId ON "tracks" (AlbumId)\n\nCREATE INDEX IFK_Tr
ackMediaTypeId ON "tracks" (MediaTypeId)\n\nCREATE INDEX IFK_AlbumArtistId O
N "albums" (ArtistId)\n\nCREATE TABLE "albums"\r\n(\r\n    AlbumId INTEGER P
RIMARY 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
TABLE "genres"\r\n(\r\n    GenreId INTEGER PRIMARY KEY AUTOINCREMENT NOT NUL
L,\r\n    Name NVARCHAR(120)\r\n)\n\n\n===Additional Context \n\nIn the chin
ook database invoice means order\n\n\n    In the \'customers\' table, addres
s column names do not have \'Billing\' prefix, \n    e.g. country column nam
e is \'country\', not \'BillingCountry\'\n    \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': 'List all genres and the
number of tracks in each genre:'}, {'role': 'assistant', 'content': 'SELECT
g.Name AS GenreName, COUNT(t.TrackId) AS NumberOfTracks\nFROM genres g\nJOIN
tracks t ON g.GenreId = t.GenreId\nGROUP BY g.Name'}, {'role': 'user', 'cont
ent': ' \n        Can you find the top 10 most popular artists based on the
number of tracks?\n        Hint: There are 3 tables - artists, albums and tr
acks, \n        where albums and artists are linked by ArtistId, albums and
```

```
tracks are linked by AlbumId,\n    '}, {'role': 'assistant', 'content': 'SEL
ECT a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfTracks\nFROM artists a
\nJOIN albums al ON a.ArtistId = al.ArtistId\nJOIN tracks t ON al.AlbumId =
t.AlbumId\nGROUP BY a.ArtistId, a.Name\nORDER BY NumberOfTracks DESC\nLIMIT
10'}, {'role': 'user', 'content': 'Find all tracks with a name containing "W
hat" (case-insensitive) '}, {'role': 'assistant', 'content': "SELECT TrackI
d, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role': 'user', 'con
tent': 'Find the customer who bought the most albums in total quantity (acro
ss all invoices):'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId,
c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM custome
rs c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_items ii
ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN
albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.L
astName\nORDER BY TotalAlbumsBought DESC\nLIMIT 1'}, {'role': 'user', 'conte
nt': 'Find the top 5 most expensive tracks (based on unit price):'}, {'rol
e': 'assistant', 'content': 'SELECT TrackId, Name, UnitPrice \nFROM tracks
\nORDER BY UnitPrice DESC \nLIMIT 5'}, {'role': 'user', 'content': '      \n
Find the top 5 customers who bought the most albums in total quantity (acros
s all invoices):\n        Hint: album quantity is found in invoice_items, \n
'}, {'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.La
stName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoic
es i ON c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId =
ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.A
lbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER B
Y TotalAlbumsBought DESC\nLIMIT 5'}, {'role': 'user', 'content': 'List all a
lbums and their corresponding artist names  '}, {'role': 'assistant', 'conte
nt': 'SELECT a.Title AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \n
JOIN artists ar ON a.ArtistId = ar.ArtistId'}, {'role': 'user', 'content':
'Find all invoices since 2010 and the total amount invoiced:'}, {'role': 'as
sistant', 'content': "SELECT InvoiceId, Total \nFROM invoices \nWHERE Invoic
eDate >= '2010-01-01'"}, {'role': 'user', 'content': 'List all invoices with
a total exceeding $10'}, {'role': 'assistant', 'content': 'SELECT InvoiceId,
Total FROM invoices WHERE Total > 10'}, {'role': 'user', 'content': 'Can you
list all tables in the SQLite database catalog?'}, {'role': 'assistant', 'co
ntent': "SELECT name FROM sqlite_master WHERE type = 'table'"}, {'role': 'us
er', 'content': 'Get all playlists containing at least 10 tracks and the tot
al duration of those tracks:'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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
ABLE \"playlist_track\"\r\n(\r\n    PlaylistId INTEGER  NOT NULL,\r\n    Tra
ckId INTEGER  NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIMARY KEY  (Pla
ylistId, TrackId),\r\n    FOREIGN 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 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
R,\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 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\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    Alb
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\n===Additional Co
ntext \n\nIn the chinook database invoice means order\n\n\n    In the 'custo
mers' table, address column names do not have 'Billing' prefix, \n    e.g. c
ountry column name is 'country', not 'BillingCountry'\n    \n\n===Response G
uidelines \n1. If the provided context is sufficient, please generate a vali
d 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": "List all ge
nres and the number of tracks in each genre:"}, {"role": "assistant", "conte
nt": "SELECT g.Name AS GenreName, COUNT(t.TrackId) AS NumberOfTracks\nFROM g
enres g\nJOIN tracks t ON g.GenreId = t.GenreId\nGROUP BY g.Name"}, {"role":
"user", "content": " \n        Can you find the top 10 most popular artists
based on the number of tracks?\n        Hint: There are 3 tables - artists,
albums and tracks, \n        where albums and artists are linked by ArtistI
d, albums and tracks are linked by AlbumId,\n    "}, {"role": "assistant",
"content": "SELECT a.Name AS ArtistName, COUNT(t.TrackId) AS NumberOfTracks
\nFROM artists a\nJOIN albums al ON a.ArtistId = al.ArtistId\nJOIN tracks t
ON al.AlbumId = t.AlbumId\nGROUP BY a.ArtistId, a.Name\nORDER BY NumberOfTra
cks DESC\nLIMIT 10"}, {"role": "user", "content": "Find all tracks with a na
me containing \"What\" (case-insensitive) "}, {"role": "assistant", "conten
t": "SELECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {"r
ole": "user", "content": "Find the customer who bought the most albums in to
tal quantity (across all invoices):"}, {"role": "assistant", "content": "SEL
ECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBo
ught\nFROM customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN
invoice_items ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId
= t.TrackId\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerI
d, c.FirstName, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 1"}, {"ro
le": "user", "content": "Find the top 5 most expensive tracks (based on unit
price):"}, {"role": "assistant", "content": "SELECT TrackId, Name, UnitPrice
\nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT 5"}, {"role": "user", "conte
nt": "      \n        Find the top 5 customers who bought the most albums in
total quantity (across all invoices):\n        Hint: album quantity is found
in invoice_items, \n    "}, {"role": "assistant", "content": "SELECT c.Custo
merId, c.FirstName, c.LastName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM
```

```
customers c\nJOIN invoices i ON c.CustomerId = i.CustomerId\nJOIN invoice_it
ems ii ON i.InvoiceId = ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackI
d\nJOIN albums al ON t.AlbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstN
ame, c.LastName\nORDER BY TotalAlbumsBought DESC\nLIMIT 5"}, {"role": "use
r", "content": "List all albums and their corresponding artist names  "},
{"role": "assistant", "content": "SELECT a.Title AS AlbumTitle, ar.Name AS A
rtistName \nFROM albums a \nJOIN artists ar ON a.ArtistId = ar.ArtistId"},
{"role": "user", "content": "Find all invoices since 2010 and the total amou
nt invoiced:"}, {"role": "assistant", "content": "SELECT InvoiceId, Total \n
FROM invoices \nWHERE InvoiceDate >= '2010-01-01'"}, {"role": "user", "conte
nt": "List all invoices with a total exceeding $10"}, {"role": "assistant",
"content": "SELECT InvoiceId, Total FROM invoices WHERE Total > 10"}, {"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": "Get all playlists containin
g at least 10 tracks and the total duration of those tracks:"}]
```

```
[( Ollama Response )]
```

```
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:53:54.687179419Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT p.PlaylistId, p.Name, COUNT
(pt.TrackId) AS TotalTracks, SUM(t.Milliseconds) / 1000 AS TotalDurationInSe
conds\nFROM playlists p\nJOIN playlist_track pt ON p.PlaylistId = pt.Playlis
tId\nJOIN tracks t ON pt.TrackId = t.TrackId\nGROUP BY p.PlaylistId, p.Name
\nHAVING COUNT(pt.TrackId) >= 10'}, 'done_reason': 'stop', 'done': True, 'to
tal_duration': 194961682995, 'load_duration': 12663097, 'prompt_eval_count':
1431, 'prompt_eval_duration': 161723831000, 'eval_count': 87, 'eval_duratio
n': 31521322000}
```

```
[( LLM Response )]
SELECT p.PlaylistId, p.Name, COUNT(pt.TrackId) AS TotalTracks, SUM(t.Millise
conds) / 1000 AS TotalDurationInSeconds
FROM playlists p
JOIN playlist_track pt ON p.PlaylistId = pt.PlaylistId
JOIN tracks t ON pt.TrackId = t.TrackId
GROUP BY p.PlaylistId, p.Name
HAVING COUNT(pt.TrackId) >= 10

[( SQL )]
generated SQL statement
```

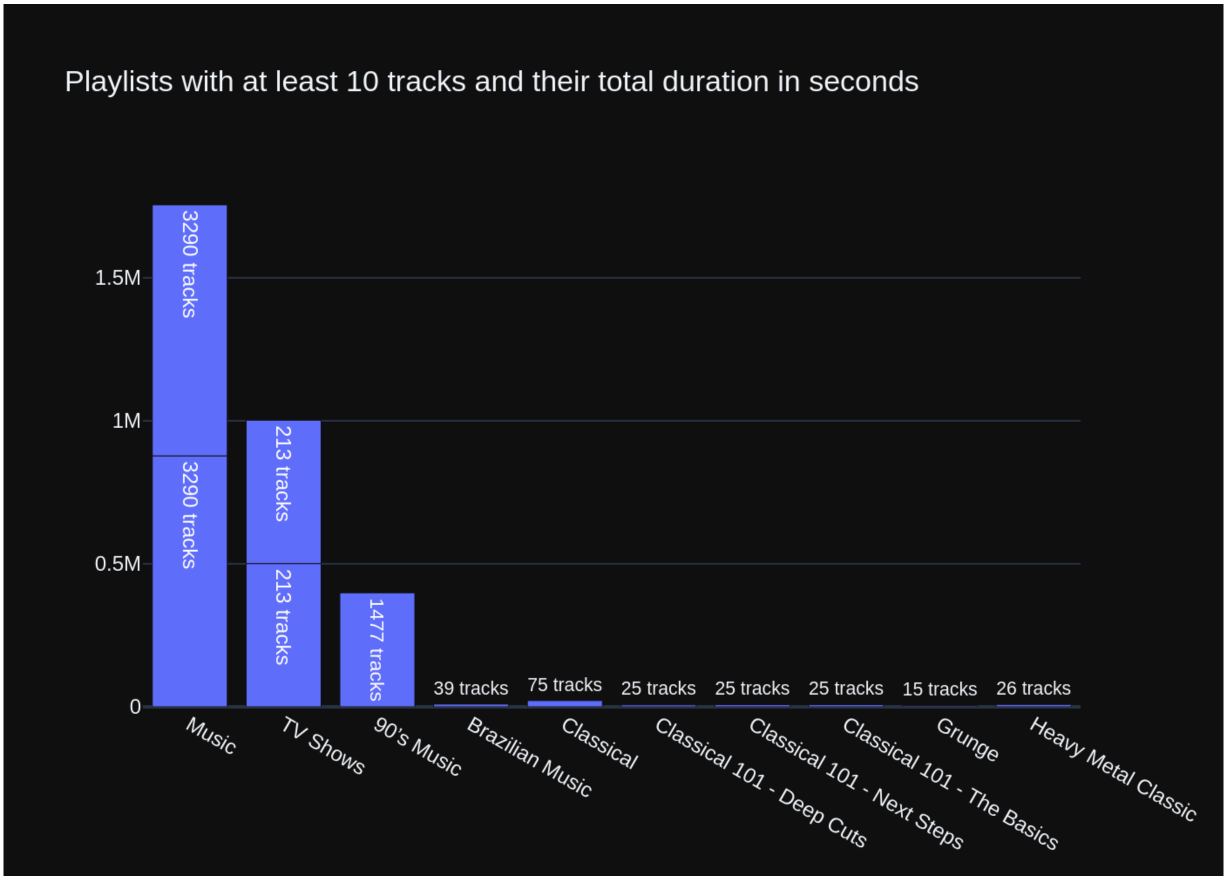
```sql
SELECT p.PlaylistId, p.Name, COUNT(pt.TrackId) AS TotalTracks, SUM(t.Milliseconds) / 1000
AS TotalDurationInSeconds
FROM playlists p
JOIN playlist_track pt ON p.PlaylistId = pt.PlaylistId
JOIN tracks t ON pt.TrackId = t.TrackId
GROUP BY p.PlaylistId, p.Name
HAVING COUNT(pt.TrackId) >= 10
```

```
[( DATA )]
queried data frame
```

	PlaylistId	Name	TotalTracks	TotalDurationInSeconds
0	1	Music	3290	877683
1	3	TV Shows	213	501094
2	5	90’s Music	1477	398705
3	8	Music	3290	877683
4	10	TV Shows	213	501094
5	11	Brazilian Music	39	9486
6	12	Classical	75	21770
7	13	Classical 101 - Deep Cuts	25	6755
8	14	Classical 101 - Next Steps	25	7575
9	15	Classical 101 - The Basics	25	7439
10	16	Grunge	15	4122
11	17	Heavy Metal Classic	26	8206

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Ge
t all playlists containing at least 10 tracks and the total duration of thos
e tracks:'\n\nThe DataFrame was produced using this query: SELECT p.Playlist
Id, p.Name, COUNT(pt.TrackId) AS TotalTracks, SUM(t.Milliseconds) / 1000 AS 
TotalDurationInSeconds\nFROM playlists p\nJOIN playlist_track pt ON p.Playli
stId = pt.PlaylistId\nJOIN tracks t ON pt.TrackId = t.TrackId\nGROUP BY p.Pl
aylistId, p.Name\nHAVING COUNT(pt.TrackId) >= 10\n\nThe following is informa
tion about the resulting pandas DataFrame 'df': \nRunning df.dtypes gives:\n
PlaylistId                 int64\nName                      object\nTotalTra
cks                int64\nTotalDurationInSeconds     int64\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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:54:53.317398003Z', 'me
ssage': {'role': 'assistant', 'content': 'import plotly.graph_objects as go
\n\nif len(df) == 1:\n    fig = go.Figure(go.Indicator(mode="number", value=
df[\'TotalTracks\'].iloc[0], number={\'suffix\': " Tracks"}))\nelse:\n    fi
g = go.Figure(go.Bar(x=df[\'Name\'], y=df[\'TotalDurationInSeconds\'], text=
df[\'TotalTracks\'], textposition=\'auto\', texttemplate=\'%{text} tracks
\'))\nfig.update_layout(title=\'Playlists with at least 10 tracks and their 
total duration in seconds\')\nfig.show()'}, 'done_reason': 'stop', 'done': T
rue, 'total_duration': 58582748989, 'load_duration': 14830837, 'prompt_eval_
count': 256, 'prompt_eval_duration': 22127021000, 'eval_count': 113, 'eval_d
uration': 36305814000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objects as go


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode="number", value=df['TotalTracks'].iloc[0], number={'suffix': " Tracks"}))
else:
    fig = go.Figure(go.Bar(x=df['Name'], y=df['TotalDurationInSeconds'], text=df['TotalTracks'], textposition='auto', texttemplate='%{text} tracks'))
fig.update_layout(title='Playlists with at least 10 tracks and their total duration in seconds')
```



```
Number of requested results 10 is greater than number of elements in index
2, updating n_results = 2
```

```
============================================================================
====
# QUESTION - 25:  Identify artists who have albums with tracks appearing in
multiple genres:
============================================================================
====



[( SQL Prompt )]
[{'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 PRIMARY
KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(200)  NOT NULL,\r\n    Albu
mId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId 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 ACTION ON UPDAT
E 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 (MediaTypeI
d) REFERENCES "media_types" (MediaTypeId) \r\n\t\tON DELETE NO ACTION ON UPD
ATE 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\n    Albu
mId 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 ACTI
ON\r\n)\n\nCREATE INDEX IFK_TrackMediaTypeId ON "tracks" (MediaTypeId)\n\nCR
EATE TABLE "genres"\r\n(\r\n    GenreId INTEGER PRIMARY KEY AUTOINCREMENT NO
T NULL,\r\n    Name NVARCHAR(120)\r\n)\n\nCREATE INDEX IFK_PlaylistTrackTrac
kId ON "playlist_track" (TrackId)\n\nCREATE TABLE "artists"\r\n(\r\n    Arti
stId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,\r\n    Name NVARCHAR(120)\r
\n)\n\nCREATE TABLE "playlist_track"\r\n(\r\n    PlaylistId INTEGER  NOT NUL
L,\r\n    TrackId INTEGER  NOT NULL,\r\n    CONSTRAINT PK_PlaylistTrack PRIM
ARY KEY  (PlaylistId, TrackId),\r\n    FOREIGN 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 ACTION\r\n)\n\n\n===Additional Context \n\nIn the chi
nook database invoice means order\n\n\n    In the \'customers\' table, addre
ss column names do not have \'Billing\' prefix, \n    e.g. country column na
me is \'country\', not \'BillingCountry\'\n    \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        Can you find
the top 10 most popular artists based on the number of tracks?\n        Hin
t: There are 3 tables - artists, albums and tracks, \n        where albums a
nd artists are linked by ArtistId, albums and tracks are linked by AlbumI
d,\n    '}, {'role': 'assistant', 'content': 'SELECT a.Name AS ArtistName, C
OUNT(t.TrackId) AS NumberOfTracks\nFROM artists a\nJOIN albums al ON a.Artis
tId = al.ArtistId\nJOIN tracks t ON al.AlbumId = t.AlbumId\nGROUP BY a.Artis
```

```
tId, a.Name\nORDER BY NumberOfTracks DESC\nLIMIT 10'}, {'role': 'user', 'con
tent': 'List all genres and the number of tracks in each genre:'}, {'role':
'assistant', 'content': 'SELECT g.Name AS GenreName, COUNT(t.TrackId) AS Num
berOfTracks\nFROM genres g\nJOIN tracks t ON g.GenreId = t.GenreId\nGROUP BY
g.Name'}, {'role': 'user', 'content': 'List all albums and their correspondi
ng artist names  '}, {'role': 'assistant', 'content': 'SELECT a.Title AS Alb
umTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar ON a.Artist
Id = ar.ArtistId'}, {'role': 'user', 'content': 'Find the customer who bough
t the most albums in total quantity (across all invoices):'}, {'role': 'assi
stant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, SUM(ii.Qua
ntity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoices i ON c.Customer
Id = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId = ii.InvoiceId\nJOIN
tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.AlbumId = al.AlbumId
\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY TotalAlbumsBought
DESC\nLIMIT 1'}, {'role': 'user', 'content': '      \n       Find the top 5
customers who bought the most albums in total quantity (across all invoice
s):\n       Hint: album quantity is found in invoice_items, \n   '}, {'rol
e': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastName, S
UM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId = ii.Invoi
ceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.AlbumId =
al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY TotalAl
bumsBought DESC\nLIMIT 5'}, {'role': 'user', 'content': 'Get all playlists c
ontaining at least 10 tracks and the total duration of those tracks:'}, {'ro
le': 'assistant', 'content': 'SELECT p.PlaylistId, p.Name, COUNT(pt.TrackId)
AS TotalTracks, SUM(t.Milliseconds) / 1000 AS TotalDurationInSeconds\nFROM p
laylists p\nJOIN playlist_track pt ON p.PlaylistId = pt.PlaylistId\nJOIN tra
cks t ON pt.TrackId = t.TrackId\nGROUP BY p.PlaylistId, p.Name\nHAVING COUNT
(pt.TrackId) >= 10'}, {'role': 'user', 'content': 'Find the top 5 most expen
sive tracks (based on unit price):'}, {'role': 'assistant', 'content': 'SELE
CT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice DESC \nLIMIT
5'}, {'role': 'user', 'content': 'Find all tracks with a name containing "Wh
at" (case-insensitive) '}, {'role': 'assistant', 'content': "SELECT TrackId,
Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {'role': 'user', 'conten
t': 'Can you list all tables in the SQLite database catalog?'}, {'role': 'as
sistant', 'content': "SELECT name FROM sqlite_master WHERE type = 'table'"},
{'role': 'user', 'content': 'Find the customer with the most invoices '},
{'role': 'assistant', 'content': 'SELECT c.CustomerId, c.FirstName, c.LastNa
me, COUNT(i.InvoiceId) AS InvoiceCount\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName, c.LastName
\nORDER BY InvoiceCount DESC\nLIMIT 1'}, {'role': 'user', 'content': 'Identi
fy artists who have albums with tracks appearing in multiple genres:'}]

[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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    A
lbumId INTEGER,\r\n    MediaTypeId INTEGER  NOT NULL,\r\n    GenreId INTEGE
R,\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 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\tON DELETE NO ACTION O
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
(\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\nCREATE 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    Playl
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\n===Additional
Context \n\nIn the chinook database invoice means order\n\n\n    In the 'cus
tomers' table, address column names do not have 'Billing' prefix, \n    e.g.
country column name is 'country', not 'BillingCountry'\n    \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
Can you find the top 10 most popular artists based on the number of tracks?
\n        Hint: There are 3 tables - artists, albums and tracks, \n        w
here albums and artists are linked by ArtistId, albums and tracks are linked
by AlbumId,\n    "}, {"role": "assistant", "content": "SELECT a.Name AS Arti
stName, COUNT(t.TrackId) AS NumberOfTracks\nFROM artists a\nJOIN albums al O
N a.ArtistId = al.ArtistId\nJOIN tracks t ON al.AlbumId = t.AlbumId\nGROUP B
Y a.ArtistId, a.Name\nORDER BY NumberOfTracks DESC\nLIMIT 10"}, {"role": "us
er", "content": "List all genres and the number of tracks in each genre:"},
{"role": "assistant", "content": "SELECT g.Name AS GenreName, COUNT(t.TrackI
d) AS NumberOfTracks\nFROM genres g\nJOIN tracks t ON g.GenreId = t.GenreId
\nGROUP BY g.Name"}, {"role": "user", "content": "List all albums and their
corresponding artist names  "}, {"role": "assistant", "content": "SELECT a.T
itle AS AlbumTitle, ar.Name AS ArtistName \nFROM albums a \nJOIN artists ar
ON a.ArtistId = ar.ArtistId"}, {"role": "user", "content": "Find the custome
r who bought the most albums in total quantity (across all invoices):"}, {"r
ole": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.LastName,
SUM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoices i ON
c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId = ii.Invoi
ceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.AlbumId =
al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER BY TotalAl
bumsBought DESC\nLIMIT 1"}, {"role": "user", "content": "      \n        Fin
d the top 5 customers who bought the most albums in total quantity (across a
ll invoices):\n        Hint: album quantity is found in invoice_items, \n
"}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstName, c.La
stName, SUM(ii.Quantity) AS TotalAlbumsBought\nFROM customers c\nJOIN invoic
es i ON c.CustomerId = i.CustomerId\nJOIN invoice_items ii ON i.InvoiceId =
ii.InvoiceId\nJOIN tracks t ON ii.TrackId = t.TrackId\nJOIN albums al ON t.A
lbumId = al.AlbumId\nGROUP BY c.CustomerId, c.FirstName, c.LastName\nORDER B
Y TotalAlbumsBought DESC\nLIMIT 5"}, {"role": "user", "content": "Get all pl
aylists containing at least 10 tracks and the total duration of those track
s:"}, {"role": "assistant", "content": "SELECT p.PlaylistId, p.Name, COUNT(p
t.TrackId) AS TotalTracks, SUM(t.Milliseconds) / 1000 AS TotalDurationInSeco
nds\nFROM playlists p\nJOIN playlist_track pt ON p.PlaylistId = pt.PlaylistI
d\nJOIN tracks t ON pt.TrackId = t.TrackId\nGROUP BY p.PlaylistId, p.Name\nH
AVING COUNT(pt.TrackId) >= 10"}, {"role": "user", "content": "Find the top 5
most expensive tracks (based on unit price):"}, {"role": "assistant", "conte
nt": "SELECT TrackId, Name, UnitPrice \nFROM tracks \nORDER BY UnitPrice DES
C \nLIMIT 5"}, {"role": "user", "content": "Find all tracks with a name cont
aining \"What\" (case-insensitive) "}, {"role": "assistant", "content": "SEL
ECT TrackId, Name FROM tracks WHERE LOWER(Name) LIKE '%what%'"}, {"role": "u
ser", "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": "Find the customer with the most in
voices "}, {"role": "assistant", "content": "SELECT c.CustomerId, c.FirstNam
e, c.LastName, COUNT(i.InvoiceId) AS InvoiceCount\nFROM customers c\nJOIN in
voices i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId, c.FirstName,
c.LastName\nORDER BY InvoiceCount DESC\nLIMIT 1"}, {"role": "user", "conten
t": "Identify artists who have albums with tracks appearing in multiple genr
es:"}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:58:21.378363422Z', 'me
ssage': {'role': 'assistant', 'content': 'SELECT DISTINCT a.ArtistId, a.Name
\nFROM artists a\nJOIN albums al ON a.ArtistId = al.ArtistId\nJOIN tracks t
ON al.AlbumId = t.AlbumId\nJOIN genres g ON t.GenreId = g.GenreId\nGROUP BY
a.ArtistId, al.AlbumId\nHAVING COUNT(DISTINCT g.Name) > 1'}, 'done_reason':
'stop', 'done': True, 'total_duration': 207954714500, 'load_duration': 12692
263, 'prompt_eval_count': 1531, 'prompt_eval_duration': 176461571000, 'eval_
count': 81, 'eval_duration': 29785179000}

[( LLM Response )]
SELECT DISTINCT a.ArtistId, a.Name
FROM artists a
JOIN albums al ON a.ArtistId = al.ArtistId
JOIN tracks t ON al.AlbumId = t.AlbumId
JOIN genres g ON t.GenreId = g.GenreId
GROUP BY a.ArtistId, al.AlbumId
HAVING COUNT(DISTINCT g.Name) > 1

[( SQL )]
generated SQL statement
```

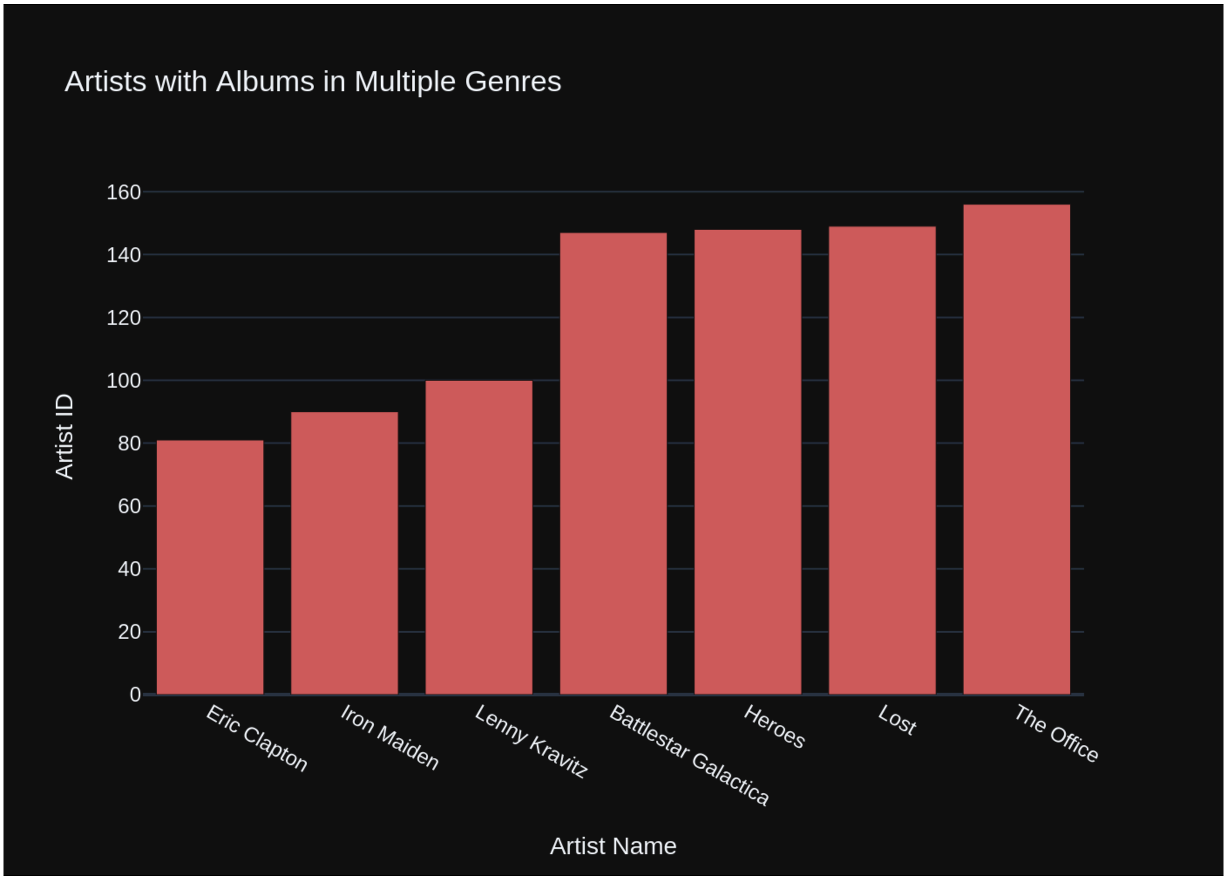
```
SELECT DISTINCT a.ArtistId, a.Name
FROM artists a
JOIN albums al ON a.ArtistId = al.ArtistId
JOIN tracks t ON al.AlbumId = t.AlbumId
JOIN genres g ON t.GenreId = g.GenreId
GROUP BY a.ArtistId, al.AlbumId
HAVING COUNT(DISTINCT g.Name) > 1
```

```
[( DATA )]
queried data frame
```

	ArtistId	Name
0	81	Eric Clapton
1	90	Iron Maiden
2	100	Lenny Kravitz
3	147	Battlestar Galactica
4	148	Heroes
5	149	Lost
6	156	The Office

```
[Ollama parameters]
model=qwen2.5:14b,
options={},
keep_alive=None

[( 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: 'Id
entify artists who have albums with tracks appearing in multiple genres:'\n
\nThe DataFrame was produced using this query: SELECT DISTINCT a.ArtistId,
a.Name\nFROM artists a\nJOIN albums al ON a.ArtistId = al.ArtistId\nJOIN tra
cks t ON al.AlbumId = t.AlbumId\nJOIN genres g ON t.GenreId = g.GenreId\nGRO
UP BY a.ArtistId, al.AlbumId\nHAVING COUNT(DISTINCT g.Name) > 1\n\nThe follo
wing is information about the resulting pandas DataFrame 'df': \nRunning df.
dtypes gives:\n ArtistId     int64\nName        object\ndtype: object"}, {"r
ole": "user", "content": "Can you generate the Python plotly code to chart t
he 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."}]

[( Ollama Response )]
{'model': 'qwen2.5:14b', 'created_at': '2024-10-13T00:59:13.643715822Z', 'me
ssage': {'role': 'assistant', 'content': "import plotly.graph_objs as go\n\n
if len(df) == 1:\n    fig = go.Figure(go.Indicator(mode='number', value=df
['ArtistId'].iloc[0]))\nelse:\n    fig = go.Figure(data=[go.Bar(x=df['Nam
e'], y=df['ArtistId'], marker_color='indianred')])\n    \nfig.update_layout
(title='Artists with Albums in Multiple Genres', xaxis_title='Artist Name',
yaxis_title='Artist ID')\nfig.show()"}, 'done_reason': 'stop', 'done': True,
'total_duration': 52233479226, 'load_duration': 10857232, 'prompt_eval_coun
t': 230, 'prompt_eval_duration': 19843117000, 'eval_count': 102, 'eval_durat
ion': 32252272000}

[( PYTHON )]
generated Plotly code
```

```python
import plotly.graph_objs as go


if len(df) == 1:
    fig = go.Figure(go.Indicator(mode='number', value=df['ArtistId'].iloc[0]))
else:
    fig = go.Figure(data=[go.Bar(x=df['Name'], y=df['ArtistId'], marker_color='indianred')])


fig.update_layout(title='Artists with Albums in Multiple Genres', xaxis_title='Artist Name', yaxis_title='Artist ID')
```



Check completion time

In [16]:
```
ts_stop = time()
elapsed_time = ts_stop - ts_start
str_elapsed_sec = f"{elapsed_time:.0f}"
ts = datetime.now().strftime("%Y%m%d-%H%M%S")
print(f"Completed testing:\n================\n LLM model '{model_name}' \n t
```

```
Completed testing:
================
 LLM model 'qwen2.5:14b'
 took 5723 sec
 run on 'ducklover1'
 at 20241012-205913
```

In [17]:
```
file_csv = f"training_data-{model_name}-{str_elapsed_sec}s-{hostname}-{ts}.c
file_csv
```

Out[17]:
```
'training_data-qwen2.5:14b-5723s-ducklover1-20241012-205913.csv'
```

Save training data

In [18]:
```
# show training data
df_training_data = vn.get_training_data()
df_training_data
```

Out[18]:

	id	question	content	training_data_type
0	0635a8fa-d5d1-568f-a68d-76578fe09510-sql	List all customers from Canada and their email...	SELECT CustomerId, FirstName, LastName, Email ...	sql
1	12139b77-b8dd-5525-9c79-d68986c652af-sql	\n For the question \n Find t...	SELECT c.CustomerId, c.FirstName, c.LastName, ...	sql
2	2d5184ce-e34e-5610-ab68-e6209ea6c763-sql	List all employees and their reporting manager...	SELECT e1.EmployeeId, e1.FirstName || ' ' || e...	sql
3	53218464-9901-50ba-b4df-d1c11a6de761-sql	Get all playlists containing at least 10 track...	SELECT p.PlaylistId, p.Name, COUNT(pt.TrackId)...	sql
4	55b1a26d-72ce-5fe7-8f7d-4708f7c7dddc-sql	Find the top 5 most expensive tracks (based on...	SELECT TrackId, Name, UnitPrice \nFROM tracks ...	sql
5	70a70d33-31e3-56b2-9303-6e6506a456d8-sql	Find all invoices since 2010 and the total amo...	SELECT InvoiceId, Total \nFROM invoices \nWHER...	sql
6	73178a89-0392-52fe-ae53-a3ae4a0e76dd-sql	\n For the question what are the top 5 ...	SELECT Country, COUNT(*) AS CustomerCount \nFR...	sql
7	77f42233-4efd-5644-bcb5-5cfb8d404ff6-sql	List all genres and the number of tracks in ea...	SELECT g.Name AS GenreName, COUNT(t.TrackId) A...	sql
8	78bf2283-e012-50e9-a724-32b0fb2b790d-sql	Find all tracks with a name containing "What" ...	SELECT TrackId, Name FROM tracks WHERE LOWER(N...	sql
9	7bcc7062-b9ff-57eb-b9ce-0495e481eb65-sql	Get the average invoice total for each customer:	SELECT c.CustomerId, c.FirstName, c.LastName, ...	sql
10	9d6f7703-8508-56f1-8297-0143426d8cfb-sql	List all albums and their corresponding artist...	SELECT a.Title AS AlbumTitle, ar.Name AS Artis...	sql
11	a0006c30-889f-5782-8f59-726368872290-sql	How many customers are there	SELECT COUNT(*) FROM customers	sql
12	b7673a50-7312-5530-9290-b6199019c110-sql	\n Find the top 5 customers who b...	SELECT c.CustomerId, c.FirstName, c.LastName, ...	sql

	id	question	content	training_data_type
13	c113adaa-9f4b-5db7-8325-8d36336235ed-sql	List all invoices with a total exceeding $10	SELECT InvoiceId, Total FROM invoices WHERE To...	sql
14	c177681b-286a-5322-b85b-755cbc7ee311-sql	Get the total number of invoices for each cust...	SELECT c.CustomerId, c.FirstName, c.LastName, ...	sql
15	c849263c-3472-5297-87f6-2068bf9e9b3d-sql	Can you list all tables in the SQLite database...	SELECT name FROM sqlite_master WHERE type = 't...	sql
16	caecb17c-1d86-5b59-a340-4d5da01d1173-sql	Find the total number of invoices per country	SELECT c.Country, COUNT(i.InvoiceId) AS Totall...	sql
17	cd236df8-7822-5043-8b1f-e0d4637f2626-sql	Find the customer who bought the most albums i...	SELECT c.CustomerId, c.FirstName, c.LastName, ...	sql
18	d3b34768-d9e5-5ded-ac54-b5e0ba51d287-sql	Find the customer with the most invoices	SELECT c.CustomerId, c.FirstName, c.LastName, ...	sql
19	d633c37d-d58a-5cdc-8d5a-8c2b2b817b36-sql	\n Can you find the top 10 most popula...	SELECT a.Name AS ArtistName, COUNT(t.TrackId) ...	sql
20	ef820d84-8025-5484-ab1a-79889d948502-sql	\n For the question which table stores ...	SELECT * FROM invoices	sql
21	f9802296-569a-5f58-83a8-b44772a2f53e-sql	Identify artists who have albums with tracks a...	SELECT DISTINCT a.ArtistId, a.Name\nFROM artis...	sql
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-	None	CREATE TABLE sqlite_stat1(tbl,idx,stat)	ddl

	id	question	content	training_data_type
	795de244bee5-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 EmployeeI...	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-ddl	None	CREATE INDEX IFK_TrackGenreId ON "tracks" (Gen...	ddl
17	b42cc9e1-9219-5a42-9a06-de906f76239e-ddl	None	CREATE TABLE "tracks"\r\n(\r\n TrackId INTE...	ddl

	id	question	content	training_data_type
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
1	ece10d36-9223-5045-9ac8-4b5bc090acb5-doc	None	\n In the 'customers' table, address column...	documentation

In [19]:

```
df_training_data.to_csv(file_csv, index=False)
```

!cat training_data-deepseek-coder-v2-38054s-ducklover1-20241012-115724.csv

In [ ]:

```
```