Unit - 2
Database backup
and CSV handling

SQLite dump

The SQLite dump command to backup and restore a database.

.dump command that gives you the ability to dump the entire database or tables into a text file.

Dump the entire database into a file

To dump a database into a file, you use the .dump command. The .dump command converts the entire structure and data of an SQLite database into a single text file.

By default, the .dump command outputs the SQL statements on screen. To issue the output to a file, you use the **.output** FILENAME command.

The following command opens a new SQLite database connection to the student.db file.

```
C:\sqlite>sqlite3 c:/sqlite/ student.db
SQLite version 3.33.0 2021-06-05 10:57:30
Enter ".help" for usage hints.
sqlite>
```

The following commands specify the output of the dump file to student.sql and dump the student database into the student.sql file.

```
sqlite> .output c:/sqlite /student.sql
sqlite> .dump
sqlite> .exit
```

Dump a specific table using the SQLite dump command

If you want to dump a specific table, you need to specify the table name followed the .dump command. For example, the following command saves the albums table to the albums.sql file.

```
sqlite> .output c:/sqlite/albums.sql
sqlite> .dump albums
sqlite> .quit
```

The following picture shows the content of the albums.sql file.

```
 PRAGMA foreign_keys=OFF;
BEGIN TRANSACTION;
 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
 );
 INSERT INTO "albums" VALUES(1,'For Those About To Rock We Salute You',
 INSERT INTO "albums" VALUES(2,'Balls to the Wall',2);
 INSERT INTO "albums" VALUES(3,'Restless and Wild',2);
 INSERT INTO "albums" VALUES(4,'Let There Be Rock',1);
 INSERT INTO "albums" VALUES(5,'Big Ones',3);
 INSERT INTO "albums" VALUES(6,'Jagged Little Pill',4);
 INSERT INTO "albums" VALUES(7,'Facelift',5);
 INSERT INTO "albums" VALUES(8,'Warner 25 Anos',6);
```

Dump tables structure

If you want to dump the structures of tables in a database, you use the .schema command. The following commands set the output file to student.sql file and save the structures of tables into the student.sql file.

    sqlite> .output c:/sqlite/ student.sql

    sqlite> .schema

    sqlite> .quit

Dump data of one or more tables into a file

To dump the data of a table into a text file, you use these steps:

First, set the mode to insert using the .mode command as follow

    sqlite> .mode insert

From now on, every SELECT statement will issue the result as the INSERT statements instead of pure text data.

Second, set the output to a text file instead of the default standard output. The following command sets the output file to the record.sql file.

    sqlite> .output record.sql

Third, issue the SELECT statements to query data from a table that you want to dump. The following command returns data from the student table.

sqlite> select * from student;

Check the content of the record.sql file.
To dump data from other tables, you need to issue the SELECT statements to query data from those tables.

CSV files handling

Import a CSV file into a table

We want to import data from CSV file into a table that does not exist in the SQLite database.

- First, the sqlite3 tool creates the table. The sqlite3 tool uses the first row of the CSV file as the names of the columns of the table.
- Second, the sqlite3 tool import data from the second row of the CSV file into the table.

We will import a CSV file named city.csv with two columns: name and population.

To import the c:\sqlite\city.csv file into the cities table:

First, set the mode to CSV to instruct the command-line shell program to interpret the input file as a CSV file. To do this, you use the .mode command as follows:

sqlite> .mode csv

Second, use the command .import FILE TABLE to import the data from the city.csv file into the cities table.

sqlite>.import c:/sqlite/city.csv cities

To verify the import, you use the command .schema to display the structure of the cities table.

sqlite> .schema cities
CREATE TABLE cities
(
  "name" TEXT,
  "population" TEXT
);

The table is already available in the database and you just need to import the data.

First, use the following CREATE TABLE statement to create th

```
CREATE TABLE cities
(
   name TEXT NOT NULL,
   population INTEGER NOT NULL
);
```

If the table already exists, the sqlite3 tool uses all the rows, ir

the CSV file as the actual data to import. Therefore, you shou

the CSV file.

The following commands import the city_without_header.csv

```
sqlite> .mode csv
sqlite> .import c:/sqlite/city_no_header.csv cities
```

Export a CSV file from table

By using the sqlite3 tool, you can use the SQL statements

interact with the SQLite database.

To export data from the SQLite database to a CSV file, you use

1. Turn on the header of the result set using the .header c
2. Set the output mode to CSV to instruct the sqlite3 tool
   CSV mode.
3. Send the output to a CSV file.
4. Issue the query to select data from the table to which y

The following commands select data from the customers tab

data.csv file.

```
>sqlite3 c:/sqlite/chinook.db
sqlite> .headers on
sqlite> .mode csv
sqlite> .output data.csv
sqlite> SELECT customerid,
   ...>    firstname,
   ...>    lastname,
   ...>    company
```

```
...>  FROM customers;
sqlite> .quit
```

If you check the data.csv file, you will see the following output.

```
CustomerId,FirstName,LastName,Company
1,"Luís","Gonçalves","Embraer - Empresa Brasileira de Aeronáutica S.A."
2,Leonie,"Köhler",
3,"François",Tremblay,
4,"Bjørn",Hansen,
5,"František","Wichterlová","JetBrains s.r.o."
6,Helena,"Holý",
7,Astrid,Gruber,
8,Daan,Peeters,
9,Kara,Nielsen,
10,Eduardo,Martins,"Woodstock Discos"
11,Alexandre,Rocha,"Banco do Brasil S.A."
```

Besides using the dot-commands, you can use the options of the sqlite3 tool to export data from the SQLite database to a CSV file.

For example, the following command exports the data from the tracks table to a CSV file named tracks.csv.

>sqlite3 -header -csv c:/sqlite/chinook.db "select * from tracks;" > tracks.csv

```
TrackId,Name,AlbumId,MediaTypeId,GenreId,Composer,Milliseconds,Bytes,UnitPrice
1,"For Those About To Rock (We Salute You)",1,1,1,"Angus Young, Malcolm Young,
2,"Balls to the Wall",2,2,1,,342562,5510424,0.99
3,"Fast As a Shark",3,2,1,"F. Baltes, S. Kaufman, U. Dirkscneider & W. Hoffman"
4,"Restless and Wild",3,2,1,"F. Baltes, R.A. Smith-Diesel, S. Kaufman, U. Dirk
5,"Princess of the Dawn",3,2,1,"Deaffy & R.A. Smith-Diesel",375418,6290521,0.9
6,"Put The Finger On You",1,1,1,"Angus Young, Malcolm Young, Brian Johnson",20:
7,"Let's Get It Up",1,1,1,"Angus Young, Malcolm Young, Brian Johnson",233926,7
8,"Inject The Venom",1,1,1,"Angus Young, Malcolm Young, Brian Johnson",210834,
9,Snowballed,1,1,1,"Angus Young, Malcolm Young, Brian Johnson",203102,6599424,
10,"Evil Walks",1,1,1,"Angus Young, Malcolm Young, Brian Johnson",263497,86112
11,C.O.D.,1,1,1,"Angus Young, Malcolm Young, Brian Johnson",199836,6566314,0.9
12,"Breaking The Rules",1,1,1,"Angus Young, Malcolm Young, Brian Johnson",2632
13,"Night Of The Long Knives",1,1,1,"Angus Young, Malcolm Young, Brian Johnson
14,Spellbound,1,1,1,"Angus Young, Malcolm Young, Brian Johnson",270863,881703
15,"Go Down",4,1,1,AC/DC,331180,10847611,0.99
```

If you have a file named query.sql that contains the script to query data, you can execute the statements in the file and export data to a CSV file.

>sqlite3 -header -csv c:/sqlite/chinook.db < query.sql > data.csv

Exercise

Short Question
1. Define .dump command.
2. What is CSV file.

Long Question
1. How to Dump the entire database into a file?
2. How Dump a specific table using the SQLite dump command?
3. Explain how to Import a CSV file into a table.
4. Write Steps to Exports data from the SQLite database to a CSV file