Functions and Grouping

Functions

In [125]:
```
%load_ext sql
%sql sqlite:///chinook.db
```

```
The sql extension is already loaded. To reload it, use:
  %reload_ext sql
```

--

`%sql` is used for single line SQL commands:

`%%sql` is used for multiple lines SQL commands:

In [126]:
```
%%sql

SELECT *
FROM Employees
LIMIT 5;
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[126]:

EmployeeId	LastName	FirstName	Title	ReportsTo	BirthDate	HireDate	Address	City	State	Country	PostalCode	Phone
1	Adams	Andrew	General Manager	None	1962-02-18 00:00:00	2002-08-14 00:00:00	11120 Jasper Ave NW	Edmonton	AB	Canada	T5K 2N1	+1 (780) 428-9482
2	Edwards	Nancy	Sales Manager	1	1958-12-08 00:00:00	2002-05-01 00:00:00	825 8 Ave SW	Calgary	AB	Canada	T2P 2T3	+1 (403) 262-3443
3	Peacock	Jane	Sales Support Agent	2	1973-08-29 00:00:00	2002-04-01 00:00:00	1111 6 Ave SW	Calgary	AB	Canada	T2P 5M5	+1 (403) 262-3443
4	Park	Margaret	Sales Support Agent	2	1947-09-19 00:00:00	2003-05-03 00:00:00	683 10 Street SW	Calgary	AB	Canada	T2P 5G3	+1 (403) 263-4423
5	Johnson	Steve	Sales Support Agent	2	1965-03-03 00:00:00	2003-10-17 00:00:00	7727B 41 Ave	Calgary	AB	Canada	T3B 1Y7	1 (780) 836-9987

In [127]:
```
%%sql

SELECT *
FROM Customers
LIMIT 5;
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[127]:

CustomerId	FirstName	LastName	Company	Address	City	State	Country	PostalCode	Phone	Fax	E
1	Luís	Gonçalves	Embraer - Empresa Brasileira de Aeronáutica S.A.	Av. Brigadeiro Faria Lima, 2170	São José dos Campos	SP	Brazil	12227-000	+55 (12) 3923-5555	+55 (12) 3923-5566	luisg@embraer.c
2	Leonie	Köhler	None	Theodor-Heuss-Straße 34	Stuttgart	None	Germany	70174	+49 0711 2842222	None	leonekohler@surf
3	François	Tremblay	None	1498 rue Bélanger	Montréal	QC	Canada	H2G 1A7	+1 (514) 721-4711	None	ftremblay@gmai
4	Bjørn	Hansen	None	Ullevålsveien 14	Oslo	None	Norway	0171	+47 22 44 22 22	None	bjorn.hansen@yah
5	František	Wichterlová	JetBrains s.r.o.	Klanova 9/506	Prague	None	Czech Republic	14700	+420 2 4172 5555	+420 2 4172 5555	frantisekw@jetbrains

In [128]:
```
%%sql

-- Use * to count the number of rows returned from a query

SELECT count(*)
FROM Employees;
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[128]:

count(*)
8

In [129]:
```
%%sql

-- What about counting distinct job titles in the Employees table?
-- First just display the distinct titles

SELECT distinct title
FROM Employees;
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[129]:

Title
General Manager
Sales Manager
Sales Support Agent
IT Manager
IT Staff

In [130]:
```
%%sql

-- What we want to count is the result of selecting the distinct titles

SELECT count(distinct title) as "#titles"
FROM Employees;
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[130]:

#titles
5

In [131]:
```
%%sql

-- NOT CORRECT! Notice this just returns a count of the number of rows since each row has a value in the titl
e column.

SELECT count (title) as "#titles"
FROM Employees;
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[131]:

#titles
8

In [132]:
```
%%sql

-- TASK1: Show each job title and a count of the number of employees
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[132]:

Title	count(*)
General Manager	1
IT Manager	1
IT Staff	2
Sales Manager	1
Sales Support Agent	3

In [133]:
```
%%sql

-- Task2: How many customers per country?
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[133]:

Country	#customers
Argentina	1
Australia	1
Austria	1
Belgium	1
Brazil	5
Canada	8
Chile	1
Czech Republic	2
Denmark	1
Finland	1
France	5
Germany	4
Hungary	1
India	2
Ireland	1
Italy	1
Netherlands	1
Norway	1
Poland	1
Portugal	2
Spain	1
Sweden	1
USA	13
United Kingdom	3

In [134]:
```
%%sql

-- Task2: How many customers per country and city?  Sort in descending order.
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[134]:

Country	City	#customers
Brazil	São Paulo	2
Czech Republic	Prague	2
France	Paris	2
Germany	Berlin	2
USA	Mountain View	2
United Kingdom	London	2
Argentina	Buenos Aires	1
Australia	Sidney	1
Austria	Vienne	1
Belgium	Brussels	1
Brazil	Brasília	1
Brazil	Rio de Janeiro	1
Brazil	São José dos Campos	1
Canada	Edmonton	1
Canada	Halifax	1
Canada	Montréal	1
Canada	Ottawa	1
Canada	Toronto	1
Canada	Vancouver	1
Canada	Winnipeg	1
Canada	Yellowknife	1
Chile	Santiago	1
Denmark	Copenhagen	1
Finland	Helsinki	1
France	Bordeaux	1
France	Dijon	1
France	Lyon	1

Germany	Frankfurt	1
Germany	Stuttgart	1
Hungary	Budapest	1
India	Bangalore	1
India	Delhi	1
Ireland	Dublin	1
Italy	Rome	1
Netherlands	Amsterdam	1
Norway	Oslo	1
Poland	Warsaw	1
Portugal	Lisbon	1
Portugal	Porto	1
Spain	Madrid	1
Sweden	Stockholm	1
USA	Boston	1
USA	Chicago	1
USA	Cupertino	1
USA	Fort Worth	1
USA	Madison	1
USA	New York	1
USA	Orlando	1
USA	Redmond	1
USA	Reno	1
USA	Salt Lake City	1
USA	Tucson	1
United Kingdom	Edinburgh	1

In [135]:
```
%%sql

-- Task3: How many customers from USA?
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[135]:

#customers
13

In [136]:
```
%%sql

SELECT *
FROM Invoices
LIMIT 5;
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[136]:

InvoiceId	CustomerId	InvoiceDate	BillingAddress	BillingCity	BillingState	BillingCountry	BillingPostalCode	Total
1	2	2009-01-01 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	None	Germany	70174	1.98
2	4	2009-01-02 00:00:00	Ullevålsveien 14	Oslo	None	Norway	0171	3.96
3	8	2009-01-03 00:00:00	Grétrystraat 63	Brussels	None	Belgium	1000	5.94
4	14	2009-01-06 00:00:00	8210 111 ST NW	Edmonton	AB	Canada	T6G 2C7	8.91
5	23	2009-01-11 00:00:00	69 Salem Street	Boston	MA	USA	2113	13.86

In [137]:
```
%%sql

-- Task4: The total column represents the total invoice cost.
-- What is the min, max, and average invoice total?  Display column headings as shown.
-- Round the average to 2 digits after decimal point.
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[137]:

cheapest	most expensive	average
0.99	25.86	5.65

In [138]:
```
%%sql

-- Task5: The total column represents the total invoice cost.
-- What is the average invoice total per billing country?
-- Round the average to 2 digits after decimal point.
-- Sort by descending order
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[138]:

BillingCountry	average
Chile	6.66
Hungary	6.52
Ireland	6.52
Czech Republic	6.45
Austria	6.09
Finland	5.95
Netherlands	5.8
India	5.79
USA	5.75
Norway	5.66
Germany	5.59
France	5.57
Portugal	5.52
Sweden	5.52
Brazil	5.43
Canada	5.43
Argentina	5.37
Australia	5.37
Belgium	5.37
Denmark	5.37
Italy	5.37
Poland	5.37
Spain	5.37
United Kingdom	5.37

In [139]:
```
%%sql

-- Task6 - How many invoices with billing country of USA or Canada?
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[139]:

BillingCountry	count(*)
Canada	56
USA	91

In [140]:
```
%%sql

-- Task7: Which countries result in most sales? Keep in mind the total column  represents the total for one i
nvoice.
-- You need to sum up the total column.  Display results with total sales over 100.
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[140]:

BillingCountry	total invoice billing
Brazil	190.09999999999997
Canada	303.9599999999999
France	195.09999999999994
Germany	156.48
USA	523.0600000000003
United Kingdom	112.85999999999999

In [141]:
```
%%sql

-- Task8: Show the number of invoices for each billing city in the USA.
-- Do not hardcode Mountain View in your query.
```

```
 * sqlite:///chinook.db
   sqlite:///studentgrades.db
Done.
```

Out[141]:

BillingCity	#invoices
Mountain View	14

In [ ]:
```

```