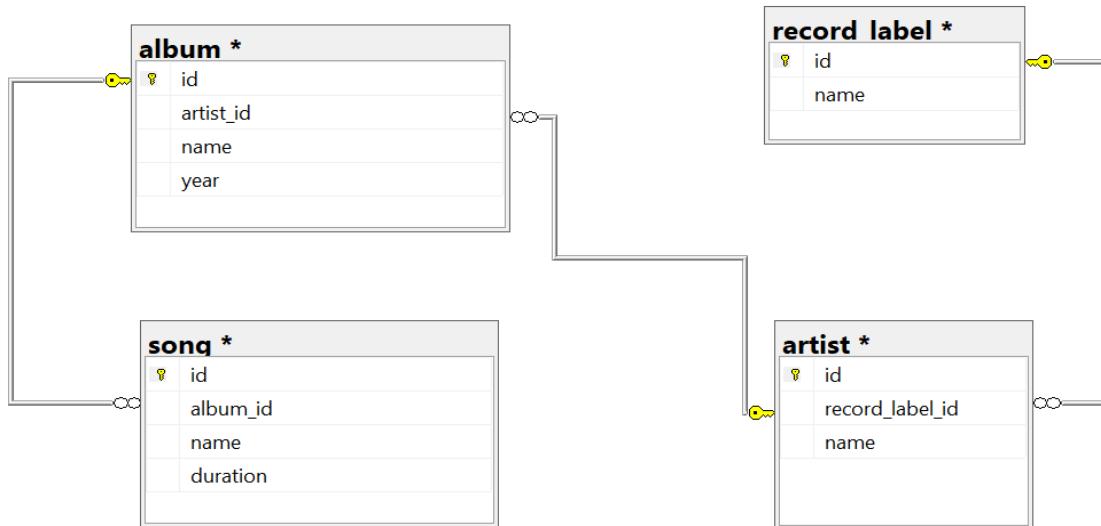


# SQL Joins assignment

## Database Schema



## Initial queries for database, table creation and inserting values

Create and use database

```
create database joins;
use joins;
```

Create Tables

```
CREATE table album (id int, artist_id int, name varchar(100), year int)

CREATE table song (id int, album_id int, name varchar(50), duration float(20))

CREATE table record_label (id int, name varchar(50))

CREATE table artist (id int, record_label_id int, name varchar(50))
```

# Inserting Values

```
INSERT INTO album (id, artist_id, name, year) VALUES(1,      1, 'Devils got a new  
disguise', 2006),  
(2,1,'Keeps getting better',2008),  
(3,    1,'Master of Puppets',1986),  
(4,    2,'Endgame',2009),  
(5,    2,'Icon',2012),  
(6,3,'Story',2000),  
(7,4,'Chapters',2003),  
(8,4,'Riding with the King',2000),  
(9,5,'Pieces of a Dream',2005),  
(10,6,'Greatest Hits',2004),  
(11,7,'All-Time Greatest Hits',1975),  
(12,8,'Greatest Hits',1983),(13,9,'Ultimate Collection',2015)
```

```
INSERT INTO song (id, album_id, name, duration) VALUES(1,1,'Dream  
On',4.26),(2,1,'Back in the Saddle',4.40),  
(3,2,'Genie in a Bottle',5.3),  
(4,2,'Beautiful',5.29),  
(5,3,'Master of Puppets',8.35),  
(6,3,'Battery',5.13),  
(7,4,'Dialectic Chaos',2.26),  
(8,4,'Endgame',5.57),  
(9,5,'Watching Airplanes',4.03),  
(10,5,'Man to Man',3.41),  
(11,6,'Balck Winter Day',3.48),  
(12,6,'Against Widows',4.04),  
(13,7,'Reptile',3.36),  
(14,7,'Modern Girl',4.49),  
(15,8,'Riding with the King',4.23),  
(16,8,'Key to the Highway',3.39),  
(17,9,'Im Outta Love',4.02),  
(18,9,'Not That Kind',3.20),  
(19,10,'Eruption',1.43),  
(20,10,'Hot For Teacher',4.43),  
(21,11,'Sweet Home Alabama',4.45),  
(22,11,'Free Bird',14.23),  
(23,12,'Thunderstruck',4.52),  
(24,12,'T.N.T',3.35),  
(25,13,'Sgt. Pepper''s Lonely Hearts Club Band',2.0333),  
(26,13,'With a Little Help from My Friends',2.7333),  
(27,13,'Lucy in the Sky with Diamonds',3.4666),  
(28,13,'Getting Better',2.8),(29,13,'Fixing a Hole',2.6),  
(30,13,'Shes Leaving Home',3.5833),  
(31,13,'Being for the Benefit of Mr. Kite!',2.6166),  
(32,13,'Within You Without You',5.066),  
(33,13,'When I''m Sixty-Four',2.6166),  
(34,13,'Lovely Rita',2.7),  
(35,13,'Good Morning Good Morning',2.6833),  
(36,13,'Sgt. Pepper''s Lonely Hearts Club Band (Reprise)',1.3166),  
(37,13,'A Day in the Life',5.65)
```

```
INSERT INTO record_label (id, name) VALUES(1,'Blackened'),  
(6,'Capitol'),  
(5,'Elektra'),  
(4,'MCA'),  
(3,'Universal'),  
(2,'Warner Bros')
```

```

INSERT INTO artist (id, record_label_id, name) VALUES(3,1, 'Anthrax'),
(2,1, 'Christina'),
(1,1, 'Aerosmith'),
(4,2, 'Eric Clapton'),
(6,2, 'Amorphis'),
(5,2, 'Gary Allan'),
(8,3, 'AC/DC'),
(7,3, 'Lynyrd Skynyrd'),
(9,6, 'Anastacia')

```

## Assignment Questions

Q1. Show all the 4 tables(album, song, record label and artist)

Output:-

`select * from album;`

`select * from song;`

`select * from record_label;`

`select * from artist;`

	<u>id</u>	<u>artist_id</u>	<u>name</u>	<u>year</u>
1	1	1	Devils got a new disguise	2006
2	2	1	Keeps getting better	2008
3	3	1	Master of Puppets	1986
4	4	2	Endgame	2009
5	5	2	Icon	2012
6	6	3	Story	2000
7	7	4	Chapters	2003
8	8	4	Riding with the King	2000
9	9	5	Pieces of a Dream	2005
10	1...	6	Greatest Hits	2004
11	1...	7	All-Time Greatest Hits	1975
12	1...	8	Greatest Hits	1983
13	1...	9	Ultimate Collection	2015

	<b>id</b>	<b>album_id</b>	<b>name</b>	<b>duration</b>
1	1	1	Dream On	4.26
2	2	1	Back in the Saddle	4.4
3	3	2	Genie in a Bottle	5.3
4	4	2	Beautiful	5.29
5	5	3	Master of Puppets	8.35
6	6	3	Battery	5.13
7	7	4	Dialectic Chaos	2.26
8	8	4	Endgame	5.57
9	9	5	Watching Airplanes	4.03
10	10	5	Man to Man	3.41
11	11	6	Balck Winter Day	3.48
12	12	6	Against Widows	4.04
13	13	7	Reptile	3.36
14	14	7	Modern Girl	4.49
15	15	8	Riding with the King	4.23
16	16	8	Key to the Highway	3.39
17	17	9	Im Outta Love	4.02
18	18	9	Not That Kind	3.2
19	19	10	Eruption	1.43
20	20	10	Hot For Teacher	4.43
21	21	11	Sweet Home Alab...	4.45
22	22	11	Free Bird	14.23
23	23	12	Thunderstruck	4.52
24	24	12	T.N.T	3.35
25	25	13	Sgt. Pepper's Lon...	2.0333
26	26	13	With a Little Help ...	2.7333
27	27	13	Lucy in the Sky wi...	3.4666
28	28	13	Getting Better	2.8

28	28	13	Getting Better	2.8
29	29	13	Fixing a Hole	2.6
30	30	13	Shes Leaving Ho...	3.5833
31	Click to select the whole row Ben...			2.6166
32	32	13	Within You Witho...	5.066
33	33	13	When I'm Sixty-Fo...	2.6166
34	34	13	Lovely Rita	2.7
35	35	13	Good Morning Go...	2.6833
36	36	13	Sgt. Pepper's Lon...	1.3166
37	37	13	A Day in the Life	5.65

	<b>id</b>	<b>name</b>
1	1	Blackened
2	6	Capitol
3	5	Elektra
4	4	MCA
5	3	Universal
6	2	Warner Bros

	id	record_label_id	name
1	3	1	Anthrax
2	2	1	Christina
3	1	1	Aerosmith
4	4	2	Eric Clapton
5	6	2	Amorphis
6	5	2	Gary Allan
7	8	3	AC/DC
8	7	3	Lynyrd Skynyrd
9	9	6	Anastacia

2 List all artists for each record label sorted by artist name.

```
select a.name,rl.name as 'record label name'
from record_label as rl
left join artist as a
on rl.id=a.record_label_id
where a.name is not null
order by a.name;
```

Output:

	artist name	record label name
1	AC/DC	Universal
2	Aerosmith	Blackened
3	Amorphis	Warner Bros
4	Anastacia	Capitol
5	Anthrax	Blackened
6	Christina	Blackened
7	Eric Clapton	Warner Bros
8	Gary Allan	Warner Bros
9	Lynyrd Skynyrd	Universal

3.Which record labels have no artists?

```
select rl.name as 'record name'  
from record_label as rl  
left join artist as a  
on rl.id=a.record_label_id  
where a.name is null;
```

Output:

	record name
1	Elektra
2	MCA

4. List the number of songs per artist in descending order

```
select ar.name as 'artist name',count(s.name) as 'number  
of songs'  
from album as a  
left join song as s  
on a.id=s.album_id  
left join artist as ar  
on a.artist_id=ar.id  
group by ar.name  
having count(s.name) is not null  
order by count(s.name) desc;
```

Output:

	artist name	number_of_songs
1	Anastacia	13
2	Aerosmith	6
3	Christina	4
4	Eric Clapton	4
5	Gary Allan	2
6	Lynyrd Skynyrd	2
7	Amorphis	2
8	Anthrax	2
9	AC/DC	2

5. Which artist or artists have recorded the most number of songs?

Note: In Microsoft Server Studio use top n instead of limit

```
select ar.name as 'artist name',(count(s.name)) as  
'number of songs'  
from album as a  
left join song as s  
on a.id=s.album_id  
left join artist as ar  
on a.artist_id=ar.id  
group by ar.name  
having count(s.name)=(select max(total_songs)  
from (select ar.name as 'artist name',(count(s.name)) as  
'total_songs'  
from album as a  
left join song as s  
on a.id=s.album_id
```

```
left join artist as ar
on a.artist_id=ar.id
group by ar.name
order by count(s.name) desc)as counts
);
```

This is dynamic

Static method is to use limit

```
select ar.name as 'artist name',(count(s.name)) as
'number of songs'
from album as a
left join song as s
on a.id=s.album_id
left join artist as ar
on a.artist_id=ar.id
group by ar.name
having count(s.name) is not null
order by count(s.name) desc
limit 1;
```

Output:

	artist name	number of songs
1	Anastacia	13

6.Which artist or artists have recorded the least number of songs?

```

select ar.name as 'artist name',(count(s.name)) as
'number of songs'
from album as a
left join song as s
on a.id=s.album_id
left join artist as ar
on a.artist_id=ar.id
group by ar.name
having count(s.name)=(select min(total_songs)
from (select ar.name as 'artist name',(count(s.name)) as
'total_songs'
from album as a
left join song as s
on a.id=s.album_id
left join artist as ar
on a.artist_id=ar.id
group by ar.name) as counts)
order by ar.name
;

```

Output:

	artist name	number of song
1	Anthrax	2
2	Amorphis	2
3	AC/DC	2
4	Gary Allan	2
5	Lynyrd Skynyrd	2

7. which artists have recorded songs longer than 5 minutes, and how many songs was that?

```
select ar.name as 'artist name', count(s.name) as 'number of songs'  
from album as a  
left join artist as ar  
on a.artist_id=ar.id  
left join song as s  
on a.id = s.album_id  
where s.duration>5  
group by ar.name  
order by ar.name;
```

Output:

	artist name	number of songs
1	Aerosmith	4
2	Anastacia	2
3	Christina	1
4	Lynyrd Skynyrd	1

8. for each artist and album how many songs were less than 5 minutes long?

```
select ar.name, a.name as 'album name', count(s.name) as 'number of songs'  
from album as a  
left join artist as ar  
on a.artist_id=ar.id  
left join song as s
```

```

on a.id = s.album_id
where s.duration < 5
group by ar.name, a.name
order by a.name;

```

Output:

	artist name	album name	number of songs
1	Lynyrd Skynyrd	All-Time Greatest Hits	1
2	Eric Clapton	Chapters	2
3	Aerosmith	Devils got a new disguise	2
4	Christina	Endgame	1
5	AC/DC	Greatest Hits	2
6	Amorphis	Greatest Hits	2
7	Christina	Icon	2
8	Gary Allan	Pieces of a Dream	2
9	Eric Clapton	Riding with the King	2
10	Anthrax	Story	2
11	Anastacia	Ultimate Collection	11

9. In which year or years were the most songs recorded?

```

select a.year, count(s.name) as 'number of songs'
from album as a
left join song as s
on a.id=s.album_id
group by a.year
having count(s.name)=(select max(song_count)
from (select a.year, count(s.name) as song_count
from album as a
left join song as s
on a.id=s.album_id
group by a.year) as xyz);

```

Output:

	year	number of songs
1	2015	13

10. list the artist, song and year of the top 5 longest recorded songs

```
select ar.name as 'artist name',a.name as 'album
name',s.name as 'song',a.year,s.duration
from album as a
left join song as s
on a.id=s.album_id
left join artist as ar
on a.artist_id=ar.id
group by ar.name,a.name,s.name,a.year,s.duration
order by s.duration desc
limit 5;
```

Output:

	artist name	album name	song	year	duration
1	Lynyrd Skynyrd	All-Time Greatest Hits	Free Bird	1975	14.23
2	Aerosmith	Master of Puppets	Master of Puppets	1986	8.35
3	Anastacia	Ultimate Collection	A Day in the Life	2015	5.65
4	Christina	Endgame	Endgame	2009	5.57
5	Aerosmith	Keeps getting better	Genie in a Bottle	2008	5.3

11.Number of albums recorded for each year

```
select a.year,count(a.name) as 'count of albums'
from album as a
group by a.year;
```

Output:

	year	count of albums
1	1975	1
2	1983	1
3	1986	1
4	2000	2
5	2003	1
6	2004	1
7	2005	1
8	2006	1
9	2008	1
10	2009	1
11	2012	1
12	2015	1

12. What is the max number of recorded albums across all the years?

-- Hint: using the above sql as a temp table

With the use of subquery:

```
select count(a.name) as 'max number of albumn
recorded per year for all years'
from album as a
group by a.year
having count(a.name)=(select max(album_count)
from (select a.year,count(a.name) as 'album_count'
from album as a
group by a.year) as xyz)
order by a.year;
```

With the use of CTE:

```
with maxalbum as
( select a.year,count(a.name) as count_of_albumns
from album as a
group by a.year )
select ma.count_of_albumns as 'max number of albumn
recorded per year for all years'
```

```
from maxalbum as ma  
where ma.count_of_albumns=(select  
max(count_of_albumns) from maxalbum);
```

Output:

	max number of album recorded per year for all years
1	2

13. In which year (or years) were the most (max) number of albums recorded, and how many were recorded?

-- Hint: using the above sql as a sub-select

Using above subquery:

```
select a.year,count(a.name) as 'max number of albumn  
recorded per year for all years'  
  
from album as a  
  
group by a.year  
  
having count(a.name)=(select max(album_count)  
from (select a.year,count(a.name) as 'album_count'  
from album as a  
  
group by a.year) as xyz)  
;  
  
;
```

Output:

	year	max number of albums recorded
1	2000	2

14. total duration of all songs recorded by each artist in descending order

```

select ar.name as artist_name,round(sum(s.duration),2)
as total_duration_of_songs
from album as a
left join song as s on a.id=s.album_id
left join artist as ar on a.artist_id=ar.id
group by ar.name
order by total_duration_of_songs desc;

```

Output:

	artist name	total duration of songs
1	Anastacia	39.87
2	Aerosmith	32.73
3	Lynyrd Skynyrd	18.68
4	Eric Clapton	15.47
5	Christina	15.27
6	AC/DC	7.87
7	Anthrax	7.52
8	Gary Allan	7.22
9	Amorphis	5.86

15. for which artist and album are there no songs less than 5 minutes long?

```

select ar.name as artist_name,a.name as album_name
from album as a
left join artist as ar on a.artist_id=ar.id
left join song as s on a.id=s.album_id
group by ar.name,a.name
having min(s.duration)>5;

```

Output:

	artist name	album name
1	Aerosmith	Keeps getting better
2	Aerosmith	Master of Puppets

16. Display a table of all artists, albums, songs and song duration -- all ordered in ascending order by artist, album and song

Using full join:

```
select ar.name as artist_name,a.name as  
album_name,s.name as song_name,s.duration  
from album as a  
left join artist as ar on a.artist_id=ar.id  
left join song as s on a.id=s.album_id  
union  
select ar.name as artist_name,a.name as  
album_name,s.name as song_name,s.duration from  
album as a  
right join artist as ar on a.artist_id=ar.id  
right join song as s on a.id=s.album_id  
order by artist_name,album_name,song_name;
```

Output:

	artist name	album name	song name	duration
1	AC/DC	Greatest Hits	T.N.T	3.35
2	AC/DC	Greatest Hits	Thunderstruck	4.52
3	Aerosmith	Devils got a new disguise	Back in the Saddle	4.4
4	Aerosmith	Devils got a new disguise	Dream On	4.26
5	Aerosmith	Keeps getting better	Beautiful	5.29
6	Aerosmith	Keeps getting better	Genie in a Bottle	5.3
7	Aerosmith	Master of Puppets	Battery	5.13
8	Aerosmith	Master of Puppets	Master of Puppets	8.35
9	Amorphis	Greatest Hits	Eruption	1.43
10	Amorphis	Greatest Hits	Hot For Teacher	4.43
11	Anastacia	Ultimate Collection	A Day in the Life	5.65
12	Anastacia	Ultimate Collection	Being for the Benefit of Mr. Kite!	2.6166
13	Anastacia	Ultimate Collection	Fixing a Hole	2.6
14	Anastacia	Ultimate Collection	Getting Better	2.8
15	Anastacia	Ultimate Collection	Good Morning Good Morning	2.6833
16	Anastacia	Ultimate Collection	Lovely Rita	2.7
17	Anastacia	Ultimate Collection	Lucy in the Sky with Diamonds	3.4666
18	Anastacia	Ultimate Collection	Sgt. Pepper's Lonely Hearts C...	2.0333
19	Anastacia	Ultimate Collection	Sgt. Pepper's Lonely Hearts C...	1.3166
20	Anastacia	Ultimate Collection	Shes Leaving Home	3.5833
21	Anastacia	Ultimate Collection	When I'm Sixty-Four	2.6166
22	Anastacia	Ultimate Collection	With a Little Help from My Frie...	2.7333
23	Anastacia	Ultimate Collection	Within You Without You	5.066
24	Anthrax	Story	Against Widows	4.04
25	Anthrax	Story	Balck Winter Day	3.48
26	Christina	Endgame	Dialectic Chaos	2.26
27	Christina	Endgame	Endgame	5.57
28	Christina	Icon	Man to Man	3.41
27	Christina	Endgame	Endgame	5.57
28	Christina	Icon	Man to Man	3.41
29	Christina	Icon	Watching Airplanes	4.03
30	Eric Clap...	Chapters	Modern Girl	4.49
31	Eric Clap...	Chapters	Reptile	3.36
32	Eric Clap...	Riding with the King	Key to the Highway	3.39
33	Eric Clap...	Riding with the King	Riding with the King	4.23
34	Gary Allan	Pieces of a Dream	Im Outta Love	4.02
35	Gary Allan	Pieces of a Dream	Not That Kind	3.2
36	Lynyrd Sk...	All-Time Greatest Hits	Free Bird	14.23
37	Lynyrd Sk...	All-Time Greatest Hits	Sweet Home Alabama	4.45

18. Total album length for all songs on the Greatest hits album - in minutes and seconds

#while creating the table song we created duration variable with type float not time so using round off function

```
select a.name as 'album name', round(sum((s.duration)))
as 'minutes',second(sum(s.duration)) as 'seconds'
from album as a
inner join song as s
```

```
on a.id=s.album_id  
where a.name='Greatest Hits';
```

Output:

	Album Name	minutes	seconds
1	Greatest Hits	14	13

19. Which artists did not release an album during the decades of the 1980's and the 1990's?

```
select distinct(ar.name)  
from album as a  
inner join artist as ar  
on a.artist_id=ar.id  
where ar.name not in (select ar.name  
from artist as ar  
inner join album as a  
on ar.id=a.artist_id  
where a.year between 1980 and 1999 )  
order by ar.name;
```

Output:

	artist name
1	Amorphis
2	Anastacia
3	Anthrax
4	Christina
5	Eric Clapton
6	Gary Allan
7	Lynyrd Skynyrd

20. Which artists did release an album during the decades of the 1980's and the 1990's?

```
select ar.name as 'artist name'  
from artist as ar  
inner join album as a  
on ar.id=a.artist_id  
where a.year between 1980 and 1999  
order by ar.name;
```

Output:

	artist name
1	AC/DC
2	Aerosmith