

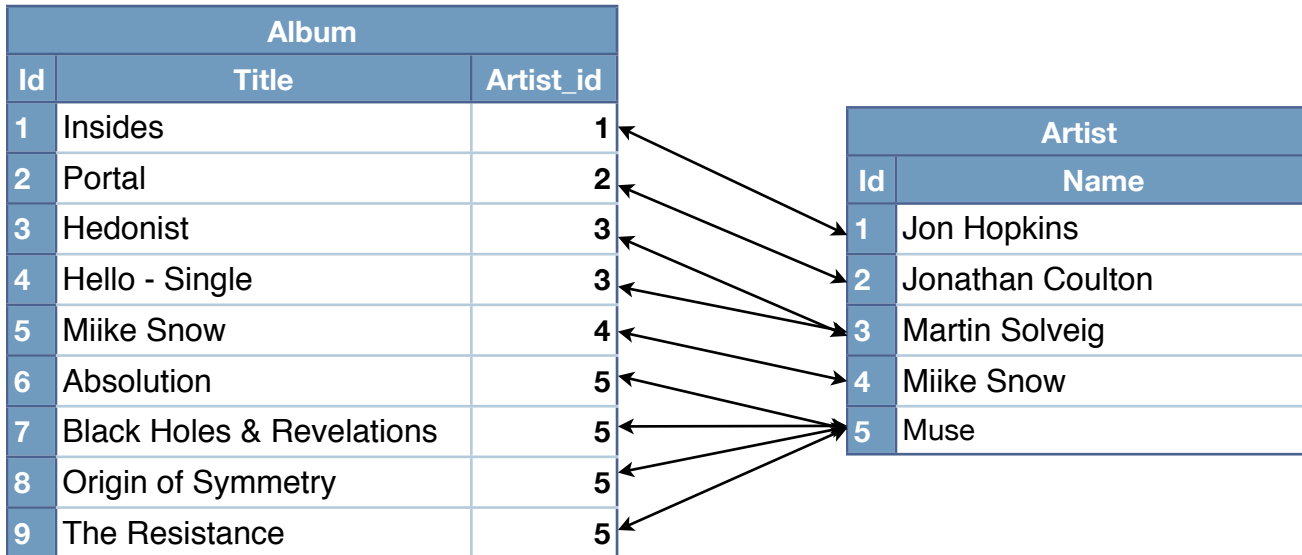
# Example Tables

Song			
Id	Title	Album_id	Length
1	Wire	1	4:41
2	Light Through the Veins (David Holmes Remix)	1	6:38
3	Still Alive	2	2:56
4	Rejection	3	4:44
5	Jealousy	3	5:17
6	Hello	4	4:41
7	Silvia	5	6:26
8	Sans soleil	5	4:27
9	Time is Running Out	6	3:56
10	Supermassive Black Hole	7	3:29
11	Map of the Problematique	7	4:19
12	New Born	8	6:04
13	Bliss	8	4:13
14	Dark Shines	8	4:47
15	Uprising	9	5:05
16	Undisclosed Desires	9	3:56

Album		
Id	Title	Artist_id
1	Insides	1
2	Portal	2
3	Hedonist	3
4	Hello - Single	3
5	Miike Snow	4
6	Absolution	5
7	Black Holes & Revelations	5
8	Origin of Symmetry	5
9	The Resistance	5

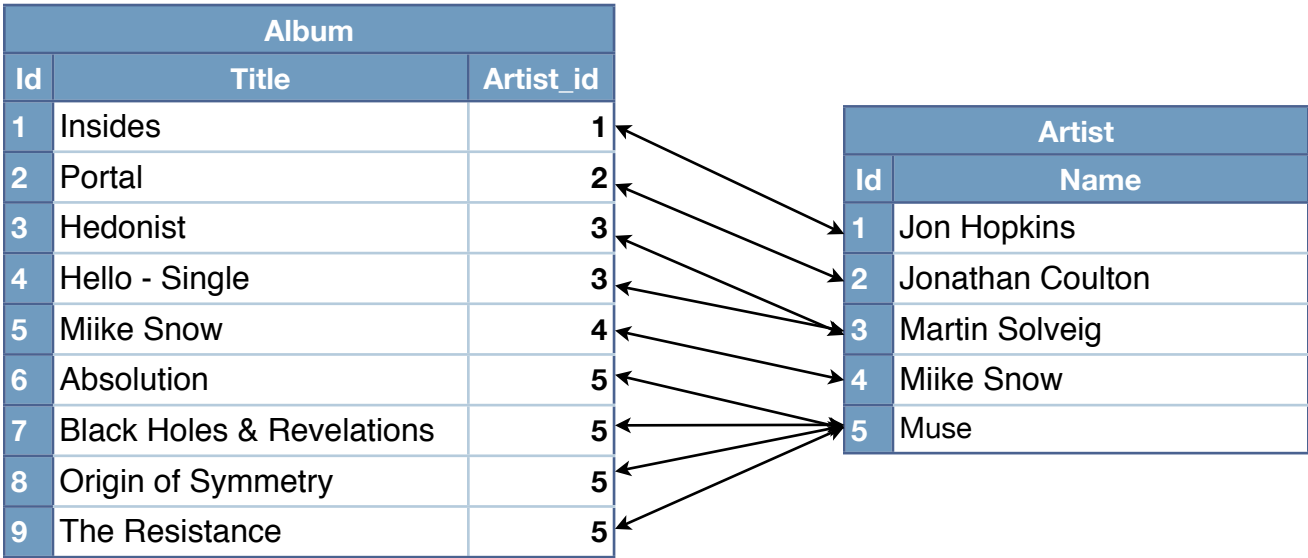
Artist	
Id	Name
1	Jon Hopkins
2	Jonathan Coulton
3	Martin Solveig
4	Miike Snow
5	Muse

# Primary - Foreign Key Connections



```
SELECT *  
FROM album  
INNER JOIN artist ON album.artist_id = artist.id
```

# Result of Join Query

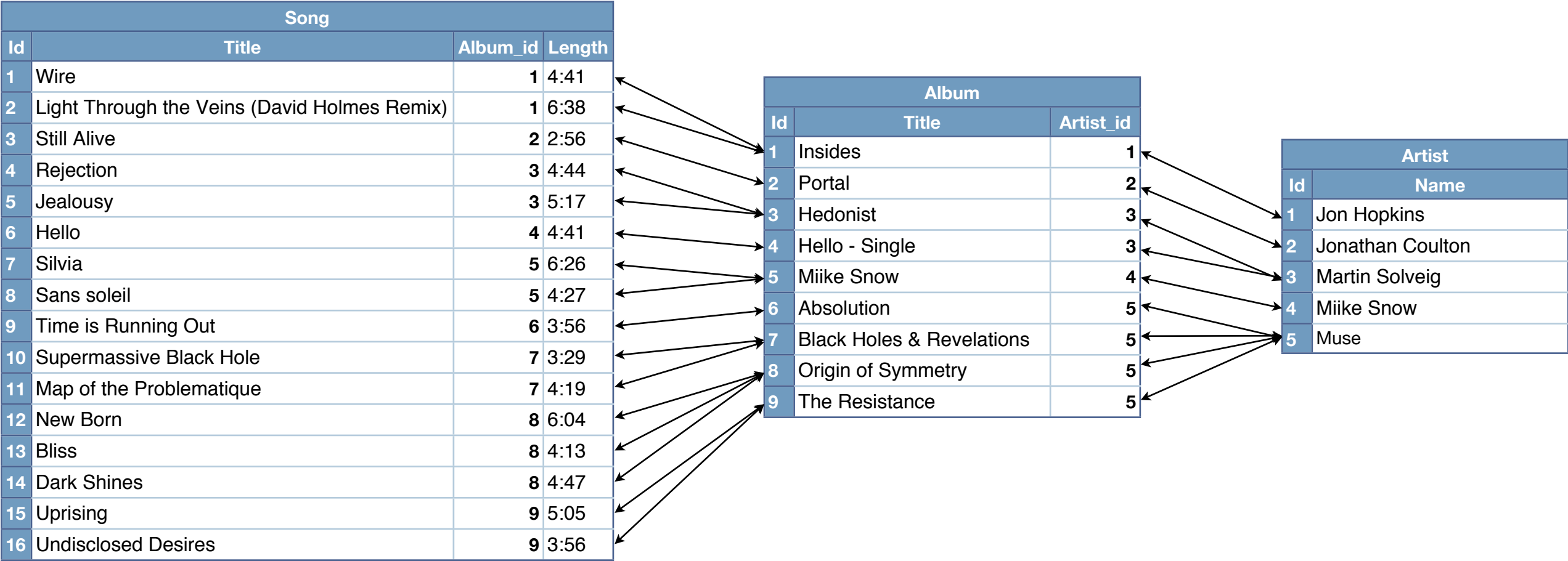


```
SELECT *  
FROM album  
INNER JOIN artist ON album.artist_id = artist.id
```

Album			Artist	
Id	Title	Artist_id	Id	Name
1	Insides	1	1	Jon Hopkins
2	Portal	2	2	Jonathan Coulton
3	Hedonist	3	3	Martin Solveig
4	Hello - Single	3	3	Martin Solveig
5	Miike Snow	4	4	Miike Snow
6	Absolution	5	5	Muse
7	Black Holes & Revelations	5	5	Muse
8	Origin of Symmetry	5	5	Muse
9	The Resistance	5	5	Muse

Notice the duplication

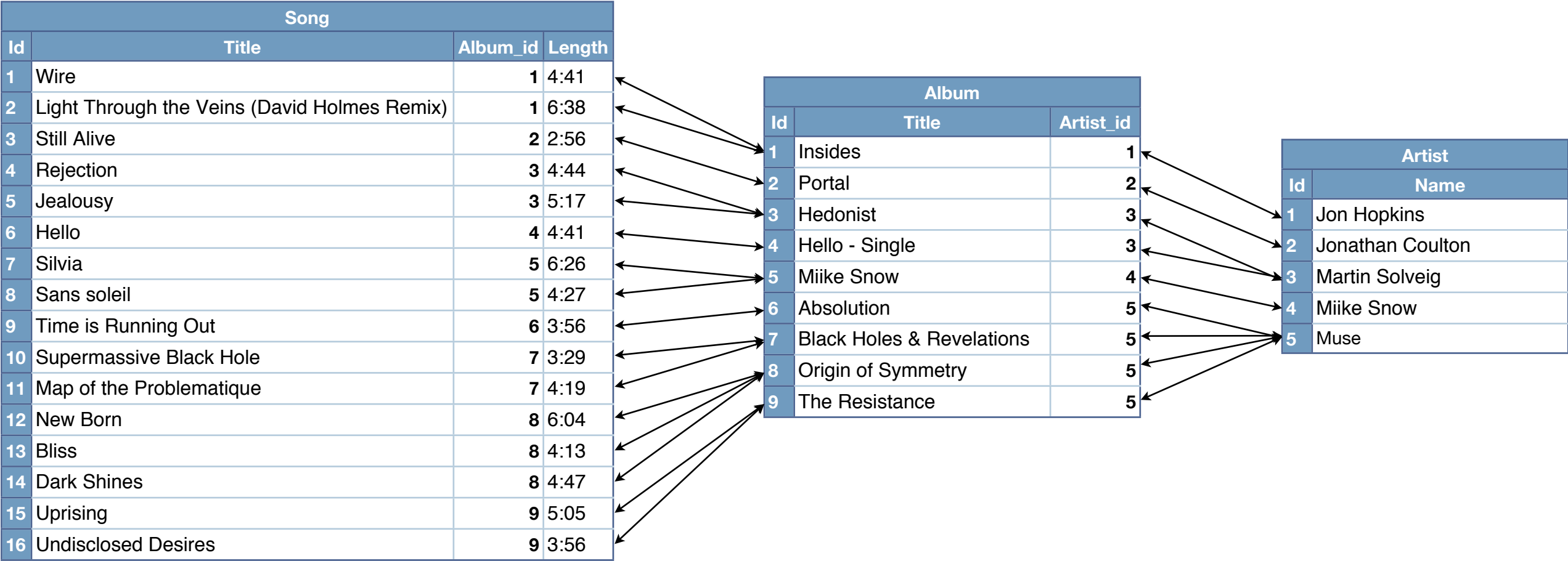
# Result of Join Query with all 3 Tables



```
SELECT *
FROM song
INNER JOIN album ON album.id = song.album_id
INNER JOIN artist ON artist.id = album.artist_id
```

Song				Album			Artist	
Id	Title	Album_id	Length	Id	Title	Artist_id	Id	Name
1	Wire	1	4:41	1	Insides	1	1	Jon Hopkins
2	Light Through the Veins (David Holmes Remix)	1	6:38	1	Insides	1	1	Jon Hopkins
3	Still Alive	2	2:56	2	Portal	2	2	Jonathan Coulton
4	Rejection	3	4:44	3	Hedonist	3	3	Martin Solveig
5	Jealousy	3	5:17	3	Hedonist	3	3	Martin Solveig
6	Hello	4	4:41	4	Hello - Single	3	3	Martin Solveig
7	Silvia	5	6:26	5	Miike Snow	4	4	Miike Snow
8	Sans soleil	5	4:27	5	Miike Snow	4	4	Miike Snow
9	Time is Running Out	6	3:56	6	Absolution	5	5	Muse
10	Supermassive Black Hole	7	3:29	7	Black Holes & Revelations	5	5	Muse
11	Map of the Problematique	7	4:19	7	Black Holes & Revelations	5	5	Muse
12	New Born	8	6:04	8	Origin of Symmetry	5	5	Muse
13	Bliss	8	4:13	8	Origin of Symmetry	5	5	Muse
14	Dark Shines	8	4:47	8	Origin of Symmetry	5	5	Muse
15	Uprising	9	5:05	9	The Resistance	5	5	Muse
16	Undisclosed Desires	9	3:56	9	The Resistance	5	5	Muse

# Result of 3 Table Join Query Reversed

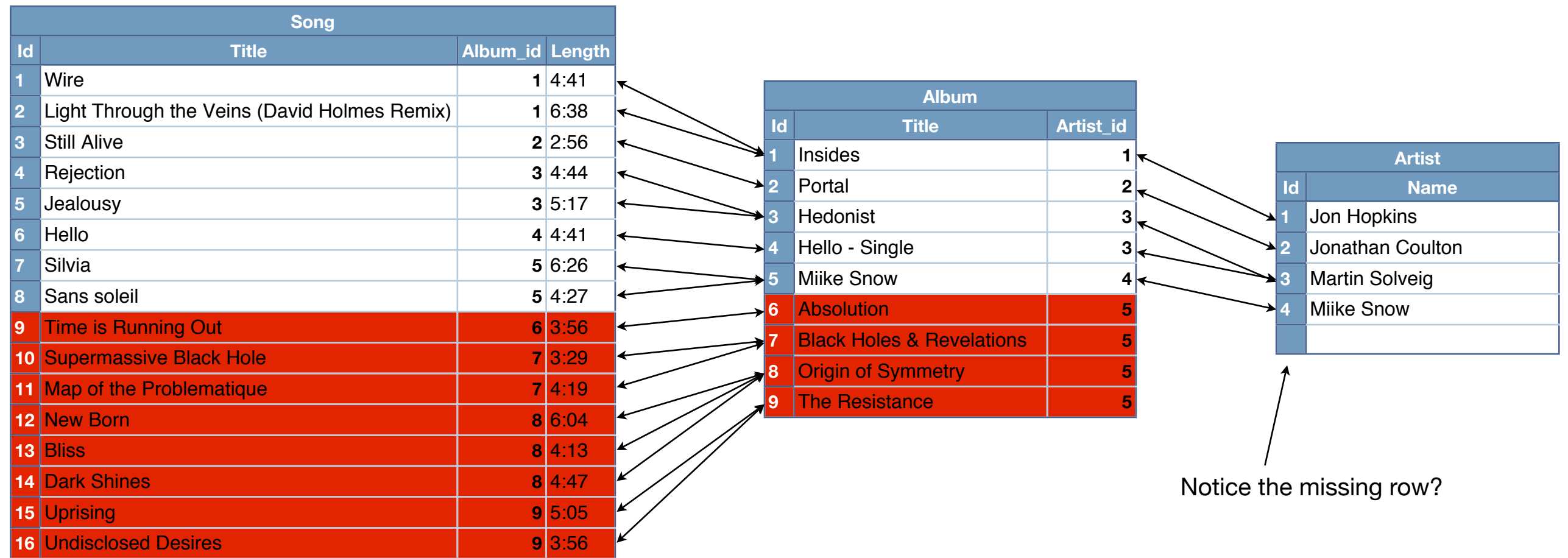


```
SELECT *
FROM artist
INNER JOIN album ON album.artist_id = artist.id
INNER JOIN song ON song.album_id = album.id
```

The SQL has been changed to pull from Artist first

Artist		Album			Song			
Id	Name	Id	Title	Artist_id	Id	Title	Album_id	Length
1	Jon Hopkins	1	Insides	1	1	Wire	1	4:41
1	Jon Hopkins	1	Insides	1	2	Light Through the Veins (David Holmes Remix)	1	6:38
2	Jonathan Coulton	2	Portal	2	3	Still Alive	2	2:56
3	Martin Solveig	3	Hedonist	3	4	Rejection	3	4:44
3	Martin Solveig	3	Hedonist	3	5	Jealousy	3	5:17
3	Martin Solveig	4	Hello - Single	3	6	Hello	4	4:41
4	Miike Snow	5	Miike Snow	4	7	Silvia	5	6:26
4	Miike Snow	5	Miike Snow	4	8	Sans soleil	5	4:27
5	Muse	6	Absolution	5	9	Time is Running Out	6	3:56
5	Muse	7	Black Holes & Revelations	5	10	Supermassive Black Hole	7	3:29
5	Muse	7	Black Holes & Revelations	5	11	Map of the Problematique	7	4:19
5	Muse	8	Origin of Symmetry	5	12	New Born	8	6:04
5	Muse	8	Origin of Symmetry	5	13	Bliss	8	4:13
5	Muse	8	Origin of Symmetry	5	14	Dark Shines	8	4:47
5	Muse	9	The Resistance	5	15	Uprising	9	5:05
5	Muse	9	The Resistance	5	16	Undisclosed Desires	9	3:56

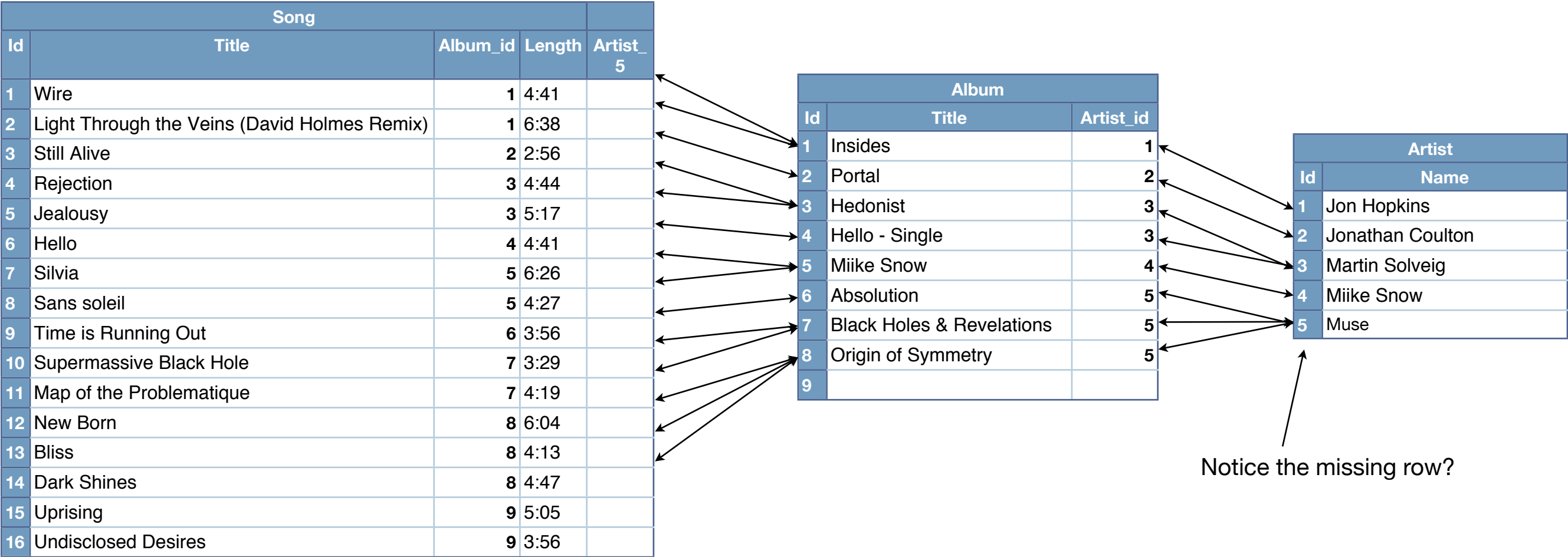
# Result of Inner Join Encountering a Missing Connection



```
SELECT *
FROM song
INNER JOIN album ON album.id = song.album_id
INNER JOIN artist ON artist.id = album.artist_id
```

Song				Album			Artist	
Id	Title	Album_id	Length	Id	Title	Artist_id	Id	Name
1	Wire	1	4:41	1	Insides	1	1	Jon Hopkins
2	Light Through the Veins (David Holmes Remix)	1	6:38	1	Insides	1	1	Jon Hopkins
3	Still Alive	2	2:56	2	Portal	2	2	Jonathan Coulton
4	Rejection	3	4:44	3	Hedonist	3	3	Martin Solveig
5	Jealousy	3	5:17	3	Hedonist	3	3	Martin Solveig
6	Hello	4	4:41	4	Hello - Single	3	3	Martin Solveig
7	Silvia	5	6:26	5	Miike Snow	4	4	Miike Snow
8	Sans soleil	5	4:27	5	Miike Snow	4	4	Miike Snow

# Result of Outer Join Encountering a Missing Connection

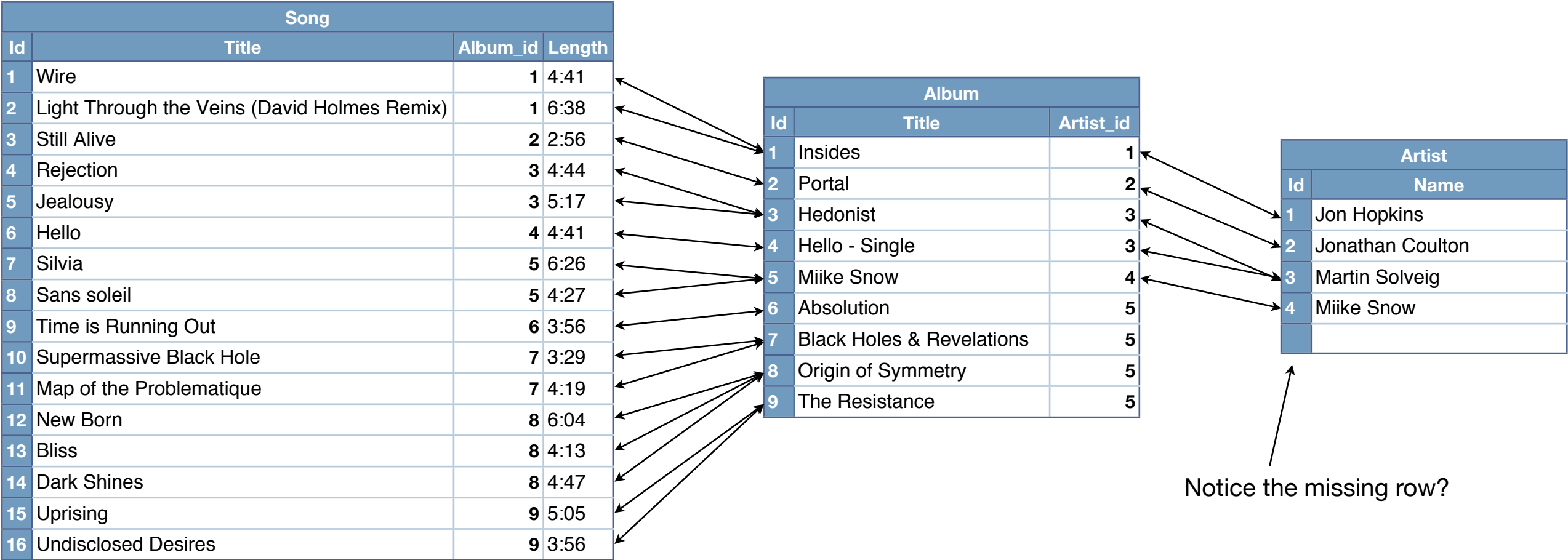


```
SELECT *
FROM song
LEFT JOIN album ON album.id = song.album_id
LEFT JOIN artist ON artist.id = album.artist_id
```

Song				Album			Artist	
Id	Title	Album_id	Length	Id	Title	Artist_id	Id	Name
1	Wire	1	4:41	1	Insides	1	1	Jon Hopkins
2	Light Through the Veins (David Holmes Remix)	1	6:38	1	Insides	1	1	Jon Hopkins
3	Still Alive	2	2:56	2	Portal	2	2	Jonathan Coulton
4	Rejection	3	4:44	3	Hedonist	3	3	Martin Solveig
5	Jealousy	3	5:17	3	Hedonist	3	3	Martin Solveig
6	Hello	4	4:41	4	Hello - Single	3	3	Martin Solveig
7	Silvia	5	6:26	5	Miike Snow	4	4	Miike Snow
8	Sans soleil	5	4:27	5	Miike Snow	4	4	Miike Snow
9	Time is Running Out	6	3:56	6	Absolution	5	NULL	NULL
10	Supermassive Black Hole	7	3:29	7	Black Holes & Revelations	5	NULL	NULL
11	Map of the Problematique	7	4:19	7	Black Holes & Revelations	5	NULL	NULL
12	New Born	8	6:04	8	Origin of Symmetry	5	NULL	NULL
13	Bliss	8	4:13	8	Origin of Symmetry	5	NULL	NULL
14	Dark Shines	8	4:47	8	Origin of Symmetry	5	NULL	NULL
15	Uprising	9	5:05	9	The Resistance	5	NULL	NULL
16	Undisclosed Desires	9	3:56	9	The Resistance	5	NULL	NULL

The rows stay, but the missing data is replaced with NULLs

# Outer Join Encountering a Missing Connection - Reversed



```
SELECT *
FROM artist
LEFT JOIN album ON album.artist_id = artist.id
LEFT JOIN song ON song.album_id = album.id
```

The SQL has been changed to pull from Artist first

Artist		Album			Song			
Id	Name	Id	Title	Artist_id	Id	Title	Album_id	Length
1	Jon Hopkins	1	Insides	1	1	Wire	1	4:41
1	Jon Hopkins	1	Insides	1	2	Light Through the Veins (David Holmes Remix)	1	6:38
2	Jonathan Coulton	2	Portal	2	3	Still Alive	2	2:56
3	Martin Solveig	3	Hedonist	3	4	Rejection	3	4:44
3	Martin Solveig	3	Hedonist	3	5	Jealousy	3	5:17
3	Martin Solveig	4	Hello - Single	3	6	Hello	4	4:41
4	Miike Snow	5	Miike Snow	4	7	Silvia	5	6:26
4	Miike Snow	5	Miike Snow	4	8	Sans soleil	5	4:27
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

All columns are NULL because the data never existed on the left side