

DBMS Final Project
Church Music Repository
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Abstract

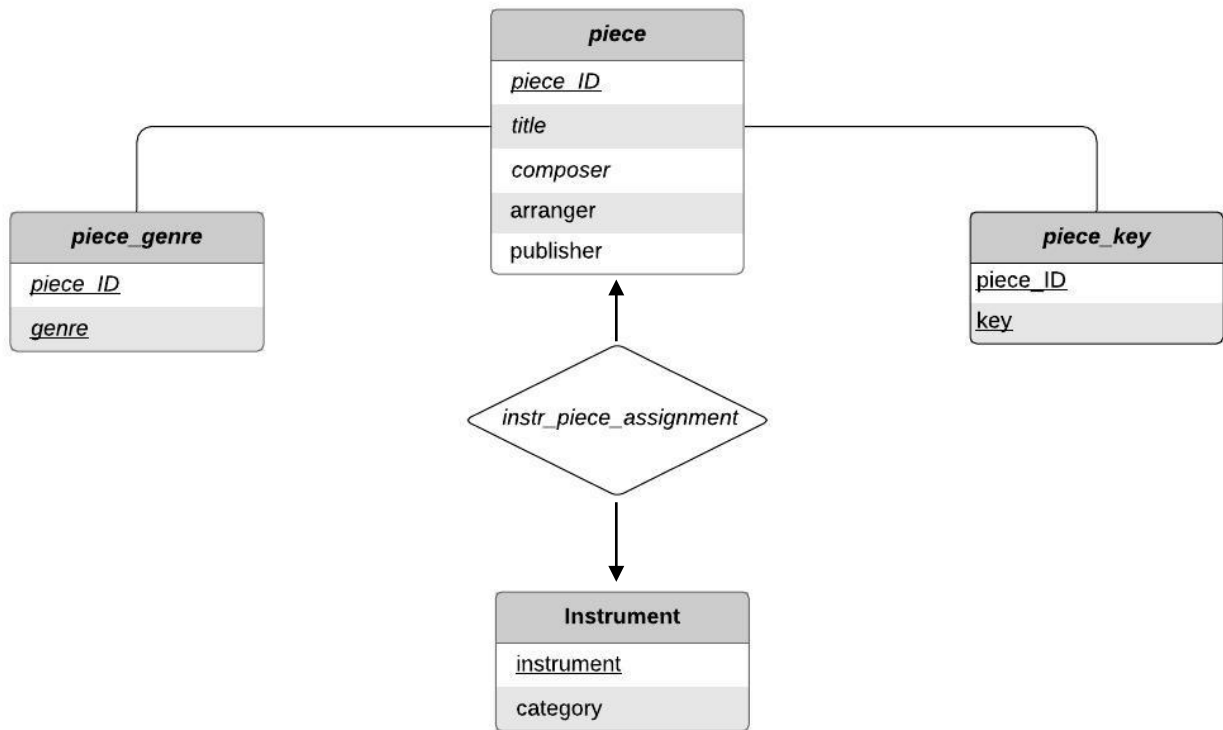
After being tightly involved with various church music ministries over the years, I have seen how difficult it can be for directors to locate music which conforms to the specific instrumentation they have available. This issues usually arrises during holidays or special events, when directors seek to provide a larger program beyond the usual choir/organ/piano, but cannot afford to hire a player for every instrument a piece may call for. They must then find music which only calls for instrumentation that they can get (or afford). More commonly, a director may have a church member who plays an instrument and wish to incorporate them for a service. If this church member is a college flute player, for example, the director would need to find any arrangements which call for flute in addition to the standard ensemble currently available to them. Most music providers focus on searching via title, composer/arranger, or broad categories like choir or orchestra. They usually don't offer more personalized instrumentation searching, leaving the director to the mercy of online forums and word of mouth.

This small database is an attempt to examine this concept on a basic level. I decided to go with a multivalued approach, since each piece must support a variable number of parts, keys, or even genres. The piece relation contains all static information about each piece, while the instr_piece_assignment, piece_key, and piece_genre tables all pair a piece_ID (primary key of piece relation) with one of the three multivalued attributes associated with that table. The instrument relation contains additional information about each instrument so that they can be grouped by broader categories. I have tried to decompose my relations as much as possible to reduce redundancy.

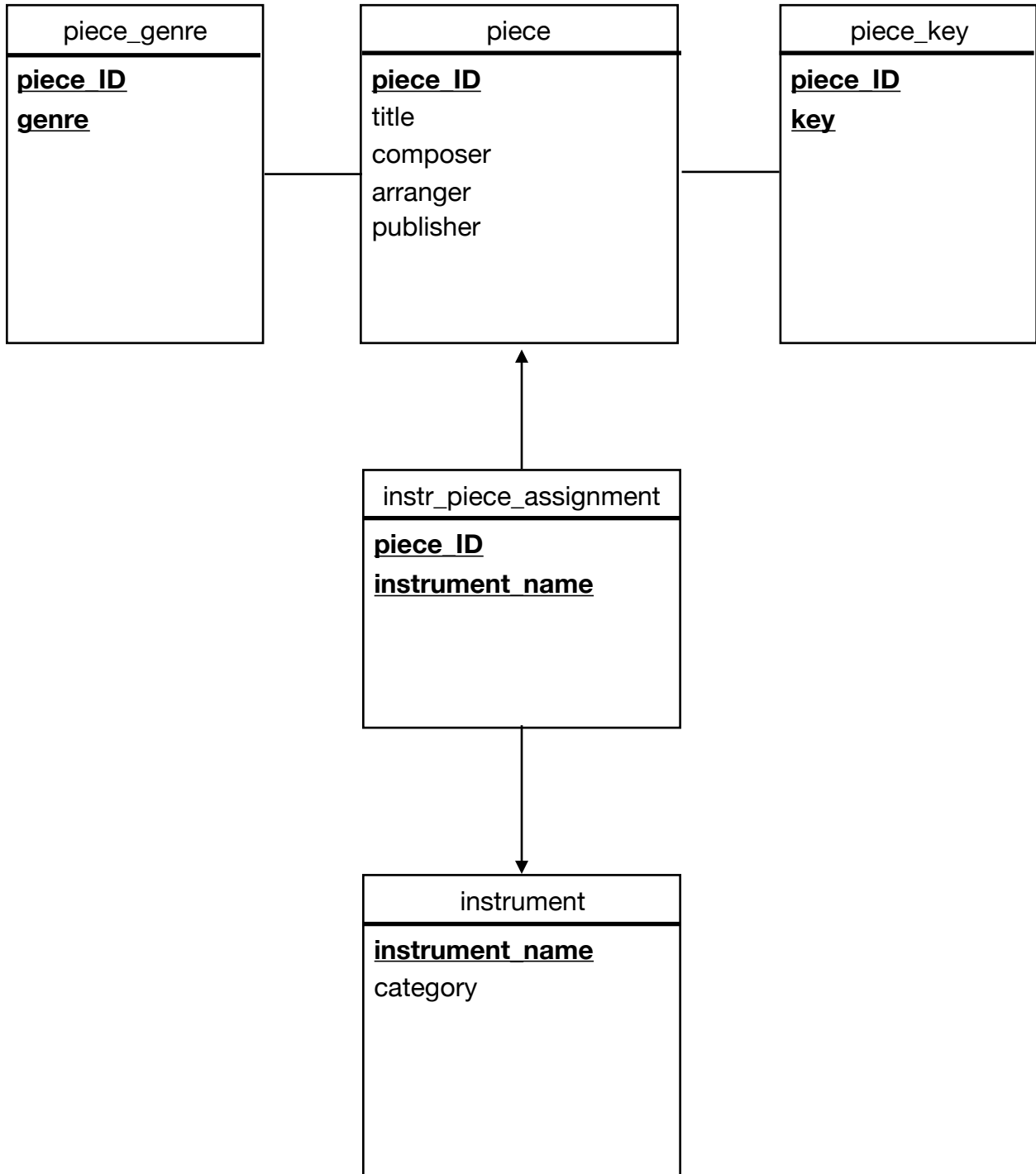
This document includes:

- ER Diagram
- Schema
- Create Table Statements
- Table Contents
- Queries (english, SQL, and results)

ER Diagram



Schema



Create Table Statements

```
create table piece
(piece_ID    varchar(7),
 title      varchar(20) not null,
 composer   varchar(20) not null,
 arranger    varchar(20),
 publisher   varchar(20),
 primary key (piece_ID),
 foreign key (piece_ID) references instr_piece_assignment (piece_ID)
 on delete cascade on update cascade,
 foreign key (piece_ID) references piece_key (piece_ID)
 on delete cascade on update cascade,
 foreign key (piece_ID) references piece_genre (piece_ID)
 on delete cascade on update cascade
);

create table instrument
(instrument_name varchar(15),
 category        varchar(15),
 primary key (instrument_name),
 foreign key (instrument_name) references instr_piece_assignment (instrument_name)
 on delete cascade on update cascade
);

create table instr_piece_assignment
(piece_ID        varchar(7),
 instrument_name varchar(15),
 primary key (piece_ID, instrument_name),
 foreign key (piece_ID) references piece (piece_ID)
 on delete cascade,
 foreign key (instrument_name) references instrument (instrument_name)
);

create table piece_key
(piece_ID    varchar(7),
 key        varchar(13),
 primary key (piece_ID, key),
 foreign key (piece_ID) references piece (piece_ID)
);

create table piece_genre
(piece_ID    varchar(7),
 genre      varchar(15),
 primary key (piece_ID, genre),
 foreign key (piece_ID) references piece (piece_ID)
);
```

Table Contents

piece Table:

piece_ID	title	composer	arranger	publisher
0000000	Wexford Carol	John Rutter	Ben Williams	JW Pepper
0000001	Indescribable	Chris Tomlin		Lifeway Music
0000002	Psalms 23	Heather Sorenson		Brookfield Press
0000003	Crown him with many crowns	Traditional	Michael W Smith	Lifeway Music
0000004	Down to the River	Traditional	Moses Hogan	JW Pepper
0000005	Christmastime	Joanna Carlson	Michael W. Smith	JW Pepper
0000006	Festival of Carols	Tom Fettke	Tom Fettke	JW Pepper
0000007	Manger Songs	Michael Lawrence	Lloyd Larson	JW Pepper
0000008	Angels We Have Heard on High	Traditional	Jeff Cranfill	JW Pepper
0000009	Mary Did You Know?	F. F Bruce	Bradly Knight	Lifeway Music
0000010	Rejoice to the Lord	Blake Young	Chris Blount	Lancaster Inc
0000011	Wonder, Merciful Savior	Mike Galatas	Michael W. Smith	Lifeway
0000012	Obade	Traditional	Moses Hogan	JW Pepper
0000013	A Mighty Fortress	Mark Nabholz	Rutter	JW Pepper
0000014	Shut de do	Michael Branson	Stanley Scott	MC Press
0000015	Prelude in F	Bach		IMSLP
0000016	Sanctuary	Traditional	John S. Porter	Lifeway
0000017	Gospel on the Bayou	Harry Potter	Gandalf	MUMC Advantage
0000018	The Word	Dennis Allen	Dennis Allen	Lifeway
0000019	Fountain	F. F Bruce	Joseph Martin	JW Pepper
0000020	Oceans	Francesca Batastelli	Ben Willialms	MC Press

instrument Table

instrument_name	category
solo	vocal
SATB	vocal
soprano	vocal
alto	vocal
tenor	vocal
base	vocal
violin	strings
viola	strings
cello	strings
double bass	strings
piccolo	woodwinds
flute	woodwinds
oboe	woodwinds
clarinet	woodwinds
alto saxophone	woodwinds
tenor saxophone	woodwinds
baritone saxophone	woodwinds
bassoon	woodwinds
bass clarinet	woodwinds
contra base clarinet	woodwinds
trumpet	brass
horn	brass
baritone	brass
euphonium	brass
trombone	brass
bass trombone	brass
tuba	brass
timpani	percussion
congas	percussion
djembe	percussion
auxiliary	percussion
guitar	rhythm section
bass	rhythm section
drum set	rhythm section
electric guitar	rhythm section
keyboard	rhythm section
piano	
organ	
harp	
banjo	

piece_key Table

piece_ID	key
0000000	A major
0000001	F major
0000002	G minor
0000002	B flat major
0000003	F major
0000004	B flat Major
0000004	C major
0000005	C major
0000005	G major
0000006	A major
0000006	B major
0000006	E major
0000007	A flat major
0000007	C major
0000008	G major
0000009	D minor
0000008	E minor
0000009	G major
0000010	F major
0000011	C major
0000012	D major
0000013	G major
0000014	A major
0000014	B major
0000015	F major
0000016	G major
0000017	E flat major
0000017	F major
0000018	C minor
0000019	D flat major
0000020	A major

piece_genre Table

piece_ID	genre
0000000	Christmas
0000001	Contemporary
0000002	
0000003	
0000004	Eclectic
0000004	Traditional
0000005	Christmas
0000006	Christmas
0000007	Christmas
0000008	Christmas
0000008	Hymn
0000009	Contemporary
0000009	Christmas
0000010	
0000011	Ballad
0000011	Contemporary
0000012	Eclectic
0000013	Hymn
0000014	Eclectic
0000015	Baroque
0000016	
0000017	Traditional
0000017	Bluegrass
0000018	Contemporary
0000019	
0000020	Contemporary
0000020	Ballad

instr_piece_asst Table

piece_ID	instrument_name						
0000000	oboe	0000006	SATB	0000009	solo	0000017	SATB
0000000	flute	0000006	piano	0000009	SATB	0000017	piano
0000000	piano	0000006	violin	0000009	piano	0000017	banjo
0000000	violin	0000006	viola	0000009	violin	0000018	soprano
0000000	viola	0000006	cello	0000009	viola	0000018	alto
0000000	cello	0000006	double base	0000009	cello	0000018	piano
0000000	double base	0000006	horn	0000009	double base	0000018	guitar
0000000	trumpet	0000006	trumpet	0000009	flute	0000018	base
0000000	horn	0000006	auxiliary	0000009	oboe	0000018	drum set
0000000	auxiliary	0000006	timpani	0000009	bassoon	0000018	keyboard
0000001	solo	0000007	violin	0000009	horn	0000019	SATB
0000001	piano	0000007	viola	0000009	trumpet	0000019	piano
0000001	guitar	0000007	cello	0000009	guitar	0000019	organ
0000001	base	0000007	double base	0000009	base	0000020	violin
0000001	drum set	0000007	flute	0000009	drum set	0000020	piano
0000002	SATB	0000007	oboe	0000009	keyboard	0000020	guitar
0000002	piano	0000007	bassoon	0000009	auxiliary	0000020	base
0000003	SATB	0000008	organ	0000009	timpani	0000020	drum set
0000003	piano	0000008	violin	0000010	SATB		
0000004	SATB	0000008	viola	0000010	piano		
0000004	violin	0000008	cello	0000011	solo		
0000004	piano	0000008	double base	0000011	piano		
0000005	piano	0000008	flute	0000012	SATB		
0000005	violin	0000008	oboe	0000012	djembe		
0000005	viola	0000008	bassoon	0000013	piano		
0000005	cello	0000008	horn	0000013	trumpet		
0000005	double base	0000008	trumpet	0000014	SATB		
0000005	flute	0000008	timpani	0000014	solo		
0000005	oboe			0000015	organ		
0000005	bassoon			0000016	piano		
0000005	horn			0000016	solo		
0000005	trumpet						
0000005	auxiliary						
0000005	timpani						

Queries

The following queries can also be found in the *WB_Queries.sql* file attached. Includes the english version of the query as well.

1. Show all Christmas pieces that do not contain any brass instruments

```
select distinct title, composer, arranger, publisher
from piece natural join piece_genre
where genre = 'Christmas' and piece_ID not in (select piece_ID
                                              from instr_piece_assignment natural join instrument
                                              where category = 'brass')
```

title	composer	arranger	publisher
Manger Songs	Michael Lawrence	Lloyed Larson	JW Pepper

2. Show all pieces by arranger Joseph Martin

```
select title
from piece
where arranger = 'Joseph Martin'
```

title
Fountain

3. Show all publishers who only appear once in the database

```
select publisher
from piece
group by publisher
having count(publisher) = 1
```

publisher
Brookfield Press
IMSLP
Lancaster Inc
MUMC Advantage

4. Show all pieces that contain the key of A major

```
select distinct title
from piece natural join piece_key
where key = 'A major'
```

title
Wexford Carol
Festival of Carols
Shut de do
Oceans

5. List any Contemporary Christmas pieces

```
select A.title, A.composer, A.arranger
from (piece natural join piece_genre) as A, (piece natural join piece_genre) as B
where A.piece_ID = B.piece_ID and A.genre = 'Contemporary' and B.genre = 'Christmas'
```

title	composer	arranger
Mary Did You Know?	F. F Bruce	Bradly Knight

6. Show all pieces that contain any minor key

```
select distinct title
from piece natural join piece_key
where key like '%minor%'
```

title
Psalm 23
Mary Did You Know?
Angels We Have Heard on High
The Word

This is my mistake. I accidentally inserted the key as minor.

7. Show all pieces that that do not include any choir or vocals, and show their genre

```
select distinct genre, title, composer, arranger
from piece natural join piece_genre
where piece_ID not in (select piece_ID
from instr_piece_assignment natural join instrument
where category = 'vocal')
```

genre	title	composer	arranger
Christmas	Wexford Carol	John Rutter	Ben Williams
Christmas	Christmastime	Joanna Carlson	Michael W. Smith
Christmas	Manger Songs	Michael Lawrence	Lloyed Larson
Christmas	Angels We Have Heard on High	Traditional	Jeff Cranfill
Hymn	Angels We Have Heard on High	Traditional	Jeff Cranfill
Hymn	A Might Fortress	Mark Nabholz	Rutter
Baroque	Prelude in F	Bach	

8. Show all piece that include ONLY SATB and any percussion category instrument

```
with percussion as (select distinct instrument_name
from instrument
where category = 'percussion')
```

```
select distinct title, composer, arranger, publisher
from piece natural join instr_piece_assignment
except
select distinct title, composer, arranger, publisher
from piece natural join instr_piece_assignment
where instrument_name <> 'SATB' and instrument_name not in percussion
```

title	composer	arranger	publisher
Obatede	Traditional	Moses Hogan	JW Pepper

9. Show all original pieces (no arranger)

```
select title, composer
from piece
where arranger is null
```

title	composer
Indescribable	Chris Tomlin
Psalms 23	Heather Sorenson
Prelude in F	Bach

10. Create a view showing the title, composer, arranger of all piece with publisher JW Pepper

```
create view jw_pepper as
select title, composer, arranger
from piece
where publisher = 'JW Pepper';
```

```
select *
from jw_pepper
```

title	composer	arranger
Wexford Carol	John Rutter	Ben Williams
Down to the River	Traditional	Moses Hogan
Christmastime	Joanna Carlson	Michael W. Smith
Festival of Carols	Tom Fettke	Tom Fettke
Manger Songs	Michael Lawrence	Lloyd Larson
Angels We Have Heard on High	Traditional	Jeff Cranfill
Obade	Traditional	Moses Hogan
A Mighty Fortress	Mark Nabholz	Rutter
Fountain	F. F Bruce	Joseph Martin

11. Update the title of 'Fountain' to 'The Fountain' and display the updated tuple

```
update piece
set title = 'The Fountain'
where title = 'Fountain';
```

```
select *
from piece
where title = 'The Fountain'
```

piece_ID	title	composer	arranger	publisher
0000019	The Fountain	F. F Bruce	Joseph Martin	JW Pepper