

Introduction

Project Overview

This database is intended to track the memberships and various media that a given library may store. This should include which items are checked out, for how long, what is overdue, any fees charged to members, and other important details about items available.

Scope

The database will not track the content or condition of every item. It will track the availability of certain items, and the membership fees associated with a client account.

Database Creation and Access

The database was created using MariaDB on the KU cycle servers. The database can be accessed through the KU servers, using the following login process:

On the KU Linux terminal, enter:

```
mysql -h mysql.eecs.ku.edu -u 447f24_m913m292 -p
```

When prompted, enter the following password:

```
au7eeHah
```

Once you have access to the MariaDB server, type the following command:

```
use 447f24_m913m292
```

After following these steps, you will have access to the example database.

Data Population

We created a set of fake data to populate the database for testing.

SQL Queries

- Show All from the specific Relation.

```
SELECT * FROM Medium;
```

```
SELECT * FROM Member;
```

```
SELECT * FROM Person;
```

- Show Members that are seniors.

SELECT Member_ID, Member_name_first, Member_name_last, **FROM** Member **WHERE** Membership_Type = "Senior";

- Find all books that are checked out.

SELECT Title **FROM** Medium **WHERE** Check_Out_Currently = "Yes";

- Find authors that have the first name of John. (More than you think)

SELECT Author_ID **FROM** Person **WHERE** Author_name_first= "John";

- Find the authors of Historical Fiction books.

SELECT Author_name_first, Author_name_last **FROM** Person **WHERE** Author_ID **IN** (**SELECT** Author_ID **FROM** Writes **WHERE** Book_ID **IN** (**SELECT** Book_ID **FROM** Medium **WHERE** Genre = 'Historical Fiction'));

- Find the books being checked out by Students.

SELECT Title **FROM** Medium **WHERE** ID **IN** (**SELECT** Medium_ID **FROM** Checks_Out **WHERE** Member_ID **IN** (**SELECT** Member_ID **FROM** Member **WHERE** Membership_Type = 'Student'));

Testing

SQL Queries

- Show All from the specific Relation.

SELECT * FROM Medium;

ID	Title	Genre	Publication_date	Check_out_currently	Issue_number
60850524	Brave New World	Dystopian	1932-08-31	no	NULL
60883287	One Hundred Years of Solitude	Magical Realism	1967-05-30	no	NULL
60934347	Don Quixote	Satire	1605-01-16	no	NULL
61120084	To Kill a Mockingbird	Drama	1960-07-11	yes	NULL
140177398	Of Mice and Men	Tragedy	1937-02-06	no	NULL
140444308	Les Misérables	Historical Fiction	1862-04-03	no	NULL
140449136	Crime and Punishment	Crime	1866-01-01	yes	NULL
141439556	Wuthering Heights	Romance	1847-12-01	no	NULL
141439846	Dracula	Horror	1897-05-26	no	NULL
141441146	Jane Eyre	Gothic Fiction	1847-10-16	yes	NULL
143039433	The Grapes of Wrath	Historical Fiction	1939-04-14	no	NULL
316769488	The Catcher in the Rye	Coming-of-Age	1951-07-16	yes	NULL
451524935	1984	Dystopian	1949-08-06	yes	NULL
451530564	The Adventures of Huckleberry Finn	Adventure	1885-02-18	no	NULL
486266890	The Picture of Dorian Gray	Gothic	1890-06-20	no	NULL
486282111	Frankenstein	Horror	1818-01-01	no	NULL
486455025	Sense and Sensibility	Romance	1811-10-30	no	NULL
547928227	The Hobbit	Fantasy	1937-09-21	no	NULL
618640157	The Lord of the Rings	Fantasy	1954-07-29	yes	NULL
743273565	The Great Gatsby	Tragedy	1925-04-10	yes	NULL
1400079988	War and Peace	Historical Fiction	1869-01-01	yes	NULL
1497879988	Anna Karenina	Historical Fiction	1878-01-01	no	NULL
1503280786	Moby-Dick	Adventure	1851-10-18	yes	NULL
1503290563	Pride and Prejudice	Romance	1813-01-28	yes	NULL
1851240550	The Scarlet Letter	Historical Fiction	1850-03-16	no	NULL

25 rows in set (0.001 sec)

SELECT * FROM Member;

Member_ID	Member_name_first	Member_name_middle_initial	Member_name_last	Membership_type	Membership_end_date	Membership_status	Late_fees
1023	Ethan	J	Carter	Adult	2025-01-05	Active	0
1247	Jacob	T	Moore	Student	2025-01-05	Active	5
1248	Nora	S	Simmons	Student	2024-08-05	Inactive	0
1462	Isabella	F	Walker	Senior	2025-01-05	Active	30
1845	Ella	B	Howard	Adult	2024-11-05	Inactive	0
2046	Abigail	M	Bell	Student	2025-01-05	Active	0
2307	Lily	A	Foster	Adult	2024-01-05	Inactive	0
2765	Ava	R	Bennett	Student	2025-01-05	Active	0
2835	Lily	M	Davis	Student	2025-01-05	Active	0
2846	Ruby	S	Patterson	Student	2024-08-05	Inactive	0
2940	Jack	R	Wilson	Senior	2025-01-05	Active	0
3068	Gabriel	A	Price	Child	2024-02-05	Inactive	0
3284	Benjamin	T	Adams	Adult	2025-01-05	Active	15
3579	Carter	E	Taylor	Student	2024-08-05	Inactive	0
3912	Noah	M	Thompson	Student	2025-01-05	Active	0
3958	Emily	K	Evans	Senior	2024-12-05	Active	0
4598	Olivia	M	Collins	Adult	2025-01-05	Active	0
4721	Owen	S	Scott	Child	2025-01-05	Active	0
4812	Logan	J	King	Child	2025-01-05	Active	15
4917	Mia	C	Turner	Student	2025-01-05	Active	45
4918	Benjamin	A	Wilson	Child	2025-01-05	Active	0
4951	Lucas	M	Gray	Adult	2024-04-05	Inactive	0
5031	Layla	J	Richardson	Student	2025-01-05	Active	0
5086	Scarlett	R	Wright	Student	2025-01-05	Active	30
5263	Charlotte	P	Brooks	Adult	2024-12-05	Active	0
5401	Ava	R	Harris	Child	2025-01-05	Active	5
5837	Mason	J	Miller	Student	2025-01-05	Active	15
5962	Grace	M	Johnson	Student	2025-01-05	Active	5
6078	Harper	L	Rogers	Student	2025-01-05	Active	30
6183	Jackson	C	Peterson	Student	2024-10-05	Inactive	0
6429	Julian	C	Cooper	Child	2025-01-05	Active	15
6521	Sophia	E	Reed	Child	2025-01-05	Active	195
6754	Zoe	C	Lee	Adult	2025-01-05	Active	50
6758	Elijah	D	Parker	Senior	2024-10-05	Inactive	45
7291	Aiden	M	Hughes	Senior	2025-01-05	Active	5
7359	Amelia	J	Moore	Adult	2025-01-05	Active	0
7381	Samuel	J	Brown	Student	2025-01-05	Active	15
7384	Chloe	H	Phillips	Child	2024-03-05	Inactive	0
7425	Zoe	B	Roberts	Student	2024-10-05	Inactive	0
7429	Isaac	J	Clark	Student	2024-11-05	Inactive	55555
7489	Emma	G	Harrison	Student	2025-01-05	Active	0
8106	Henry	D	Evans	Child	2025-01-05	Active	0
8152	Caleb	J	Clark	Senior	2025-01-05	Active	45
8320	Daniel	E	Taylor	Child	2025-01-05	Active	0
8341	Liam	A	Davis	Adult	2025-01-05	Active	0
8394	Emily	K	Ward	Adult	2024-09-05	Inactive	0
9074	Lucas	W	Young	Senior	2025-01-05	Active	0
9135	Caleb	A	Hayes	Child	2025-01-05	Active	5
9173	Aria	D	Morgan	Adult	2024-07-05	Inactive	0
9602	Wyatt	J	Mitchell	Child	2024-03-05	Inactive	0

50 rows in set (0.001 sec)

SELECT * FROM Person;

Author_ID	Author_name_first	Author_name_last	Creator_role
10234	Jane	Austen	Author
14629	Charlotte	Brontë	Author
20468	Miguel	de Cervantes	Author
27659	Herman	Melville	Author
29406	Emily	Brontë	Author
32841	Oscar	Wilde	Author
39128	F. Scott	Fitzgerald	Author
45987	George	Orwell	Author
47215	John	Steinbeck	Author
48123	Bram	Stoker	Author
49172	Leo	Tolstoy	Author
50863	Jane	Austen	Author
52639	Victor	Hugo	Author
58371	J.D.	Salinger	Author
60784	Nathaniel	Hawthorne	Author
65213	J.R.R.	Tolkien	Author
67589	J.R.R.	Tolkien	Author
72918	Mark	Twain	Author
73592	Aldous	Huxley	Author
74893	Leo	Tolstoy	Author
81065	Mary	Shelley	Author
83412	Harper	Lee	Author
83942	John	Steinbeck	Author
90745	Fyodor	Dostoevsky	Author
91357	Gabriel	García Márquez	Author

25 rows in set (0.001 sec)

- Show Members that are seniors:

SELECT Member_ID, Member_name_first, Member_name_last **FROM** Member **WHERE** Membership_Type = "Senior";

Member_ID	Member_name_first	Member_name_last
1462	Isabella	Walker
2940	Jack	Wilson
3958	Emily	Evans
6758	Elijah	Parker
7291	Aiden	Hughes
8152	Caleb	Clark
9074	Lucas	Young

7 rows in set (0.001 sec)

- Find all books that are checked out.

```
SELECT Title FROM Medium WHERE Check_Out_Currently = "Yes";
```

```
+-----+
| Title |
+-----+
| To Kill a Mockingbird |
| Crime and Punishment |
| Jane Eyre |
| The Catcher in the Rye |
| 1984 |
| The Lord of the Rings |
| The Great Gatsby |
| War and Peace |
| Moby-Dick |
| Pride and Prejudice |
+-----+
10 rows in set (0.001 sec)
```

- Find authors that have the first name of John. (More than you think)

SELECT Author_ID **FROM** Person **WHERE** Author_name_first = "John";

```
+-----+
| Author_ID |
+-----+
|      47215 |
|      83942 |
+-----+
2 rows in set (0.001 sec)
```


- Find the authors of Historical Fiction books.

```
SELECT Author_name_first, Author_name_last FROM Person WHERE Author_ID IN
(SELECT Author_ID FROM Writes WHERE Book_ID IN (SELECT Book_ID FROM Medium
WHERE Genre = 'Historical Fiction'));
```

Author_name_first	Author_name_last
Jane	Austen
Charlotte	Brontë
Miguel	de Cervantes
Herman	Melville
Emily	Brontë
Oscar	Wilde
F. Scott	Fitzgerald
George	Orwell
John	Steinbeck
Bram	Stoker
Leo	Tolstoy
Jane	Austen
Victor	Hugo
J.D.	Salinger
Nathaniel	Hawthorne
J.R.R.	Tolkien
J.R.R.	Tolkien
Mark	Twain
Aldous	Huxley
Leo	Tolstoy
Mary	Shelley
Harper	Lee
John	Steinbeck
Fyodor	Dostoevsky
Gabriel	García Márquez

25 rows in set (0.002 sec)

- Find the books being checked out by Students.

```
SELECT Title FROM Medium WHERE ID IN (SELECT Medium_ID FROM Checks_Out  
WHERE Member_ID IN (SELECT Member_ID FROM Member WHERE Membership_Type =  
'Student'));
```

```
+-----+  
| Title |  
+-----+  
| The Catcher in the Rye |  
| The Great Gatsby |  
| War and Peace |  
| Moby-Dick |  
+-----+  
4 rows in set (0.001 sec)
```

Error Handling

- Case-sensitive error testing (Lower-Case 'medium' instead of 'Medium')

SELECT * FROM medium;

```
MariaDB [447f24_m913m292]> select * from medium;  
ERROR 1146 (42S02): Table '447f24_m913m292.medium' doesn't exist
```

- Incorrect names

Correct query (output in the testings above):

```
SELECT Member_ID, Member_name_first, Member_name_last FROM Member  
      WHERE Membership_Type = "Senior";
```

Incorrect query (changed Member_name_first and Member_name_last to Member_first_name and Member_last_name):

```
SELECT Member_ID, Member_first_name, Member_last_name FROM Member  
      WHERE Membership_Type = "Senior";
```

```
MariaDB [447f24_m913m292]> SELECT Member_ID, Member_first_name, Member_last  
_name FROM Member WHERE Membership_Type = "Senior";  
ERROR 1054 (42S22): Unknown column 'Member_first_name' in 'field list'
```

- Incorrect quotations

Correct query (output in the testings from the previous section):

```
SELECT Author_name_first, Author_name_last FROM Person WHERE Author_ID IN  
  (SELECT Author_ID FROM Writes WHERE Book_ID IN (SELECT Book_ID FROM  
    Medium WHERE Genre = 'Historical Fiction'));
```

Incorrect query using “Historical Fiction” instead of ‘Historical Fiction’:

```
SELECT Author_name_first, Author_name_last FROM Person WHERE Author_ID IN  
  (SELECT Author_ID FROM Writes WHERE Book_ID IN (SELECT Book_ID FROM  
    Medium WHERE Genre = “Historical Fiction”));
```

```
MariaDB [447f24_m913m292]> select * from;  
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual  
that corresponds to your MariaDB server version for the right syntax to use  
near '' at line 1
```

- Empty name

Tested query:

SELECT * FROM;

```
MariaDB [447f24_m913m292]> select * from;  
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual  
that corresponds to your MariaDB server version for the right syntax to use  
near '' at line 1
```

Testing Documentation

Using the instructions to access the database on page 1, we successfully got in and started testing some queries we came up with going from easy to hard. Each query output exactly what we expected so everything seems to be working just fine. Some issues we ran into while testing was that some of the initial queries we worked up quickly had some column names that didn't line up with what we named it in our database. This was an easy fix solved by doing **SELECT * FROM** table_name where table_name is whichever table the column was pulling from. Once we did that, we made sure the column name in our database matched the query we wanted to test. For example, one of our current testing queries is this: **SELECT** Author_name_first, Author_name_last **FROM** Person **WHERE** Author_ID **IN** (**SELECT** Author_ID **FROM** Writes **WHERE** Book_ID **IN** (**SELECT** Book_ID **FROM** Medium **WHERE** Genre = 'Historical Fiction')); where we before, we had the query selecting 'Author_first_name' and 'Author_last_name' which aren't part of the database. This was solved by using the query **SELECT * FROM** Person to see what the name of the appropriate columns were which ended up being 'Author_name_first' and 'Author_name_last' which has since been corrected in the current query for testing. These were just user errors we ran into. All testing in the database worked flawlessly and gave us exactly what we wanted.