# SE3309a - Assignment Three Samuel Mallabone - 250844429

Samuel Mallabone - 250844429 Robert Northmore - 250838145 Jak Terpak - 250846924 Craig Cook - 250866685 Note: We also created a Github repository name SE3309Databases and included all the TA's in it. Github link: <a href="https://github.com/sam-mallabone/SE3309Databases">https://github.com/sam-mallabone/SE3309Databases</a> (If this link doesn't work, the Github Repository's name is SE3309ADatabases and my username is sam-mallabone, here is a clonable link for the repository too: <a href="https://github.com/sam-mallabone/SE3309Databases.git">https://github.com/sam-mallabone/SE3309Databases.git</a>)

## Question 2: Creating Tables:

The top three screenshots show the commands to create the tables. All these commands ran properly and created the tables as we intended. Below the create table statements, we used the describe <table\_name> command to show that the tables were successfully created and had the schema we

intended.

CREATE TABLE book( ISBN BIGINT PRIMARY KEY. title VARCHAR(50) NOT NULL, publishingDate DATE, genre VARCHAR(20) NOT NULL, inventory INT NOT NULL, authorID INT NOT NULL, FOREIGN KEY(authorID) REFERENCES author(authorID) ); CREATE TABLE user( ID INT AUTO\_INCREMENT PRIMARY KEY, name VARCHAR(30) NOT NULL, email VARCHAR(20) NOT NULL, age INT, phoneNumber VARCHAR(15), membershipStart DATE, membershipEnd DATE ); CREATE TABLE employee( staffID INT AUTO INCREMENT PRIMARY KEY, startDate DATE NOT NULL, salary INT NOT NULL, email VARCHAR(30) NOT NULL, phoneNumber VARCHAR(15) NOT NULL, name VARCHAR(30) NOT NULL,

role VARCHAR(15) NOT NULL

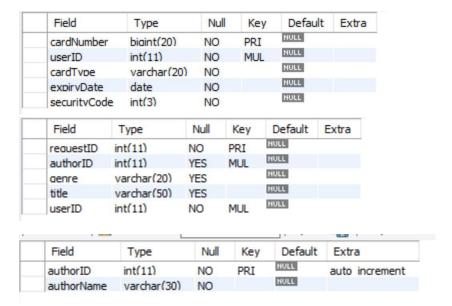
);

```
CREATE TABLE userpaymentinfo (
    cardNumber BIGINT,
    userID INT NOT NULL,
    cardType VARCHAR(20) NOT NULL,
    expiryDate DATE NOT NULL,
    securityCode INT(3) NOT NULL,
    PRIMARY KEY (cardNumber),
    FOREIGN KEY (userID) REFERENCES user(ID)
);
CREATE TABLE returned (
    borrowID INT PRIMARY KEY,
    userID INT NOT NULL,
    bookID BIGINT NOT NULL,
    dateBorrowed DATE NOT NULL,
    expectedReturnDate DATE NOT NULL,
    dateReturned DATE NOT NULL,
    rating INT,
    FOREIGN KEY (userID) REFERENCES user(ID),
    FOREIGN KEY (bookID) REFERENCES book(ISBN)
);
```

```
CREATE TABLE outgoing
                  INT NOT NULL AUTO_INCREMENT,
   borrowID
                       INT NOT NULL,
   userID
   bookID
                       BIGINT NOT NULL,
   dateBorrowed
                   DATE NOT NULL,
   expectedReturnDate DATE NOT NULL,
   PRIMARY KEY (borrowID),
   FOREIGN KEY (userID) REFERENCES user(ID),
   FOREIGN KEY (bookID) REFERENCES book(ISBN)
);
CREATE TABLE author
                    INT NOT NULL AUTO_INCREMENT, VARCHAR(30) NOT NULL,
   authorID
   authorName
   PRIMARY KEY
                       (authorID)
);
CREATE TABLE payment (
   borrowID INT NOT NULL,
   amountOwed DECIMAL(6,2),
   isPaid BOOLEAN,
   PRIMARY KEY (borrowID),
   FOREIGN KEY (borrowID) REFERENCES returned(borrowID)
);
CREATE TABLE wishlist (
   requestID INT NOT NULL,
   authorID INT,
   genre VARCHAR(20),
   title VARCHAR(50),
   userID INT NOT NULL,
   PRIMARY KEY (requestID),
   FOREIGN KEY (userID) REFERENCES user(ID),
   FOREIGN KEY (authorID) REFERENCES author(authorID)
);
```

# This section is when we were running the describe <table\_name> commands

Field	Туре	1	Nu	lil.	Ke		Default	E	xtra		
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title	varch	ar(50)	NO	1			ULL				
publishinaDate	date		YES	S			ULL				
genre	varch	ar(20)	NO				ULL				
inventory	int(11	1)	NO	1			ULL				
authorID	int(11	1)	NO		MUI	E	ULL				
Field	Туре		Nu	I	Key		Default	Ex	tra		
staffID	int(11	)	NO		PRI	17.53	JLL	aut	to inc	reme	ent
startDate	date		NO				JLL				
salarv	int(11)	)	NO			NU	JLL				
email	varcha	ar(30)	NO			NU	JLL				
phoneNumber	varcha	ar(15)	NO			NU	JLL				
name	varcha		NO			NU	JLL				
role	varcha		NO			NU	JLL				
Field		Туре		Nu	I	Key	Def	ault	Ext	tra	
borrowID		int(11)		NO		PRI	NULL		auto	o inc	reme
userID		int(11)		NO		MUL	NULL		aut	0 1110	- CITIC
bookID		bigint(2		NO		MUL	NULL				
dateBorrowed		date	201	NO		MOL	NULL				
expectedReturn	Date	date		NO			NULL				
-											
Field	Туре		Nul		Key		efault	Ex	tra		
Field borrowID	Type int(11)		Nul	I	Key PRI	NU	LL	Ex	tra		
12112000000				I	-	NU	LL	Ex	tra		
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borrowID amountOwed isPaid Field	int(11) decima	(6.2) (1) Type	NO YES YES	Nu	PRI	NU NU Key	LL Def	fault		tra	
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borrowID amountOwed isPaid Field borrowID userID	int(11) decima	(6.2) (1) Type int(11) int(11)	NO YES YES	Nu NO NO	PRI	Key PRI MUL	Def	ault		tra	
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borrowID amountOwed isPaid  Field borrowID userID bookID dateBorrowed expectedReturn dateReturned rating  Field ID	int(11) decima tinvint(	Type int(11) biaint( date date int(11) pe	NO YES YES 200)	Nu NO NO NO NO NO YES	PRI	Key PRI MUL	Def NOLL NOLL NOLL NOLL NOLL NOLL NOLL NOL	fault	Ex	1	]
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# Question 3: Three different types of Insert

Below shows the three different insert commands for entering data into tables. All three of these different types of commands worked for us and the screenshots show both the command and the output. Instead of running the select \* statement for the table to show that the values had been entered, we showed the success statement of the output because we thought this would exemplify that the command worked as intended.

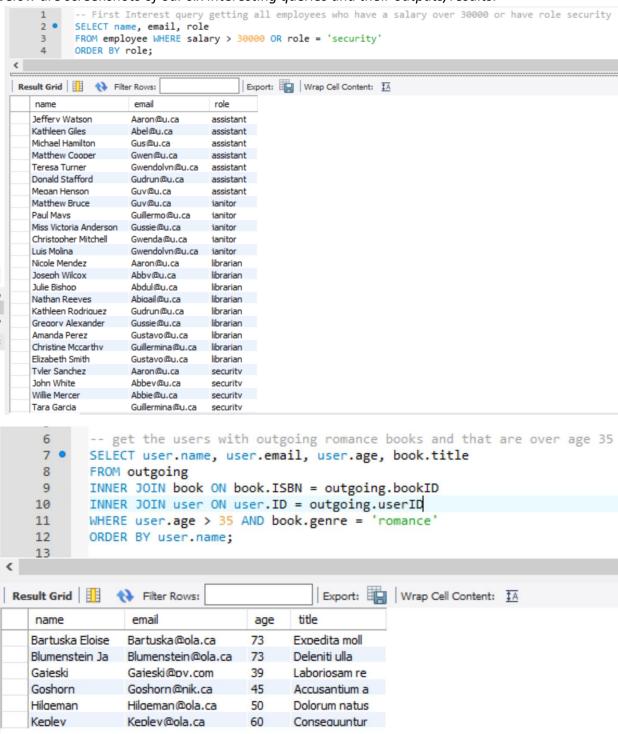
```
INSERT INTO book (
       ISBN,
       title,
       publishingDate,
       genre,
       inventory,
       authorID
 ) VALUES (
       9780545010221,
       'Harry Potter and the Deathly Hallows',
       DATE '2007-07-21',
       'Fantasy Fiction',
       25,
       1
-);
      40 11:54:17 INSERT INTO book (ISBN, title, publishing Date, genre, inventory, authorID) VALUES (9780545... 1 row(s) affected
      41 11:54:36 select *from book LIMIT 0, 1000
                                                                                                                       1 row(s) returned
           --- the command commented out was to enter an entry into the database that could then be used in the insert
    35
           INSERT INTO outgoing
    36 •
    37
           VALUES
           (1106, 1683, 3024002041378, DATE '2017-09-18', DATE '2017-12-23');
    38
    40 • ☐ INSERT INTO returned (
    41
                    borrowID,
    42
                    userID,
                    bookID,
    43
    44
                    dateBorrowed.
    45
                    expectedReturnDate.
    46
                    dateReturned,
    47
                    rating
               ) SELECT borrowID, userID, bookID, dateBorrowed, expectedReturnDate, DATE '2017-11-22', 4 FROM outgoing
    48
    49
           WHERE expectedReturnDate=DATE '2017-12-23';
    50
Output:
 Action Output
                Action
                                                                                               Message
    9 11:37:51 select *from outgoing LIMIT 0, 10000
                                                                                               104 row(s) returned
10 11:47:19 INSERT INTO outgoing VALUES (1106, 1683, 3024002041378, DATE '2017-09-18', DATE '2017-12-23')
                                                                                              1 row(s) affected
    11 11:47:24 INSERT INTO returned (borrowID, userID, bookID, dateBorrowed, expectedReturnDate, dateReturned, ra... 1 row(s) affected Records: 1 Duplicates: 0 Warnings: 0
```

## Question 4: Inserting data into the tuples.

To insert our data into the tuples, we used python (the files name is insertmysql.py). This python file would run the script that enters data into the database. We ensured to create the tables in such a way that we could use existing primary keys from a created table for the foreign keys on another table. This ensured that we could properly use all the joins and that our queries would run as expected. In the python file a lot of the code is commented out and in weird order. We ran several sections of the code to insert data which accounts for the seemingly random ordering of the code. It worked perfectly and we were able to enter over 5000 tuples into two tables, several hundred into another table and over one hundred tuples the remaining tables. To get our data, we used a combination of csv files containing names as well as a python library called Faker which allowed us to generate random names and random text which we took advantage of.

# Question 5: Six Interesting queries

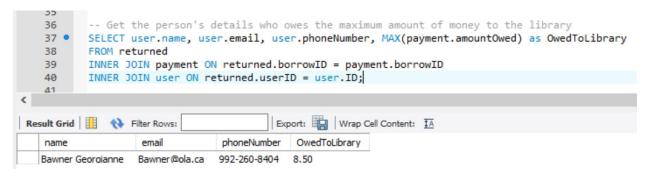
Below are screenshots of our six interesting queries and their outputs/results.



#### Note: a count was returned



#### Note: Only the one tuple was returned



# Question 6: Delete and Update

Below shows three interesting modification commands. We choose to do one interesting delete and two interesting updates. For each of these commands we included the MySQL statement and the output from running the command to show that the command worked as intended.

#### Delete:

```
DELETE FROM employee WHERE role = 'security' OR name LIKE 'Mat%';

30 12:20:10 DELETE FROM employee WHERE role = 'security' OR name LIKE 'Mat%';

5 row(s) affected

Update:

-- Extending the amount of time the book is borrowed for all books that have to be returned on a certain day UPDATE outgoing SET expectedReturnDate = DATE '2018-01-02' WHERE expectedReturnDate = DATE '2017-12-29';

31 12:27:01 UPDATE outgoing SET expectedRetumDate = DATE '2017-12-29' WHERE expectedRetumDate = DATE '20... 4 row(s) affected Rows matched: 4 Changed: 4 Warnings: 0

Update 2:

18 -- Update the dateborrowed of a book who's date borrowed was 2017-10-22 based on the query results of the returned table whos -- expected return date is 2017-11-28

20 UPDATE outgoing as dest, (SELECT * FROM returned where expectedReturnDate = DATE '2017-11-28') as src

SET dest.dateBorrowed = src.dateBorrowed WHERE dest.dateBorrowed = DATE '2017-10-22';

39 12:43:43 UPDATE outgoing as dest, (SELECT * FROM returned where expectedReturnDate = DATE '2017-11-28') as sr... 1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0
```

## **Question 7: Views**

Below shows the View commands and the result tables from running the commands. We ran a Create View command and then a select \* command was run to see all the tuples within the View.

```
-- Creates a view of all employees who are librarians
CREATE VIEW Librarians AS

SELECT * FROM Employee
WHERE role = 'librarian'
ORDER BY name;
```

#### Result from querying all tuples in the above view

staffID	startDate	salary	email	phoneNumber	name	role
33	2013-01-19	41000	Gustavo@u.ca	334-119-1778	Amanda Perez	librarian
39	2013-09-09	41000	Guillermina@u.ca	334-129-1826	Christine Mccarthy	librarian
43	2013-09-09	41000	Gustavo@u.ca	334-129-1878	Elizabeth Smith	librarian
32	2013-01-19	41000	Gussie@u.ca	334-119-1765	Gregory Alexander	librarian
14	2017-05-19	24000	Abdul@u.ca	301-159-1091	Janice Gonzalez	librarian
23	2016-01-19	35000	Abbv@u.ca	301-159-1078	Joseph Wilcox	librarian
24	2016-01-19	35000	Abdul@u.ca	301-159-1091	Julie Bishop	librarian
28	2013-01-19	41000	Gudrun@u.ca	334-119-1713	Kathleen Rodriguez	librarian
11	2017-05-19	24000	Abbev@u.ca	301-159-1052	Margaret Beltran	librarian
51	2017-12-19	42500	auv4@me.com	401-991-9243	Matty Johnson	librarian
27	2016-01-19	35000	Abigail@u.ca	301-159-1130	Nathan Reeves	librarian
20	2016-01-19	35000	Aaron@u.ca	301-159-1039	Nicole Mendez	librarian

#### VIEW 2:

```
-- Second view created
-- Create a view of all the books in the library who have been published in 2017

CREATE VIEW NewBooks(bookName, authorName, genre, publishingDate) AS

SELECT book.title, author.authorName, book.genre, book.publishingDate

FROM book
NATURAL JOIN author
WHERE book.publishingDate > DATE '2017-01-01'
ORDER BY book.genre;
```

## Result from querying all tuples within the view:

bookName	authorName	genre	publishingDate
Ouisquam ad d	Cassandra Nash	comedv	2017-05-13
Velit volupta	Allen Andrews	comedy	2017-05-13
Expedita anim	Ashlev Galvan	comedy	2017-05-13
Ratione sit e	Amanda Jenkins	comedv	2017-05-13
Rem qui autem	Adam Johnson	comedy	2017-05-13
Ouam consegua	Lauren Larson	comedy	2017-05-13
Ouia animi si	David Lvons	fiction	2017-05-13
Voluptates il	Andrew Wilson	fiction	2017-05-13
Sunt id porro	Kimberly Cisneros	fiction	2017-05-13
Esse laborum	Jasmin Small	fiction	2017-05-13
		_	

#### VIEW 3:

```
-- View of all authors who have their books currently in the library
-- IE this excludes all authors who are in the library database but don't have their book in the library currently

CREATE VIEW AuthorsInLibrary (name, ID) AS
SELECT author.authorName, author.authorID
FROM author
INNER JOIN book ON author.authorID = book.authorID
ORDER BY author.authorName;
```

## Resulting from querying all rows within the view.

name	ID
Adam Davis	454
Adam Johnson	3040
Adam Morales	3275
Adam Ortiz	3991
Adam Patterson	2918
Adam Robles	4821
Adam Smith	550
Adam Smith	550
Adrian Williams	2494
Adriana Thomas	1051

## Inserting into the views we created:

Note: see the comments above the command for an explanation of why the insertion worked or did not work.

Working insert for view 1:

```
31 -- this works because this view is composed of only one table
32 • INSERT INTO Librarians VALUES (0, DATE '2015-02-12', 35360, 'g@owl.ca', '778-998-2939', 'Jack Johanis', 'librarian');
```

49 13:03:55 INSERT INTO Librarians VALUES (0, DATE '2015-02-12', 35360, 'g@owl.ca', '778-998-2939', 'Jack Johanis', 1... 1 row(s) affected

#### Not working insert for view 2:

```
-- this won't work because this view is composed of multiple tables
INSERT INTO NewBooks VALUES ('Jack and the Magic Hat', 'Jackson Holt', 'adventure', DATE '2017-02-17');

50 13:08:37 INSERT INTO NewBooks VALUES (Jack and the Magic Hat', 'Jackson Holt', 'adventure', DATE '2017-02-17') Error Code: 1394. Can not insert into join view library database newbooks' without fields list
```

The third view also will not be able to have values inserted because it is composed of a join between multiple tables. We chose not to include the screenshots of the failed insert because it is the same as the one above.

## Question 8: Non-Existent MySQL clause.

The SQL clause that we learned in class, but was not implemented in MySQL is the assertion statement. An assertion is a predicate expressing a condition we wish the database to always satisfy. Through our experience with MySQL we found out that this assertion was unavailable and thus we would not be able to use it if necessary.