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```
__ *********************************
-- EECS3421B
-- Project 4 Part A (Triggers)
-- Name: Hassaan Abid
-- ID: 214243935
-- EECS Account: ha104
__ *********************************
-- Examples/Tests are located in file: trigger_test_examples.sql
-- NOTE: execute bash script: runA.sh to test these triggers
--#SET TERMINATOR @
-- trigger #1
-- on delete book cascade delete its offers as well
create or replace trigger cleanUpOffers
after delete on yrb_book
referencing
    old as 0
for each row mode db2sql
begin atomic
    DELETE FROM new_offer AS Y WHERE Y.title = O.title and Y.year = O.year ;
end@
-- trigger #2
-- reject insertion into purchase if customer is not a member of offering club
create or replace trigger rejectNonMemberPurchase
before insert on new_purchase
referencing
    new as N
for each row mode db2sql
when (
    N.cid not in
(SELECT M.cid from new member AS M where M.club = N.club))
begin atomic
SIGNAL SQLSTATE '80000'
('Error: Purchase is invalid since customer is not a member');
end@
-- trigger #3
-- on insert customer, add customer to club 'Basic' as well
create or replace trigger addToClubBasic
after insert on yrb customer
referencing
   new as N
for each row mode db2sql
when (
   N.cid not in
(SELECT cid from new member where club = 'Basic'))
begin atomic
    insert into new member (club, cid) values('Basic', N.cid);
end@
```

```
-- Testing Trigger # 1
-- By deleing the following book
-- title = 'Acrimony Made Simple' and year = 1992"
-- expected result:
                     1. The book should be deleted
                     2. All offers for this book should also be deleted
-- This drop is necessary to test trigger # 1
drop table YRB OFFER;
-- make sure book is present
select * from yrb_book where title = 'Acrimony Made Simple' and year = 1992;
-- make sure book has offers
select * from new_offer where title = 'Acrimony Made Simple' and year = 1992;
-- delete the book
delete from yrb_book where title = 'Acrimony Made Simple' and year = 1992;
-- check if all the others also got deleted
select * from new offer where title = 'Acrimony Made Simple' and year = 1992;
-- Testing Trigger # 2
-- reject insertion into purchase if customer is not a member of offering club
-- see who is and isnt member of club 'AAA', cid 2 is while 1 isnt.
select * from new member where club = 'AAA';
-- make sure insertion is sucessfull since cid = 2 is a member of club = 'AAA'
insert into new purchase values
   (2, 'AAA', 'Richmond Underground','1997', '2019-11-29-04.55.46.656000', 2);
-- insertion should fail since cid = 1 is not a member of club = 'AAA'
-- i.e. a trigger violation should show
-- "Error: Purchase is invalid since customer is not a member".
insert into new purchase values
(1, 'AAA', 'Richmond Underground', '1997', '2019-11-29-04.55.46.656000', 2);
-- an extra check to make sure that the purchase was rejected
-- bookt with title = Richmond Underground and year = 1997 should not be among
-- purchases of cid = 1
select * from new purchase where cid = 1;
-- Testing Trigger # 3
-- when a new customer is inserted make them a member of club 'Basic'
insert into yrb customer values (50, 'Joe Jackson', 'Boston');
-- check if customer was inserted
select * from yrb_customer where cid = 50;
-- make sure customer is now a member of club basic
select * from new_member where cid = 50 and club = 'Basic';
```

## Part A (Triggers)

### **Triggers Run Instructions:**

- 1. Download the submitted file: ha104 p4 parta.zip
- 2. cd to ha104 p4 partb.zip and execute: unzip ha104\_p4\_parta.zip
- 3. cd ha104\_p4\_partb
- 4. Execute the script: runA.sh

  Note: if there is a permission error execute: chmod +x runA.sh

The results from testing triggers were also submitted, see location:

ha104\_p4\_parta/output/trigger\_1\_test\_output.txt ha104\_p4\_parta/output/trigger\_2\_test\_output.txt ha104\_p4\_parta/output/trigger\_3\_test\_output.txt

## Part B (Database Application)

#### **Program Installation Guide**

Note: This installation guide was tested successfully on Lassonde's server: **red.cs.yorku.ca** 

There are 4 steps to install/run this program

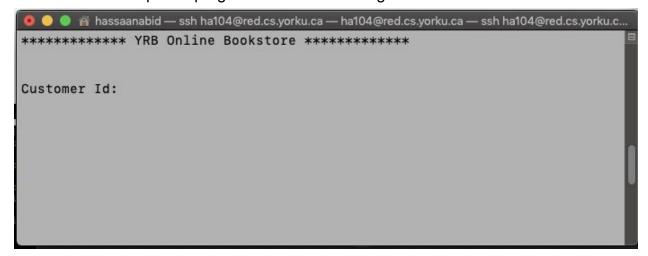
- 5. Download the submitted file: ha104 p4 partb.zip
- 6. cd to ha104\_p4\_partb.zip and execute: unzip ha104\_p4\_partb.zip
- 7. cd ha104 p4 partb
- 8. Execute the script: runB.sh

  Note: if there is a permission error execute: chmod +x runB.sh

**NOTE:** Every time the runB.sh script runs it will drop all tables and create new schemas. However, this is not an issue for us since this project is not running in a production environment.

To keep the same schema between executions, comment out lines 12 and 16 from runB.sh (see screenshot on the next page).

After the above steps the program should be running as shown below:



File runB.sh contains the following commands

```
# connect to database
10
     db2 connect to c3421a
11
     # delete existing schema
12
    db2 -tf ./util/yrb_drop.sql
13
14
15
    # create new schema
16
    db2 -tf ./util/yrb_create.sql
17
18
    # setup enviorment variables
    source ~db2leduc/cshrc.runtime
19
20
21
     # compile java files
     javac Connect.java YRBQueries.java YRB.java
22
23
24
    clear
25
26
    # run the program
    java YRB
27
28
```

### Tools used in this project

```
> IDE: IntelliJ IDEA 2018.3.2 (Ultimate Edition)
```

- > TextEditor: Visual Studio Code Version: 1.40.2
- > **JRE**: java version "1.8.0 202"
- > **JVM**: Java HotSpot(TM) 64-Bit Server VM (build 25.202-b08, mixed mode)
- > **OS**: macOS 10.14.3
- > Imports: import java.sql.\*, java.util.\*
- ➤ Database: IBM DB2

### Scenario #1 - Customer updates their information

The following shows, the customer with **cid = 6** confirm that they would like to **update** their information.

- The customer enters a new name and a new city.
- After executing an SQL update command, the program returns with a success message.

As a cross-check(outside of the application) the following query shows that indeed customer with cid =6 is now named 'Nick Wayne' and lives in "oklahoma'.

```
● ● ● hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.c...

red 305 % db2 "select * from yrb_customer where cid = 6"

CID NAME CITY

6 Nick Wayne oklahoma

1 record(s) selected.

red 306 % ■
```

### Scenario #2 - Customer purchases a book

This would be the most typical scenario that a customer wants to purchase a book.

- The customer enters their **cid**.
- The customer says 'n' when asked to update their information.

continues...

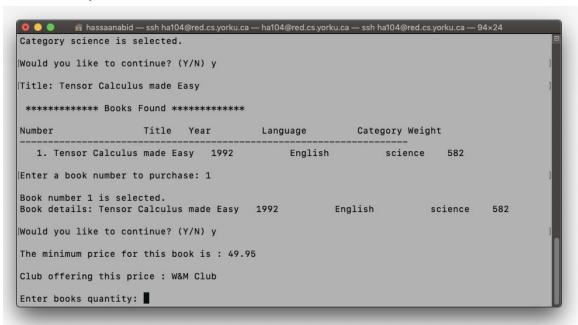
The customer chooses the book category.

```
🧿 🔵 🥛 📸 hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca -
Would you like to update the customer information? (Y/N) n
 ******* Book Categories *******
Number Category Name
    1. children
    2. cooking
    3. drama
    4. guide

    history
    horror

    7. humor
    8. mystery
    9. phil
   10. romance
   11. science
   12. travel
[Choose a category number: 11
Category science is selected.
[Would you like to continue? (Y/N) y
Title:
```

The customer enters a book title of their choice. In this case, the title is being sold by a club that they are a member of.



The customer purchases 2 copies of the same books and exits the session.

```
The minimum price for this book is : 49.95

Club offering this price : W&M Club

Enter books quantity: 2
The total price for your order will be : $ 99.90

[
Would you like to purchase the book/books? (Y/N) y

Thank you for your purchase.

[
Would you like to continue? (Y/N) n

Exiting now.

red 329 % 

|
```

A DB2 query (outside of the application) confirms that indeed that purchase was added to the database.

```
**Ri hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca — 112×12

red 331 % db2 "select * from yrb_purchase where cid = 7 and title = 'Tensor Calculus made Easy' and qnty = 2"

CID CLUB TITLE YEAR WHEN QNTY

7 W&M Club Tensor Calculus made Easy 1992 2019-12-01-01.23.39.281000 2

1 record(s) selected.

red 332 %
```

### Scenario #3 - Customer purchases multiple books in one session

Customer (cid = 8) chooses category 9 ('phi'l) to purchase the first book.

```
🧿 🔵 🌒 👸 hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca — 92×38
******* YRB Online Bookstore *******
Customer Id: 8
Customer Information Retrieved
ID: 8
Name : Jack Daniels
City: Blacksburg
Would you like to update the customer information? (Y/N) n
 ****** Book Categories *******
Number Category Name

    children
    cooking
    drama

    4. guide
    5. history
    6. horror
    7. humor
   8. mystery
   9. phil
10. romance
   11. science
   12. travel
Choose a category number: 9
Category phil is selected.
[Would you like to continue? (Y/N) y
```

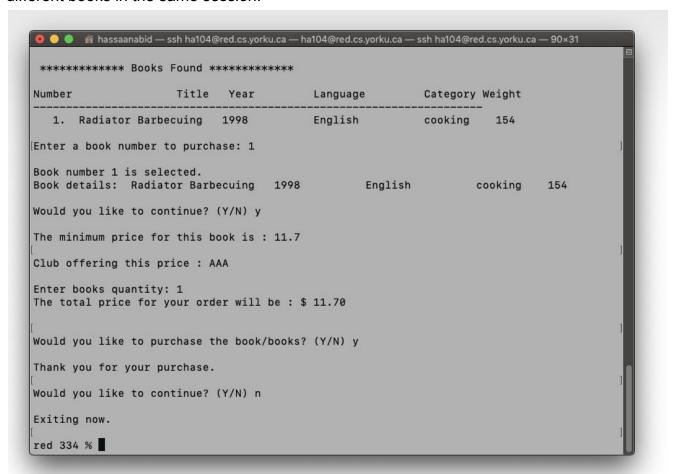
Customer purchases 'Plato Rocker'.

```
🧑 🔘 🌒 🧌 hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca — 92×30
[Would you like to continue? (Y/N) y
[Title: Plato Rocks
******* Books Found *******
Number
                                                            Category Weight
                      Title Year
                                           Language
  1.
               Plato Rocks 1975
                                             Greek
                                                               phil
                                                                        467
[Enter a book number to purchase: 1
Book number 1 is selected.
Book details:
                       Plato Rocks
                                                   Greek
                                    1975
                                                                        phil
                                                                               467
[Would you like to continue? (Y/N) y
The minimum price for this book is: 38.95
Club offering this price : YRB Bronze
Enter books quantity: 1
The total price for your order will be : $ 38.95
Would you like to purchase the book/books? (Y/N) y
Thank you for your purchase.
Would you like to continue? (Y/N)
```

The customer continues their shopping experience after the purchase (without terminating the application/ current session). This time customer chooses category 2 (cooking).



Customer purchases 'Radiator Barbecuing'. In total the customer purchased two different books in the same session.



# Scenario #4 - The title customer entered does not exist (customer may choose a different category)

The customer selects the children category to purchase a book.

```
🧕 🕒 🌒 🧌 hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca — 87×36
    ******* YRB Online Bookstore ********
Customer Id: 4
Customer Information Retrieved
Name : Suzy Sedwick
City: Williamsburg
Would you like to update the customer information? (Y/N) n
 ******* Book Categories ********
Number Category Name

    children
    cooking
    drama

    4. guide
5. history
6. horror
7. humor
    8. mystery
    9. phil

    romance
    science
    travel

[Choose a category number: 1
Category children is selected.
```

The customer selects the title 'harry potter' but unfortunately it does not exist (i.e. the club(s) they are a member of are not offering this book. However, customer would like to continue shopping. Hence, they are taken back to select another category.



### Scenario #6 - Customer exits after choosing a category

Supported feature: the customer may exit after choosing a category as shown below.

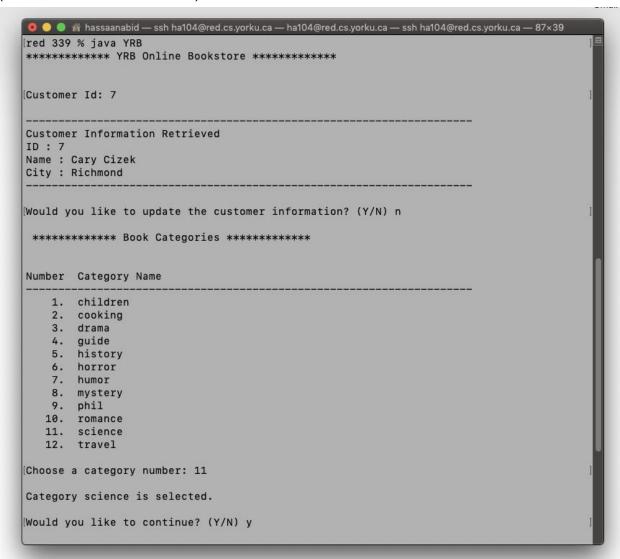
```
🧕 🌕 🌒 🧌 hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca — 82×42
red 337 % java YRB
****** YRB Online Bookstore ********
Customer Id: 2
Customer Information Retrieved
ID: 2
Name : Qfwfq
City: Pluto
Would you like to update the customer information? (Y/N) n
 ****** Book Categories ********
Number Category Name
    1. children

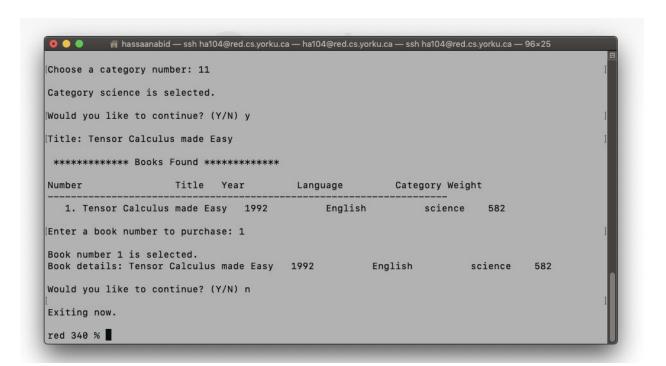
    cooking
    drama

    4. guide
5. history
6. horror
7. humor
    8. mystery
    9. phil
   10. romance
   11. science
   12. travel
Choose a category number: 3
Category drama is selected.
Would you like to continue? (Y/N) n
Exiting now.
red 338 %
```

### Scenario #7 - Customer exits after choosing a book

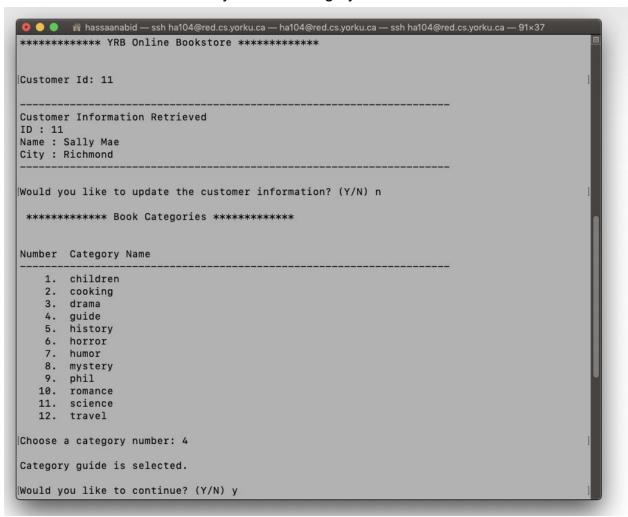
Supported feature: the customer may exit after choosing a book title as shown below. (see the second screenshot)



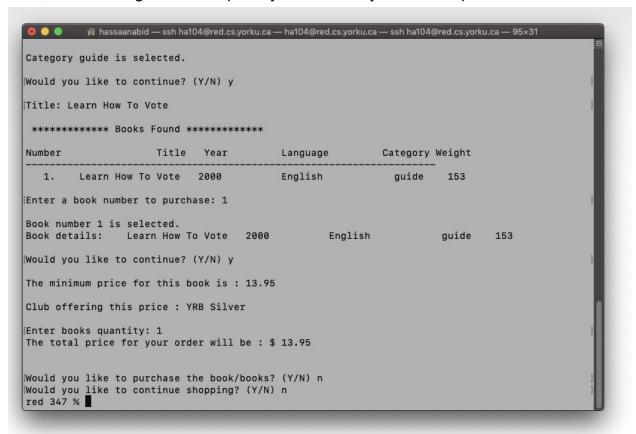


### Scenario #8 - Customer exits before purchasing a book

Supported feature: the customer may exit right before purchasing a book. This screenshot shows that they select a category.

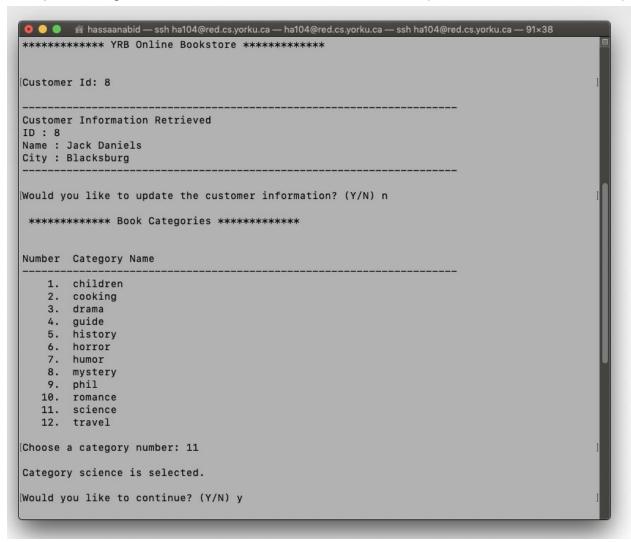


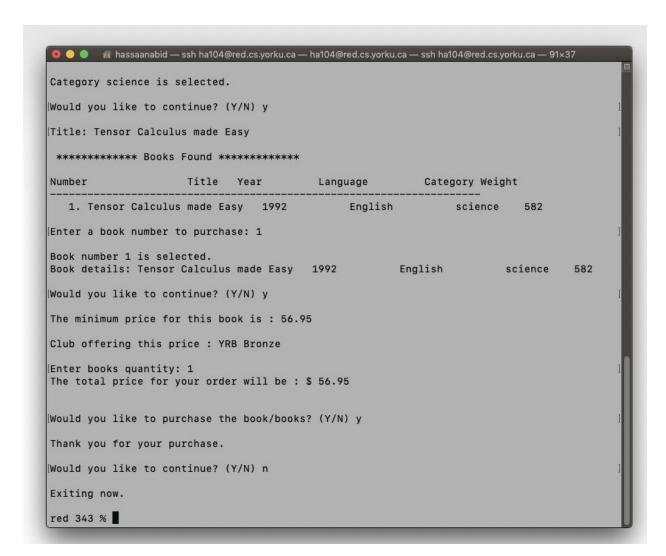
Here, after entering a title and quantity customer says 'n' to final purchase and exits.



### Scenario #9 - Customer exits after purchasing a book

After purchasing a book the customer can exit the session. (see the second screenshot)





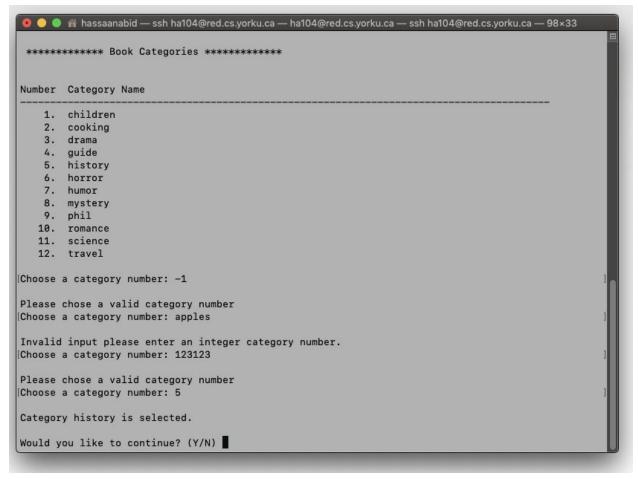
#### Scenario #10 - Customer enters invalid customer ID

Supported feature: handle invalid customer ID

```
🧑 🔵 🐧 🔐 hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca — 93×21
******* YRB Online Bookstore ********
Customer Id: 123123
ERROR: Customer id not found. Try Again.
[Customer Id: asd
Invalid input please enter an integer cid.
[Customer Id: vb
Invalid input please enter an integer cid.
[Customer Id: $$@
Invalid input please enter an integer cid.
[Customer Id: 2
Customer Information Retrieved
ID : 2
Name : Qfwfq
City : Pluto
Would you like to update the customer information? (Y/N)
```

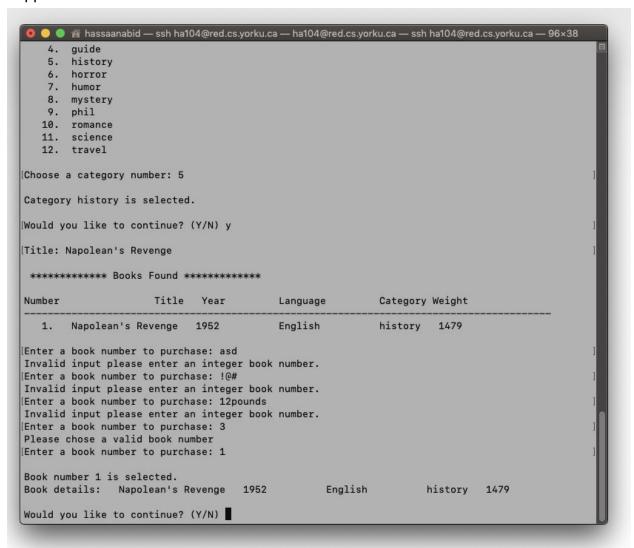
### Scenario #11 - Customer enters invalid Book category (number)

Supported feature: handle invalid book category



# Scenario #12 - Customer enters invalid input when choosing a book to purchase

Supported feature: handle invalid book number.



### Scenario #13 - Customer enters an invalid quantity of books

Supported feature: handle invalid book quantity

```
👸 hassaanabid — ssh ha104@red.cs.yorku.ca — ha104@red.cs.yorku.ca — ssh ha104@red.cs.yorku.ca — 8..
Book number 1 is selected.
                                      1952
                                                    English
Book details: Napolean's Revenge
                                                                      history
                                                                                1479
[Would you like to continue? (Y/N) y
[The minimum price for this book is : 139.85
Club offering this price : Oprah
Enter books quantity: qwe
Invalid input please enter a valid number as quantity.
Enter books quantity: $123##
Invalid input please enter a valid number as quantity.
Enter books quantity: ][;[op
Invalid input please enter a valid number as quantity.
Enter books quantity: 3
The total price for your order will be : $ 419.55
Would you like to purchase the book/books? (Y/N)
```

Thank you.