Order Processing System

Database Management Systems Final Project

Implementation of a DBMS of an online bookstore.

Team Members

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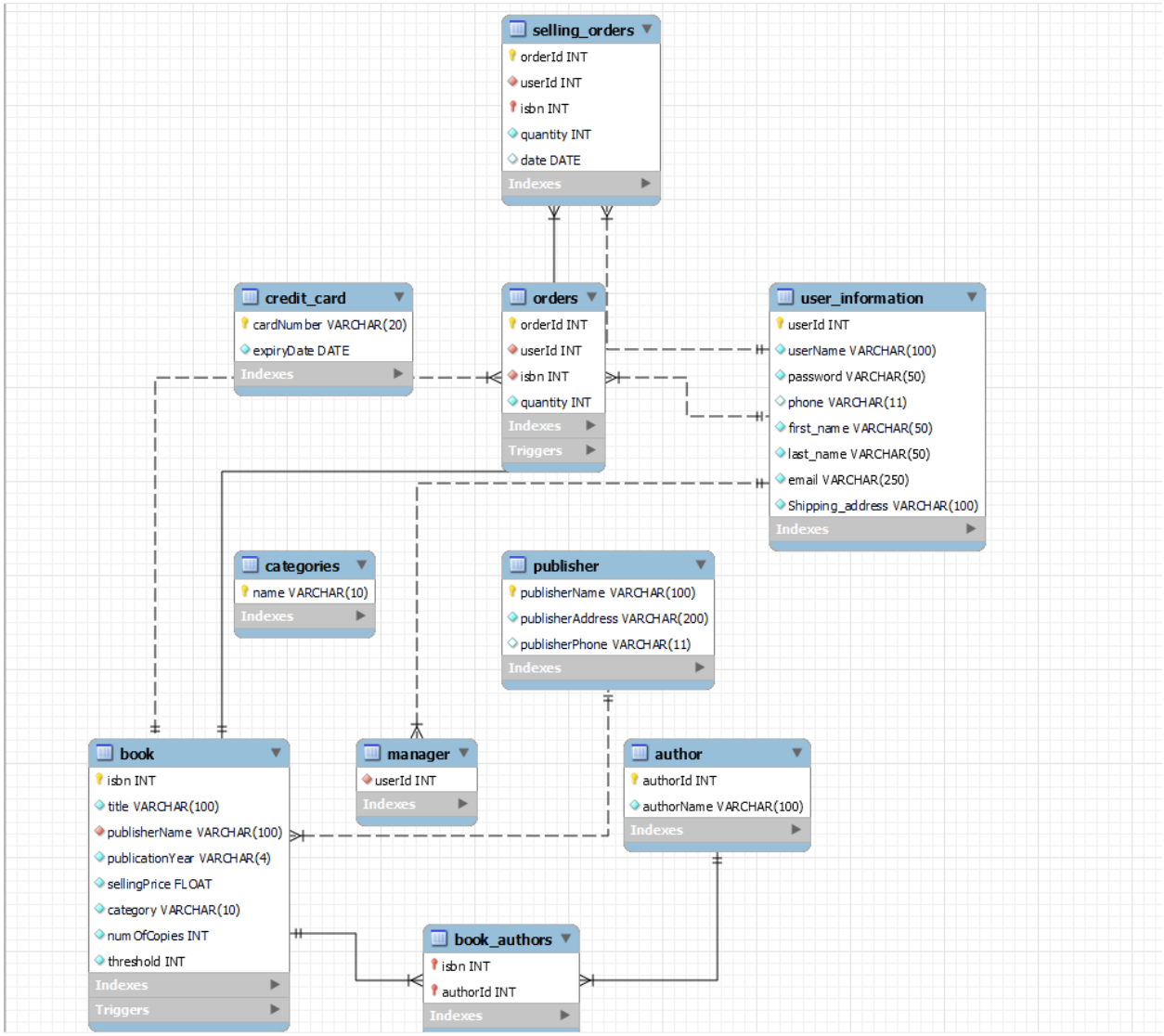
Database ERD Diagram



Analysis

Triggers

1) Modify_existing_books

   Make users cannot update the quantity of a book if this update will cause the quantity of a book in stock to be negative.

```
delimiter $$
create trigger modify_existing_books
 before update on book
 for each row
begin
    if  new.numOfCopies<0 then
        SIGNAL SQLSTATE '45000'SET MESSAGE_TEXT = 'Cannot update book with negative number of copies ';
end if;
end;$$
delimiter ;
INSERT INTO `bookstore`.`publisher` (`publisherName`, `publisherAddress`, `publisherPhone`) VALUES ('elahram', 'cairo', '01023564789');
INSERT INTO `bookstore`.`book` (`title`, `publisherName`, `publicationYear`, `sellingPrice`, `category`, `numOfCopies`, `threshold`) VALUES ('algo', 'elahram', '2022', '130', 'history', '5', '2');
update book set numOfCopies=-1 where book.isbn=1;
```

2) Place_order

   System order an order with constant quantity is placed only when the quantity of a book drops from above a given threshold , assuming System is a manager with id 0

```
create trigger place_order
after update on book
for each row
begin
    if  new.numOfCopies<new.threshold and old.numOfCopies>old.threshold then
            insert into ORDERS(userId,isbn,quantity) values ( "0" ,old.isbn,old.threshold);
    end if;
end;$$
delimiter ;
-- INSERT INTO `bookstore`.`user_information` (`userId`, `userName`, `password`, `phone`, `first_name`, `las
-- INSERT INTO `bookstore`.`publisher` (`publisherName`, `publisherAddress`, `publisherPhone`) VALUES ('elah
-- INSERT INTO `bookstore`.`book` (`title`, `publisherName`, `publicationYear`, `sellingPrice`, `category`,
-- update book set numOfCopies=1 where book.isbn=1;
```

3) confirmOrder

   The quantity of the book in store automatically increases with the quantity specified in the order , when manager confirm an order

```
delimiter $$
create trigger confirmOrder
before  delete on ORDERS
for each row
begin
    update book set numOfCopies = numOfCopies + old.quantity where isbn = old.isbn ;
end;$$
delimiter ;
-- delete from ORDERS where orders.orderId = 2;
```

Indices

Add indices to attributes which we used more in select or update to optimize query

```
create index userIdIndex on user_information(userId);
create index userEmailIndex on user_information(email);
create index bookIsbnIndex on book(isbn);
create index bookTitleIndex on book(title);
create index bookAuthorIsbnIndex on book_authors(isbn);
create index authorIdIndex on author(authorId);
create index authorNameIndex on author(authorName);
create index userIdOrdersIndex on orders(userId);
create index isbnOrdersIndex on orders(isbn);
```

Database Tuning

To ensure using memory efficiently, a relation is made for publishers instead of keeping a column for publisher in the BOOK relation to avoid redundancy of information as many books may have the same publisher.

Moreover, a relation is created to store managers' IDs instead of keeping a column of boolean in the USER_INFORMATION relation as the number of managers is much less than the number of users, so storing managers' IDs is a more cost-effective approach.

Concurrency / Transaction Control

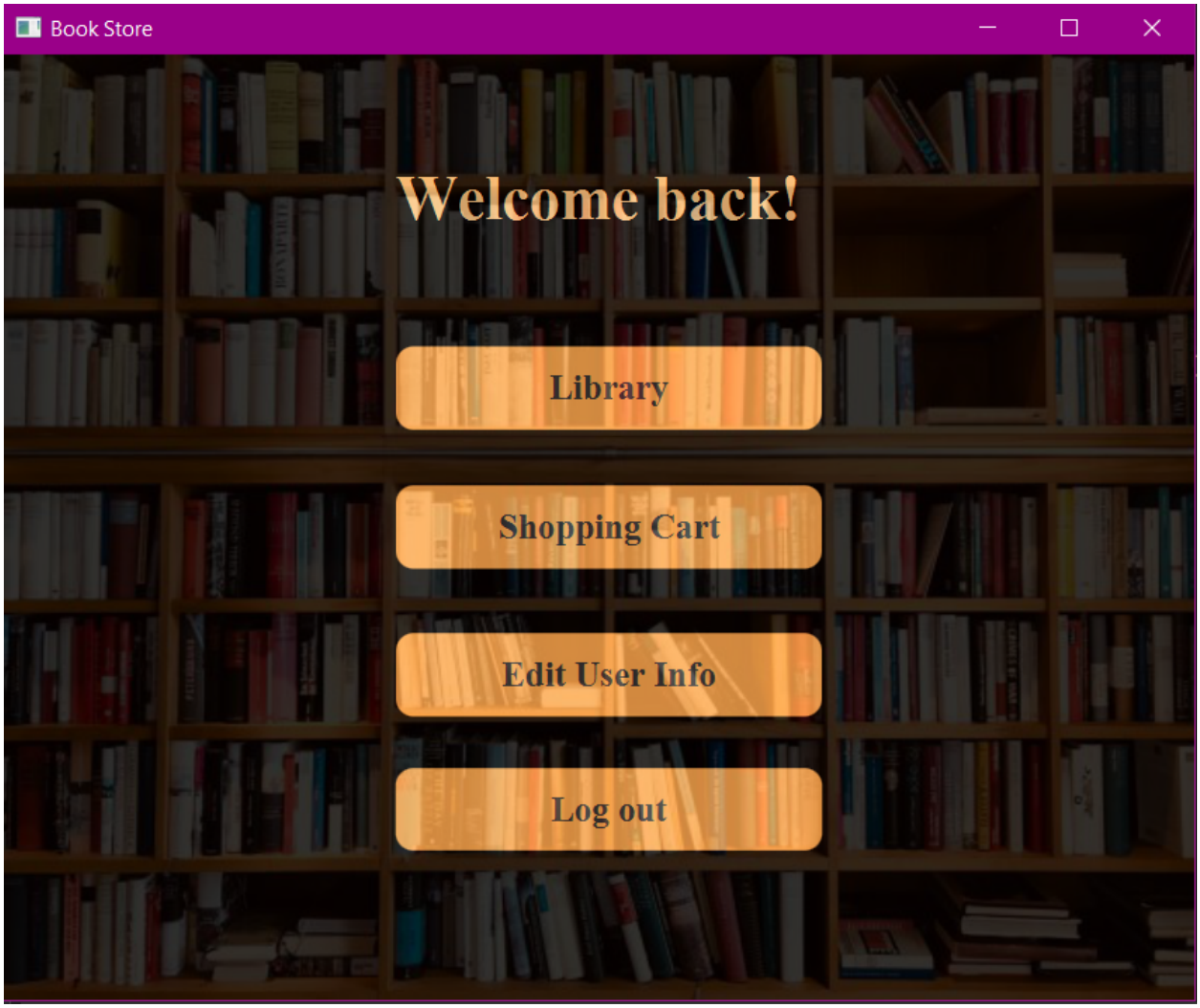
On checkout from the shopping cart, a transaction is started with an isolation level of Repeatable Read to prevent dirty reads and non-repeatable reads while the user is entering his credit card details. A transaction is committed on confirmation if the credentials are valid. If the user cancels the checkout, the transaction rollback.

On modifying a book, a transaction is started with an isolation level of Repeatable Read to prevent dirty reads and non-repeatable reads while the user is entering the new details of the book. A transaction is committed on confirmation if the new title is unique.

Sample Screenshots

I. User

User Homepage



Edit User Info ::

>> before editing fields .

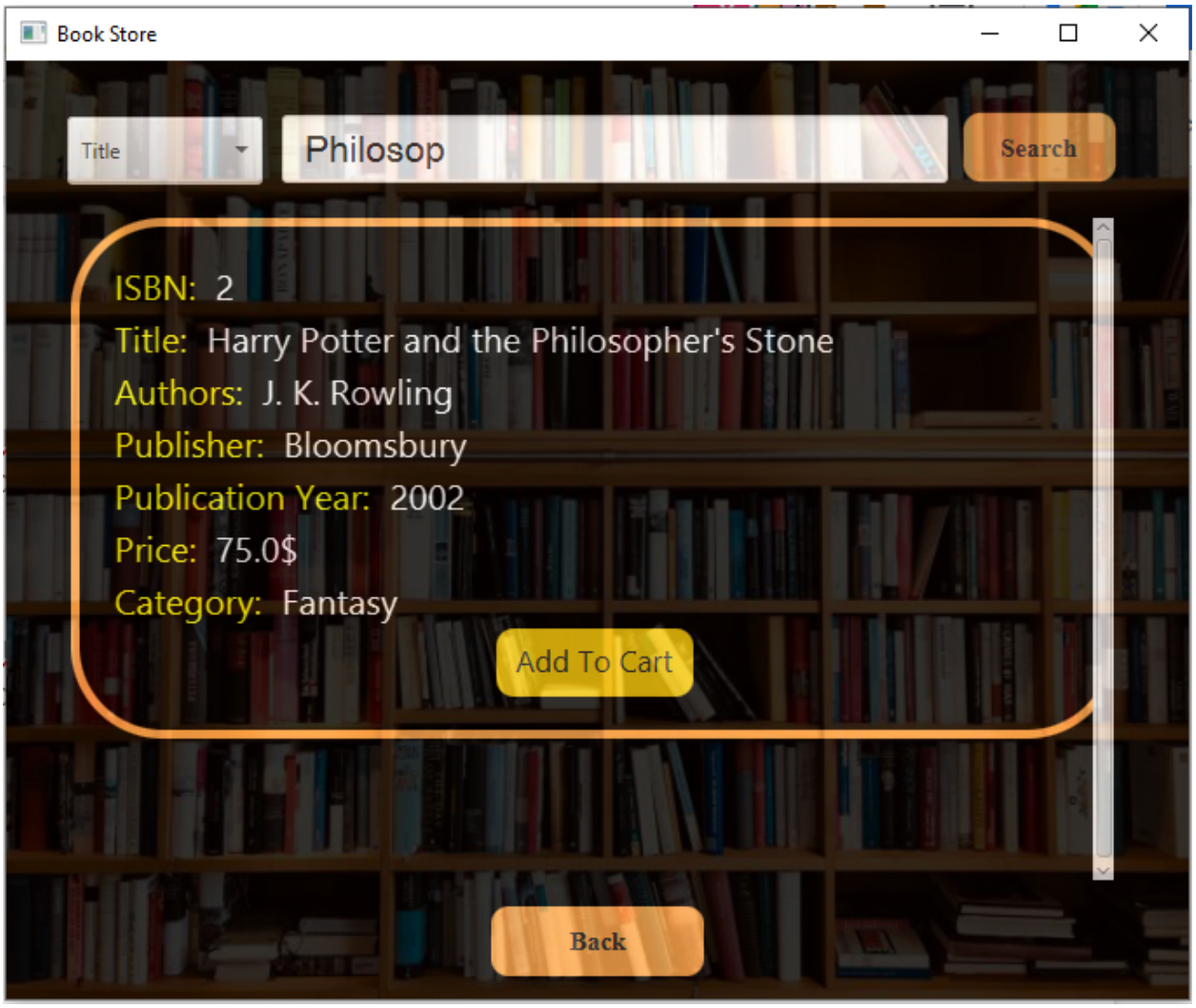
>> after editing ::

>> For Editing Password ::

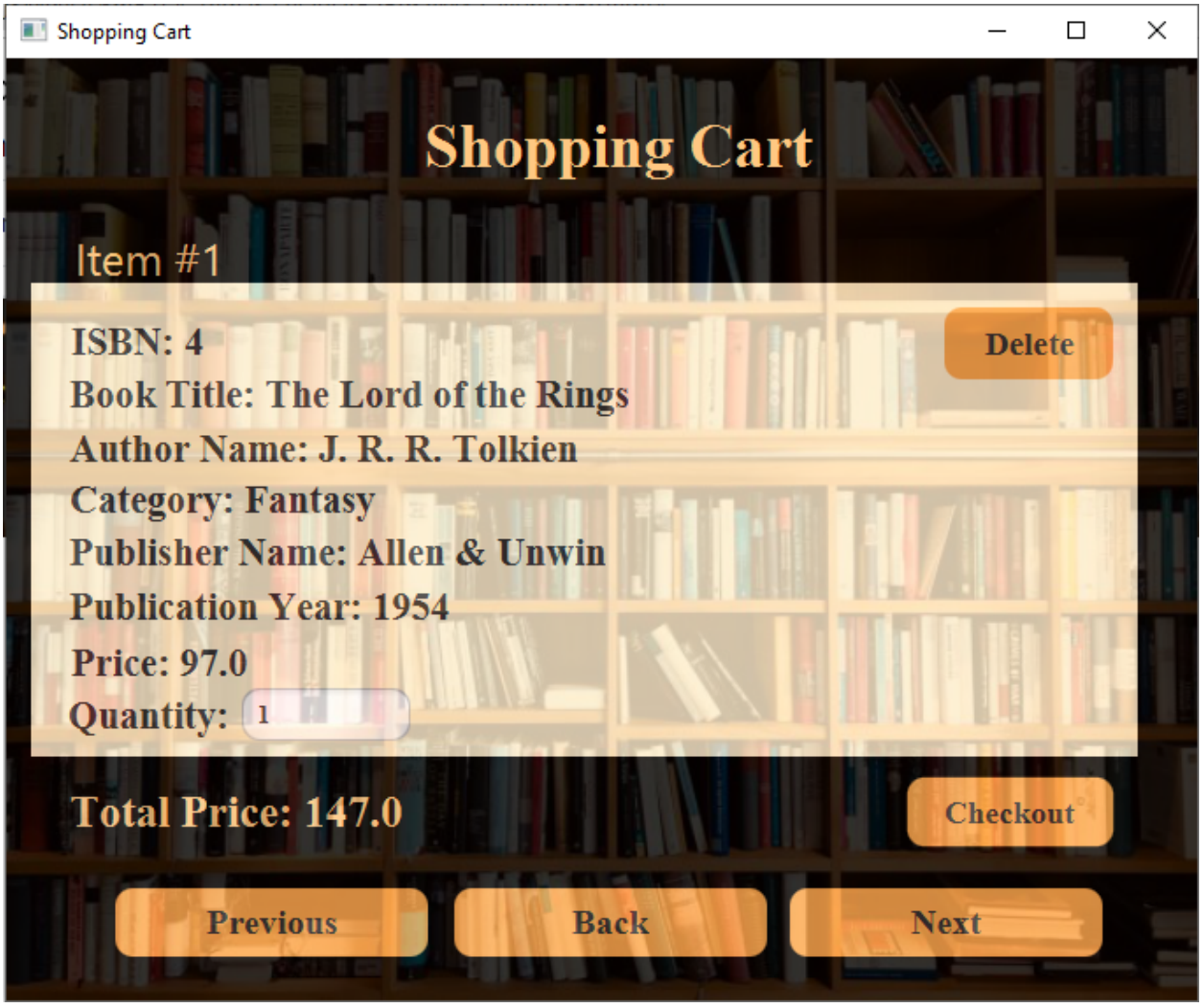
>> Entering invalid old password ::

Library

Search

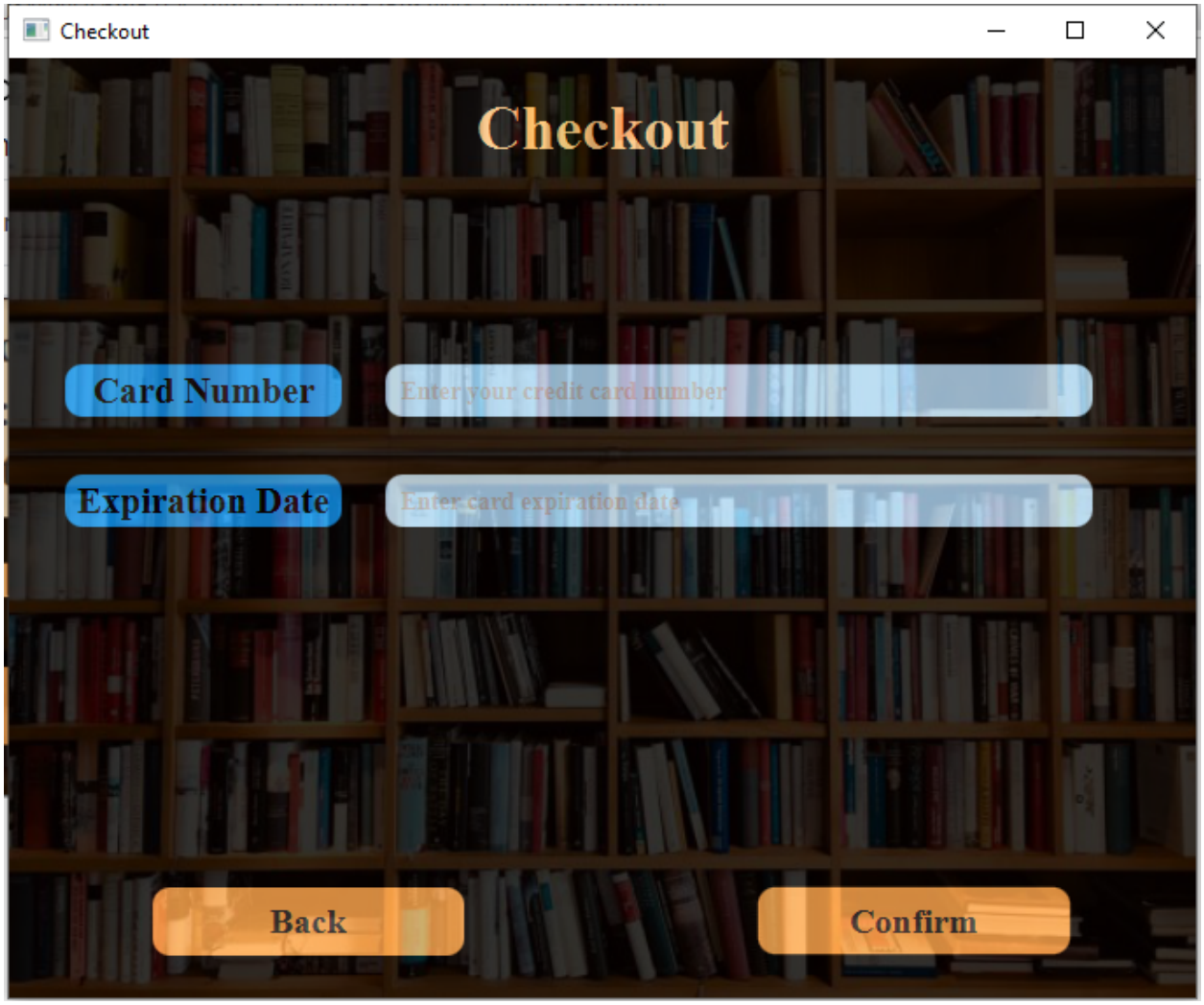


Shopping Cart

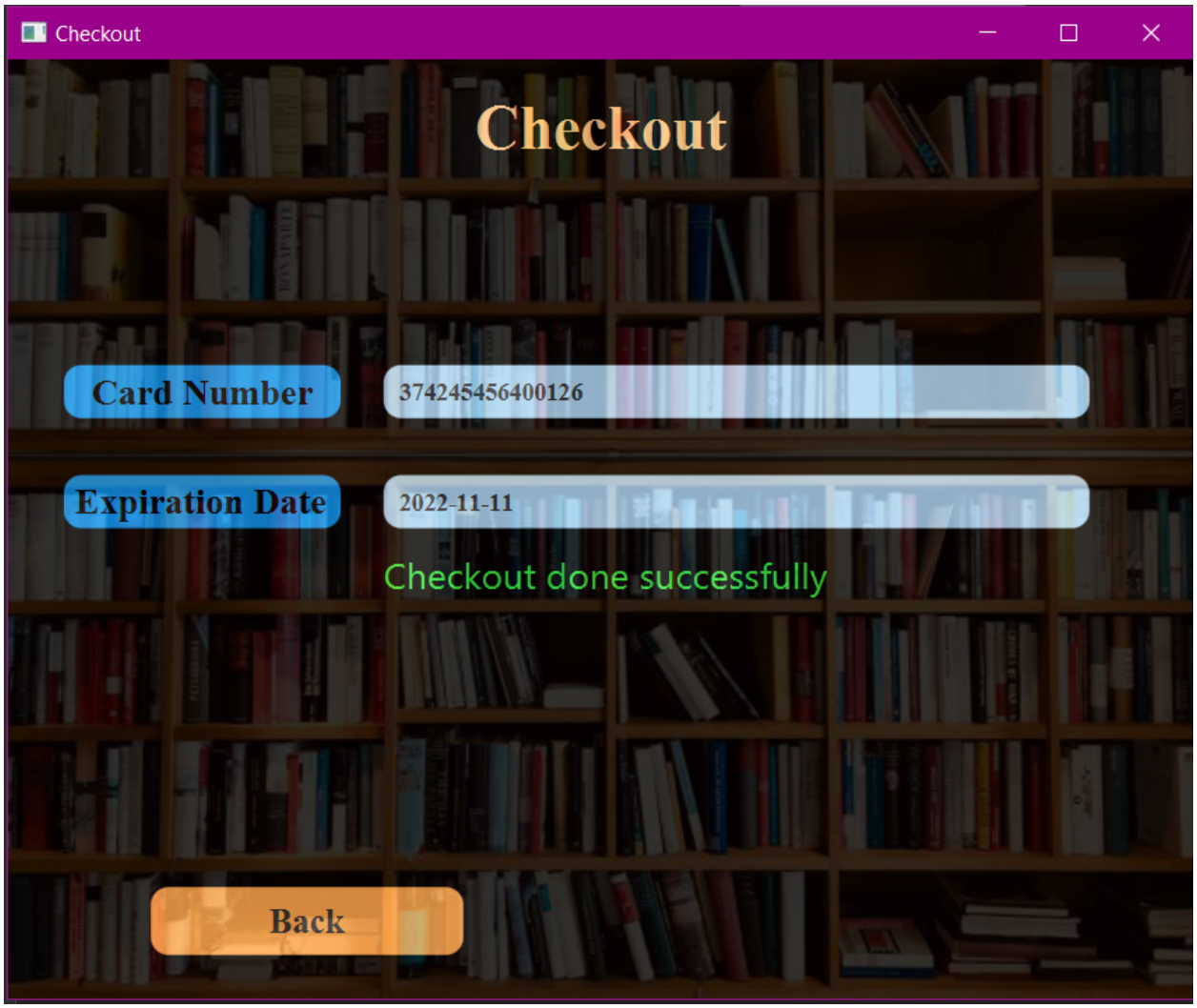

Shopping Cart
Shopping Cart
Item #1
ISBN: 4
Delete
Book Title: The Lord of the Rings
Author Name: J. R. R. Tolkien
Category: Fantasy
Publisher Name: Allen & Unwin
Publication Year: 1954
Price: 97.0
Quantity: 1
Total Price: 147.0
Checkout
Previous
Back
Next


Shopping Cart
Shopping Cart
Item #2
ISBN: 5
Delete
Book Title: Inverting the Pyramids: The History of Football...
Author Name: Jonathan Wilson
Category: Sports
Publisher Name: Hachette Book Group
Publication Year: 2003
Price: 50.0
Quantity: 3
Total Price: 247.0
Checkout
Previous
Back
Next

Checkout



Checkout Success

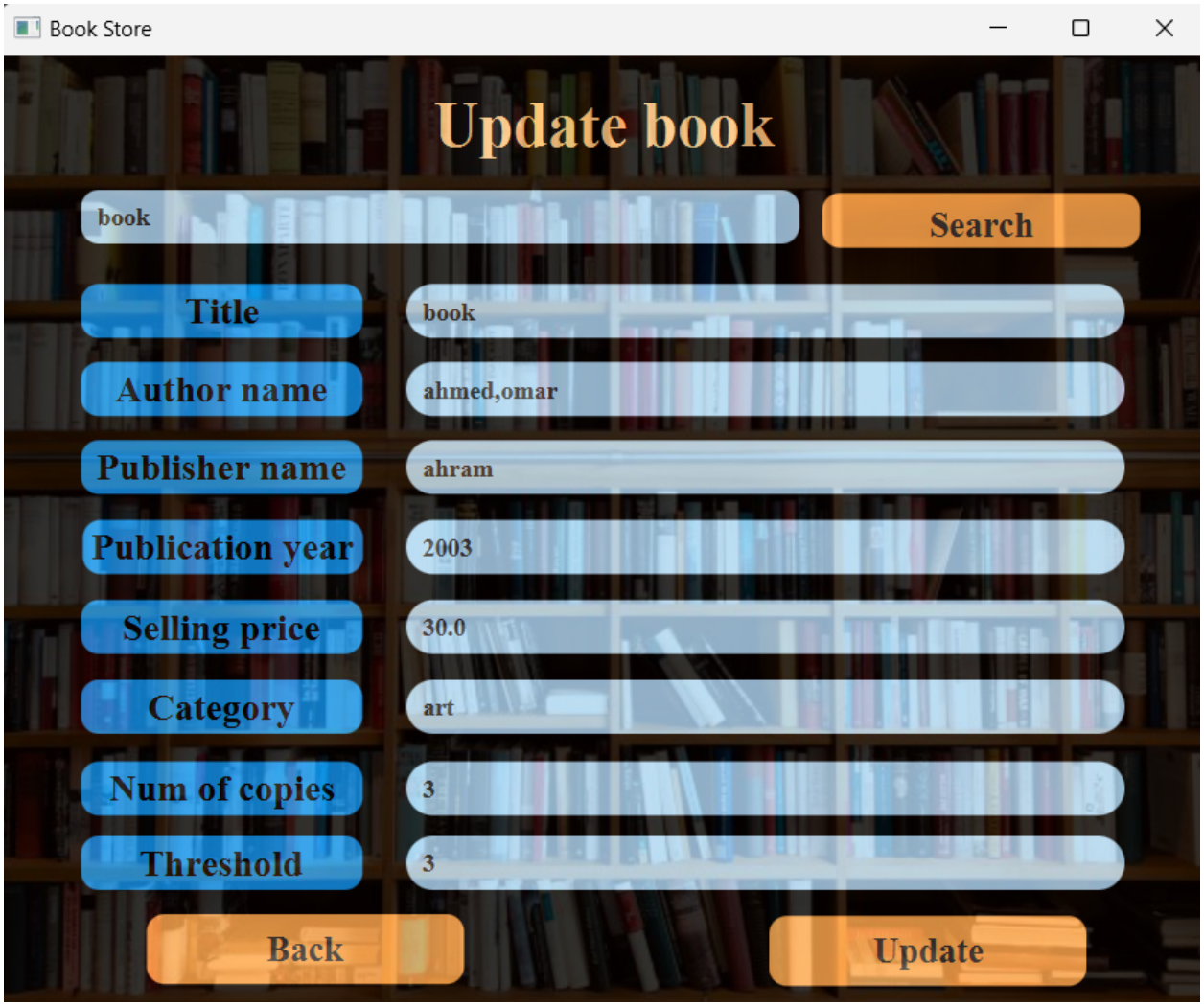


Checkout with quantities exceeding stock value

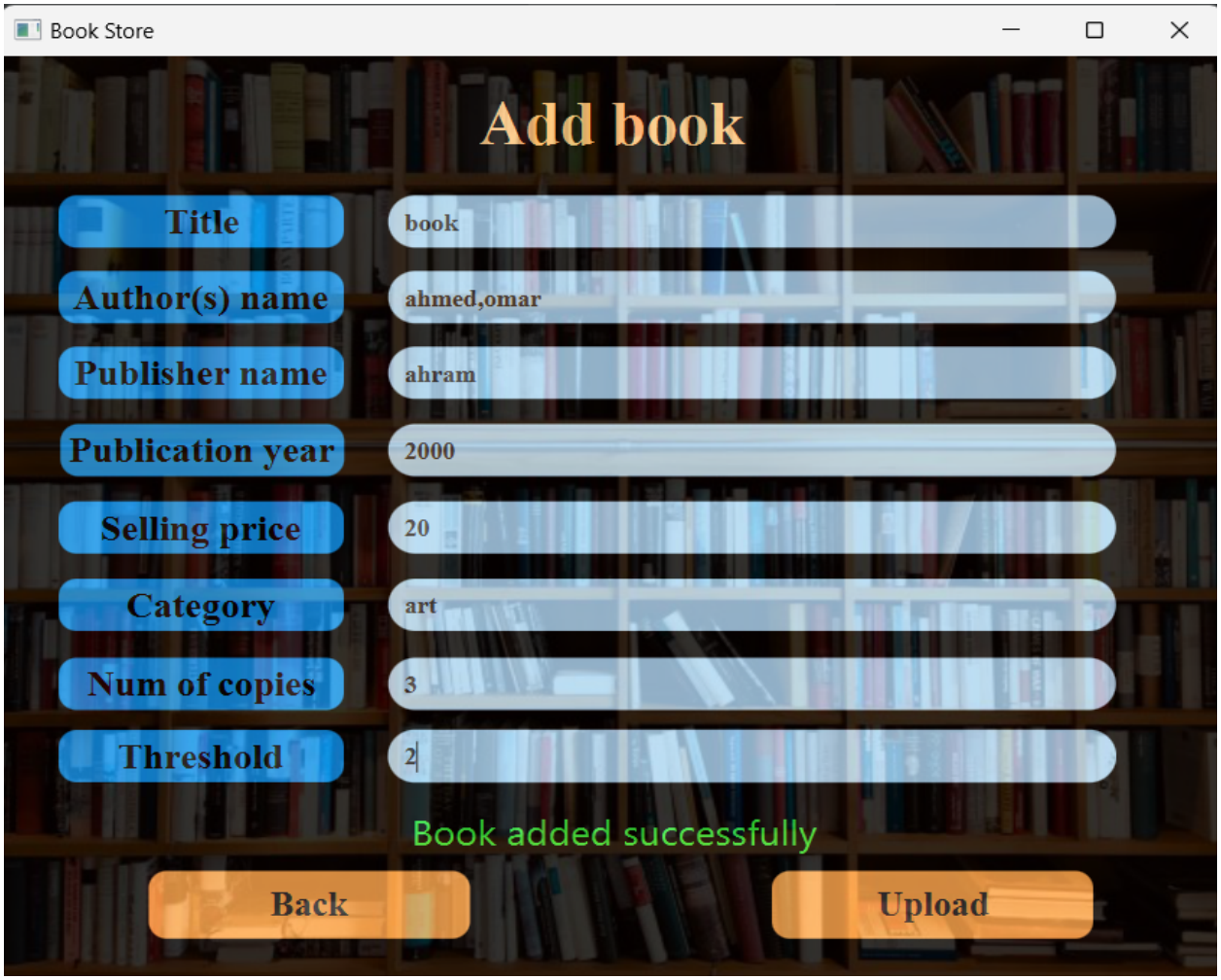

Shopping Cart
Shopping Cart
Your order is reset to available stock
Item #1
ISBN: 1
Delete
Book Title: engy
Author Name: yara, niera, heba
Category: comedy
Publisher Name: yara
Publication Year: 2022
Price: 1.0
Quantity: 132
Total Price: 132.0
Checkout
Previous
Back
Next

II. Manager

Modify existing books

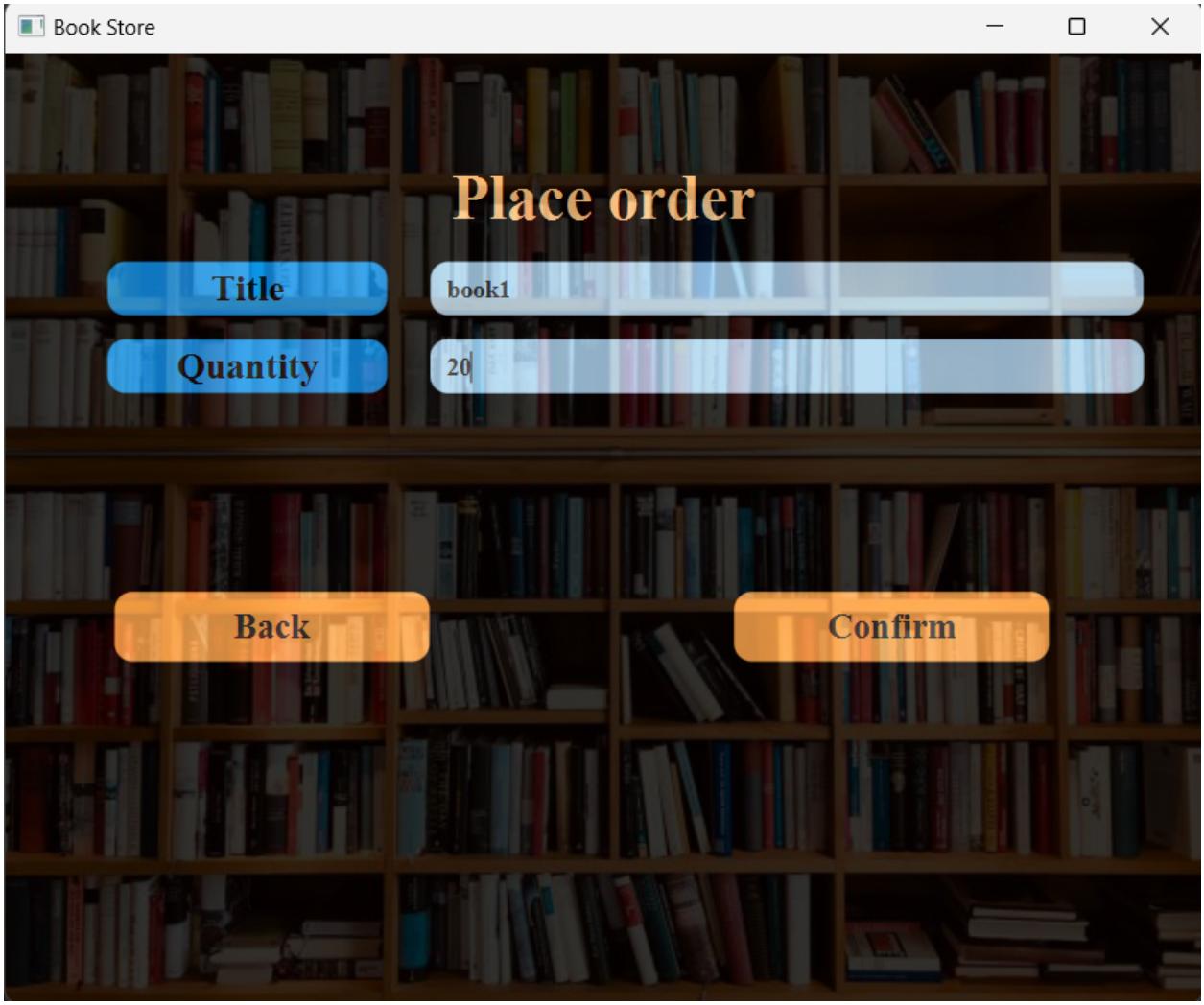


Add book

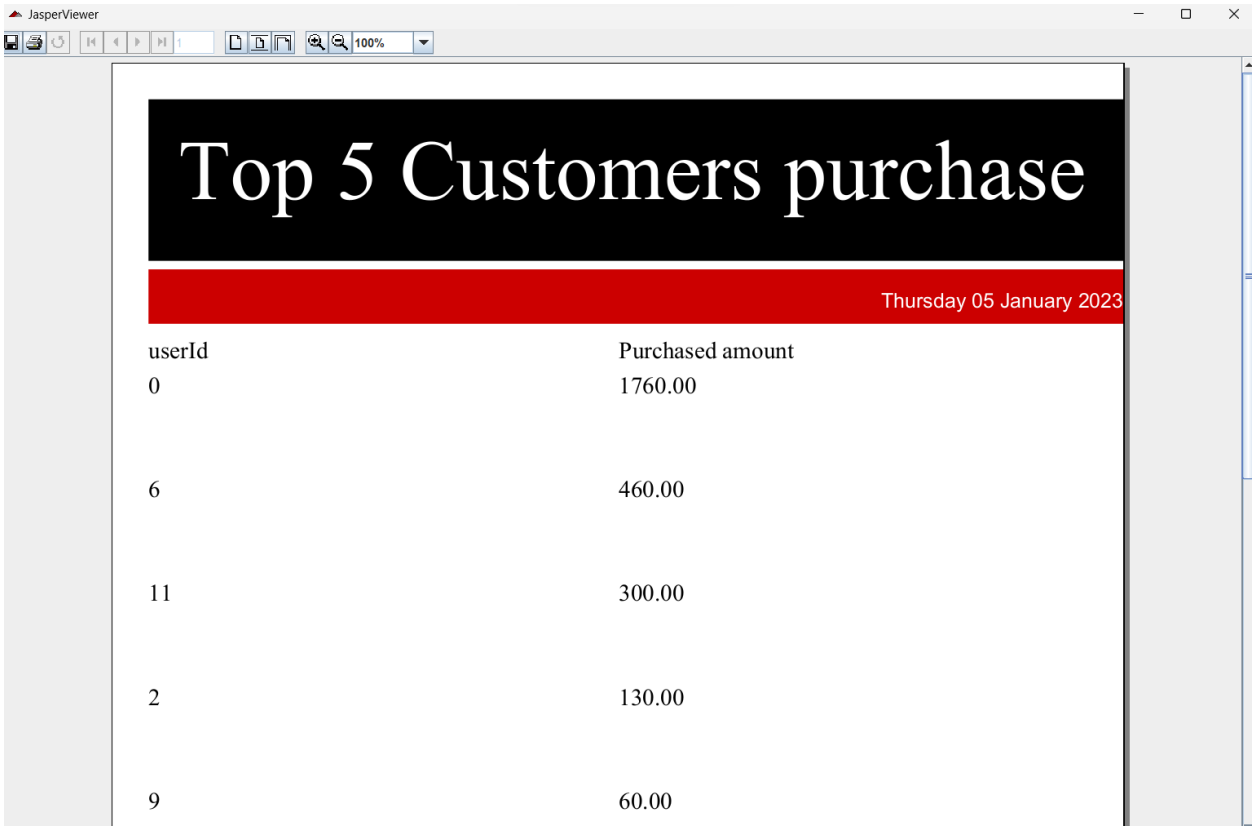

Book Store
Add book
Title
book
Author(s) name
ahmed,omar
Publisher name
ahram
Publication year
2000
Selling price
20
Category
art
Num of copies
3
Threshold
2
Book added successfully
Back
Upload

Confirm orders

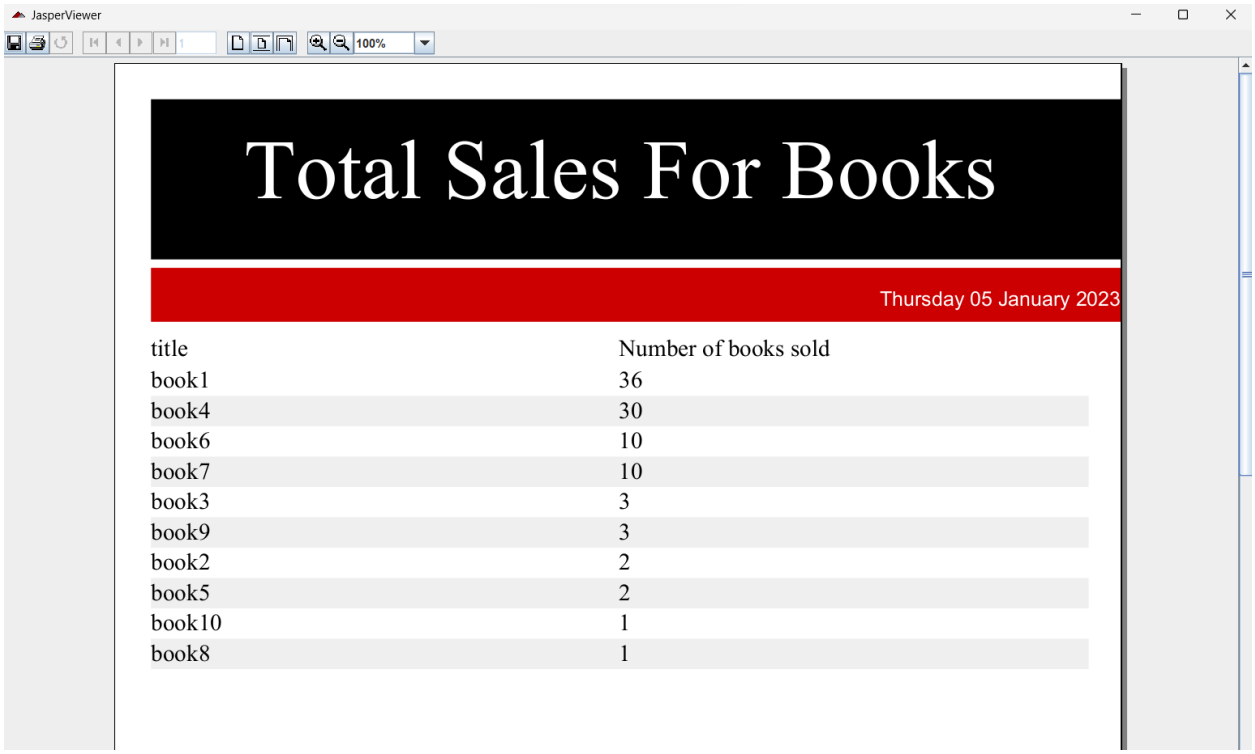
Place orders for books

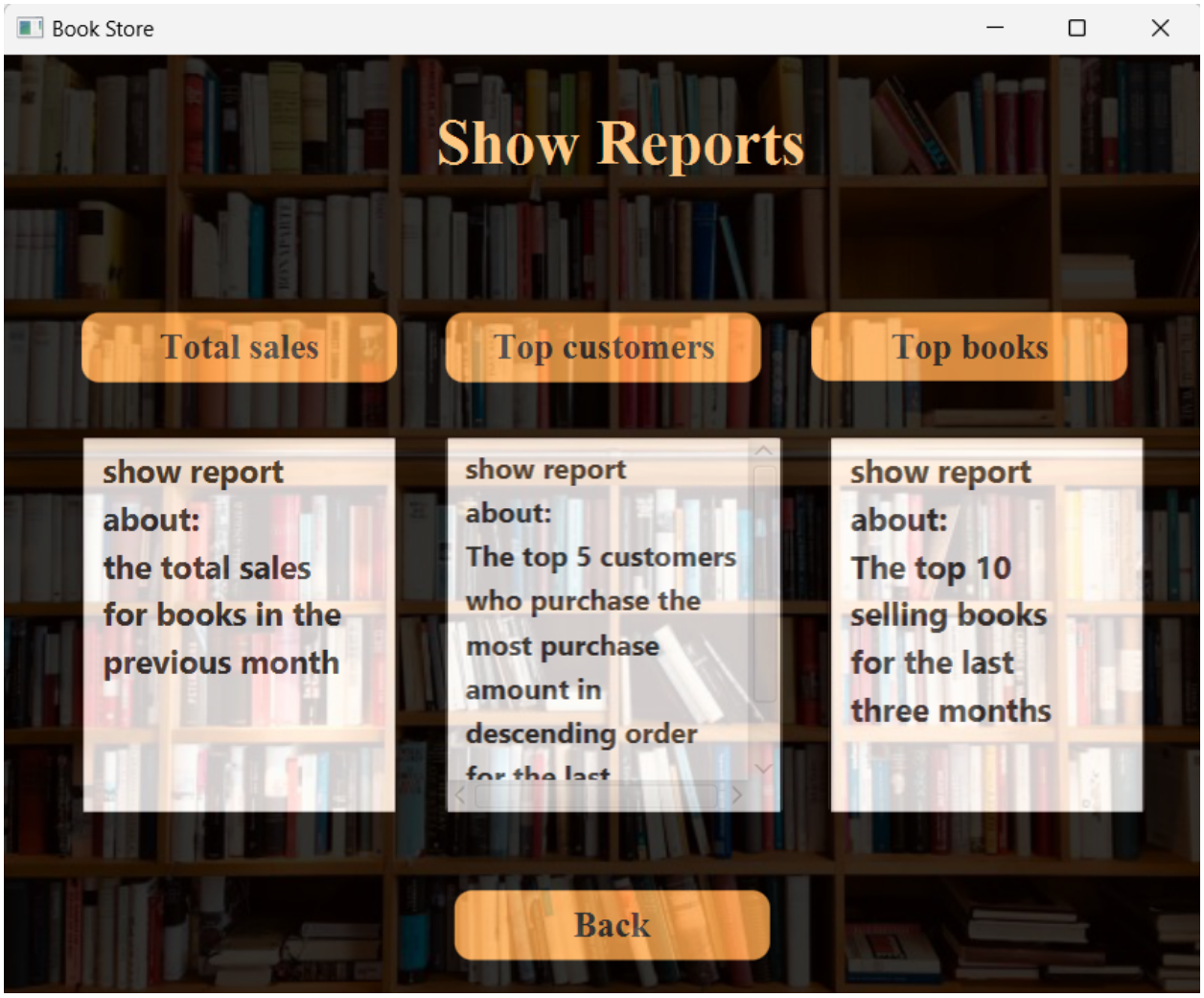


Add book


JasperViewer
100%
Top 5 Customers purchase
Thursday 05 January 2023
userId
Purchased amount
0
1760.00
6
460.00
11
300.00
2
130.00
9
60.00


JasperViewer
100%
Top 10 Selling Books
Thursday 05 January 2023
title
sellings
book1
36
book4
30
book6
10
book7
10
book3
3
book9
3
book2
2
book5
2
book10
1
book8
1


JasperViewer
100%
Total Sales For Books
Thursday 05 January 2023
title
Number of books sold
book1
36
book4
30
book6
10
book7
10
book3
3
book9
3
book2
2
book5
2
book10
1
book8
1


Book Store
Show Reports
Total sales
Top customers
Top books
show report about: the total sales for books in the previous month
show report about: The top 5 customers who purchase the most purchase amount in descending order for the last
show report about: The top 10 selling books for the last three months
Back