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Hawkins Public Library

CS 340

Summary

Library database for Hawkins Public Library that records the information of library customers, books present at the library, and upcoming events.  
Link to website: https://hawkins-library.now.sh

Table of Contents

[Design Changes 2](#_Toc33788036)

[Upgrades from Step 3 Final to Step 4 Draft 2](#_Toc33788037)

[Actions Based on Feedback—Step 4 Draft 2](#_Toc33788038)

[Upgrades from Step 3 Draft to Step 3 Final 2](#_Toc33788039)

[Actions Based on Feedback—Step 3 Final 2](#_Toc33788040)

[Upgrades from Step 3 Draft to Step 3 Final 3](#_Toc33788041)

[Actions Based on Feedback—Step 3 Draft 3](#_Toc33788042)

[Upgrades from Step 2 to Step 3 Draft 3](#_Toc33788043)

[Actions Based on Feedback—Step 2 4](#_Toc33788044)

[Upgrades from Step 1 to Step 2 4](#_Toc33788045)

[Overview 5](#_Toc33788046)

[Outline 6](#_Toc33788047)

[customers 6](#_Toc33788048)

[books 6](#_Toc33788049)

[checkoutOrders 6](#_Toc33788050)

[events 7](#_Toc33788051)

[eventRegistrations 7](#_Toc33788052)

[Feedback from Peer Reviewers—Step 4 8](#_Toc33788053)

[Feedback from Peer Reviewers—Step 3 12](#_Toc33788054)

[Feedback from Peer Reviewers—Step 2 14](#_Toc33788055)

[Entity-Relationship Diagram 17](#_Toc33788056)

[Schema 18](#_Toc33788057)

# Design Changes

## Upgrades from Step 3 Final to Step 4 Draft

* We initially used bootstrap to style our pages. After looking at other projects and seeing that a lot of groups also used bootstrap, we felt like we needed to stand out. Huy had experience with React and web development prior to enrolling in this program, so we decided to take advantage of that. We decided to overhaul our website using React, only keeping our library concept. Our new tech stack uses React on the frontend and Next.js to handle routing.
* We also added our ddl.sql and dml.sql files that include code for creating tables; insert and select queries for all tables; delete queries for events, customers, and events; and update queries for events and books.
* Our website now displays books, customers, library events, checkouts, and event registrations using data from our database.
* Implemented database Read functionality for all tables.
* Implemented database Create functionality for books and events.
* We decided to change the phone attribute in customers from an int to a varchar. This is because we were hitting the maximum value for integers with some phone numbers, so we decided to solve this by changing the data type to a varchar.
* We added an imgUrl attribute to the books entity so that we could add pictures of the books to our website’s library page.
* We added imgUrl and description attributes to the events entity. This allows us to add images as well as descriptions for events on our website’s events page.
* We changed the email attribute in customers in order to make it unique to each customer.
* Changed events table attributes:
  + guest and description are no longer required attributes

## Actions Based on Feedback—Step 4 Draft

* We did not receive feedback from our grading TA for our Step 3 Final Version.

## Upgrades from Step 3 Draft to Step 3 Final

* We decided to change the names of the foreign keys in each table, so orderNumber in Books became oid, customerID in CheckoutOrders became cid, cusomerID in EventRegistrations became cid, and eventID in EventRegistrations became eid.
* We also decided to uncapitalize the names of the entities to reflect what we named our tables.
* In the ID attributes for each entity, we changed ID to Id. We also changed orderNumber to orderId.

## Actions Based on Feedback—Step 3 Final

* We received peer feedback that we did not have delete and update functionality. This was already implemented on the admin > manage books page as well as the admin > manage events.
* Peer feedback also suggested that we should remove the tables in the Library and Return Books pages. Due to time constraints, we decided to leave the tables as-is for now. In the future, we plan on creating a new website with a friendlier user interface that gets rid of the tables on the user side of the website. However, from an updating, deleting, and adding standpoint, it still makes sense for the admin to be able to view everything in a table. Therefore, everything in the admin page will be displayed as such.
* We did not receive any grader feedback at the time of turning in our step 3 final version.

## Upgrades from Step 3 Draft to Step 3 Final

* We decided to add add-books.html, customers.html, and delete-events.html to our website. This will cover the missing insert and select functionalities as well as the delete for the many-to-many relationship. We also added links to these pages to the navigation bar.
* We originally had a “Manage events” page that dealt with adding events, but we decided to rename this to “Add an event” to better match what the page will be used for.
* Since we created the add-books.html page, we also got rid of the “Add a book” form on the “Manage books” page.

## Actions Based on Feedback—Step 3 Draft

* We decided to change the presentation of our file based on feedback from our grading TA. We added a cover page and table of contents in addition to adding headers for each section. We also put each section on a new page in order to make the document more presentable.
* We added rationale behind our changes in order to explain why we changed certain parts of our project.

## Upgrades from Step 2 to Step 3 Draft

* We decided to remove the Authors entity and add the Events entity. We felt that an Authors entity was not necessary for our database because it could simply be represented as an attribute in our Books entity. Libraries often have events such as author meet-and-greets and read-alouds for children, so adding an Events entity would allow us to keep track of upcoming events held at the library. We updated our ERD and schema to reflect this change.
* The Authors entity we removed had a many-to-many relationship with Books, so we needed to create a new many-to-many relationship. We decided to build a many-to-many relationship between Customers and Events in order to fulfill the many-to-many relationship requirement.
* Because we made changes to our entities, we changed our overview to reflect these changes.
* We created our website and added the following pages: add-events.html, admin.html, checkout-orders.html, events.html, index.html, join.html, library.html, manage-books.html, return.html, and view-event-registration.html. We also created style.css to add style to our webpage.

## Actions Based on Feedback—Step 2

* We received feedback from two reviewers that we needed a many-to-many relationship. We already had a many-to-many relationship in our original draft, so we decided not to add a second one. However, we did decide to change the many-to-many relationship as described in the following section.
* We received feedback to remove the Employees entity because it was essentially the same as the Customers entity. Therefore, we removed all attributes from other entities associated with Employees.
* We also decided to remove the Audiobooks entity based on feedback received due to its similarities with Books. We removed all attributes from other entities associated with Audiobooks as well as removed the AudiobookOrders relationship entity.

## Upgrades from Step 1 to Step 2

* Because we needed a new many-to-many relationship after removing the Audiobooks entity, we added the Authors entity to serve as a many-to-many relationship with Books. We felt that an Authors entity made sense in that it would enable us to keep track of each author within the library as well as the books they have written. With this addition, we needed to add a BooksAuthors relationship entity. We also updated our outline, ERD, and schema to reflect this addition.
* We changed the name of the city library, the population, number of books in the library, the average number of visitors per day, and the average number of books checked out. We originally had data associated with a larger city, but we decided to make the city smaller in order to simplify our database and the number of books held in the library. We also did not like the original name we picked for our city, so we decided to change its name. Therefore, our library changed from “Glenwood Public Library” to “Hawkins Public Library.”

# Overview

We will be creating a website that contains a database for Hawkins Public Library. The fictional city of Hawkins has a population of 30,000 people. With 100,000 Books available for checkout, the Hawkins Public Library has a wide variety of genres to choose from. An average of 150 visitors stop by the library each day and approximately 250 Books are checked out daily. Because of the large number of Books within the library, a database will be essential in order to store their information. The Books entity will be used to store the information of each book. The database will also be used to access information related to Customers of the library through the Customers entity. Customers can check out multiple Books in their CheckoutOrders. They can also have several CheckoutOrders, so having a database will be important in tracking each of the CheckoutOrders currently open. Additionally, events will be held at the library, which will be represented with the Events entity. Events include author meet and greets, book clubs, and children’s read-alouds. Customers will be able to sign up for multiple Events, and Events will be able to hold several Customers. In this way, the information stored within the database will allow the Hawkins Public Library to determine which Books have been checked, track the CheckoutOrders of Customers, and keep track of Events being held at the library.

# Outline

customers entity: Records the information of library Customers

* customerId: int, auto\_increment, unique, not NULL, primary key
* firstName: varchar, not NULL
* lastName: varchar, not NULL
* email: varchar, unique, not NULL
* phone: varchar, not NULL
* dateJoined: date, not NULL
* lateFee: int, not NULL; $1 will be added for each day a book is overdue. lateFee can have a value of 0 or more
* One-to-many relationship between the Customers and CheckoutOrders entities: Customers can have multiple CheckoutOrders, but each of the CheckoutOrders is only associated with at most one of the Customers. Customers can have 0 or more CheckoutOrders. customerID will be implemented as a foreign key within the CheckoutOrders entity.
* Many-to-many relationship between the Events and Customers entities: Customers can sign up for multiple Events and Events can have multiple Customers.

books entity: Records the information of library Books

* bookId: int, auto\_increment, unique, not NULL, primary key
* title: varchar, not NULL
* author: varchar, not NULL
* publisher: varchar, not NULL
* genre: varchar, not NULL
* imgUrl: varchar
* oid: int, foreign key from CheckoutOrders entity; used to keep track of what order the book belongs to. It will be NULL if the book does not belong to an order.
* One-to-many relationship between the Books and CheckoutOrders entities: CheckoutOrders can contain 0 or more Books, but each of the Books can only be in at most one of the CheckoutOrders. orderNumber from CheckoutOrders will be implemented as a foreign key within Books to track which of the CheckoutOrders it belongs to.

checkoutOrders entity: Records the checkout order of a Customer. CheckoutOrders can contain multiple Books and are associated with Customers.

* orderId: int, auto\_increment, unique, not NULL, primary key; used to identify a specific order
* checkoutDate: date, not NULL
* dueDate: date, not NULL
* cid: int, foreign key from Customers entity. Represents the ID of the customer who made the checkout order.
* One-to-many relationship between the Customers and CheckoutOrders entities: Customers can have multiple CheckoutOrders, but each of the CheckoutOrders is only associated with at most one of the Customers. Customers can have 0 or more CheckoutOrders. customerID will be implemented as a foreign key within the CheckoutOrders entity.
* One-to-many relationship between the Books and CheckoutOrders entities: CheckoutOrders can contain 0 or more Books, but each of the Books can only be in at most one of the CheckoutOrders. orderNumber from CheckoutOrders will be implemented as a foreign key within Books to track which of the CheckoutOrders it belongs to.

eventsentity: Records upcoming library events

* eventId: int, auto\_increment, unique, not NULL, primary key
* name: varchar, not NULL
* date: date, not NULL
* guest: varchar
* description: varchar
* imgUrl: varchar
* Many-to-many relationship between the Events and Customers entities: Customers can sign up for multiple Events and Events can have multiple Customers.

eventRegistrationsentity: Represents the relationship between Events and Customers

* registrationId: int, auto\_increment, unique, not NULL, primary key
* cid: int, not NULL, foreign key from the Customers entity
* eid: int, not NULL, foreign key from the Events entity

# Feedback from Peer Reviewers—Step 4

**Database Definition Queries:**

**Is the SQL file syntactically correct?**

**Cris Shumack:** I received errors when trying to import the .sql file into phpMyAdmin, and also errors copying/pasting it into phpMyAdmin. However, the tables were all CREATE'd correctly. Nothing was INSERT'd into any of the tables, but the structure of the tables appears to be correct.

**Pablo Turati:** My importing tool showed errors while trying to import the file. Therefore, it was not possible to do so successfully. I think that getting this right is the most important part of this step. After all, this file is the actual initialization of the project.  Although the errors are syntactic, this being an initialization file, I suggest you first run a DROP TABLE script on all your tables. This allows for a clean process to run removing any previous table versions already in the platform.

Also, the current script runs with CREATE TABLE as opposed to CREATE TABLE IF NOT EXISTS.  While this is far from being a requirement, I suggest it being that this would also help mitigate any possible errors of table duplication.

**Emily Edmonson:** I could not import the data. It looks like the DDL data is correct (i.e. the create and inserts) syntactically speaking.

**Martin Delgado:** No the file is not syntactically correct, and this is based off my experience of just copying and pasting it into the phpadmin website. There might have been some small inconsistencies from when they did it individually, and combining everything because it seems based off their report that they were able to do it successfully. So, it's probably going to be a little fix. Even their constraints on attributes match up, the only thing I can see is that the consistency is a little off in naming. Some of the types are all capitalized and in other tables it isn't (though I don't think thats important). Another thing I recommend would be to add is a drop table if exists for the rest of them

**Are the data types appropriate considering the description of the attribute in the database outline?**

**Cris Shumack:** All of the data types in the database appear to be appropriate. All of the text inputs are varchar(255) except for the phone number input, which is varchar(255). Dates are all date data types. All integers are data type int(11), which seems correct. So overall, all of these seem to be classified appropriately.

**Pablo Turati:** Overall there are INT for numerics, VARCHAR for text fields and links, and DATES and DATETIME for dates.  I do see however a field labeled ‘lateFee’ in the Customers table whereas that should probably be a floating point field.  I would suggest DECIMAL(13, 2) for good precision and decimal places.

**Martin Delgado:** Yes, most of the data types look to be appropriate. They even accounted for a 10 digit number for the telephone and accommodated the integer for that. The only data type where they might want to change is the fee one. If you are dealing with money it might be best to not be restricted to just whole numbers.

**Are the foreign keys correctly defined when compared to the Schema?**

**Cris Shumack:** All foreign keys appear to be correctly defined based on the schema overview.

**Pablo Turati:** Yes, foreign keys match according to schema.

**Emily Edmonson:** Yes, they are correctly defined as far as I can tell.

**Martin Delgado:** Yes, based off the schema all the foreign keys seem to match well with the DDQ file that was made.

**Are relationship tables present when compared to the ERD/Schema?**

**Cris Shumack:** Yes, all relationship tables present in the ERD/schema are present in the database and correctly created.

**Pablo Turati:** Although relationship tables are present.  In the ERD, I think that the Customers should relate directly to the Events, the relationship table that unites both is not necessary, showing that M:M relationship can be done on the Schema and keeps the ERD cleaner.

**Emily Edmonson:** As far as I can tell, this information is correctly organized.

**Martin Delgado:** Yes, the relationship tables are present when compared to the ERD/Schema.

**Database Manipulation Queries:**

**Are the queries syntactically correct?**

**Cris Shumack:** All of the queries in the database manipulation queries file appear to be syntactically correct. Some of the queries include a semicolon at the end while others do not, but that is the only syntax I noticed as being different.

**Pablo Turati:** Yes, the SQL syntax seems correct, minor colon details here and there but overall good.

**Emily Edmonson:** It looks like all of the queries are formatted correctly.

**Martin Delgado:** Yes, from what I can see the queries look syntactically correct. It looks like they used : to show what information they will get from admin, and that stays consistent throughout the file.

**Are there queries providing all functionalities as required by the CS340 Project Guide? What query is missing? What needs to be fixed?**

**Cris Shumack:** It appears that all of the required queries are present and are syntactically correct.

**Pablo Turati:** Base functionality for handling customers, book orders and events seems there.  However, per the requirements, addition, removal and updating values of an M:M relationship needs to be considered. I was only able to see reading the joint values (events\_registrations) but no update nor delete as of now.

The schema uses table names capitalized on the first letter (i.e. Customers) whereas the DDL file creates the tables in all lower case.  Other than that, relations seem correct.

**Emily Edmonson:** I see select, update, delete and insert.

**Martin Delgado:** From what I see every table (entity) has select functionality, the project has delete functionalities, as well as update functionalities. This group has a lot more than required, which is great for functionality on the website.  The only functionality that I think I don't see is the search/filter one.

**Do the queries cover the relationships as required by the CS340 Project Guide?**

**Cris Shumack:** It appears that the queries cover all of the relationships required.

**Pablo Turati:** Yes, they seem to be extensive. Probably along the way more DMQ will be needed for even better functionality and improved user experience but overall the project seems good.

**Emily Edmonson:** Yes, it looks like all of the tables are covered by the various queries.

**Martin Delgado:** Yes, it looks like the queries cover the relationships that are required by the project.

**User Interface:**

**Pablo Turati:** Also, the visual design looks great, very well implemented and clean.  Great work, really!

**Emily Edmonson:** Haha so I like your group name a lot! Your website looks incredible! I can tell that y'all put a lot of work into this! So maybe I missed it but I don't see a DB dump in here.

**Martin Delgado:** I really like the front-end of the website. Definitely the best looking one that I have seen so far.

**Martin Delgado:**

**An ideal peer review for a DDQ file would answer all of the following questions:**  
**Is the SQL file syntactically correct?**

**Are the data types appropriate considering the description of the attribute in the database outline?**

**Are the foreign keys correctly defined when compared to the Schema?**

**Are relationship tables present when compared to the ERD/Schema?**

# Feedback from Peer Reviewers—Step 3

**Does the UI utilize a SELECT for every table in the schema? In other words, data from each table in the schema should be displayed on the UI. Note: it is generally not acceptable for just a single query to join all tables and displays them.**

**Karen Berba:** Yes, the UI utilizes a SELECT for every table in the schema (Books, CheckoutOrders, Customers, EventRegistrations, Events).

**Amy:** Yes, it does. It shows a select for checkout orders, event registrations, events, books, and customers

**Bowen Lin:** I think the UI contains data for each table, which is pretty comprehensive

**Does at least one SELECT utilize a search/filter with a dynamically populated list of properties?**

**Karen Berba:** Yes, there are 3 SELECT functions that utilize a search/filter with a dynamically populated list of properties.

**Amy:** Yes, under upcoming events

**Bowen Lin:** Yes, the web page contains eight lists to choose from.

**Does the UI implement an INSERT for every table in the schema? In other words, there should be UI input fields that correspond to each table and attribute in that table.**

**Karen Berba:** Yes, it does seem like the UI implements an INSERT for every table in the schema.

**Amy:** Yes, there's an insert query for every table

**Bowen Lin:** Yes, you can enter each of the corresponding properties in the UI framework.

**Does each INSERT also add the corresponding FK attributes, including at least one M:M relationship? In other words if there is a M:M relationship between Orders and Products, INSERTing a new Order (e.g. orderID, customerID, date, total), should also INSERT row(s) in the intersection table, e.g. OrderDetails (orderID, productID, qty, price and line\_total).**

**Karen Berba:** Yes, each INSERT function adds the corresponding FK attributes. And yes, the INSERT function adds the corresponding FK attributes to at least one M:M relationship (between the Events and Customers entities).

**Amy:** Yes, each insert add the corresponding FK attributes, and at least one M:M relationship

**Bowen Lin:** Yes, the project includes m:m relationships, such as libraries and books

**Is there at least one DELETE and does at least one DELETE remove things from a M:M relationship? In other words, if an order is deleted from the Orders table, it should also delete the corresponding rows from the OrderDetails table, BUT it should not delete any Products or Customers.**

**Karen Berba:** No, there doesn't seem to be a DELETE function.

**Amy:** have not seen a delete function

**Bowen Lin:** I did not find a place to delete, the web page can only upload data.

**Is there at least one UPDATE for any one entity? In other words, in the case of Products, can productName, listPrice, qtyOnHand, e.g. be updated for a single ProductID record?**

**Karen Berba:** From the UI side, there doesn't seem to be an UPDATE function, but it's possible it's implemented in the back-end.

**Amy:** I can't find one that allows this in the UI

**Bowen Lin:** Yes, the product can be updated

**Is at least one relationship NULLable? In other words, there should be at least one optional relationship, e.g. having an Employee might be optional for any Order. Thus it should be feasible to edit an Order and change the value of Employee to be empty.**

**Karen Berba:** Yes, there is at least one relationship that is NULLable -- the orderNumber in the Books entity can be NULL if the book does not belong to an order.

**Amy:** Yes, the order number is nullable

**Bowen Lin:** Yes, the page contains at least one relationship which can be NULLLable

**Do you have any other suggestions for the team to help with their HTML UI?**

**Karen Berba:** First of all, I want to say that the site is beautiful! I don't have any suggestions because the site seems easy and intuitive for users to navigate and use. Great job!

**Amy:** I think it's good! I am not totally sure why you're essentially displaying your database data in the UI, though. You should probably remove what is essentially every table as a display, and just make it something like "add book to checkout", list of books (or empty field), and user entry. It's a little overwhelming and confusing. Just try to think "what information do I need to know in my database, but the user doesn't necessarily need to know to perform this action or get information?" and go from there

**Bowen Lin:** I think this web page is designed to be very perfect, very much like a lending site that we can use in our lives. I think it would be nice to just add the delete button.

# Feedback from Peer Reviewers—Step 2

**Does the overview describe what problem is to be solved by a website with DB back end?**

**Ryan Lew:** Did not provide an answer.

**Anish Reddy:** Yes, the overview does describe the problem to be solved with a website and DB back end. They are trying to solve the problem of having a lot of books with a lot of people within a city at Glenwood Public Library.

**Karen Berba:** Yes, the overview clearly describes the problem to be solved by a website with a DB back end, which is to keep track of the information about the current selection of book / audiobook (e.g. availability / checked-out status, CheckoutOrders made by Customers and Employees)

**Rebecca:** Yes, the overview describes the problem to be solved and it’s back end portion of the website.

**Does the overview list specific facts?**

**Ryan Lew:** Yes, overview lists specifics about book numbers, customer numbers and usage.

**Anish Reddy:** Yes, the overview does list specific facts. It lists the amount of books available in the library, being 300,000, with the amount of people in the city being 200,000. They also list that there will be 2000 visitors each day, and approximately 2500 books and audiobooks are checked out daily.

**Karen Berba:** Yes, the overview lists specific facts about the population of the city, the number of books and audiobooks available, the average number of visitors, and the approximate number of books and audiobooks checked out each day

**Rebecca:** Yes, there are specific facts listing within the overview in relation to the entities and relationships.

**Are at least four entities described and does each one represent a single idea to be stored as a list?**

**Ryan Lew:** Yes. Lists entities, their relations and purposes.

**Anish Reddy:** Yes, there are 5 entities: Employees, Customers, Books, Audiobooks, CheckoutOrders. Maybe you don't need 5, you could cut out audiobooks to make the database easier to implement. Each entity does represent a single idea to be stored as a list.

**Karen Berba:** Yes, there are five entities (Customers, Employees, Books, Audiobooks, CheckoutOrders), and each one represents a single idea to be stored in a list

**Rebecca:** Yes, there are at least four entities. In this case there are more of which are represented as a single idea to be stored as a list.

**Does the outline of entity details describe the purpose of each, list attribute datatypes and constraints and describe relationships between entities?**

**Ryan Lew:** Yes. All details and relationships are defined and rationalized.

**Anish Reddy:** Yes, the outline does describe the list attribute datatypes and constraints and it does describe relationship between entities.

**Karen Berba:** Yes, each entity outline includes the purpose of the entity, the attribute datatypes and constraints, as well as clearly describes the relationships between the entities

**Rebecca:** Yes, the outline of the entity’s details does describe the purpose of each. They do list attribute datatypes. They do have constraints. They do describe their relationship between entities.

**Are 1:M relationships correctly formulated? Is there at least one M:M relationship?**

**Ryan Lew:** There is no many to many relationship, but the 1:M relationships are formulated correctly.

**Anish Reddy:** I did notice one problem with the relationship between CheckoutOrders and Employees. I understand that each employee can have 0 to many CheckoutOrders, but how can each CheckoutOrder have 0 employees? Wouldn't each CheckoutOrder need at least/most 1, and can't have 0? Maybe I am confusing myself here, but that is what I thought when I looked at the ER diagram. I think all the other relationships are correct, and there is one M:M relationship between Audiobooks and CheckoutOrders, which is formulated correctly.

**Karen Berba:** Yes, the 1:M relationships are correctly formulated. And yes, there is a M:M relationship between Audiobooks and CheckoutOrders. (The only question I have is: are Employees essentially the same as Customers, in that that they just check out books to read? Or, for each Customer that checks out a book, does an Employee need to be associated with processing that book check-out?)

**Rebecca:** Yes, there is a 1:M relationship which is correctly formulated. No, there is not least one M:M relationship within the current diagram.

**Is there consistency in a) naming between overview and entity/attributes b) entities plural, attributes singular c) use of capitalization for naming?**

**Ryan Lew:** Yes, across multiple entities naming schemes follow a pattern and is easy to understand.

**Anish Reddy:** Yes, entities are plural, and attributes are singular. The name is consistent between the overview and entity/attributes. Capitalization is used as the second word in an attribute name is capitalized and is consistent throughout.

**Karen Berba:** Yes, there is consistency in naming between overview and entity/attributes; the entities are all plural, while the attributes are all singular; there is also use of capitalization for naming

**Rebecca:** a. Yes, there is consistence in entity/attributes. With entities being plural and attributes singular.

b. Yes, entities are plural, and attributes are singular.

c. Yes, camel case style is used and naming is properly capitalized.

# Entity-Relationship Diagram

A close up of a sign

Description automatically generated

# Schema

A screenshot of a cell phone

Description automatically generated