

Screaming Beckers: Daniel Stanev, Harry Tran

Dr. Eric Becker

CS 4347.501

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### Updated Proposal: Library Database

Cohort Name: Screaming Beckers

Members: Daniel Stanev, Harry Tran

#### Cohort:

Our cohort consists of only two people, Daniel Stanev and Harry Tran. We have decide to call our cohort **Screaming Beckers**. We came up with this name after Daniel suggested “Screaming Eagles”, and then Harry suggested “What about Screaming Beckers, like Dr. Becker” (We are not actually saying Dr. Becker screams, we just needed a name). Our main methods of communication will be through Discord and face-to-face meetings, and our project will hosted in a private Github repository.

#### Updated Project Description:

Our project is to build a database that stores information pertinent to a library (physical public library). Libraries manage all sorts of media ([academic articles](#), movies, books, even music disks), and people (employees, volunteers, customers). The main relationship between entities is obviously people borrowing media (purpose of a library), but other important things that the database will track include; the salary of employees, the remaining stock of media available to be borrowed, information about media (author, publisher, ISBN, etc.), information about people (name, address, bank account, etc.), [types of employees \(regular employee, clerk, volunteer, supervisor, librarian\)](#), and relationships between employees (supervisor).

## Updated Assumptions:

### *People:*

- The database tracks how many pieces of media a person has borrowed.
- People may have bank accounts associated with them (~~bank accounts are a weak entity in this case~~). This is because customers pay a membership and employees get paid a salary. **This is now a multivalued attribute in the person class. A person may have any number of bank accounts which are stored as the multivalued attribute routing\_num.**
- If a person does not have a bank account associated with them, their payments are in cash.
- Every person (total participation) can be an employee or a customer or both (overlapping subclasses).
- Employees may be (partial participation) 1 of the following: supervisor, clerk or volunteer (disjoint subclasses).
- Every supervisor (total participation) supervises any amount of employees, and every employee (total participation) has exactly 1 supervisor (1 : \*).
- Clerks have a specific register they always work at.
- **Clerks are either in training or have their training completed**
- **Librarians hold some sort of degree, (usually a masters of some sort)**
- **Librarians may be library policy developers.**
- **Librarians may participate in any number of librarian associations.**
- Volunteers may be court mandated; library would care about this because presumably they may have to validate volunteer hours.

### *Private Rooms:*

- **The library has private rooms available to be rented out.**
- **Every private room has a unique room number.**
- **Private rooms may have a whiteboard and/or a screen that the renter can use.**
- **Private rooms have a maximum occupancy.**
- **Private rooms are only rented out for 1 day at a time.**

### *Schedule:*

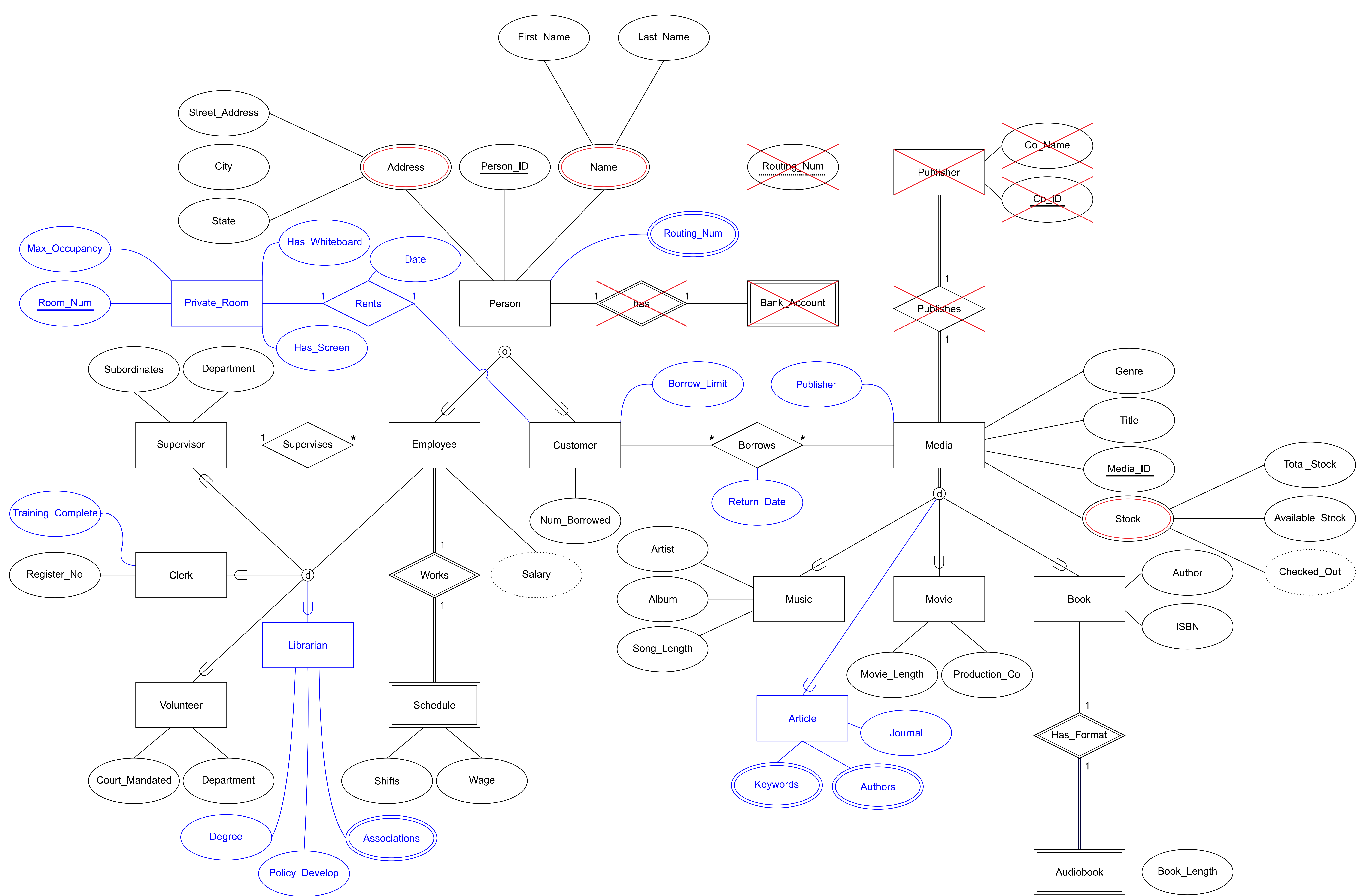
- A work schedule is a weak entity because it cannot exist without an employee working that schedule.
- Every employee has works exactly 1 schedule (total participation, 1 : 1).
- There are 14 possible shifts (7 days a week, 2 shifts every day), and each schedule tracks which shifts an employee works and their wage per shift.

### *Media:*

- Every piece of media is only one of the following: **an article**, book, movie, or music (total participation, disjoint classes).
- All media have stock (total and available), title, genre, and a unique id.
- If a media is available as a movie and book (like Harry Potter) then the movies and books are distinct pieces of media with distinct identifiers.
- Each media has exactly 1 publisher (~~total participation, 1 : 1~~) **This is no longer a relation, rather it is now an attribute of media.**
- **Academic articles may have many authors and many keywords, but are published only in 1 journal**

### *Borrowing:*

- ~~Any amount of~~ customers may borrow ~~any amount of~~ media (partial participation, \* : \*)
- **Customers have a limit to the number of media they may borrow**
- **Every borrow has a set return date**



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## Updated Entity and Relation Dictionaries

### Entity Dictionary:

Entity: Article

Description:

An academic paper or article that is available at the library

Attributes:

Primary Key: Media\_ID

- Journal, VARCHAR(100), The name of the journal in which it was published
- Authors, VARCHAR(100), The names of all the authors
- Keywords, VARCHAR(100), The set of all keywords that apply to this article

Weak Entity: Audiobook

Description:

Some books have an audiobook format that **may** be rented out digitally

Attributes:

- Book\_Length, TIME

~~Weak Entity: Bank\_Account~~

~~Description:~~

~~—— Bank account owned by a person in the database~~

~~Attributes:~~

~~Surrogate Key: Routing\_Num~~

- ~~• Routing\_Num, INT~~

Entity: Book

Description:

Subclass of Media, a book available to be rented out

Attributes:

Primary Key: Media\_ID

- Author, VARCHAR(32100)
- ISBN, INT, [International Standard Book Number](#)

Entity: Clerk

Description:

Subclass of Employee, reserved for people checking in and out books

Attributes:

Primary Key: Person\_ID

- Register\_No, INT
- [Training\\_Complete](#), BOOL

Entity: Customer:

Description:

Subclass of person, reserved for customers of the library

Attributes:

Primary Key: Person\_ID, INT

- Num\_Borrowed, INT, [Current amount of borrowed books](#)
- [Borrow\\_Limit](#), INT, [Amount of books available to be borrowed](#)

Entity: Employee

Description:

Subclass of person, reserved for people employed by the library

Attributes:

- Primary Key: Person\_ID, INT
- Salary, INT

[Entity: Librarian](#)

[Description:](#)

[Subclass of employee, reserved for librarians](#)

[Attributes:](#)

- [Primary Key: Person\\_ID, INT](#)
- [Degree](#), VARCHAR(100), [The degree librarian has, usually some type of masters](#)
- [Policy\\_Develop](#), BOOL, [True if the librarian is involved in policy development](#)
- [Associations](#), VARCHAR(100), [Set of all associations the librarian is involved in](#)

Entity: Media

Description:

A piece of media available to be rented out at the library

Attributes:

Primary Key: Media\_ID

- Genre, VARCHAR(32100)
- Title, VARCHAR(100)
- Media\_ID, INT
- Stock
  - Total\_Stock, INT
  - Available\_Stock, INT
- Publisher, VARCHAR(100)

Entity: Movie

Description:

Subclass of media, a DVD available to be rented out

Attributes:

Primary Key: Media\_ID

- Movie\_Length, TIME
- Production\_Co, VARCHAR(32100)

Entity: Music

Description:

Subclass of media, a music disk available to be rented out

Attributes:

Primary Key: Media\_ID

- Artist, VARCHAR(32100)
- Album, VARCHAR(32100)
- Song\_Length, TIME

Entity: Person

Description:

Any human entered into the database for any reason

Attributes:

- Primary Key: Person\_ID, INT
- Person\_ID, Int
- Name:
  - First\_Name, VARCHAR(32)
  - Last\_Name, VARCHAR(32)
- Address:
  - Street\_Address, VARCHAR(100)
  - City, VARCHAR(20100)
  - State, VARCHAR(2)
- Routing\_Num, INT

Entity: Private\_Room

Description:

A private room that is able to be rented out to a customer

Attributes:

- Primary Key: Room\_Num
- Max\_Occupancy, INT
- Has\_Whiteboard, BOOL, True if the room has a whiteboard
- Has\_Screen, BOOL, True if the room has a screen that the customer can use

Entity: Publisher

Description:

~~— The company that has published any given media in the database~~

Attributes:

- ~~— Primary Key: Co\_ID~~
- ~~Co\_Name, VARCHAR(100)~~
- ~~Co\_ID, INT~~

Weak Entity: Schedule

Description:

Entity that tracks which of 14 weekly shifts an employee works and their wage

Attributes:

- Shifts, VARBINARY(14), 14 shifts per week, tracks which ones the employee works
- Wage, INT, Amount that is paid per shift



Entity: Supervisor

Description:

Subclass of Employee, reserved for supervisors of employees

Attributes:

Primary Key: Person\_ID, INT

Department, VARCHAR(32100)

Subordinates, ~~VARCHAR(1000)~~ INT, number of subordinates

Entity: Volunteer

Description:

Subclass of Employee, reserved for people volunteering at the library

Attributes:

- Primary Key: Person\_ID
- Court\_Mandated, BOOLEAN, Some volunteers are doing court-mandated service
- Department, VARCHAR(32100)

## Relation Dictionary:

Relationship: Borrows

Description:

The act of a customer borrowing a piece of media

Entities: Customer, Media

Cardinality: \*: \* (many-to-many)

Participation: Partial : Partial

Attribute: Return\_Date, Date, The date which the media must be returned by

~~Relationship: Has~~

~~Description:~~

~~———— The relationship of a person having a bank account~~

~~Entities: Person, Bank\_Account~~

~~Cardinality: 1:1 (one-to-one)~~

~~Participation: Partial : Partial~~

Relationship: Has\_Format

Description:

Books may be available as an audiobook

Entities: Book, Audiobook

Cardinality: 1:1 (one-to-one)

Participation: Partial : Total

~~Relationship: Publishes~~

~~Description:~~

~~———— Each publisher publishes some media~~

~~Entities: Publisher, Media~~

~~Cardinality: 1:\* (one-to-many)~~

~~Participation: Total : Total~~

Relationship: Rents

Description:

Customers may rent out private rooms

Entities: Customer, Private\_Room

Cardinality: 1:1 (one-to-one)

Participation: Partial : Partial

Attribute: Date, DATE, The date for which the private room is reserved

Relationship: Supervises

Description:

Every supervisor supervises some employees

Entities: Supervisor, Employee

Cardinality: 1:\* (one-to-many)

Participation: Total : Total

Relationship: Works

Description:

Every employee works their schedule

Entities: Employee, Schedule

Cardinality: 1:1 (one-to-one)

Participation: Total : Total