Jungle Library
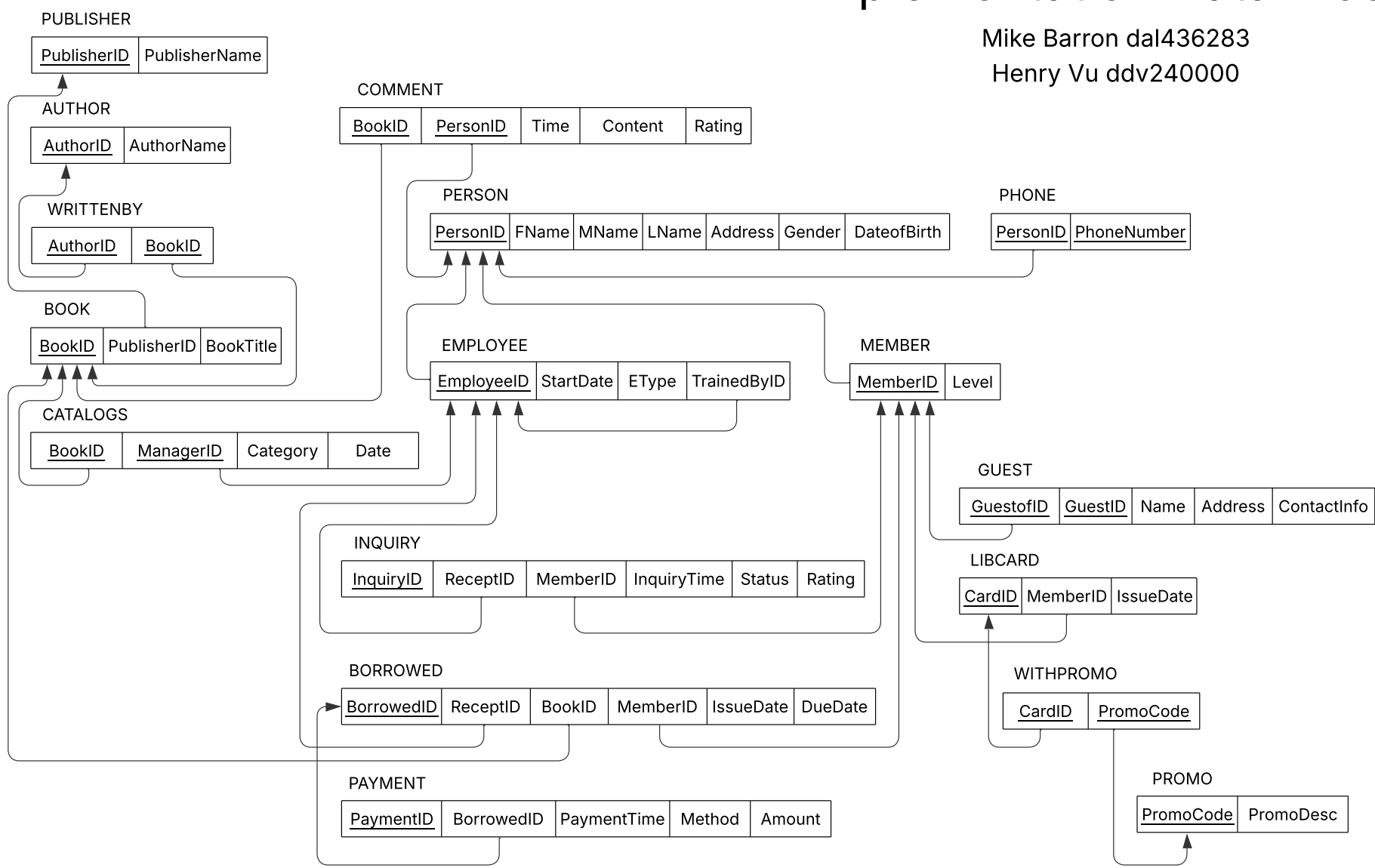## EER Diagram
Mike Barron dal436283
Henry Vu ddv240000

Assumptions:
- Only members can borrow books (employees who are not members can't borrow books).
- PersonID follows "PXXX" format.
- For each Employee, StartDate - DateOfBirth >= 18 years.
- Borrow event is associated with only 1 pCataloging Managers catalog exactly one category per day (they may work on different categories on different days).
- Inquiry rating must be 1, 2, 3, 4, or 5.

Edits based on Project I feedback and Project II Efforts:
- Receptionist to TrainedBy is total (double line)
- Catalogs is an M:N relation, with Category as an attribute. Date is added to Catalog as an attribute
- Level is now an attribute of Member instead of Library Card
- Several N:N relationships correctly relabeled as M:N

Jungle Library
Implementation Data Model
Mike Barron dal436283
Henry Vu ddv240000

Step 1 - Map Normal Entities

PERSON   Name included as (Fname, MName, LName), Omit Phone for now

PersonID	FName	MName	LName	Address	Gender	DateofBirth

BOOK

BookID	BookTitle

AUTHOR

AuthorID	AuthorName

PUBLISHER

PublisherID	PublisherName

BORROWED

BorrowedID	IssueDate	DueDate

PAYMENT

PaymentID	PaymentTime	Method	Amount

INQUIRY

InquiryID	InquiryTime	Status	Rating

LIBCARD

CardID	IssueDate

PROMO

PromoCode	PromoDesc

Step 2 - Map Weak Entities

GUEST

GuestofID	GuestID	Name	Address	ContactInfo

Step 3 - Mapping of Binary 1:1 Relationships

PAYMENT   Late relationship -> add FK BorrowedID to PAYMENT

PaymentID	BorrowedID	PaymentTime	Method	Amount

LIBCARD   Owns relationship -> add FK MemberID to LIBCARD

CardID	MemberID	IssueDate

Step 4 - Mapping of Binary 1:N Relationships

BOOK   PublishedBy relationship -> add FK PublisherID to BOOK

BookID	PublisherID	BookTitle

BORROWED   OnLoan relationship -> add FK BookID to BORROWED

BorrowedID	BookID	IssueDate	DueDate

BORROWED   Borrows relationship -> add FK MemberID to BORROWED

BorrowedID	BookID	MemberID	IssueDate	DueDate

INQUIRY   Submits relationship -> add FK MemberID to INQUIRY

InquiryID	MemberID	InquiryTime	Status	Rating

Resolves and Tracks and TrainBy relationships to be addressed later

Step 5 - Mapping of Binary M:N Relationships

COMMENT   Add new relation, include both FKs as PK

BookID	PersonID	Time	Content	Rating

WRITTENBY   Add new relation, include both FKs as PK

AuthorID	BookID

CATALOGS   Add new relation, include both FKs as PK

BookID	PersonID	Category	Date

WITHPROMO   Add new relation, include both FKs as PK

CardID	PromoCode

Step 6 - Mapping of Multivalued Attributes

PHONE   Add new relation, include FK of owner as PK

PersonID	PhoneNumber

Step 7 - Mapping of N-ary relationship types - None

Step 8 - Mapping of Super/Sub-Classes

For super Person and subs Employee and Member, create relations for Employee and Member (Option 8a), with associated attributes and add foreign key (aka PersonID) (which will also be PK).

EMPLOYEE

EmployeeID	StartDate

MEMBER

MemberID	Level

For super Employee and subs Manager and Supervisor and Receptionist, collapse into 1 class Employee with new type attribute EType (Option 8c). Note that EType can be 1 of Manager or Supervisor or Receptionist, but cannot be NULL (employee type is total). In this case, Employee also needs a foreign key added (TrainedByID) which must reference an Employee with EType = Manager or Supervisor. Similarly, CATALOGS.PersonID should be renamed ManagerID and must reference an EMPLOYEE that has EType = Manager. Also, Receptionist participates in N:1 relationships with BORROWED and INQUIRY, which must be accounted for: BORROWED needs an EmployeeID with constraint EType = Receptionist (Tracks relation), and INQUIRY needs an EmployeeID with constraint EType = Receptionist (Resolves relation).

EMPLOYEE   Add TrainedByID, add constraint EType = Manager or Supervisor

EmployeeID	StartDate	EType	TrainedByID	EType cannot be NULL

CATALOGS   Change PersonID to ManagerID, add constraint EType = Manager

BookID	ManagerID	Category

BORROWED   Tracks relationship -> add FK ReceptID to BORROWED, constraint EType = Receptionist

BorrowedID	ReceptID	BookID	MemberID	IssueDate	DueDate

INQUIRY   Submits relationship -> add FK EmployeeID to INQUIRY, constraint EType = Receptionist

InquiryID	ReceptID	MemberID	InquiryTime	Status	Rating

For super Member and subs Silvermember and Goldmember, collapse into 1 class Member with existing type attribute Level (Option 8c). Note that Level can be Silver or Gold, but cannot be NULL (membership is total). In this case, GUEST.GuestofID must reference a Member with Level = Gold.

Step 9 - Mapping of Categories

The only category (Trainer) was eliminated by the collapse of Employee subclasses Manager and Supervisor and Receptionist during Step 8. No further work needed.