CSC540 Database Management Systems

PROJECT REPORT 1

WolfPubDB Database Management System

By

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Team X

Assumptions

1. Every edition of a book has a different ISBN.
2. If staff not an editor - he is an author.
3. Article authors are considered as Journalists.
4. Text is considered as Chapter Title for Books & Article text for articles in periodic publications.
5. Each Periodic publication issue has at least one article.
6. Each Periodic publication has at least one issue.
7. Each order will have exactly one distributor associated with it.
8. Location associated with a distributor is considered as a unique combination of address and city.

1. Problem Statement

We have designed a WolfPub Database system for WolfCity publishing house.

The management and editors of the publishing house will be using this database system to maintain details about Publications(books, monthly journals and weekly magazines), Authors/Editors and their payment(report) and orders placed by distributors(wholesale distributors, bookstores, and libraries).

The major tasks and operations include: maintaining publications where editors/authors can update contents of a publication, add/delete articles/chapters; keeping track of authors/editors, and their pay; find books, articles by topics; maintaining details about distributors and their order history; generating monthly reports to keep track of total revenue and expenses of the publishing house.

Any Publishing House will have a large amount of data to be stored and processed. Having a database system makes it easier to access data using a query language. Also, it allows multiple users to access data at once. Using a file system here would make it difficult to enter and update information frequently and also, we can lose data that has not been backed up.

2. Intended Class of Users

a) Admin: The Admin has the whole and sole control of the WolfCity publishing house, they have access to all the information associated with the publishing house. They can add/update/delete staff, publication, orders and distributor information.

b) Staff (Editors/Authors): Editors are assigned to publications. Editor can view the information for which he/she is responsible. Editor can add/delete the articles in periodic publications as well as can add/delete the chapters/sections for books. Authors are assigned to books, they can view information of the books they have authored.

c) Distributors: Distributors can place orders pertaining to publications(books or periodic publications). They have an account assigned to them, they can view their account details, specifically the balance owed for current and past orders.

3. Important entities

a) Books: PID, Title, Topic, ISBN, Publication Date and Edition

b) Periodic publication: PID, Title, Topic, Type, Issue Date and Periodicity.

c) Orders: OrderID, Deadline date, Placement date, Shipping cost and price.

d) Staff: StaffID, Name, Type.

e) Distributor: DistributorID, Name, type Phone, Balance, Contact Person, Street Address and City.

4. Realistic situations

a) An **author** named Alex, an employee/staff of the publishing house came up with an article on Climate Change, Alex reaches out to the WolfCity publishing house and asks the publishing house to **add the article** in their **monthly issue of city magazine**.

b) A Wholesale **Distributor** named “Pearson Enterprises” reaches out to the WolfCity publishing house, the distributor wants to **update** the **Contact Person** information for his company.

5. API

Information processing - Maintaining publication, staff, distributor accounts and order details

addPublicationInfo(PID, title, topic, ISBN, publicationDate, Edition, Periodicity, ptype) -> return confirmation(true if added)

updatePublicationInfo(PID, title, topic, ISBN, publicationDate, Edition, Periodicity, ptype) -> return confirmation

deletePublicationInfo(PID, title, topic, ISBN, publicationDate, Edition, Periodicity, ptype) -> return confirmation

addStaff(StaffID, name, type, isEditor) -> return confirmation(true if added)

updateStaff(StaffID, name, type, isEditor) -> return confirmation

deleteStaff(StaffID, name, type, isEditor) -> return confirmation

addDistributors(DistributorID, Name, Type, City, Phone Number, Contact person, Street Address, Balance) -> return confirmation(true if added)

updateDistributors(DistributorID, Name, Type, City, Phone Number, Contact person, Street Address, Balance) -> return confirmation

deleteDistributors(DistributorID, Name, Type, City, Phone Number, Contact person, Street Address, Balance) -> return confirmation

addOrders(OrderID, price, Shipping cost, Placement date, Deadline date) -> return confirmation(true if added)

updateOrders(OrderID, price, Shipping cost, Placement date, Deadline date) -> return confirmation

deleteOrders(OrderID, price, Shipping cost, Placement date, Deadline date) -> return confirmation

addChapters(ChapterID, text) -> return confirmation(true if added)

updateChapters(ChapterID, text) -> return confirmation

deleteChapters(ChapterID, text) -> return confirmation

addArticle(ArticleID, text) -> return confirmation(true if added)

updateArticle(ArticleID, text) -> return confirmation

deleteArticle(ArticleID, text) -> return confirmation

addPayment(StaffID, salary, date) -> return confirmation(true if added)

updatePayment(StaffID, salary, date) -> return confirmation

deletePayment(StaffID, salary, date) -> return confirmation

Maintaining Orders:

mapOrderToPublication(OrderID, PID, number of copies) -> return confirmation

mapOrderToDistributor(OrderID,DistributorID) -> return confirmation

Maintaining Publications:

mapStaffToPublication(StaffID, PID) -> return confirmation

Books:

mapChaptersToBooks(PID, ChapterID) -> return confirmation

Articles:

mapArticlesToPreiodic(PID, ArticleID) -> return confirmation

RetrieveInformation:

findPublicationByTopic(topic) -> return Publication record

findPublicationByDate(publicationDate) -> return Publication record

findPublicationByAuthor(name) -> return Publication record

Distributor Billing:

updateBalance(DistributorID) -> return confirmation

Reports:

getCopiesSoldPerMonth(DistributorID,PID) -> return int

gettotalPriceOfCopiesSoldPerMonth(DistributorID,PID) -> return double

getTotalRevenue() -> return double

getTotalExpenses() -> return double

getTotalNumberOfDistributors() -> return int

calculateTotalRevenuePerCity(city) -> return double

calculateTotalRevenuePerDistributor(Name) -> return double

calculateTotalRevenuePerLocation(addr, city) -> return double

Payments:

getTotalPaymentsToStaff(startDate, endDate) -> return double

getTotalPaymentsToStaffPerWorkType(startDate, endDate, isEditor) -> return double

6. Views:

a) Admin

Admin has access to all the information present in the database.Admin can view all the Distributor, order, publications and Staff Information. He/she can view add and modify staff information payments made to staff of the publishing house.
He/She has access to information about the publications and its authors/editors.
Admin can view what orders are placed by distributors for which publications.

b) Staff

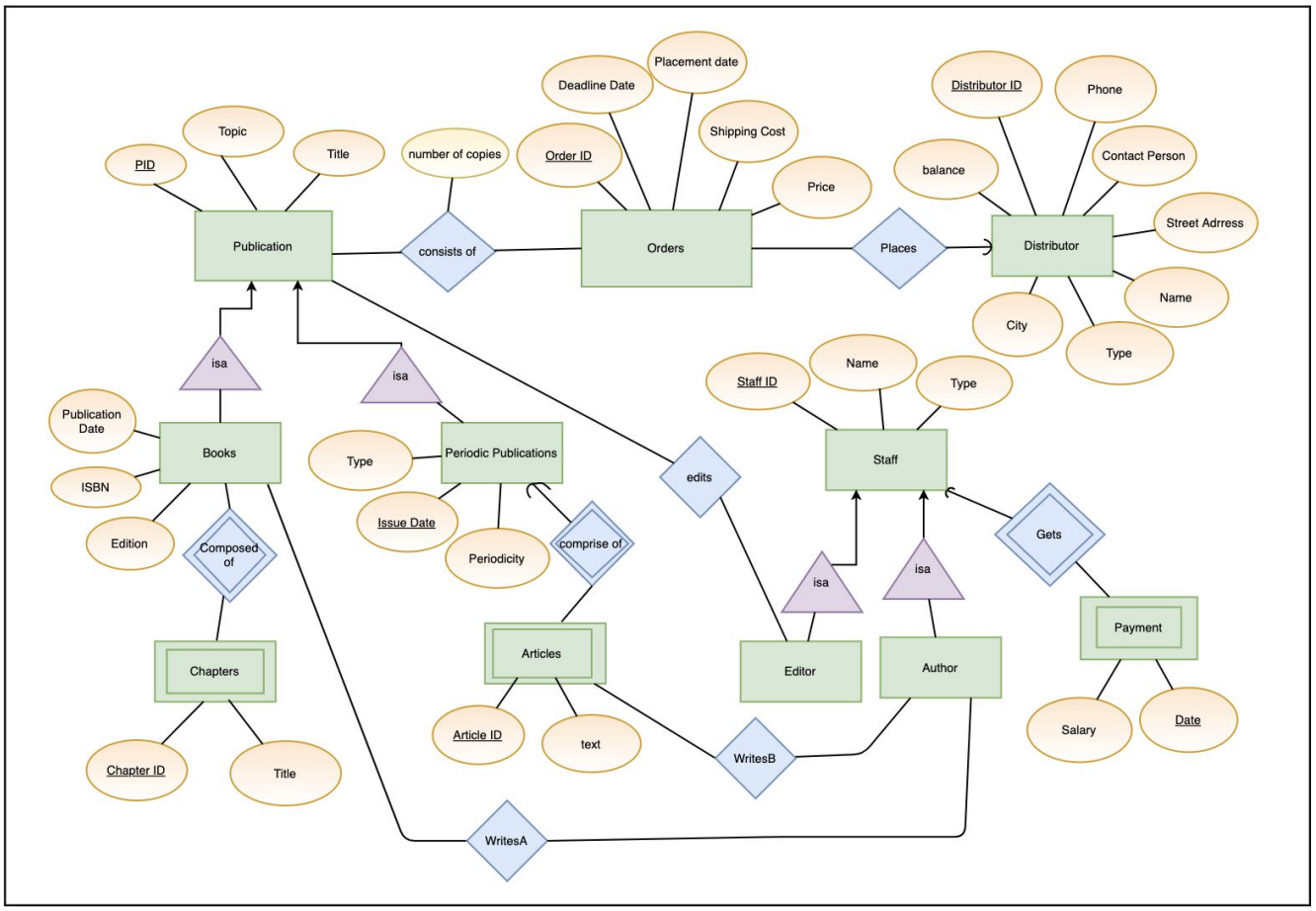
Staff have access to articles, books and editors can edit them.They can view all the information about articles, books and periodic publications. They also have access to the issues of each publication and the associated topics. Staff have no access to orders placed and the distributors.

c) Distributor

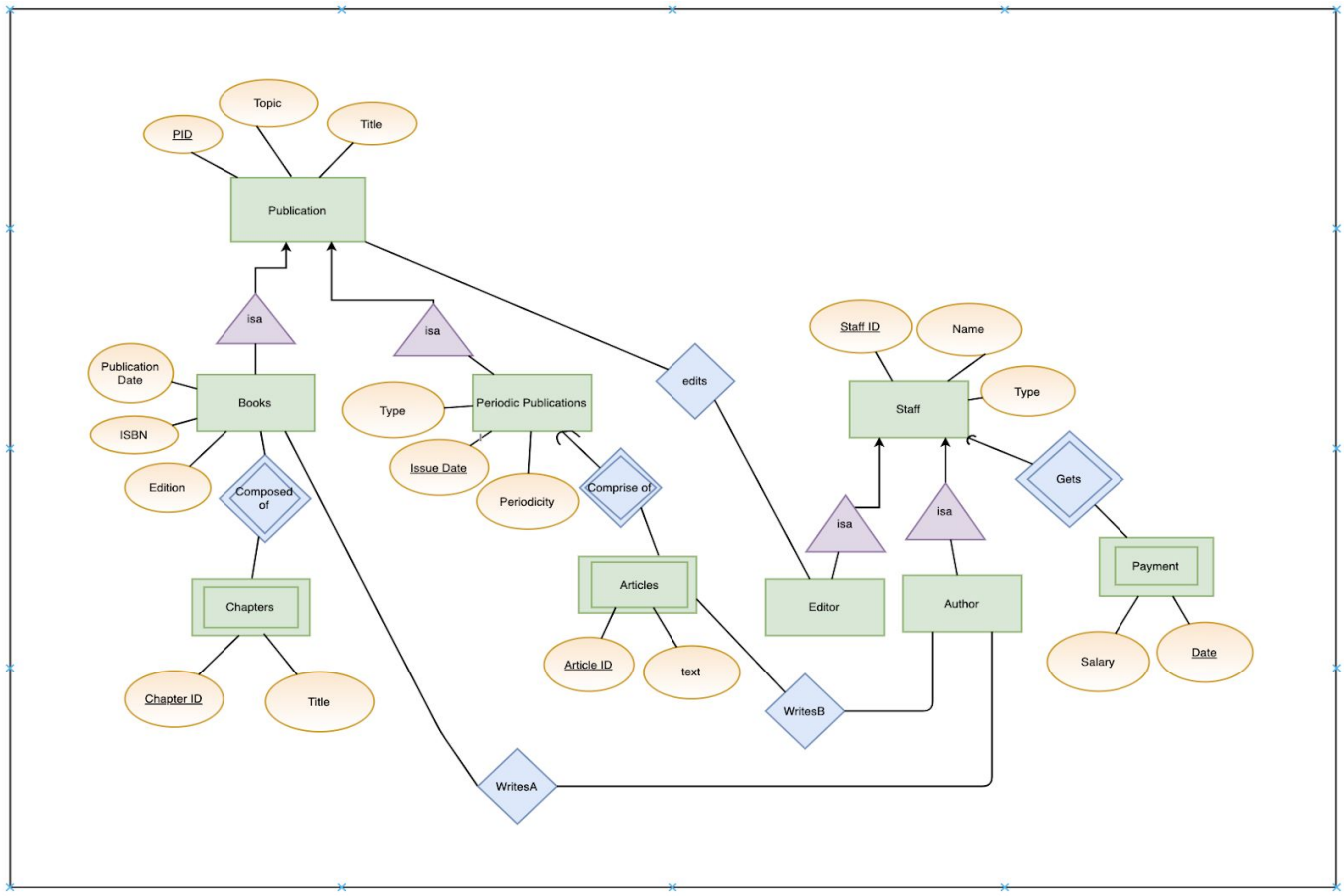
Distributors can view the orders placed with the wolf city publishing house. Distributors keep a track on the balance of payment left with the publishing house. Distributor has no access to the staff information of the publishing house.

7. E/R DIAGRAM:

A. ADMIN VIEW



B. STAFF VIEW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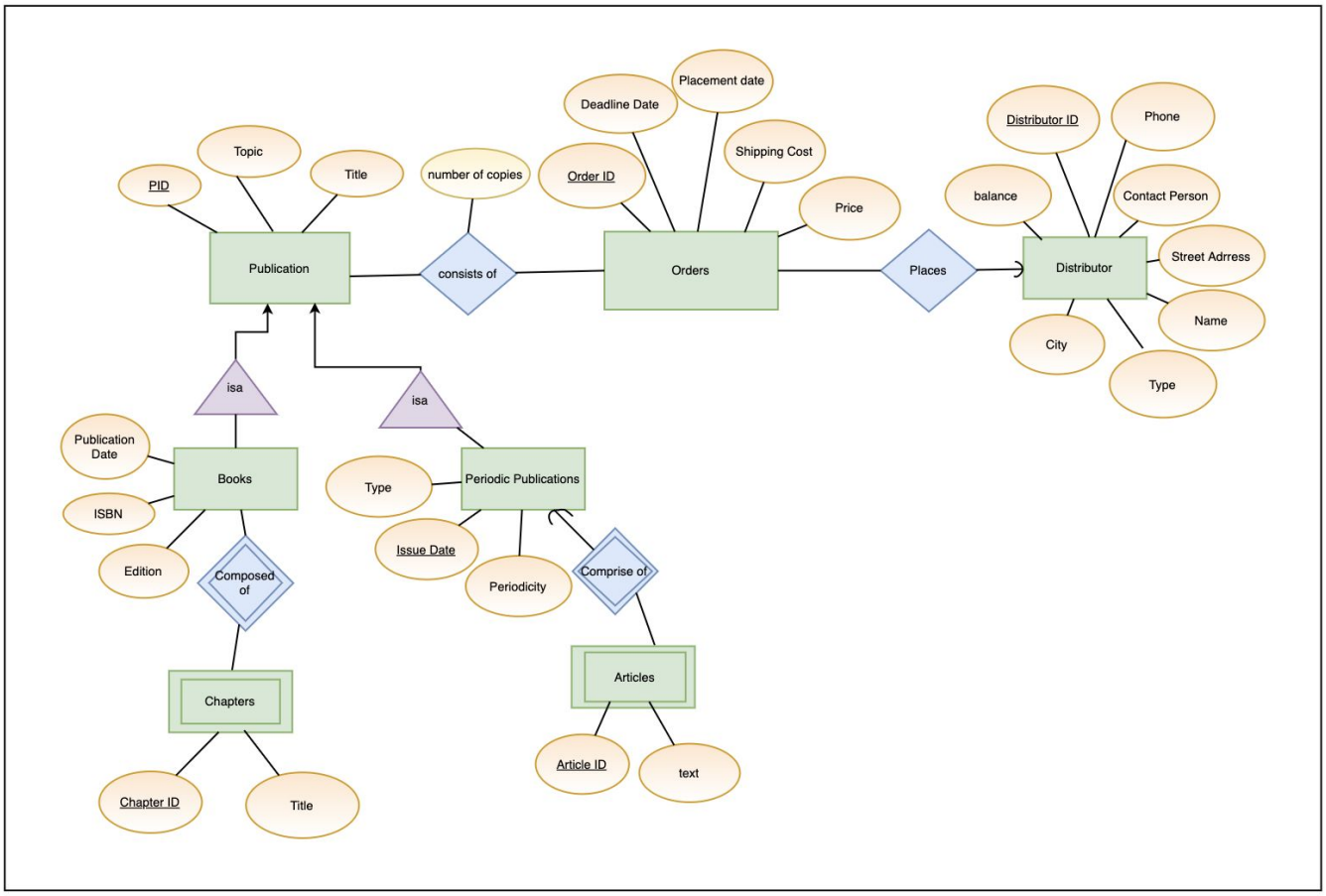
C. DISTRIBUTOR VIEW



8. Description of Local E/R Diagram

Entities:

- **Staff:** Staff includes publishing house employees or can be invited - they **can be** authors or editors. The Staff gets **paid** for their work as Authors/Editors.

- **Editor:** Is a staff(can be an employee/invited), has an ID and name. Editor can **edit** publications. They can edit Books as well as Periodic Publications.

- **Author:** Is a staff(can be an employee/invited), has an ID and name. The Chapters of the Books are **written** by Authors. The articles of Periodic publications are also **written** by Authors.

- **Publication:** Publications are associated with an ID, topic and title. Publications **can be** books **or** periodic publications.

- **Orders:** Orders have an associated order ID, Deadline date, Placement date, shipping cost and price. Orders **consist** of publications and the number of copies to be published.

- **Distributor:** Distributors are associated with Distributor ID, name, type(wholesale distributors, bookstores, or libraries), street address, city, contact person, phone and balance. Distributors can **place orders** for publications.

- **Books:** Books are a **type** of publication. Books are associated with PID, Publication date, ISBN and Edition. Books are **composed of** chapters.

- **Periodic publication:** Periodic publication is a **type** of publication. They are either journals/magazines(type attribute). They have an associated issue date and also have a periodicity attribute which can be monthly/weekly. Periodic publications **comprise of** articles.

- **Chapters:** This is a weak entity set and has Publication as the supporting entity set. They have an associated chapter ID, PID and title.

- **Articles:** This is a weak entity set and has periodic publication as the supporting entity set. They have an associated article ID, PID and text. Each article belongs to exactly one issue of aperiodic publication.

- **Payment:** This is a weak entity set and has staff as the supporting entity set. It has salary and date as attributes.

9. Local Relational Schema

A. Admins view:

Publication(PID, Topic, Title)

Books(PID,Publication Date, ISBN, Edition)

Periodic publication(PID, Type, Issue date, periodicity)

Chapters(PID, ChapterID, Title)

Articles(PID, ArticleID, text)

Orders(OrderID, Deadline date, Placement date, Shipping cost, price)

Distributor(DistributorID, Name, type Phone, Balance, Contact Person, Street Address, City)

Staff(StaffID, Name, Type)

Editor(StaffID)

Author(StaffID)

WritesB(StaffID, PID, ArticleID)

WritesA(StaffID, PID)

ConsistsOf(PID, OrderID, number of copies)

Places(OrderID, DistributorID)

Edits(StaffID, PID)

Payment(StaffID, Date, Salary)

B. Staff's view:

Publication(PID, Topic, Title)

Books(PID,Publication Date, ISBN, Edition)

Periodic publication(PID, Type, Issue date, periodicity)

Chapters(PID, ChapterID, Title)

Articles(PID, ArticleID, text)

Staff(StaffID, Name, Type)

Editor(StaffID)

Author(StaffID)

WritesB(StaffID, PID, ArticleID)

WritesA(StaffID, PID)

Edits(StaffID, PID)

Payment(StaffID, Date, Salary)

C. Distributor's view:

Publication(PID, Topic, Title)

Books(PID,Publication Date, ISBN, Edition)

Periodic publication(PID, Type, Issue date, periodicity)

Chapters(PID, ChapterID, Title)

Articles(PID, ArticleID, text)

Orders(OrderID, Deadline date, Placement date, Shipping cost, price)

Distributor(DistributorID, Name, type Phone, Balance, Contact Person, Street Address, City)

ConsistsOf(PID, OrderID, number of copies)

Places(OrderID, DistributorID)

10. Local Schema Documentation:

A. Entity-Sets to Relations:

- All entity sets are converted to relations - Publication, Staff, Orders, Distributors.
  All of these entities have respective IDs as primary key.
- All subclasses are also converted to relations to avoid redundancy - Books, Periodic publication, editor, author.
  - ❏ Books and Periodic Publications have Publication as parent entity and have Publication ID as primary key. Periodic Publications also have Issue date as a part of primary key.
  - ❏ Editor and Author have Staff as parent entity and have Staff ID as primary key.

B. Weak entity sets to Relations:

- We have converted all weak entity sets to relations which are represented with the help of supporting entity set - Chapters, Articles Payments.
  - ❏ Chapters and Articles are associated with Publication ID.
  - ❏ Payments are associated with Staff ID.

C. Relationships to Relations:

- All relationships in the E/R diagram are converted to relations - consistsOf, places, writesA and writesB. Their attributes are the keys of the entities they are associated with.
  - ❏ consistsOf relation also has ‘number of copies’ as an attribute which is relational attribute.
  - ❏ places has Order ID and Distributor ID as attributes.
  - ❏ writesA has Staff ID and PID as attributes.
  - ❏ writesB Staff ID, Article ID and PID as attributes.
- Weak relationships are not converted to relations.