CS 631 - DATA MANAGEMENT SYSTEMS DESIGN

(Prof. Dimitrios Theodoratos)

PROJECT - THE CITY LIBRARY

DELIVERABLE 1

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GOALS OF PHASE 1 PROJECT

1. To analyze the entire application for the City Library and come up with an extended ER diagram.
2. To use the notation for E/R model constructs and additional notation for specialization/generalization hierarchies we learned in class.
3. To analyze the entire application for the City Library and come up with an extended ER diagram.
4. To use the notation for E/R model constructs and additional notation for specialization/generalization hierarchies we learned in class.
5. To show entity types, relationship types (including class/subclass relationship types), and attributes.
6. To show different types of attributes a)simple/composite b) single valued/multi-valued c) stored/derived
7. To show key attributes.
8. To include structural constraints (cardinality ratios and participation constraints).
9. To use both notations for the constraints of the relationship types on the diagram i.e both the traditional one and the (min, max) notation.

ASSUMPTIONS

1. ASSUMED ATTRIBUTES

- P_ID and P_NAME attributes under PUBLISHER entity.
- Number of documents and number of copies of documents attribute under Reserves relationship type.
- Due_Date and Fine_Rate attributes under Borrows relationship type.
- Reader_Name attribute is a simple attribute and the Type attribute is a single attribute under Reader entity.
- Proceeding_Chairs attribute under Conference Proceedings entity is multivalued.

2. ASSUMED CONSTRAINTS

- A Publisher publishes many documents or a publisher may not publish any document at all.
- Guest editors can have many Journal Issues and a single Journal Issue can have many guest editors.
- Journal can have a maximum of 10 Journal Issues and a Journal might not have a Journal Issue at all.
- Readers can borrow copies of different documents.

- In Document Copy, it is assumed that there might be no copies of a document in any of the branches or many document copies in that particular branch..
- It is also assumed that there might be no document copies for a particular document or there might be many copies for a particular document.
- It is assumed that every document copy has a document.

DIFFICULTIES FACED

- Specifications for some attributes could be considered ambiguous when translating to a real world design.
- Deciding the structural constraints on the entity types.
- Possibility of misinterpreting the meaning of certain relationships.
- Certain assumptions made might affect the future extendability.

ENTITIES, RELATIONSHIP TYPES AND ATTRIBUTES

Based on the analysis and observation of the specifications mentioned, the following Entity types, Attributes and Relationship Types are obtained.

1. **Entities**
    - 1.1. Library Branch
    - 1.2. Document (Generalized Entity Type - SuperClass)
        - 1.2.1. Conference Proceedings
        - 1.2.2. Journal
        - 1.2.3. Books
    - 1.3. Document Type (Weak Entity type)
    - 1.4. Publisher
    - 1.5. Reader
    - 1.6. Authors
    - 1.7. Books
    - 1.8. Journal
    - 1.9. Journal Issue (Weak Entity type)
    - 1.10. Conference Proceedings
    - 1.11. Chief Editor
    - 1.12. Guest Editor

2. **Relationship types**
    - 2.1. Holds (Library Branch → Document copy)
    - 2.2. Has (Document → Document Copy)

2.3. Publishes (Publisher → Document)
2.4. Register (Library branch → Reader)
2.5. Reserves (Reader → Document copy)
2.6. Borrows (Reader → Document copy)
2.7. Has (Journal → Journal Issue)
2.8. Have (Books → Authors)
2.9. Supervised By (Journal → Chief Editor)
2.10. Has (Journal issue → Guest Editor)

3. Attributes in each Entity Type and Relationship Type

3.1. Library Branch
- 3.1.1. Location
- 3.1.2. B_Id (Key Attribute)
- 3.1.3. B_Name

3.2. Holds
- 3.2.1. No_Copies
- 3.2.2. Po_Copies

3.3. Document Copy
- 3.3.1. Copy_id (Partial Key Attribute)

3.4. Document
- 3.4.1. P_date
- 3.4.2. Title
- 3.4.3. Doc_id (Key Attribute)

3.5. Publisher
- 3.5.1. P_address
- 3.5.2. P_name
- 3.5.3. P_id (Key Attribute)

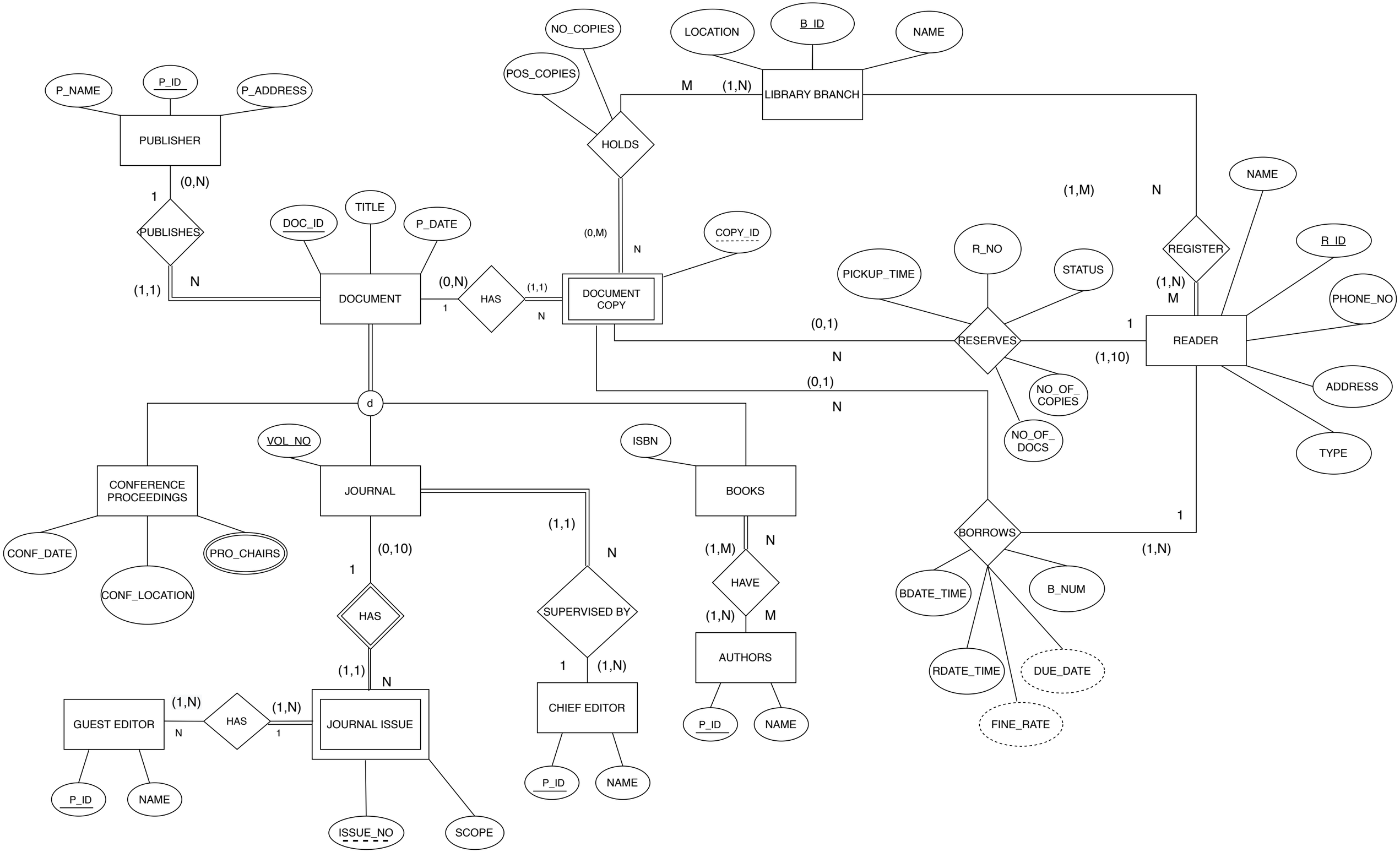
3.6. Reserves
- 3.6.1. Pickup_time
- 3.6.2. R_no
- 3.6.3. Status
- 3.6.4. No_of_copies
- 3.6.5. No._of_docs

3.7. Reader
- 3.7.1. Name
- 3.7.2. R_id (Key Attribute)
- 3.7.3. Phone_no
- 3.7.4. Address
- 3.7.5. Type

3.8. Borrow
- 3.8.1. Bdate_time
- 3.8.2. Rdate_time
- 3.8.3. B_num

- 3.8.4. Due_date (derived)
- 3.8.5. Fine_rate (derived)

- 3.9. Books
  - 3.9.1. ISBN
- 3.10. Authors
  - 3.10.1. P_id (Key Attribute)
  - 3.10.2. Name
- 3.11. Journal Issue
  - 3.11.1. Issue_no (Partial Key Attribute)
  - 3.11.2. Scope
- 3.12. Journal
  - 3.12.1. Vol_no (Key Attribute)
- 3.13. Conference Proceedings
  - 3.13.1. Conf_location
  - 3.13.2. Conf_date
  - 3.13.3. Pro_chairs (Multivalued Attributes)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