

Unit 2 Research Project

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Definitions

Business Rule. Business rules are utilized in defining database relationships, constraints, attributes, and entities which are used in the design and development of database models. A good example of an applied business rule (that a university could use) would be: DEPARTMENTS---- -offers-----COURSE. The structure of noun, verb, and noun are part of the business rule model that are used in database relationships (Carnegie Mellon University, 2014).

Entity. An entity is a construct in a database that represents something where its data is collected. Good examples of entities would include a person, place or thing (like an automobile) (Teach-ICT, n.d.).

Entity Set (Entity Type). An entity set would be a collection of entities that are similar or that have the same type. A good example of what would be considered an entity set would be all people in a database that have a bank account (Simon Fraser University, 1995).

Entity Instance. An entity instance is a single instance or a row in table. For example, in an entity set with type VEHICLE, an entity instance would be VEHICLE XYZ (Kroenke, 2002).

Attribute. An attribute is a descriptive element that is associated with an entity. For example, in the vehicle example, attributes would be VehicleLicenseNumber and VehicleVIN (Kroenke, 2002).

Relationship. A relationship is defined as a link or association between one or more entities. An example of a database relationship would be VEHICLE (an entity) has a relationship with an OWNER (another entity) (Kroenke, 2002).

Connectivity. Connectivity is the relationship between entities that adheres to a standardized classification. There are several good examples of these classifications which include 1:1 (one-to-one), 1:M (one-to-many), and M:N (many-to-many) (Coronel & Morris, 2012). To carry the example one step further, a one-to-many association can be seen in LIBRARY_PATRON----checks out-----BOOKS.

Cardinality Constraint. Cardinality constraint defines the minimum and maximum number of instances of entity relationships. Using the workplace as an example, ONE MANAGER----manages---ONE DEPARTMENT (Coronel & Morris, 2012).

Participation Constraint. The participation constraint is based upon establishing optional or mandatory relationships between entities. For example, if there is an EMPLOYEE----who works for----DEPARTMENT, if a new employee must be associated with a department when joining the organization, then the participation constraint would be considered mandatory (Coronel & Morris, 2012).

Associative Entity. An associative entity is a specific entity meant to connect or relate a many-to-many entity relationship to a one-to-many relationship. An example of this would be taking STUDENT----CLASS and changing it to STUDENT----ENROLL----CLASS (Coronel & Morris, 2012). ENROLL would be the associative entity.

Business Rules

Author – Book

MANY Authors can write MANY Books [M]

Author M:N Book

Taking this one step further, MANY-Mandatory Authors, write MANY-Optional Books

ONE Book has can have MANY Volumes [M]

Book 1:M Volume

ONE-Mandatory Book can have MANY-Optional Volumes

ONE Country has MANY Authors [M]

Country 1:M Author

ONE-Mandatory Country has MANY-Optional Authors

The M:N is

MANY Authors writes MANY Books, MANY Books can be published by ONE Publisher

Thus, the associative entity is Book.

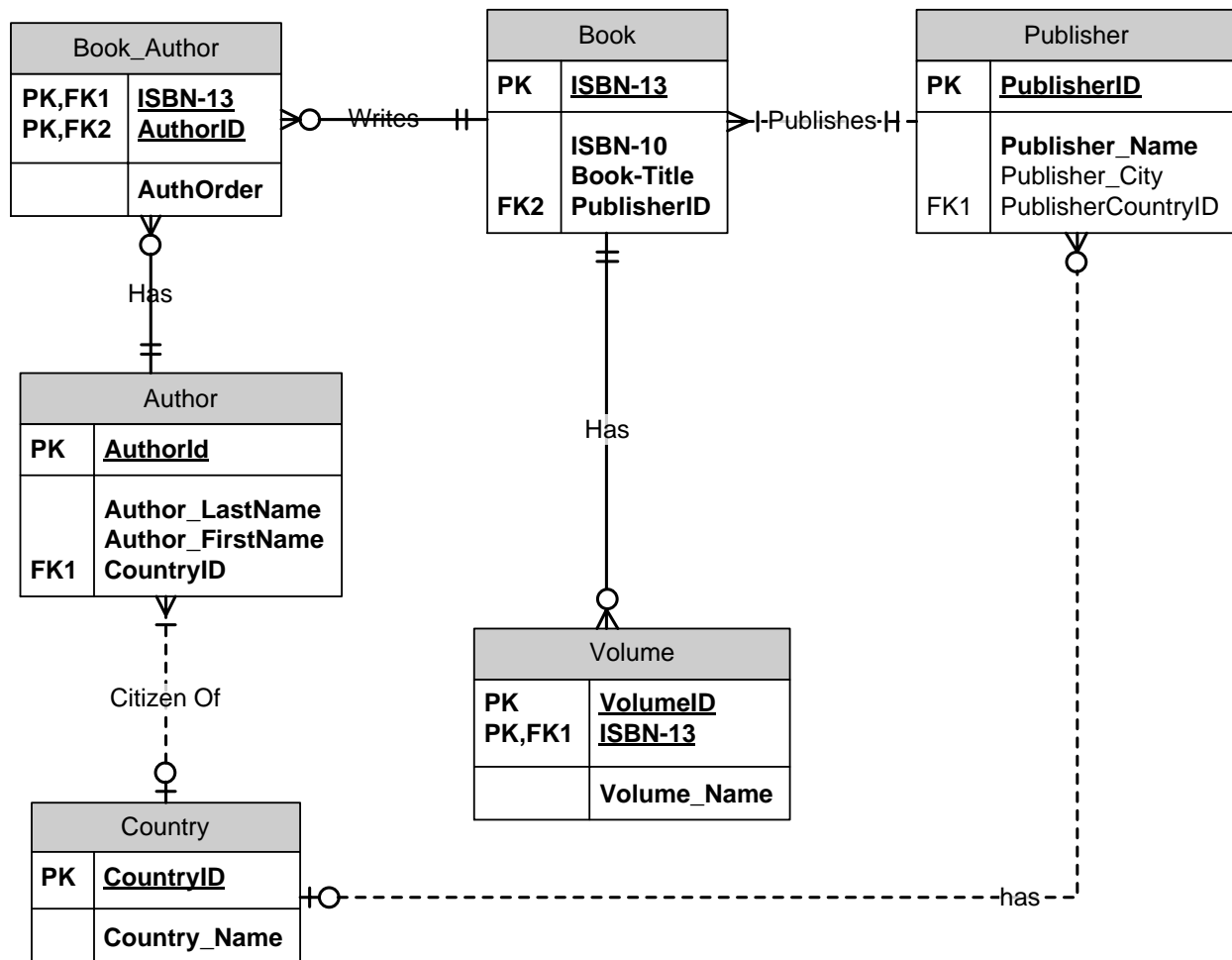
It is important to note, there is an associative entity missing between Author and Book.

Primary Key / Foreign Key Placement

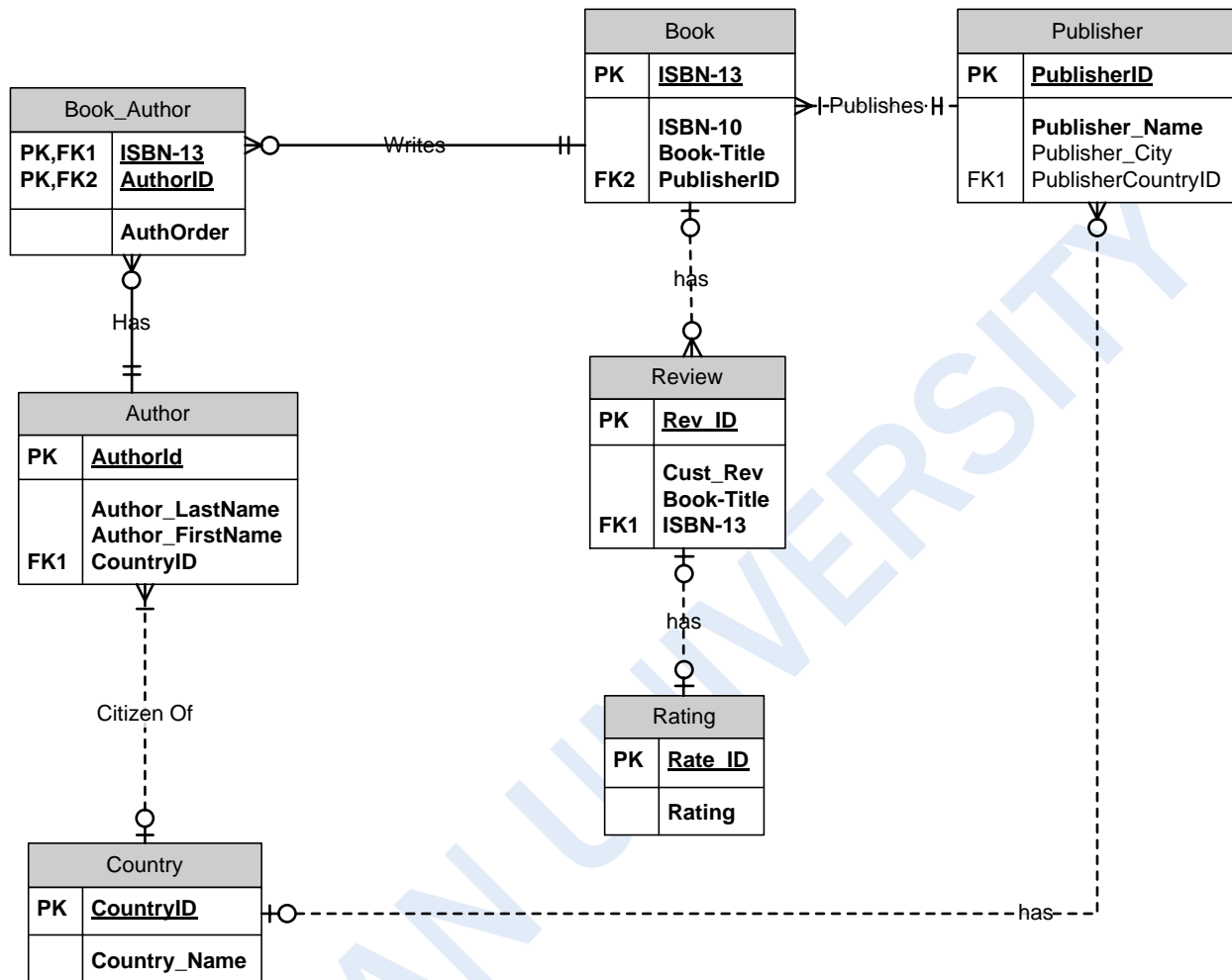
This has to be updated; it is missing foreign keys.

Entity Set	Primary Key Attribute(s)	Foreign Key Attribute(s)
Publisher	Publisher_ID	
Volume	Volume_ID	
Book	ISBN-13	
Book-Author	ISBN-13 AuthorId	
Author		AuthorId
Country	ID	

Entity Relationship Diagram - A



Entity Relationship Diagram - B



The specific approach taken is a top-down approach. The reason this has been selected is to start from a general perspective, and then create a specific design that meets client expectations. After interviewing the client and gathering requirements, the main idea is to add customer reviews to books, and those reviews must have a rating. It can be observed in the above example that a "Review" entity was created with a relationship to "Book" and "Rating." One book may have many reviews. Each review may have only one rating. Specifically, a book may have many optional reviews, and each review must have exactly one rating.

References

- Carnegie Mellon University. (2014). Carnegie Mellon Univ. Dept. of Computer Science 15-415 - Database Applications. Retrieved from <http://www.cs.cmu.edu/~christos/courses/dbms.S12/slides/02ERdiagrams.pdf>
- Coronel, C., Rob, P., & Morris, S. (2012). *Database systems: design, implementation, and management (10th ed.)*. Boston, MA: Cengage Learning.
- Kroenke, David M. (1/1/2002). *Database Processing: Fundamentals, Design, and Implementation -- Eighth 8th Edition*. Prentice Hall. Retrieved from <http://facweb.cs.depaul.edu/bfisher/csc319/ch03-ans.doc>
- Simon Fraser University. (1995). Entities and Entity Sets. Retrieved from <http://www.cs.sfu.ca/CourseCentral/354/zaiane/material/notes/Chapter2/node2.html>
- Teach-ICT. (n.d.). Entities. Retrieved from http://www.teach-ict.com/as_a2_ict_new/ocr/AS_G061/315_database_concepts/attributes_entities/miniweb/pg2.htm