



Scroll down and click "Respond" to post your reply to the Discussion topics. Please review the Discussion Board Participation grading rubric on your course Syllabus.

The Discussion Board Participation grading rubric contains important information that will ensure that you earn maximum points. Your postings should be qualitative and provide substantive depth that advances the discussion.

Topic 1 Discussion Topic: Database Design

Compare top-down database design to bottom-up database design. Which do you think is easier? Which is more thorough?

To be added

Topic 2 Discussion Topic: Enhanced Entity Relationship Concepts

Provide an example of the use of supertype and subtype entities.

To be added

Conceptual Design: Enhanced Entity Relationship Model

This unit presents some important extensions to the E-R model that are useful in capturing additional business meaning. In particular, the enhanced entity-relationship (EER) model includes constructs for supertype/subtype relationships and then the inclusion of new notation for business rules allows the designer to capture a broader range of constraints on the data model.

Outcomes

After completing this unit, you should be able to:

- Define the construct of supertype and subtype.
- Identify overlap and disjoint subtypes.
- Identify completeness and disjoint constraints.
- Develop an enhanced entity relationship (EER) model.

Course outcome(s) practiced in this unit:



IT525-2: Use data modeling concepts.

IT525-3: Use entity-relation diagrams in the design of a database.

What do you have to do in this unit?

- Complete the assigned Reading.
- Participate in the Seminar or complete the Alternative Assignment.
- Participate in the Discussion Board.
- Complete the unit Assignment.

Additional Resources

Criteria for choosing the supertype/subtype paradigm include:

1. **Entities share multiple attributes that are the same that would be defined as the supertype.**
2. **There are attributes unique to one or multiple subtypes.**
3. **There are relationships unique to one or more but not all subtypes.**

Steps to Enhance an ERD to add Supertype and Subtype Entities.

1. You first identify the supertype and all its attributes that will be inherited by the subtypes.
2. Draw the supertype entity.
3. You then will identify the subtypes that will be linked from the supertype.
4. You then need to determine if the subtypes will be partial or total specialization
 - a. **Partial completeness** - Specifies that an entity instance of the supertype is allowed not to belong to any subtype. If the supertype entity instance is not required to belong to any subtype, then draw a single line from the Supertype to a Big Circle.
 - b. **Total completeness** - Specifies that each entity instance of the supertype must be a member of some subtype in the relationship. If each supertype entity instance must be in at least one subtype, then draw two lines from the Supertype to a Big Circle.



5. Draw the subtype entities.
6. Draw lines from the Big Circle to the subtype entities.
7. Then you need to determine what value needs to be within the Circle; either D or O.
 - a. **Disjoint subtype** - A constraint that addresses the question whether an instance of a supertype may simultaneously be a member of two (or more) subtypes. If a supertype can only be one subtype then put a D in the big Circle.
 - b. **Overlap subtype** - Specifies that an entity instance can simultaneously be a member of two (or more) subtypes. If an entity can be more than one subtypes then put an O in the Big Circle.

Chapter 5 presents important extensions to the E-R model (described in Chapter 4) that are useful in capturing additional business meaning. In particular, the enhanced entity-relationship (EER) model includes constructs for supertype/subtype relationships and then the inclusion of new notation for business rules allows the designer to capture a broader range of constraints on the data model.

Web Reading Summary and link

Using your favorite search engine, please research the following topics:

- Enhanced Entity Relationship Diagrams
- Enhanced Entity Relationship Modeling

- **Generalization:** The process of defining a more general entity type from a set of more specialized entity types.
- **Supertype/Subtype Hierarchy:** A hierarchical arrangement of supertypes and subtypes, where each subtype has only one supertype.
- **Supertype:** A generic entity type that has a relationship with one or more subtypes.
- **Subtype:** A subgrouping of the entities in an entity type that is meaningful to the organization and that shares common attributes or relationships distinct from other subgroupings.
- **Attribute Inheritance:** A property by which subtype entities inherit values of all attributes of the supertype.



- **Partial Completeness:** Specifies that an entity instance of the supertype is allowed not to belong to any subtype.
- **Total Completeness:** Specifies that each entity instance of the supertype must be a member of some subtype in the relationship.
- **Disjoint Subtype:** A constraint that addresses the question whether an instance of a supertype may simultaneously be a member of two (or more) subtypes.
- **Overlapping Subtype:** Specifies that an entity instance can simultaneously be a member of two (or more) subtypes.

Attending live Seminars is important to your academic success, and attendance is highly recommended. The Seminar allows you to review the important concepts presented in each unit, discuss work issues in your lives that pertain to these concepts, ask your instructor questions, and allow you to come together in real time with your fellow classmates. There will be a graded Seminar in Units 1 through 5 in this course. You must either attend the live Seminar or you must complete the Seminar alternative assignment in order to earn points for this part of the class.

Option 1

Topics reviewed in the Seminar will include:

1. The enhanced entity relationship (EER) model.
2. Attribute inheritance — how a join condition allows knowledge of common supertype attributes.
3. The constructs of supertype and subtype entities.
4. The overlap, disjoint, partial specialization, and total specialization rules.

Option 2- Alternative Assignment:

You will benefit most from attending the graded Seminar as an active participant. However, if you are unable to attend you have the opportunity to make up the points by completing the alternative assignment.

Please review the Seminar. Provide a 200 word summary of the Seminar. Follow APA format. Include at least two references and two citations.

Format:

- One inch margins (top, bottom, sides), Times New Roman or Arial 12 point font.



- Double spaced.
- Running header with title, name, and page numbers.
- References and citations follow APA Format. Do not use more than 5 words directly from a source without quotation marks to avoid plagiarism.

Rubric:

1. Two hundred words. 5 points.
2. Compliance with APA format. At least two reference and citations. 5 points
3. Writing ability (Grammar, Spelling, Flow). 5 points
4. Mastery of database design concepts. 10 points

Your paper should be in APA format and cite all references used. Submit to the Seminar Dropbox.

Project 3

Outcomes addressed in this activity:

Course Outcomes:

IT525-2: Use data modeling concepts.

IT525-3: Use entity-relation diagrams in the design of a database.

Project Instructions:

Question 1. Definitions

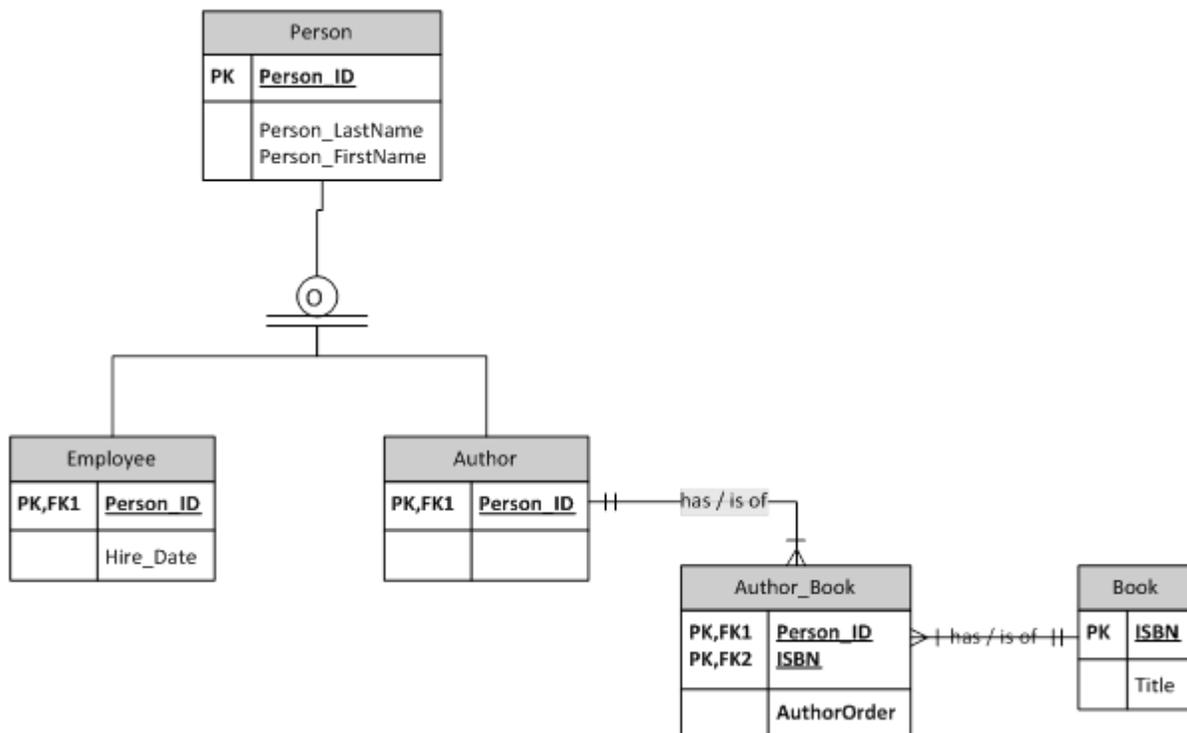
Define each of the following terms (1 pt. each). In addition, ***provide an example*** of each term (2 pts. each).

- a. Attribute Inheritance
- b. Supertype
- c. Subtype
- d. Generalization



- e. Composite Key
- f. Total Completeness
- g. Partial Completeness
- h. Surrogate Key
- i. Disjoint Subtype
- j. Overlapping Subtype

Question 2. Analyze a Supertype/Subtype ERD (a subset of a Publisher database ERD)



- a. List the attributes for Author. List the attributes for Employee.
- b. For each entity in the diagram, state whether it is a supertype, a subtype, or neither.
- c. Answer the questions below:
 - Can an employee also be an author?
 - Can a person be neither an employee nor an author?
- d. Assume there is a “manages” relationship in which an Employee manages an Author. State the business rules for the relationship. Modify the ERD to reflect



this relationship. Hints: A single attribute may have only one FK constraint. An FK attribute does not have to have the same name as its referenced PK.

Question 3. Create an ERD

A Diagnostic Radiology Service provides Radiology Procedures for outpatients. Use the entity descriptions and Business Rules described below to develop an ERD. Please break composite keys such as Name and Address into the appropriate fields. Please identify PK, FK and Hierarchy Constraints and all relationships within the ERD.

Entities

Person

PersonID

Name

Address

HomePhone

CellPhone

Gender

Race

ReferringPhysician

PersonID

NationalPractitionerID

Specialty

Patient

PersonID

ReferringPhysician (FK referencing physician's NationalPractitionerID)

Employee



EmployeeID

DateHired

DateLastPromotion

Degree

HourlyRate

Technician

EmployeeID

Certification

Radiologist

EmployeeID

Specialty

Visit

PatientID

Date

VisitReason

RadiologyProcedure

RadiologyProcedureID

Name

Description

Person is a supertype.

Subtypes: ReferringPhysician, Patient



A Person is not employed by the organization. A Person must be at least one of the following: ReferringPhysician or Patient. A Person can be both.

Employee is a supertype.

Subtypes: Technician, Radiologist

An Employee is a Technician, or a Radiologist, or an Administrative Staff.

Patient to ReferringPhysician

One Referring Physician has many Patients.

One Patient has one and only one Referring Physician.

Referring Physician 1:M Patient

Patient to Visit

One Patient has many Visits.

One Visit relates to one and only one Patient.

Patient 1:M Visit

Visit to RadiologyProcedure

One Visit may contain many Radiology Procedures

One Radiology Procedure may be performed for many Visits

Visit M:N Radiology Procedure; Associative Entity: **VisitProcedure**

Radiologist to VisitProcedure

One Radiologist reads results from many VisitProcedures

One VisitProcedure result is read by one Radiologist

Radiologist 1:M VisitProcedure

Technician to VisitProcedure



One Technician performs many VisitProcedures

One VisitProcedure is performed by one Technician

Technician 1:M VisitProcedures

Review the grading rubric below before beginning this activity.

100 point project grading rubric

Project Requirements/criterion	Points Possible	Points earned by student
1. Document demonstrates that the student was able to provide the proper definitions with examples.	0-30	
2. Document demonstrates that the student understands the supertype/subtype concepts .	0-20	
3. Student creates ERD with supertype/subtype constructs and required attributes.	0-50	
Total (Sum of all points)		
Points deducted for spelling, grammar, and/or APA errors.		
Adjusted total points		