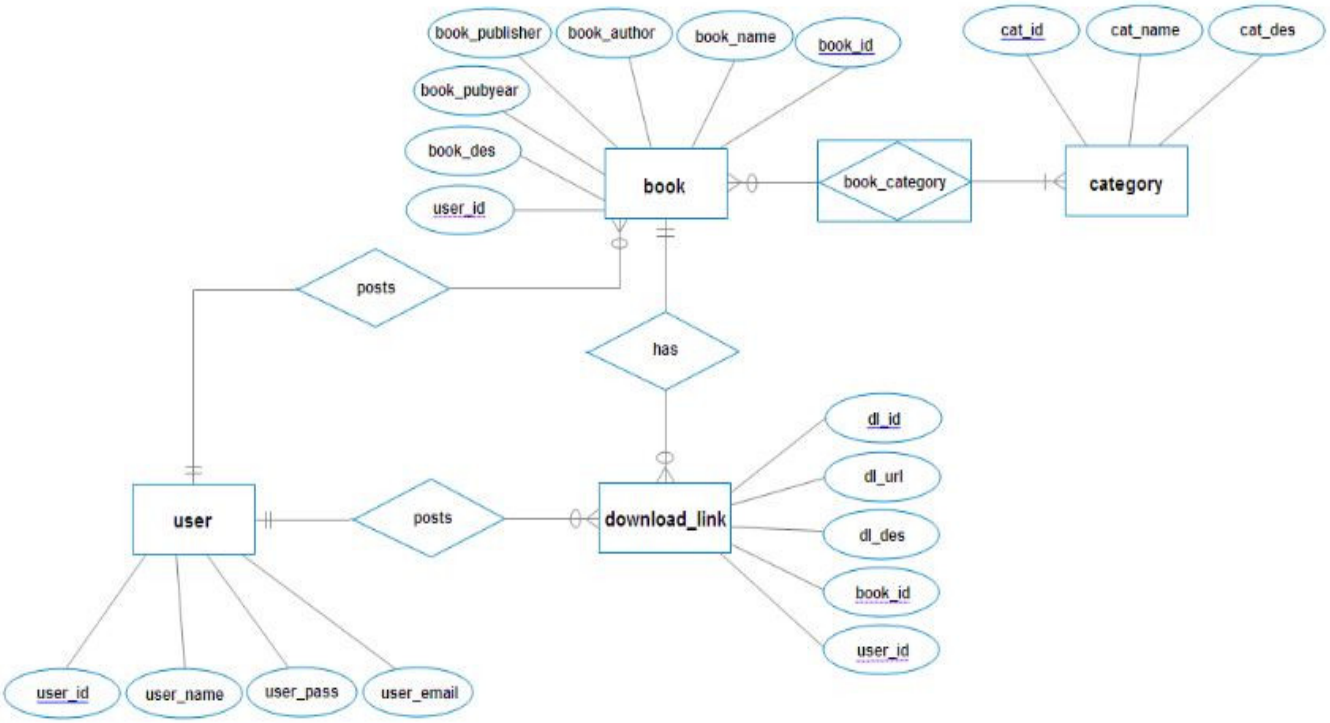
Tutorial 4

1. How to convert the following into relations. Give an example for each type.
   a. Single attribute, mutivalued attribute
   b. Composite attribute and derived attribute
   c. Unary relationship
   d. Binary relationship
   e. Ternary relationship
   f. Weak entity
   g. Supertype/subtype
   h. 1:M relationship
   i. M:N relationship
   j. Associative relationship
2. What is primary key, what is foreign key? Give an example.
3. What is fully functional, partial and transitive dependence? What is 1NF, 2NF & 3NF. Steps to normalize relations. Give example to illustrate it.
4. Convert this ERD into 3NF relations:



5. The figure shows a class list for Millennium College. Draw an EER. Convert this user view to a set of 3NF relations. Assume the following:

   • An instructor has a unique location.
   • A student has a unique major.
   • A course has a unique title.

MILLENNIUM COLLEGE
CLASS LIST
FALL SEMESTER 201X

COURSE NO.: IS 460
COURSE T ITLE: DATABASE
INSTRUCTOR NAME: NORMA L. FORM
INSTRUCTOR LOCATION: B 104

STUDENT NO.	STUDENT NAME	MAJOR	GRADE
38214	Bright	IS	A
40875	Cortez	CS	B
51893	Edwards	IS	A

6. Given a piece of data, state the dependencies and draw an EER:

TABLE 4-5 Shipping Manifest

Shipment ID:	**00-0001**	**Shipment Date:**	**01/10/2010**
Origin:	Boston	Expected Arrival:	01/14/2010
Destination:	Brazil		
Ship Number:	39	Captain:	002-15 Henry Moore

Item Number	Type	Description	Weight	Quantity	TOTALWEIGHT
3223	BM	Concrete Form	500	100	50,000
3297	BM	Steel Beam	87	2,000	174,000
				Shipment Total:	224,000

TABLE 4-6 Parking Tickets at Millennium College

Parking Ticket Table

St ID	L Name	F Name	Phone No	St Lic	Lic No	Ticket #	Date	Code	Fine
38249	Brown	Thomas	111-7804	FL	BRY 123	15634	10/17/10	2	$25
						16017	11/13/10	1	$15
82453	Green	Sally	391-1689	AL	TRE 141	14987	10/05/10	3	$100
						16293	11/18/10	1	$15
						17892	12/13/10	2	$25

7. The materials manager at Pine Valley Furniture Company maintains a list of suppliers for each of the material items purchased by the company from outside vendors. Table 4-7 shows the essential data required for this application.

TABLE 4-7 Pine Valley Furniture Company Purchasing Data

Attribute Name	Sample Value
Material ID	3792
Material Name	Hinges 3" locking
Unit of Measure	each
Standard Cost	$5.00
Vendor ID	V300
Vendor Name	Apex Hardware
Unit Price	$4.75
Terms Code	1
Terms	COD

a. Draw a dependency diagram for this data. You may assume the following:

• Each material item has one or more suppliers. Each supplier may supply one or more items or may not supply any items.

• The unit price for a material item may vary from one vendor to another.

• The terms code uniquely identifies the terms of the sale (e.g., code 2 means 10 percent net 30 days, etc. At a given time, a supplier applies a term code. The terms for a supplier are the same for all material items ordered from that supplier.

b. Decompose this diagram into a set of diagrams in 3NF.

c. Draw an E-R diagram for this situation.

Homework

1. Define each of the following terms:

   a. determinant
   b. functional dependency
   c. transitive dependency
   d. recursive foreign key
   e. normalization
   f. composite key
   g. relation
   h. normal form
   i. partial functional dependency
   j. enterprise key

2. Match the following terms to the appropriate definition

   1. well-structured relation
   2. anomaly
   3. functional dependency
   4. determinant
   5. composite key
   6. 1NF
   7. 2NF
   8. 3NF
   9. recursive foreign key
   10. relation
   11. transitive dependency

   a. constraint between two attributes
   b. functional dependency between the primary key and a nonkey attribute via another nonkey attribute
   c. references the primary key in the same relation
   d. multivalued attributes removed
   e. inconsistency or error
   f. contains little redundancy
   g. contains two (or more) attributes
   h. contains no partial functional dependencies
   i. transitive dependencies eliminated
   j. attribute on left side of functional dependency
   k. named two-dimensional table of data

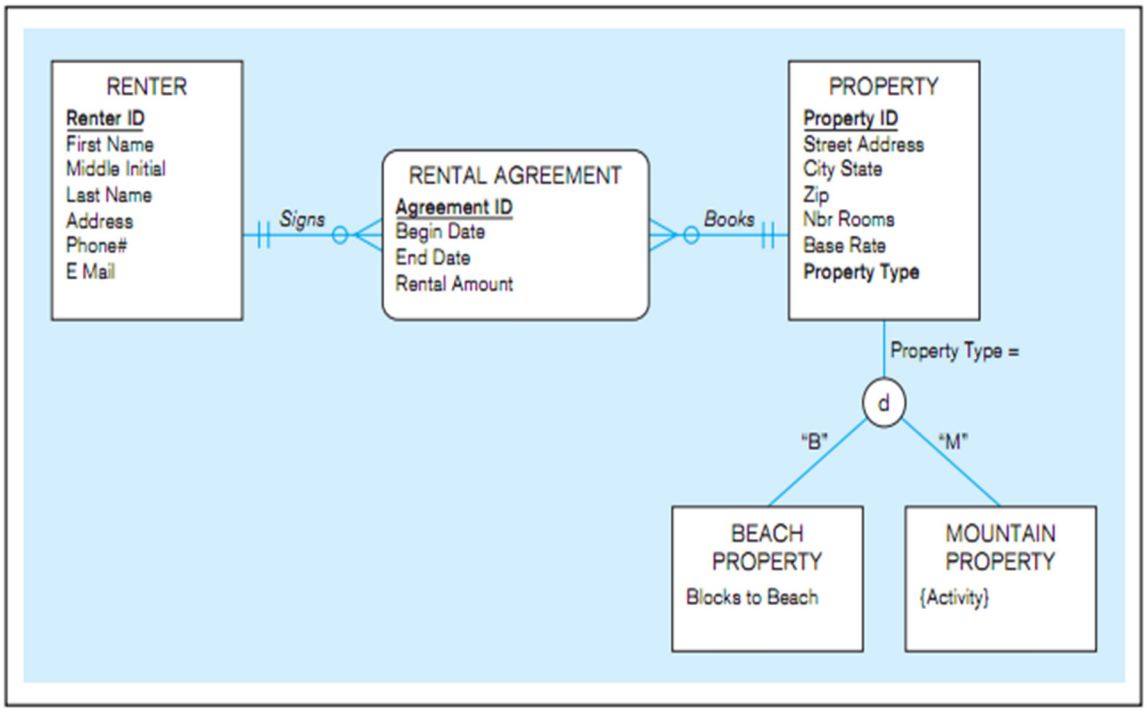
3. Figure below shows an EER diagram for Vacation Property Rentals. This organization rents preferred properties in several states. As shown in the figure, there are two basic types of properties: beach properties and mountain properties.

   a. Transform the EER diagram to a set of relations and develop a relational schema.

   b. Diagram the functional dependencies and determine the normal form for each relation.

   c. Convert all relations to third normal form, if necessary, and draw a revised relational schema.

   d. Suggest an integrity constraint that would ensure that no property is rented twice during the same time interval.



4. Transform the diagram into a relation. In addition, verify that the resulting relations are in 3NF