1DV503/1DT903 Database Technology and Modeling

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Task 1. The Hospital database

1.1 Identify all entities and their attributes from the description of database requirements using the following Table template:

Entity	Attribute	Attribute Type	Key Attribute	Value sets of attribute (type, min, max, value, NULL/NOT NULL)
Department	Name	Simple	true	String max 256 characters
Physician	Unique id	Simple	True	String max 256 characters / integers
	Name	Composite	false	String max 256 characters
	Address	Complex attributes	false	String max 256 characters
Patient	Unique id	Simple	True	String max 256 characters / integers
	Name	Compostie	false	String max 256 characters
	Address	Complex attributes	false	String max 256 characters
	Phone	Simple	false	Not ull / string / integers
	Insurance id	Simple	True	String / integers / not null
Appointment	Appointment id	Simple	True	String max 256 characters / integers
	Physician id	Simple	True	String max 256 characters / integers
	Patient id	Simple	True	String max 256 characters / integers

	Start date	Complex attributes	false	String max 256 characters / integers
	End date	Complex attributes	false	String max 256 characters / integers
	Room	Complex attributes	false	String max 256 characters
Nurse	Unique id	Simple	True	String max 256 characters / integers
	Name	Composite	false	String max 256 characters
	Position	Simple	false	String max 256 characters
Medication	Unique id	Simple	True	String max 256 characters / integers
	Code	Simple	True	String max 256 characters / integers
	Name	Composite	false	String max 256 characters
	Brand	Simple	false	String max 256 characters
	description	Simple	false	String max 256 characters
Procedure	Unique code	Simple	True	String max 256 characters/ integers
	Name	Composite	false	String max 256 characters
	Cost	Simple	false	Integer
Room	Unique number	Simple,	True	String max 256 characters / integers
	Type	Composite	false	String max 256 characters
	Available/Busy	Simple	false	String max 256 characters / Integers

1.2 Identifying the relationship between entity sets using the following table template:

Entity A	Relationship name	Entity B	Cardinality Ration (1: 1, 1: N,	Attribute of Relationship Types	Justify your decision

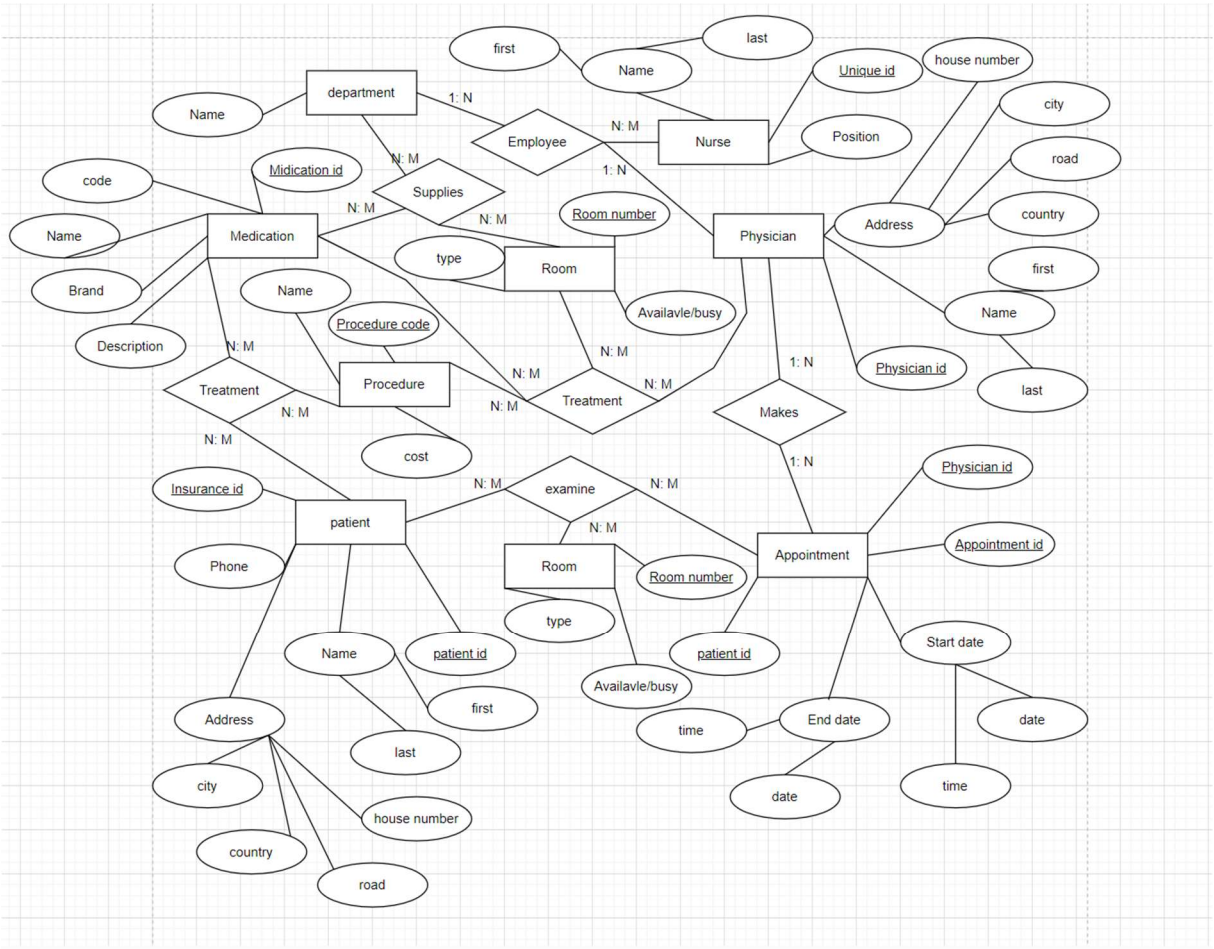
			N:1, M: N)		
Department	Employee	Physician	1: 1	One-to-one	One department has only one physician
Department	Employee	Nurse	1: N	One-to-many	One department has multiple nurses.
Department	supplies	Medication	1: N	One-to-many	One department supplies multiple types of medications
Department	supplies	Room	1: N	One-to-many	One departments supplies multiple rooms.
Physician	Makes	Appointment	1: N	One-to-many	One physician can make multiple appointments
Physician	Employee	Nurse	1: N	One-to-many	One physician controlles all the nurses in that department
Physician	Treatment	Medication	N: M	Many-to-many	Multiple physicians can prescribe multiple medications
Physician	Treatment	Procedure	N: M	Many-to-many	Multiple physicians can address multiple

					procedure
Physician	Treatment	Room	N: M	Many-to-many	Multiple physicians can book multiple rooms
Patient	Examine	Appointment	1: N	One-to-many	One patient can have multiple appointments
Patient	Treatment	Medication	N: M	Many-to-many	Multiple patients can have multiple medications
Patient	Treatment	Procedure	N: M	Many-to-many	Multiple patients can have multiple procedures
Patient	examine	Room	N: M	Many-to-many	Multiple patents can be in multiple rooms and moved between them
Appointment	examine	Room	N: M	Many-to-many	Multiple appointments can be in multiple rooms and the rooms may change for the same appointment
Medication	Treatment	Procedure	N: M	Many-to-many	Multiple different medications can be used for different procedures

Medication	Treatment and Supplies	Room	N: M	Many-to-many	Different medications can be used in different rooms
Procedure	Treatment	Room	N: M	Many-to-many	Different procedures in different rooms

1.3 Design an ER schema for hospital database based on information provided in task 1, and entities defined in 1.2 with relationships defined in 1.3.

The ER schema should contain entities with their corresponding attributes, key attributes of each entity, relationship types, and their corresponding cardinality ration.



Task 2 Conference Review Database (25 points)

2.1 Identify all entities and their attributes from the description of Conference review database requirements using the following Table template:

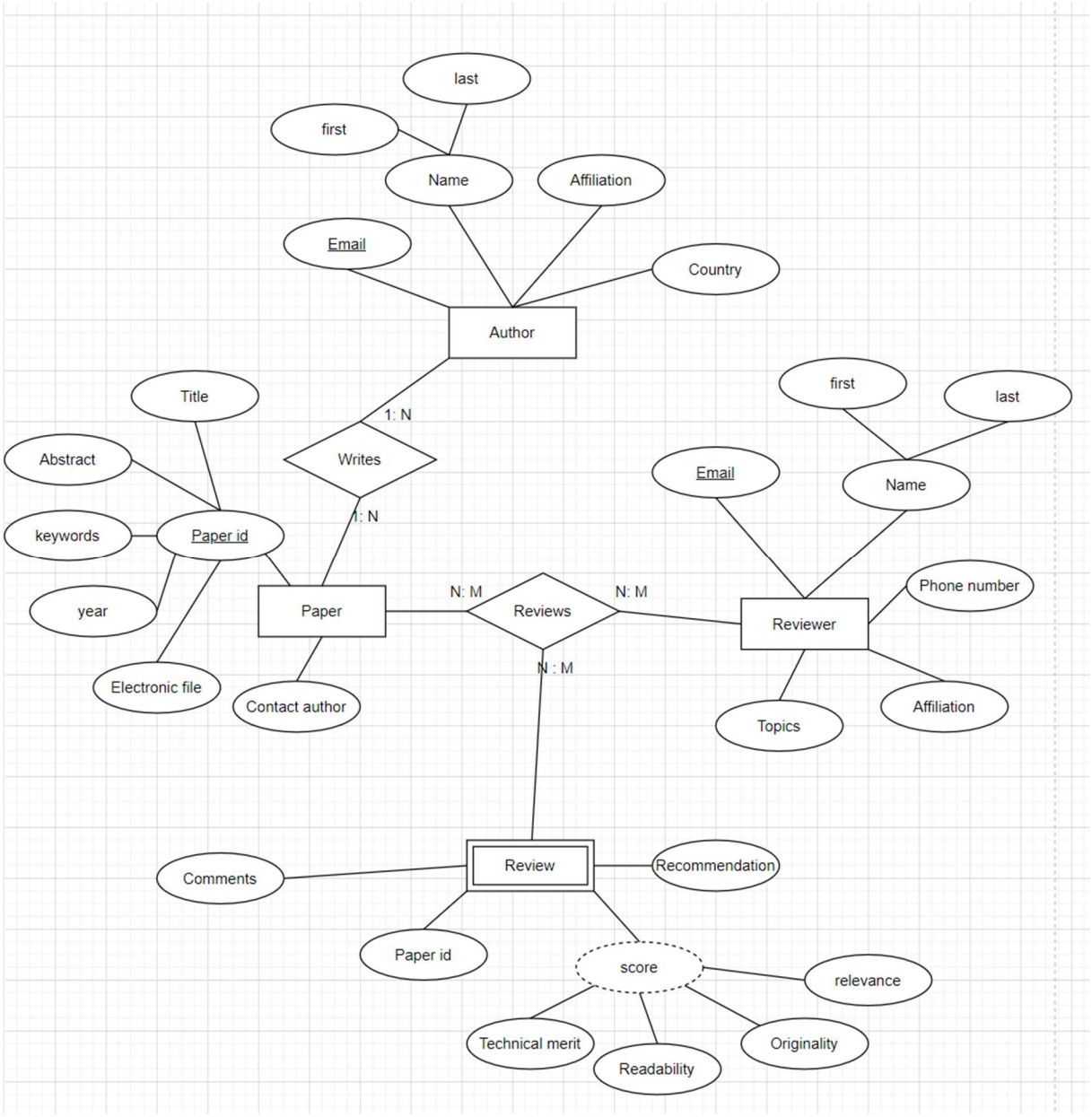
Entity	Attribute	Attribute Type	Key Attribute	Value sets of attribute (type, min, max, value, NULL/NOT NULL)
Author	Email	Simple	true	String max 256 characters
	Name	Composite	false	Integer, [5,100], not null
	Affiliation	Simple	false	String max 256 characters
	Country	simple	false	String max 256 characters
Paper	Unique id	Multivalued	True	String max 256 characters or interges
	Contact author	composite	false	String max 256 characters
Reviewer	Email	Simple	True	String max 256 characters
	Name	Composite	false	String max 256 characters
	Phone number	Simple	false	String max 256 characters / integers
	Affiliation	Simple	false	String max 256 characters
	Topics	Multivalued	false	String max 256 characters
Review	Paper id	Simple	True	String max 256 characters
	Score categories	multivalued	false	Integers
	Recommend ation	simple	false	String max 256 characters

	Comments	Composite	false	String max 256 characters

2.2 Identifying the relationship between entity sets using the following table template:

Entity A	Relationship name	Entity B	Cardinality Ration (1:1,1:N,N:1,M:N)	Attribute of Relationship Types	Justify your answer
Author	Writes	Paper	N: M	Many-to-many	Multiple authors write multiple papers
Paper	Reviewes	Reviewer	N: M	Many-to-many	Multiple papers can be reviewed by multiple reviewers
Paper	Reviewes	Review	N: M	Many-to-many	Multiple papers can have multiple reviews on them
Reviewer	Reviewes	Review	N: M	Many-to-many	Multiple reviewers can do multiple reviwes

2.3 Design an ER schema for review database based on information provided in task 2, and entities defined in 2.1 with relationships defined in 2.2. You are free to make additional assumptions if you feel that some information is missing. Make sure to **document all assumptions** that you make. Please justify your assumptions.



Task 3. Bank database (25 points)

Consider the ER diagram shown below for part of a BANK database. Each bank can have multiple branches, and each branch can have multiple accounts and loans. Provide answers on the following statements:

A. List a strong (nonweak) entity type in the ER diagram

My Answer: Customer

B. Is there a weak entity type? If so, give its name, partial key, and identifying relationship

My Answer: BANK_BRANCH, Branch_no, Has_Branches

C. What constraints do the partial key and the identifying relationship of the weak entity type specify in this diagram?

My Answer: There is no uniquely identification for the records in the entity.

D. List the names of all relationship types and specify the (min,max) constraint and each participation of an entity type in a relationship type. Justify your answer.

Relationship type	Relationship name	min,max	Justify your answer
One-to-many	Has_branches	1: N and 1: 1	A Bank Branch has a minimum of 1 branch and a maximum of N branches, (1: N). The bank has a minimum of 1: branch and a maximum of 1, (1: 1)
One-to-many	Has_Accounts	1:1 and 1: N	The bank_branch have a minimum of 1 account and a maximum of 1 account, (1: 1). Created accounts are at a minimum of 1 and a maximum of N, (1: N)
Many-to-many	A_C	1: N and 1: N	Minimum of customer is 1 and the bank can have at most N customers, (1: N). There can be a minimum of 1 account and a maximum of N accounts, (1: N).
Many-to-many	L_C	1: N and 1: N	There is a minimum of 1 customer with loan and maximum of N, (1: N). There are a minimum of 1 loan and a maximum of N, (1: N)
One-to-many	Loans	0: 1 and 1: N	The bank_branch has on a minimum 0 loans and max 1 loan, (0: 1). The loan is at a minimum of 1 and a maximum of N, (1: N).

Task 4. Baseball organization database (25 points)

4.1 Identify all superclass entities (with their attributes) and subclasses in the table below:

Superclass	**Attributes**	**Subclass**	**Subclass Attributes**
Peopel	personel	Umpiers	Personnel id
Personnel	Personnel id, info (name, date of birth, place of birth)	Coaches, Managers	
		Players	Pitchers (earned run average), Batters (Batting average,

			batting orientation)
teams	Names, location	Home team, away team	

4.2 Design an enhanced entity-relationship diagram (EER). Provide justification for designed relationships between entities, defined superclasses, and subclasses.

You are free to make additional assumptions if you feel that some information is missing. Make sure to **document all assumptions** that you make. Please justify your assumptions!