



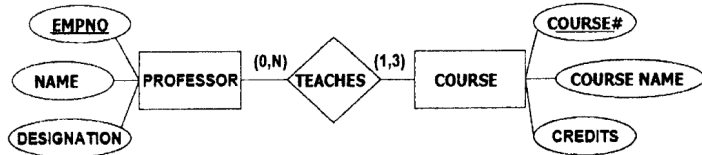
# Adi Shankara

INSTITUTE OF ENGINEERING AND TECHNOLOGY

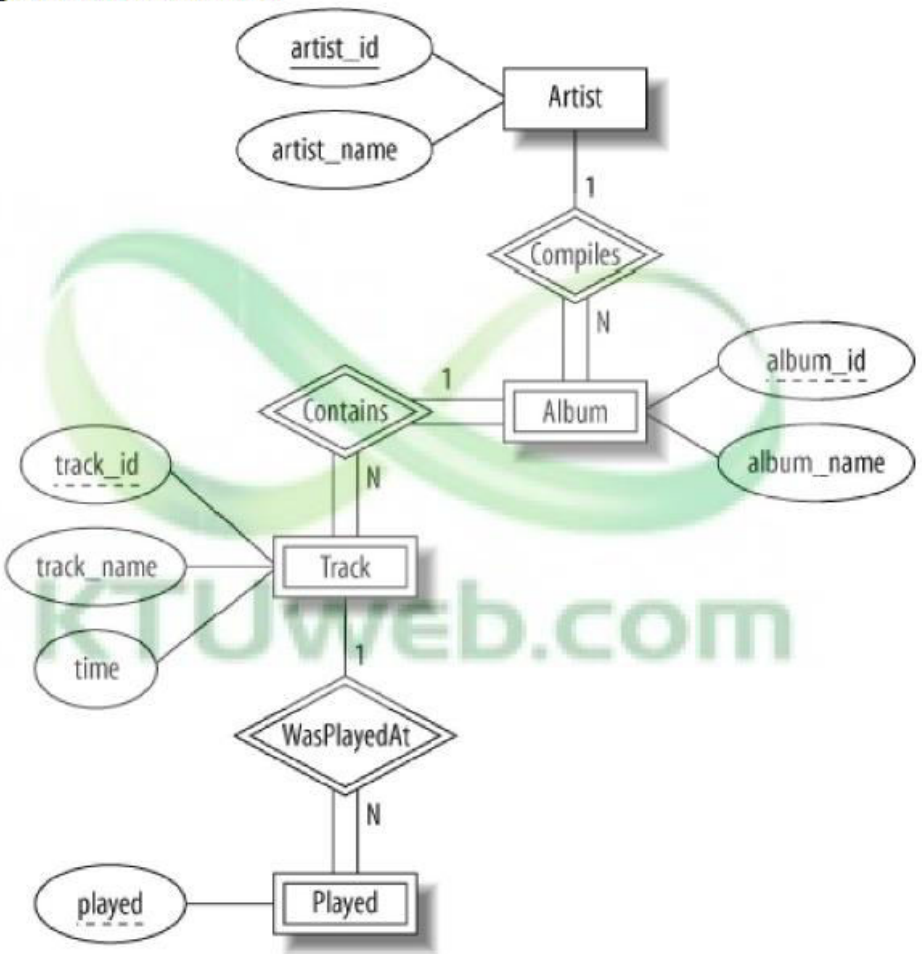
Vidya Bharathi Nagar , Mattoor, Kalady, Ernakulam, Kerala 683574

DEPARTMENT

ART A (MODULE II)				1*	2*	3*	4*
		<b>15 Marks Questions</b> <i>Each question can have maximum four sub division</i> <b>(Prepare maximum Questions possible, covering all areas of the modules assigned )</b>	Marks	Course Outcome	Knowledge Level	Theory(T)/ Problem(P)/ Design(D)	Difficulty Level (S/A/D/T)
1	(a)	When is the concept of a weak entity used in data modelling? Define the terms owner entity type, weak entity type, identifying relationship type, and partial key.	(5)	II	L2	T	A
	(b)	Explain the difference among Entity, Entity Type & Entity Set	(5)	II	L2	T	A
	(c)	What is meant by Referential Integrity?. How it is implemented using foreign key?. illustrate with example?	(5)	II	L2	T	A
2	(a)	Draw ER diagram of Company has the following description:  (a) Company has several departments. (b) Each department may have several Location. (c) Departments are identified by a name, D_no, Location. (d) A Manager control a particular department. (e) Each department is associated with number of projects. (f) Employees are identified by name, id, address, dob, date_of_joining. (g) An employee works in only one department but can work on several project. (h) We also keep track of number of hours worked by an employee on a single project. (i) Each employee has dependent	(15)	II	L3	T	D

		Dependent has D_name, Gender and relationship					
3	(a)	<p>A university registrar's office maintains data about the following entities:</p> <ul style="list-style-type: none"> <li>a) courses, including number, title, credits, syllabus, and pre-requisites;</li> <li>b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;</li> <li>c) students, including student-id, name, and program; and</li> <li>d) instructors, including identification number, name, department, and title.</li> </ul> <p>Further, the enrolment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modelled Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints.</p>	(15)	II	L3	T	D
4	(a)	<p>1. Distinguish between <b>total</b> and <b>partial</b> participation constraints with real world example</p> <p>2. Describe real world situation described by following ER diagram</p>  <p>Redraw above ER diagram replacing (Min, Max) notation with</p>	(5)	II	L2	T	A

		the conventional notation showing cardinality and participation.					
	(b)	1. In a relationship of degree 2, how can we decide if an attribute of the relationship can be moved to one of the entity set ?	( 5 )	II	L2	T	S
	(c)	1. Give an example of <i>multi-valued</i> , <i>composite</i> and <i>null</i> valued attribute?	( 5 )	II	L2	T	S
5	(a)	UPS prides itself on having update information on processing and current location of each shipped item. To do this, UPS relies on a company wide information system. Shipped items can be characterized by item number(unique),weight,dimensions,insuranceamount,destination and final delivery date.Shipped items are received into ups system at a single retail center. Retail Centers are characterized by their type, unique ID and address. Shipped items make their way to the destination via one or more standard UPS transportation events. These transportation events are characterized by unique schedule Number, type and delivery route. Model this scenario by identifying Entities, Attributes ,Primary Keys, Relationship and Cardinality	(15 )	II	L3	T	D

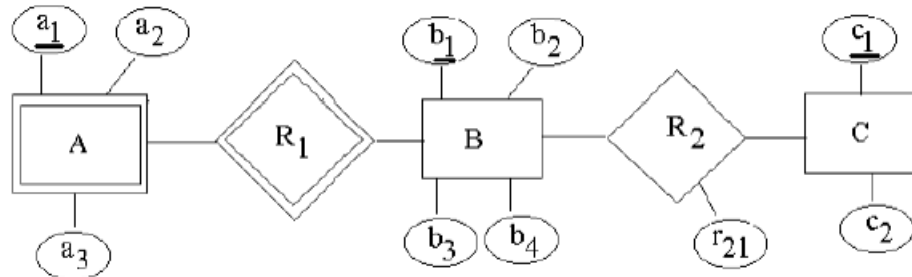
6	(a)	<p>Use the standard synthesis procedure to generate the set of relation corresponding to the ER diagram below. Identify primary and foreign key of the generated relations.</p> 	( )				
7	(a)	<p>What is meant by referential integrity How is it implemented using foreign key?</p>	( )				

Illustrate using a real example

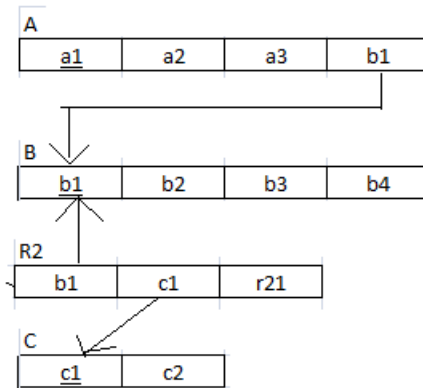
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(a)

Consider the following ER diagram. Using this ER diagram create a relational database (primary keys are underlined).



Soln:



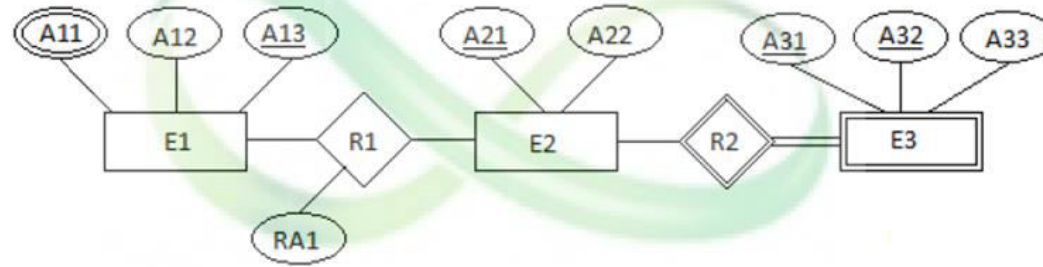
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9	(a)	<p>a) Use the standard synthesis procedure to generate the set of relations corresponding to the ER diagram below. Identify primary and foreign keys of the relations</p> <pre>graph TD     Airplane[Airplane] -- 1 -- Flies -- N --&gt; Flight[Flight]     Passenger[Passenger] -- 1 -- Books -- N --&gt; Booking[Booking]     Flight -- 1 -- HasBooking -- N --&gt; Booking</pre> <p>The ER diagram illustrates the following entities and their attributes:</p> <ul style="list-style-type: none"><li><b>Airplane</b>: ModelNumber, <u>RegistrationNumber</u> (primary key), Capacity.</li><li><b>Passenger</b>: GivenNames, Surname, <u>EmailAddress</u> (primary key).</li><li><b>Flight</b>: <u>FlightNumber</u> (primary key), From, To, DepartureDate, DepartureTime, ArrivalDate.</li><li><b>Booking</b>: (No attributes shown).</li></ul> <p>The relationships and cardinalities are:</p> <ul style="list-style-type: none"><li><b>Flies</b> (Airplane to Flight): 1 to N.</li><li><b>Books</b> (Passenger to Booking): 1 to N.</li><li><b>HasBooking</b> (Flight to Booking): 1 to N.</li></ul>	( )				
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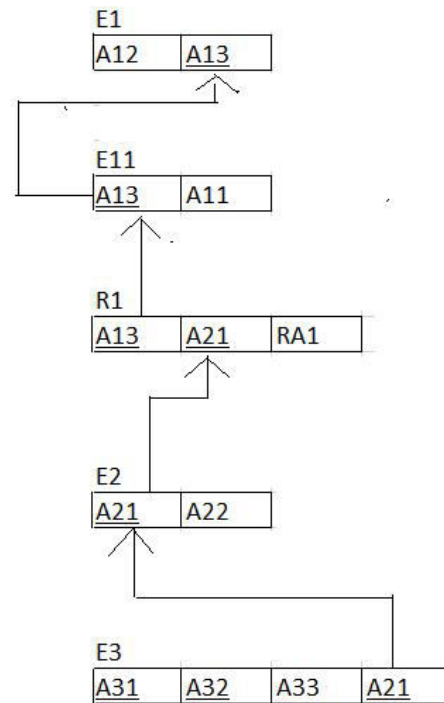
10	(a)	<p>Covert the following ER Model to Relational Model</p> <pre> graph LR     Student[Student] -- "EnrollsIn (N:1)" --- Program[Program]     Student -- "Attempts (N:M)" --- Attempts{Attempts}     Program -- "Contains (1:N)" --- Course[Course]          subgraph Student_Attributes         GN([GivenNames])         S([Surname])         SID([Student_ID])         DOB([Date_of_Birth])         YE([YearEnrolled])     end     Student --- GN     Student --- S     Student --- SID     Student --- DOB     Student --- YE          subgraph Program_Attributes         PName([Name])         PID([program_id])         CP1([CreditPoints])         YC1([YearCommenced])     end     Program --- PName     Program --- PID     Program --- CP1     Program --- YC1          subgraph Course_Attributes         CName([Name])         CID([course_id])         CP2([CreditPoints])         YC2([YearCommenced])     end     Course --- CName     Course --- CID     Course --- CP2     Course --- YC2          subgraph Attempts_Attributes         Y([Year])         S([Semester])         M([Mark])         G([Grade])     end     Attempts --- Y     Attempts --- S     Attempts --- M     Attempts --- G   </pre>	( )				
11		What is entity integrity constraint? Why is it important?	( )				



Using the following ER diagram, create a relation database. Give your assumptions.



Soln:



13		<p>The relational schema for a library describing members, books and issue information is given below. Foreign keys have the same name as primary keys.</p> <p>BOOKS(<u>ACC-NO</u>, ISBN, TITLE, EDITION, YEAR)</p> <p>MEMBERS(<u>MEMBERID</u>, MEMBERNAME, MEMBERTYPE)</p> <p>ISSUEDTO(<u>ACC-NO</u>, <u>MEMBERID</u>, DATE OF ISSUE)</p> <p>Write relational algebra expressions for the following queries:</p> <p>a) Accession Number(s) and Name(s) of third edition books published in 2018. (2)</p> <p>b) Names and dates of issue of books taken by a member with name 'PRIYA'. (3)</p> <p>c) Names of books <i>not</i> taken by any member. (4)</p>					
14		<p>Consider the following database with primary keys underlined</p> <p>Suppliers ( <u>sid</u>, <u>sname</u>, address)</p> <p>Parts ( <u>pid</u>, <u>pname</u>, <u>color</u>)</p> <p>Catalog ( <u>sid</u>, <u>pid</u>, cost)</p> <p><u>sid</u> is the key for Suppliers, <u>pid</u> is the key for Parts, and <u>sid</u> and <u>pid</u> together form the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers.</p> <p>Write relational algebra for the following queries: -</p> <p>i) Find then names of suppliers who supply some red part</p> <p>ii) Find the <u>sid</u>'s of suppliers who supply some red or green part</p> <p>iii) Find the <u>sid</u>'s of suppliers who supply some red part and some green part.</p>					

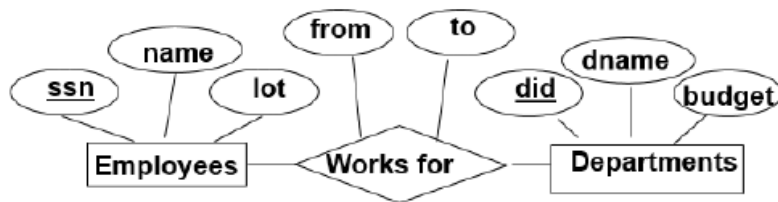
15	<p>The relational database schema below represents certain information about albums, songs in the albums and singers of those songs. Foreign keys are given the <i>same</i> name as primary keys for easy identification. (9)</p> <p>ALBUMS(<u>ALBUM#</u>, ALBUM-NAME, PRODUCED-BY, YEAR)</p> <p>SONGS(<u>SONG#</u>, SONG-START, DURATION, ALBUM#)</p> <p>SUNGBY(<u>ARITISTNAME</u>, SONG#)</p> <p>In the context of the schema, write relational algebra expressions for the following queries:</p> <p>(a) Names of albums produced by 'HVM' in the year 2018. (b) Names of albums in which an artist with name, 'AVANTHIKA' sung. (c) Names of albums in which <i>all</i> the artists have sung songs.</p>						
16	<p>Consider the schema given below.</p> <p><u>employee</u> (person-name, street, city)</p> <p><u>works</u> (person-name, company-name, salary)</p> <p><u>company</u> (company-name, city)</p> <p><u>manages</u> (person-name, manager-name)</p> <p>Write relational algebra queries for the following questions</p> <p>a. Find the names and cities of residence of all employees who work for First Bank Corporation.</p> <p>b. Find the names, street address, and cities of residence of all employees who <u>work</u> for First Bank Corporation and earn more than \$10,000 per annum.</p> <p>c. Find the names of all employees in this database who live in the same city as the <u>company</u> for which they work.</p>						
17	<p>a) With the help of an example, compare DML and DDL. (4)</p> <p>b) What are logical data independence and physical data independence? What is the difference between them? Which of these harder to realize? Why?</p>						

18		<p>Design an ER diagram to represent the following scenario: A company has many employees working on a project. An employee can be part of one or more projects. Each employee works on a project for certain amount of time. Assume suitable attributes for entities and relations. Mark the primary key(s) and the cardinality ratio of the relations.</p>						
19		<p>Consider the following relations for a database that keeps track of business trips of salespersons in a sales office: SALESPERSON(Ssn, Name, StartYear, DeptNo) TRIP(Ssn, FromCity, ToCity, DepartureDate, ReturnDate, TripId) EXPENSE(TripId, AccountNo, Amount)</p> <p>a) A trip can be charged to one or more accounts. Specify the foreign keys for this schema, stating any assumptions you make. b) Write relation algebra expression to get the details of salespersons who have travelled between Mumbai and Delhi and the travel expense is greater than Rs. 50000 c) Write relation algebra expression to get the details of salesperson who had incurred the greatest travel expenses among all travels made.</p>						
20		<p>Design an ER diagram for the given scenario; Suppose that you are designing a schema to record information about reality shows on TV. Your database needs to record the following information:</p>						

		<p>_ For each reality show, its name, genre, basic_info and participants name. Any reality show has at least two or more participants- For each producer, the company name, company country..</p> <p>- For each producer, the company name, company country. A show is produced by exactly one producer. And one producer produces exactly one show.</p> <p>- For each television, its name, start year, head office. A television may broadcasts multiple shows. Each show is broadcasted by exactly one television.</p> <p>-For each user, his/her username, password, and age. A user may rate multiple shows, and a show may be rated by multiple users. Each rating has a score of 0 to 10.</p>						
21		Covert the following ER Model to Relational Model						

		<p>The ER diagram illustrates the following entities and their attributes:</p> <ul style="list-style-type: none"><li><b>Student</b> (Entity): GivenNames, Surname, <u>Student_ID</u>, Date_of_Birth, YearEnrolled.</li><li><b>Program</b> (Entity): Name, <u>program_id</u>, CreditPoints, YearCommenced.</li><li><b>Attempts</b> (Entity): <u>Year</u>, <u>Semester</u>, Mark, Grade.</li><li><b>Course</b> (Entity): Name, <u>course_id</u>, CreditPoints, YearCommenced.</li></ul> <p>Relationships and Cardinalities:</p> <ul style="list-style-type: none"><li><b>EnrollsIn</b> (Relationship between Student and Program): N to 1.</li><li><b>Attempts</b> (Relationship between Student and Course): N to M.</li><li><b>Contains</b> (Relationship between Program and Course): 1 to N.</li></ul>						
21	a	Differentiate Natural join, Equi-join and Left outer join						
	b	<p>Consider the schema given below.</p> <p>employee (person-name, street, city)</p> <p>works (person-name, company-name, salary)</p> <p>company (company-name, city)</p> <p>manages (person-name, manager-name)</p> <p>Write relational algebra queries for the following questions</p> <p>a. Find the names and cities of residence of all employees who work for First Bank Corporation.</p> <p>b. Find the names, street address, and cities of residence of all employees who work for First Bank Corporation and earn more</p>						

		than \$10,000 per annum. c. Find the names of all employees in this database who live in the same city as the company for which they work.						
22		How a weak entity in an ER diagram is mapped to relational model. Give example						
23		Define primary key, candidate key and super key.						
24		<p>Consider a movie database in which data is recorded about the movie industry. The data requirements are summarized as follows:</p> <ul style="list-style-type: none"><li>• Each movie is identified by title and year of release. Each movie has a length in minutes. Each has a production company and each is classified under one or more genres (such as horror, action, drama...). Each movie has one or more directors and one or more actors appear in it. Each movie also has a plot outline. Finally, each movie has zero or more quotable quotes, each of which is spoken by a particular actor appearing in the movie.</li><li>• Actors are identified by name and date of birth and appear in one or more movies. Each actor has a role in the movie.</li><li>• Directors are also identified by name and date of birth and direct one or more movies. It is possible for a director to act in a movie.</li><li>• Production companies are identified by name and each has an address. A production company produces one or more movies.</li></ul>						

		Design an entity relationship diagram for the movie database. Specify key attributes of each entity type and constraints on each relationship type.						
25		How structured, semi structured and unstructured data vary in its storage and manipulation. Give proper examples for each type						
26		What is the difference between DDL and DML? Discuss any TWO DDL and any TWO DML commands in SQL						
27		<p>Given the ER schema for employee works for department. Suppose an employee will work for some department for two or more periods. How can you re-design the schema in a better way?</p> 						
28		Consider the a relation R(A,B,C,D) where A is a key of R. Write any three relational algebra expressions equivalent to $\Pi_{A,B} (\sigma_{A = 2 \text{ and } B=3} (R))$						
29		What is the role of views in SQL, and how can they be used to simplify database management and querying?						



30		What is the UPDATE operation in SQL, and how is it used to modify existing data in a table?						
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