COMP-306 HW-1

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1-)

Part-A:

CREATE TABLE Vehicle (Model: VARCHAR(15), Vin: VARCHAR(30), Price: INTEGER, Sales_id: INTEGER, Ssn: INTEGER, PRIMARY KEY (Vin), FOREIGN KEY Sales_id REFERENCES Salesperson, FOREIGN KEY Ssn REFERENCES Customer, sales_Date: VARCHAR(20));

CREATE TABLE Car (Vin: VARCHAR(30), Engine_size: VARCHAR(15), PRIMARY KEY (Vin), FOREIGN KEY Vin REFERENCES Vehicle);

CREATE TABLE Truck (Vin: VARCHAR(30), Tonnage: INTEGER, PRIMARY KEY (Vin), FOREIGN KEY Vin REFERENCES Vehicle);

CREATE TABLE Suv (Vin: VARCHAR(30), No_seats: INTEGER, PRIMARY KEY (Vin), FOREIGN KEY Vin REFERENCES Vehicle);

CREATE TABLE Salesperson (Sid: INTEGER, Name: VARCHAR(30), PRIMARY KEY (Sid));

CREATE TABLE Customer (Ssn: INTEGER, Cust_Name: VARCHAR(30), City: VARCHAR(20), State: VARCHAR(20), Street: VARCHAR(20), PRIMARY KEY (Ssn));

Part-B:

CREATE TABLE Book (ISBN: INTEGER, book_Title: VARCHAR(20), book_Price: INTEGER, front_Cover_Type: VARCHAR(25), number_Of_Pages: INTEGER, book_Payment_Method: VARCHAR(15), book_Purchase_Date: VARCHAR(30), book_Borrow_Date: VARCHAR(30), book_Return_Date: VARCHAR(30), Id: INTEGER, PRIMARY KEY (ISBN), FOREIGN KEY Id REFERENCES Customer);

CREATE TABLE Customer (Id: INTEGER, name: VARCHAR(20), PRIMARY KEY (Id));

CREATE TABLE Registered_Customer(Id: INTEGER, Reg_date: VARCHAR(15), PRIMARY KEY(Id), FOREIGN KEY Id REFERENCES Customer);

CREATE TABLE Visiting_Customer (Id: INTEGER, phone_Number: INTEGER, Address: VARCHAR(60), PRIMARY KEY(Id), FOREIGN KEY Id REFERENCES Customer);

CREATE TABLE Customer_Email_Addresses (Id: VARCHAR(20), E-mail Address: VARCHAR(25), PRIMARY KEY (Id, E-mail Address), FOREIGN KEY Id REFERENCES Customer);

CREATE TABLE Author (author_ID: INTEGER, author_Name: INTEGER, PRIMARY KEY(author_ID));

CREATE TABLE WrittenBy (author_ID: INTEGER, ISBN: INTEGER, FOREIGN KEY author_ID REFERENCES Author, FOREIGN KEY ISBN REFERENCES Book, PRIMARY KEY(author_ID,ISBN));

Part-A & Part-B General Explanation:

For each subclass; to the primary key part which is inside the Create Table statement of the subclass, I have written the primary key of the superclass. Next, to the Create Table statement of each subclass, I have added the simple attributes of each subclass. Additionally, to the "Create Table" statement belonging to a subclass, I have added a foreign key same as the primary key of the superclass. Furthermore, as the primary key of each subclass, I have utilized the primary key of the superclass. When there exists an "n to 1 relation" between two entities, the simple attributes of the relation between these entities are added to the attributes of the Create Table statement for the "N-side". In addition to that, each primary key of the "1-side" of the "N to 1 relations" is contained as a foreign key in the Create Table statement of the "N-side." For the "M to N relations", I have created a new relation between "M-Side", and "N-Side". For this new relation, I have also created a seperate "Create Table" statement. As the primary key of this new relation, I have added the combination of the primary key of "N-side", and the primary key of the "M-side" to the Create Table statement of the new relation. As the foreign keys of this new relation, I have added the primary key of "N-side", and the primary key of the "M-side". For each of the multivalued attributes, I have created a seperate "Create Table Statement". To the place of the primary key in the Create Table statement of a multivalued attribute, I have written the foreign key (Here, the foreign key is the primary key of the related entity) together with the multivalued attribute. If I encountered with composite attribute, I have not dealt with the composite attribute itself but with the components of the composite attribute.

2-)

NOTE: For the answers of the second question, please see the seperately attached pdf files ("Q2, E-G-H.pdf" and "Q2, A-B-C-D-F.pdf").

NOTE-2: For all of the asked queries, at the last step of constructing the asked query, we should project onto (we should do this projection by using pi symbol in relational algebra) the features which are supposed to be retrieved.

a-) In order to find the desired query, we should subtract the employee set who born before 01/01/1990 and who works in the "Sales" department from the all employee set working in the "Sales" department.

d-) We should subtract the employees working on at least one project from the set of all employees.