COMPSCI 751 S1 C – Assignment 1

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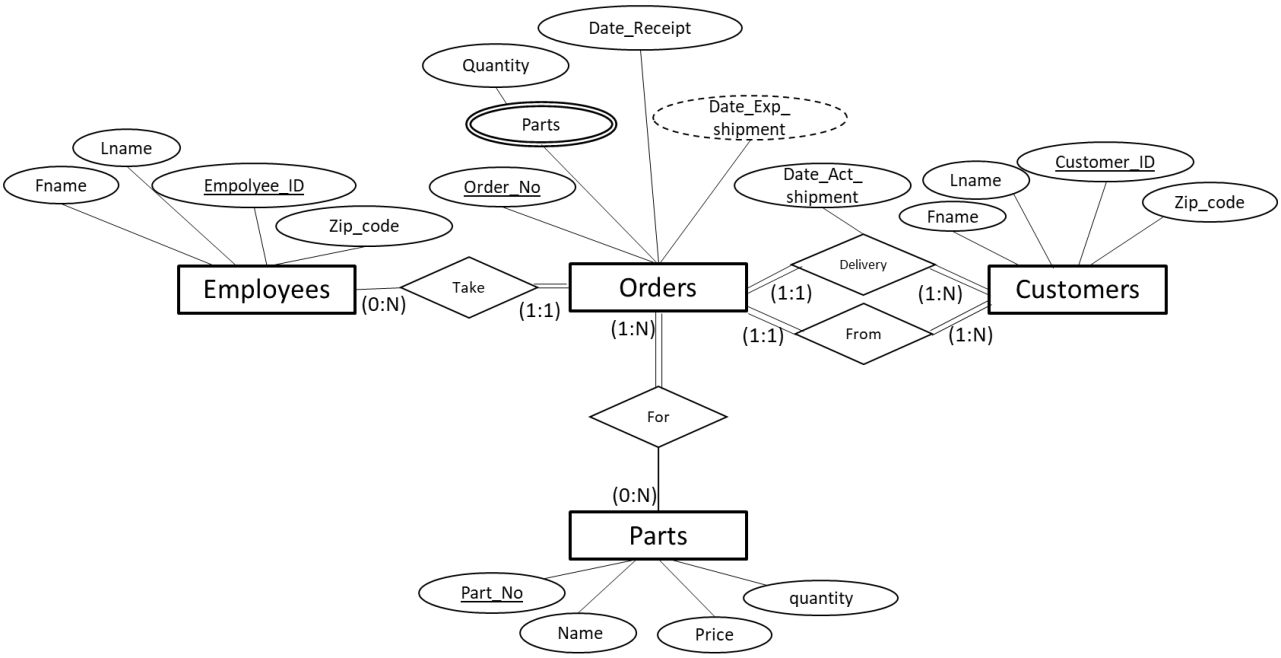
Q1. A Mail Order data model



In this mail order data model, we have,

1, **4 entities**, employees, orders, customers and parts;

2, **4 relationships** in this model, except employees take orders, orders from customers and orders for parts, one additional relationship – orders deliver to customers is included to specify actual delivery date(Date_Act_shipment);

3, **5 total participation relationships** (existence dependence), between Take and Orders (one order was taken by one employee), Orders and Delivery (one order is for one delivery), Delivery and Customers (one customer gets at least one delivery), Orders and From (one order from one customer), From and Customers (one customer can have at least one order);

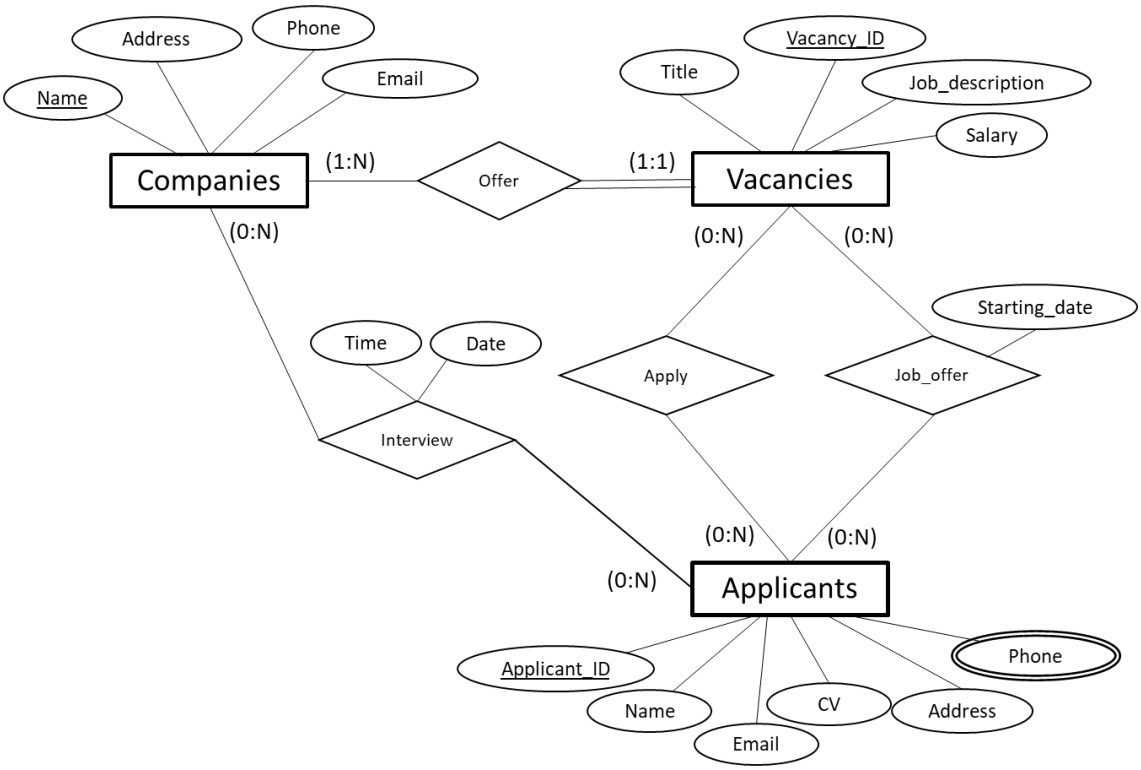
4, **primary keys**, Employee_ID, Order_No, Customer_ID and Part_No;

5, **two multi-valued attribute** - parts in orders, with its composite attribute – quantity and **one derived attribute** – Date_Exp_shipment(expected date of shipment) which can be derived from date of receipt plus certain days;

6, **assumptions**:

- Not all employees need to take order and it can have as many as possible to take orders, but only one order can be handled by only one person.
- One order is from one specific customer, therefore for one specific delivery.

Q2. A Recruitment System data model



In this recruitment system data model, we have,

1, **three entities**, companies, vacancies and applicants;

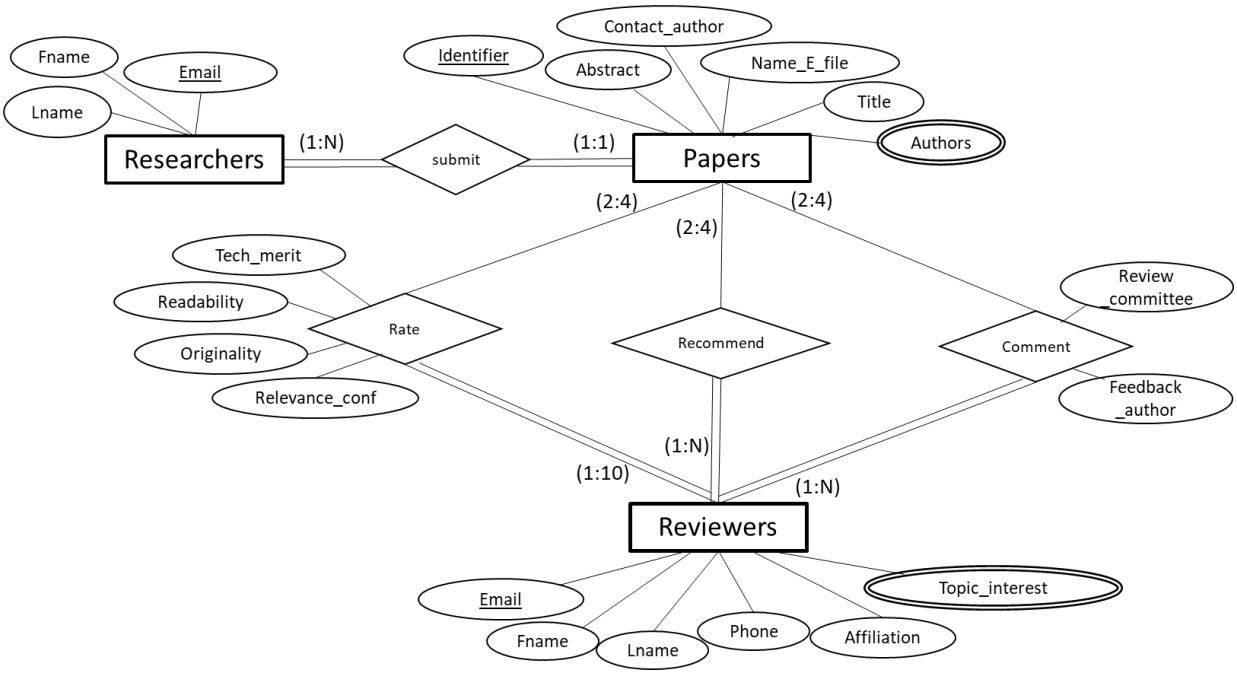
2, **4 relationships** in this model, among which relationship interview and job offer have attributes;

3, **one existence dependence** of relationship between offer and vacancies;

4, applicants' contact phone number assumed to be **multivalued attribute** (home and mobile);

5, **assumed** that company can interview / offer jobs to 0 to N candidates, and candidate may have 0-N job offers (a super talent person can get multiple job offers) and interviews. Applicants can apply 0 – N positions and not all positions would have people to apply in case it requires very specific skills.

Q3. A Conference Review data model



This CONFERENCE_REVIEW ER diagram contains:

1, **three entities**, Researchers who submitted research papers, Papers and Reviewers;

2, **three key attributes**: Email of researchers, Identifier of papers and Email of reviewers;

3, **two multivalued attributes**: Authors of papers and Topic_interest of Reviewers;

4, **two relationships with attributes**, Rate and Comment;

5, **five relationships of existence dependence**:

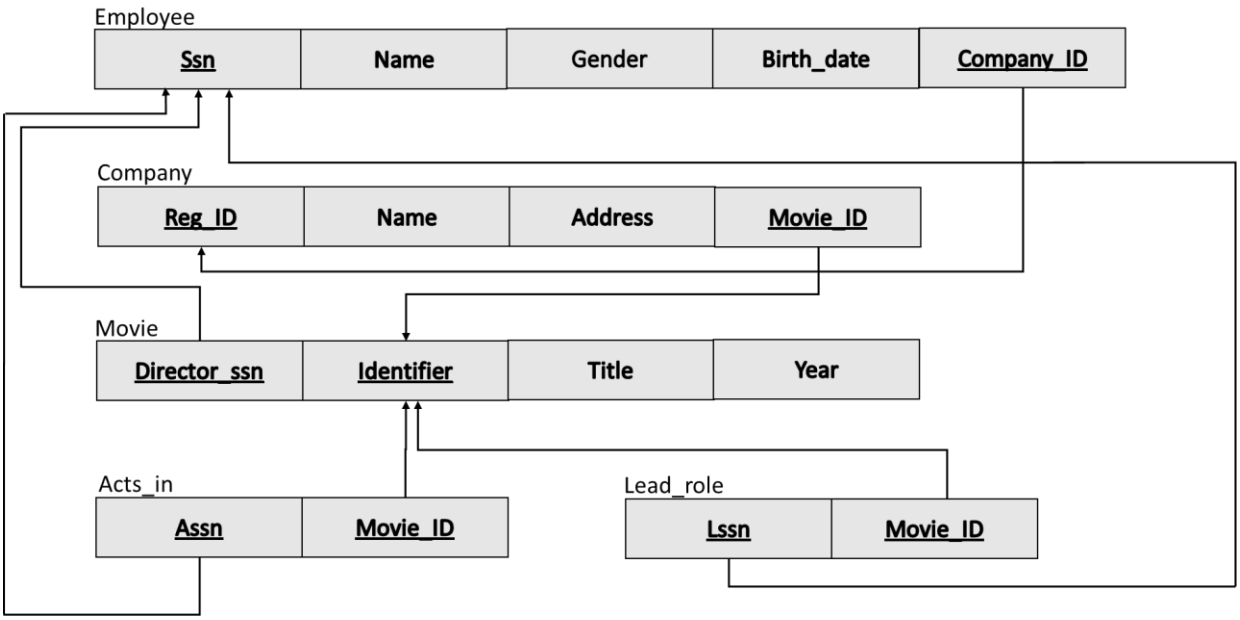
- One researcher needs to submit at least 1 paper up to N papers, otherwise he/she would not be recorded in system;
- One paper needs to be submitted by one researcher;
- One reviewer rates / recommends / comments at least one paper, otherwise he/she would not be recorded in system;

6, **assumptions**:

One paper can only be submitted by one researcher (The revised same paper resubmitted by another researcher is not included in our case). One reviewer can review 1-N papers but only rate paper from 1-10.

Q4. Converting ER diagram into Relational Data Model

Movie relational database shema:



1, **The primary keys** are SSN of empolyees, Registration ID of companies. The primary key of Acts_in relationship is the combination of two foreign keys Assn and Movie_ID, the same for Lead_role relationship, Lssn + Movie_ID. The primary key of weak entity Movie is the combination of director_ssn (foreign key) and Identifier.

2, There are **7 foreign keys** as denoted in diagram, Company_ID in Employee, Movie_ID in Company, Director_ssn in Movie, Assn and Movie_ID in Acts_in, Lssn and Movie_ID in Lead_role.

3, **Transformation steps**:

- (1) mapping all attributes in regular entities

Employee

Ssn	Name	Gender	Birth_date

Company

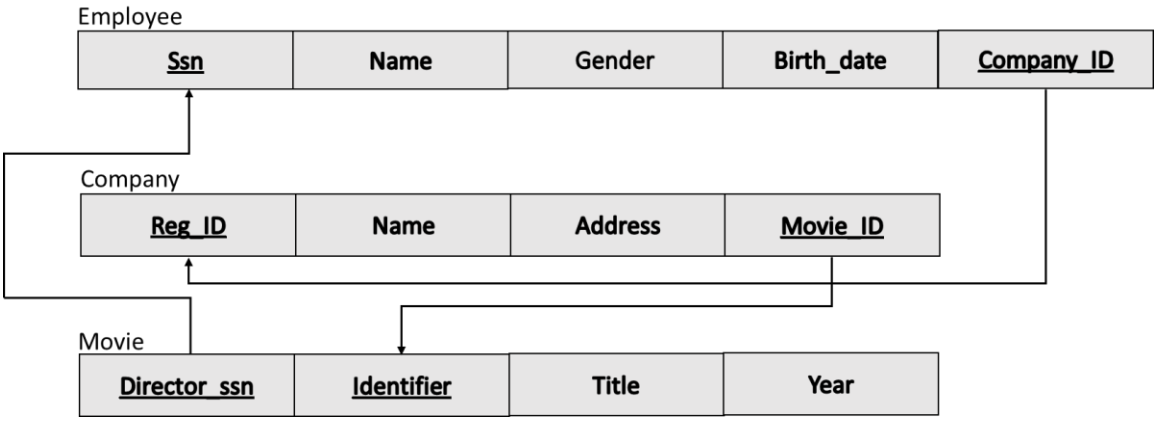
Reg_ID	Name	Address

- (2) mapping weak entity attributes

Movie

Director_ssn	Identifier	Title	Year

- (3) mapping of Binary 1:1 Relation Types (none)
- (4) mapping of Binary 1:N Relationship Types



- (5) mapping of Binary M:N Relationship

Acts_in

Assn	Movie_ID

Lead_role

Lssn	Movie_ID

- (6) mapping of Multivalued attributes. (none)
- (7) napping of N-ary Relationship Types (none)