

1.

Doc-EmpID	Doc-fname	Doc-Lname	Doc-Cell Phone
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DOCTOR (Doc-EmpID, Doc-fname, Doc-Lname, Doc-CellPhone)

App-Num	Doc-EmpID	Pat-ID	App-Date	App-Time	App-Status
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APPOINTMENT (App-Num, Doc-EmpID, Pat-ID, App-Date, App-Time, App-Status)

Pat-ID	Pat-Lname	Pat-fname	Pat-Phone	Pat-Street	Pat-City	Pat-State	Pat-Zip
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PATIENT (Pat-ID, Pat-Lname, Pat-fname, Pat-Phone, Pat-Street, Pat-City, Pat-State, Pat-Zip)

2. (a) Relational Schema:

MEMBER (MEMBER\_NUM, INVITE\_NUM, DINNER\_CODE, ENTRÉE\_CODE, DESERT\_CODE, MEMBER\_NAME, MEMBER\_ADDRESS, MEMBER\_CITY, MEMBER\_ZIPCODE, INVITE\_DATE, ACCEPT\_DATE, DINNER\_DATE, DINNER\_ATTENDED, DINNER\_DESCRIPTION, ENTRÉE\_DESCRIPTION, DESERT\_DESCRIPTION)



The composite primary key for this table is :-

MEMBER\_NUM, INVITE\_NUM, DINNER\_CODE, ENTRÉE\_CODE and DESERT\_CODE.

There are two types of dependancies occur in this table :-

### Partial Dependancy

If the table contains composite primary key, then each column of the table that is not the part of the primary key must depend upon the entire composite key for its existence. Partial Dependancy for the above table is given below:-

- In above table MEMBER\_NAME, MEMBER\_ADDRESS, MEMBER\_CITY, MEMBER\_ZIPCODE is partially dependant on MEMBER\_NUM.
- INVITE\_DATE, ACCEPT\_DATE is partially dependant on INVITE\_NUM.
- DINNER\_DATE, DINNER\_ATTENDED, DINNER\_DESCRIPTION is partially dependant on DINNER\_CODE.
- ENTRÉE\_DESCRIPTION is partially dependant on ENTRÉE\_CODE.
- DESERT\_DESCRIPTION is partially dependant on DESERT\_CODE.

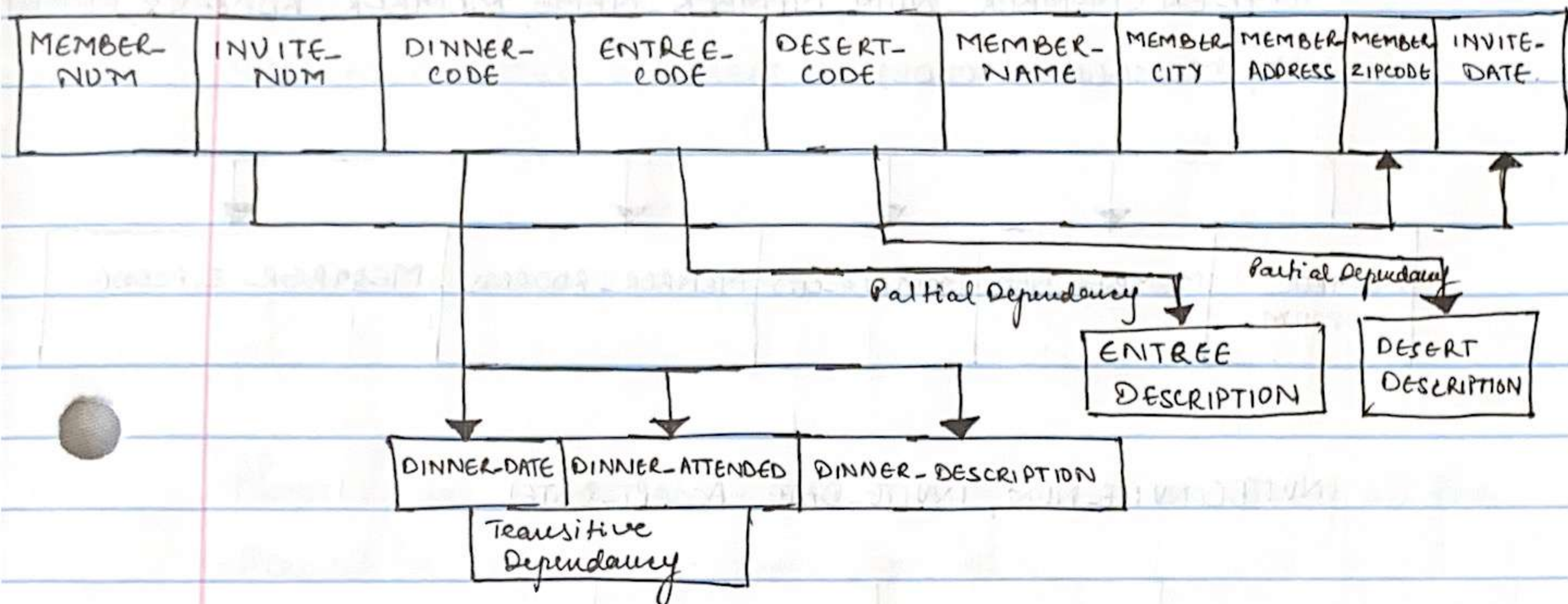
### Transitive Dependancy

A transitive Dependancy is the functional dependancy of one



non-prime attribute on another non prime attribute, which occur in the relation having three or more attributes.

DINNER ATTENDED has transitive dependancy on the DINNER-DATE.



Above figure shows all the dependancies as marked along the relationship schema.

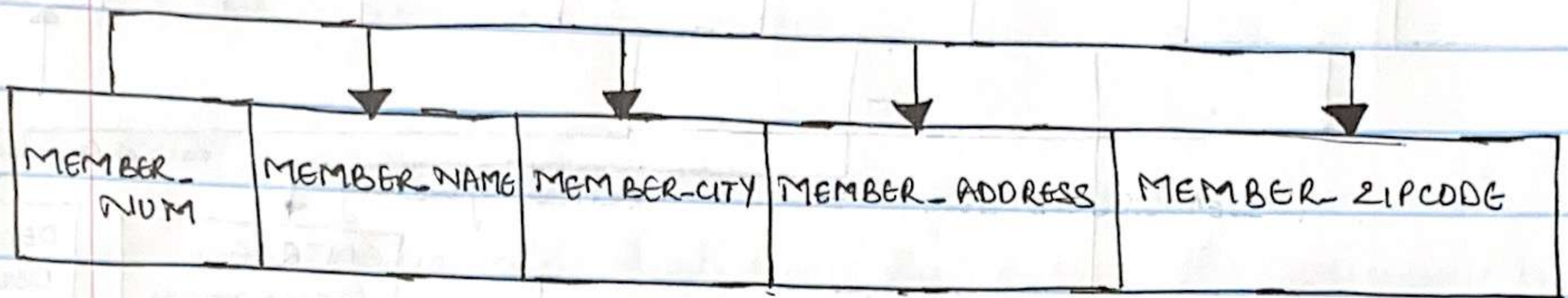
(b) 1NF:- A table is 1NF if each column in the table contains the unique value. The normal form used in the (a) is 1NF because each column contains unique value, which satisfies rule of 1NF.

2NF:- If a table is in 1NF and there must not be any partial dependancy of any column on the primary key then a table is in 2NF.

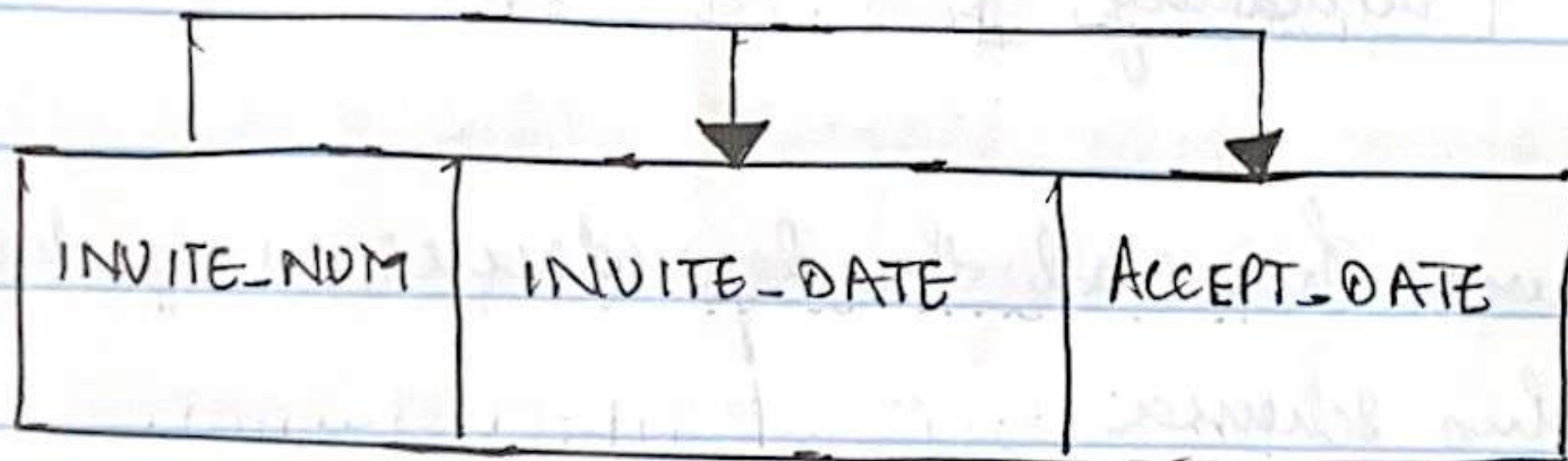


- The given table is not in 2NF because some columns are partially dependant on the primary key.
- Now to convert table into 2NF, create separate tables to remove partial dependancy.

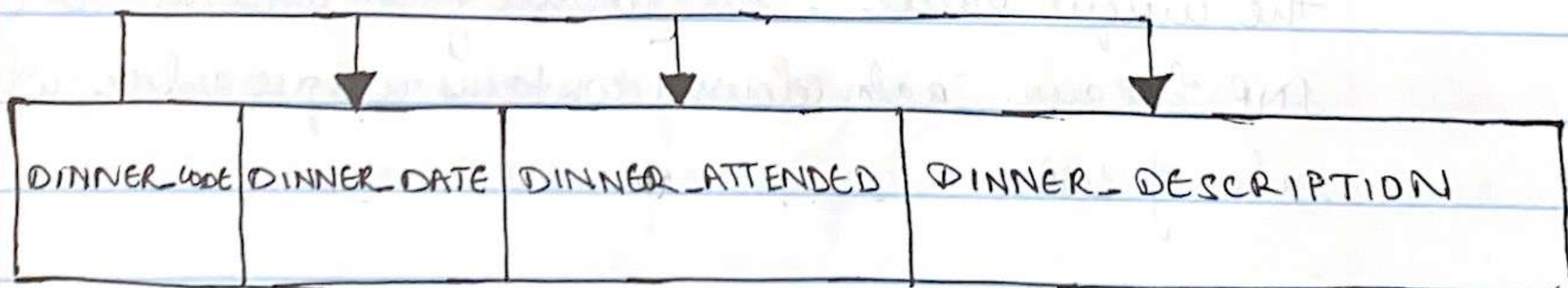
MEMBER (MEMBER\_NUM, MEMBER\_NAME, MEMBER\_ADDRESS, MEMBER\_CITY, MEMBER\_ZIPCODE)



INVITE (INVITE\_NUM, INVITE\_DATE, ACCEPT\_DATE)

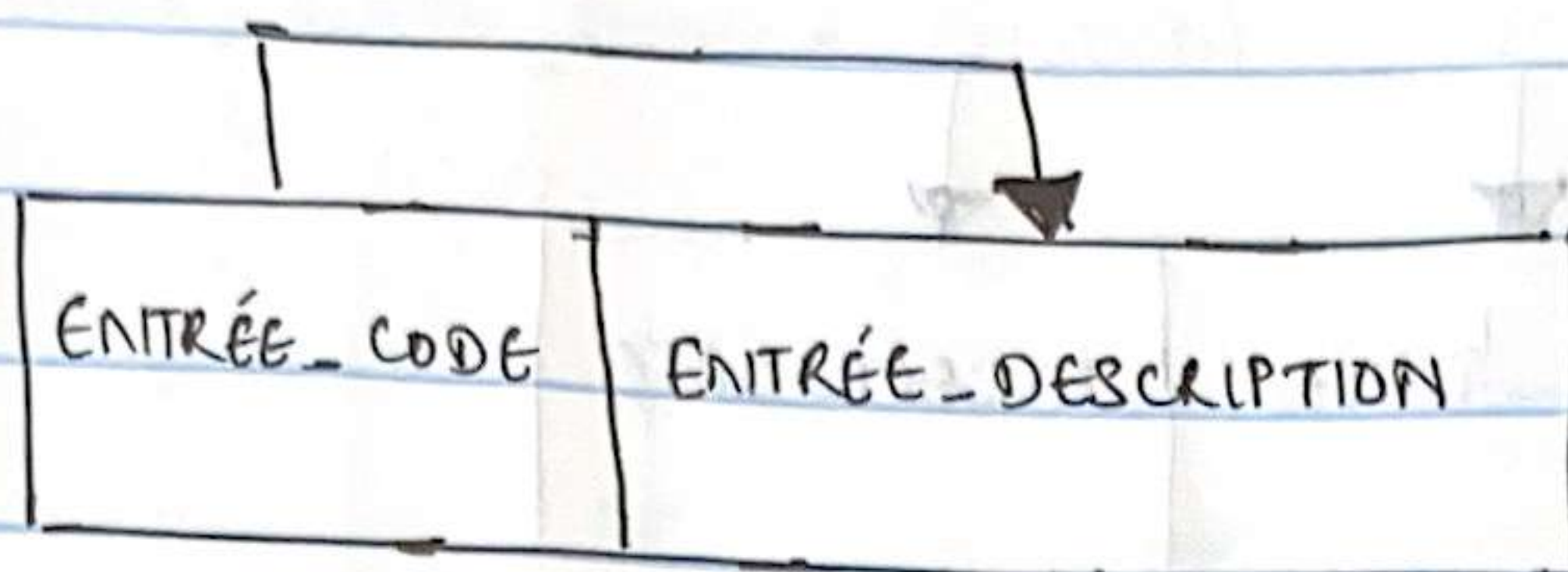


DINNER (DINNER\_CODE, DINNER\_DATE, DINNER\_ATTENDED, DINNER\_DESCRIPTION)

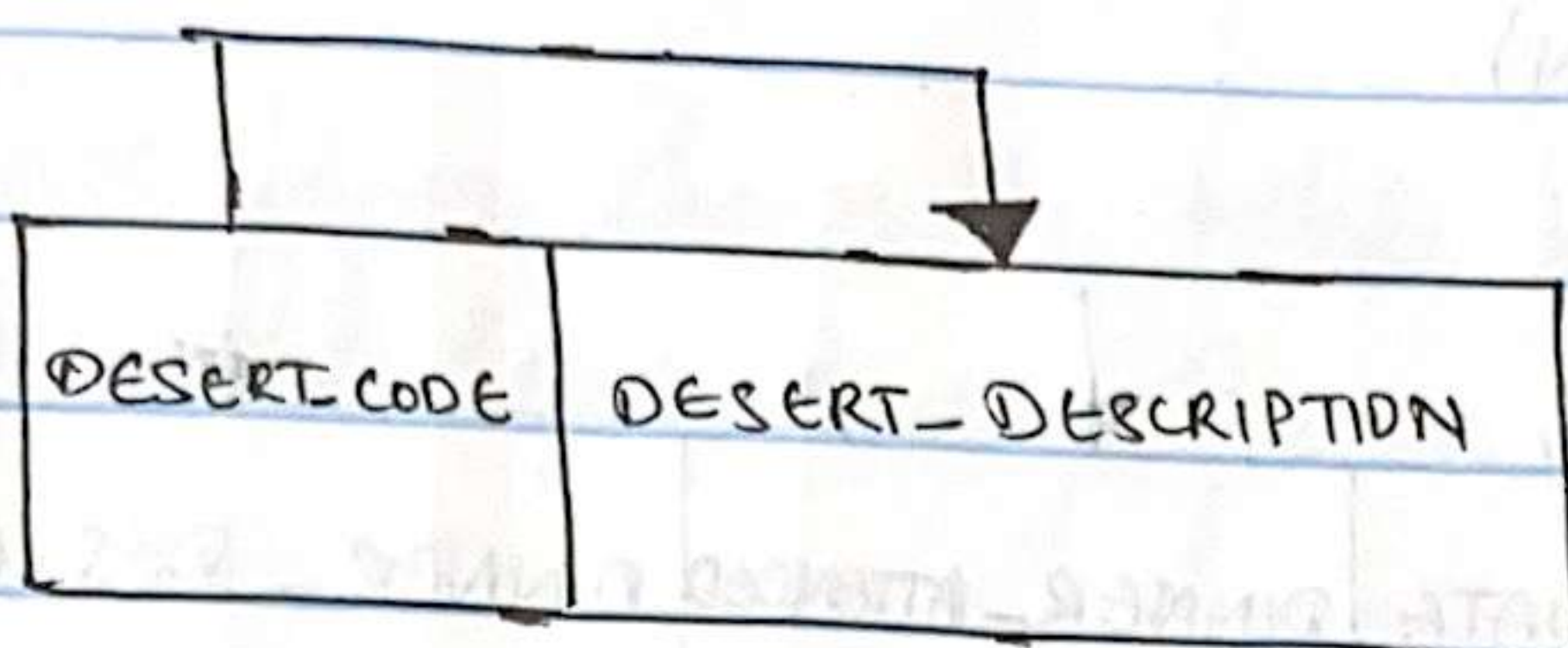




ENTRÉE (ENTRÉE\_CODE, ENTRÉE\_DESCRIPTION)



DÉSERT (DÉSERT\_CODE, DÉSERT\_DESCRIPTION)

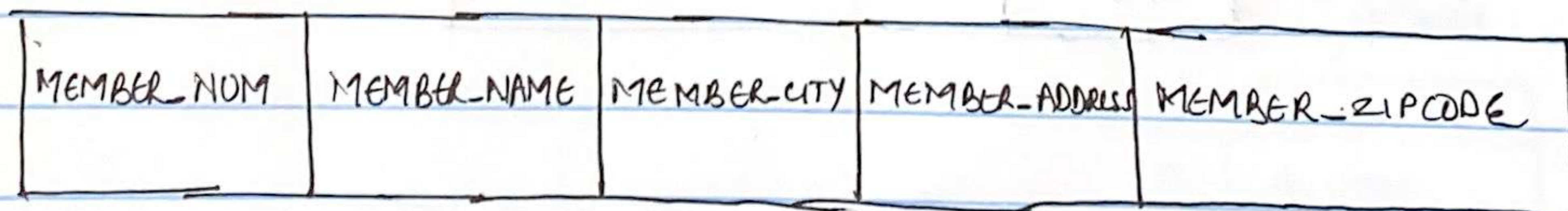


Above figure shows the table in 3NF form removing all the transitive dependency from the table.

3NF: If a table is in 2NF and every non-primary attribute of a table which is dependant on the primary key, then the table is in 3NF.

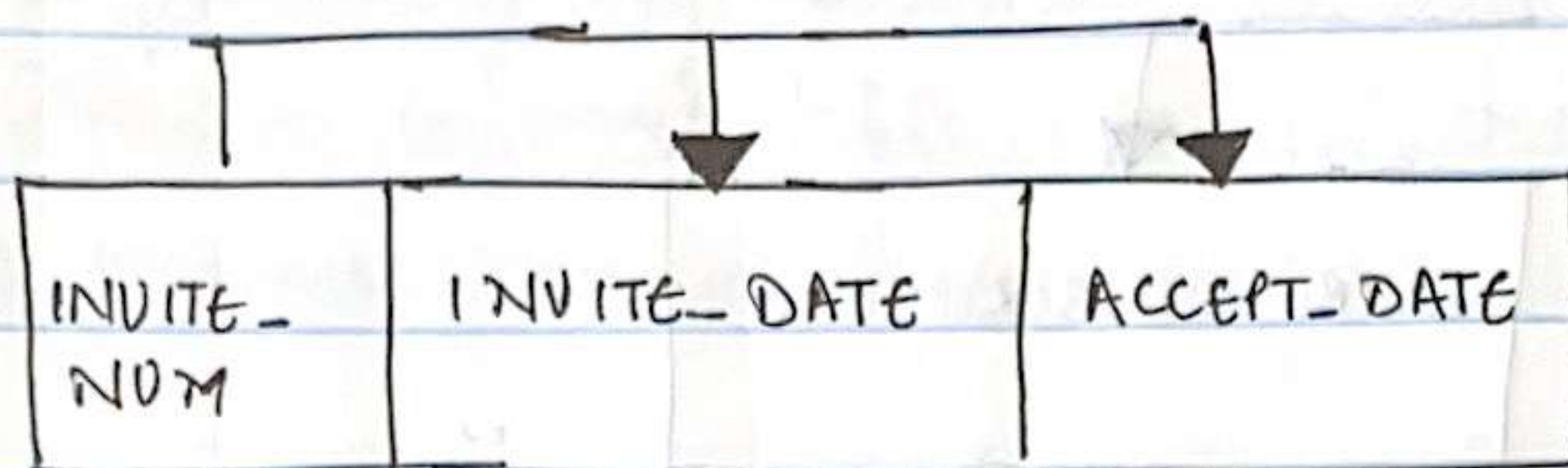
- DINNER-ATTENDED is dependant on DINNER-DATE

MEMBER (MEMBER\_NUM, MEMBER\_NAME, MEMBER\_ADDRESS, MEMBER\_CITY, MEMBER\_ZIPCODE)

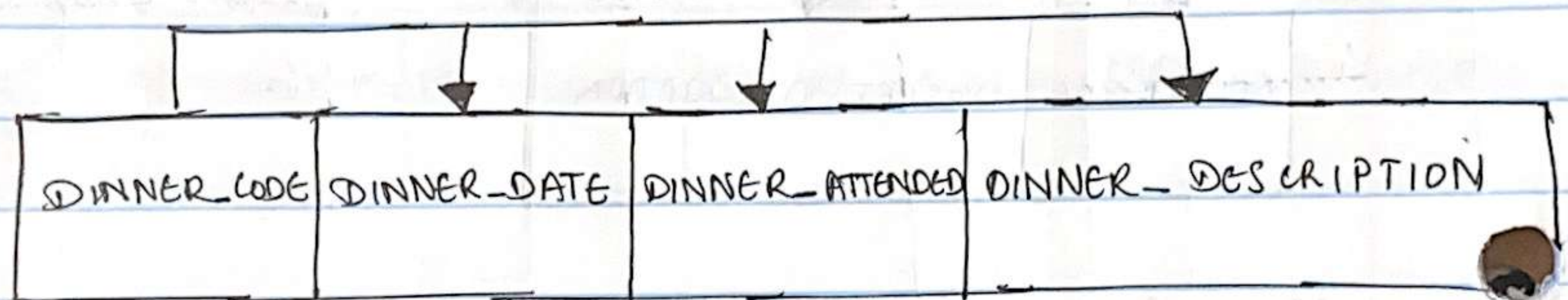




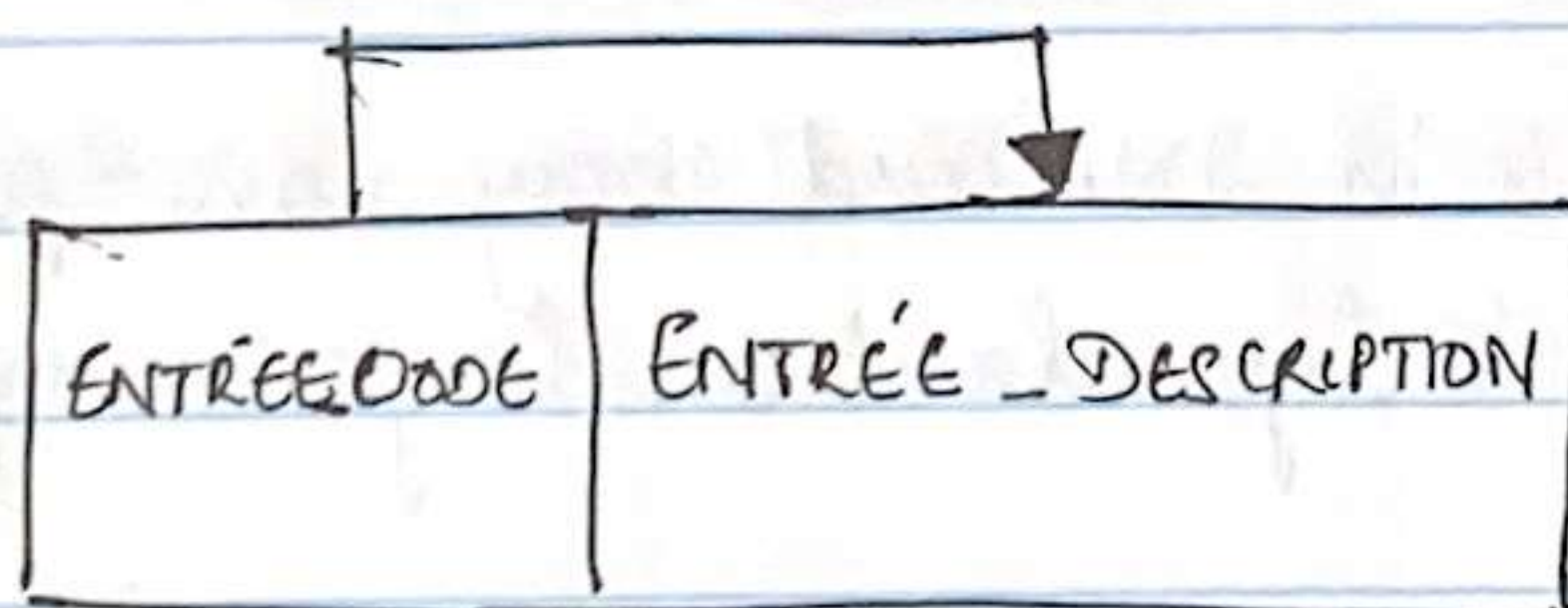
INVITE (INVITE-NOM, INVITE-DATE, ACCEPT-DATE)



DINNER (DINNER-CODE, DINNER-DATE, DINNER-ATTENDED, DINNER-DESCRIPTION)



ENTRÉE (ENTRÉE-CODE, ENTRÉE-DESCRIPTION)

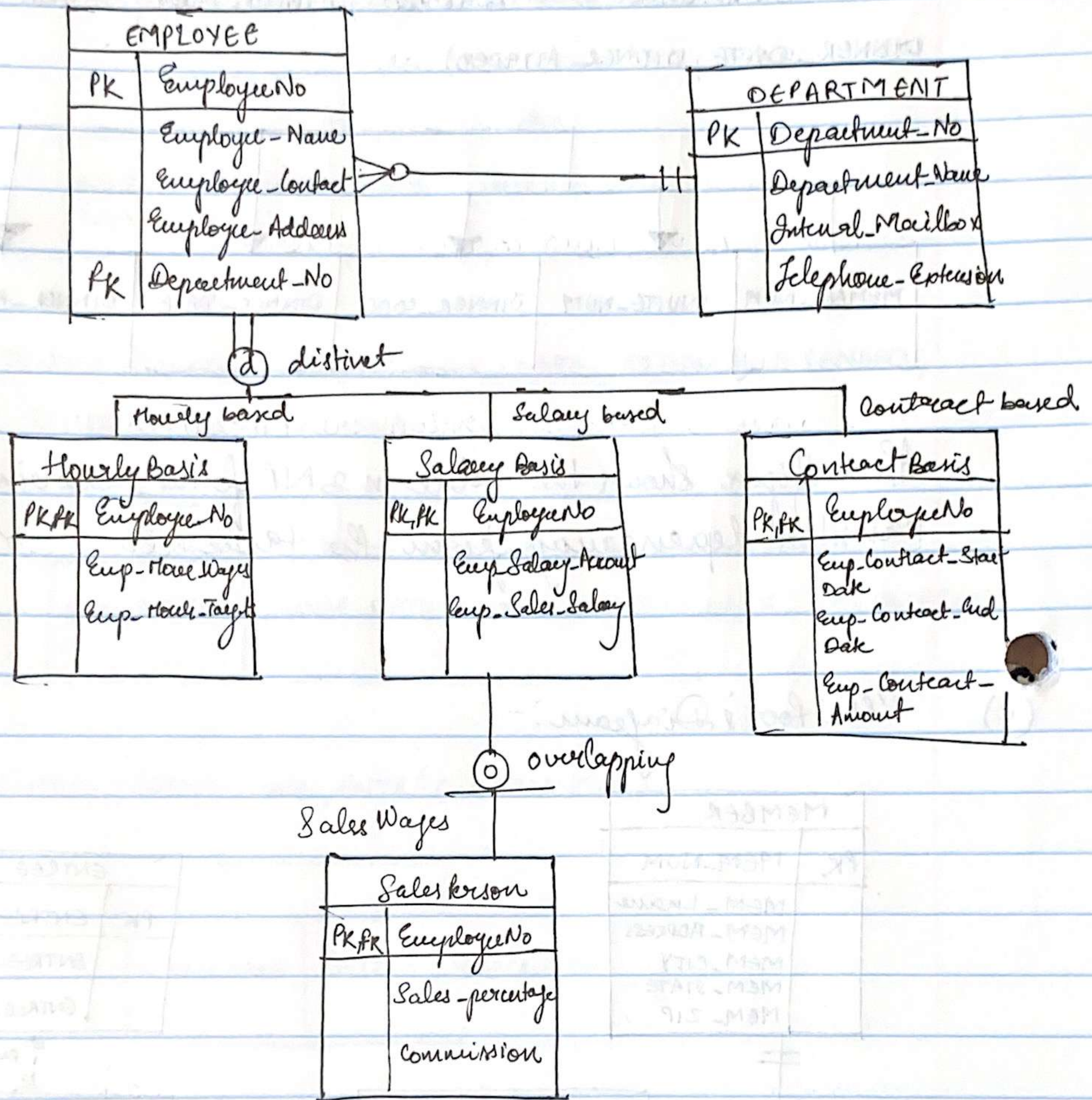


DESERT (DESERT-CODE, DESERT-DESCRIPTION)





3.



From the above Crow Foot's Notation, the relationship b/w Super class & subclass is shown.

Employee is the Super class, the different types of employees are represented by specialization of three types, there are Salary, Hourly, Contract based.



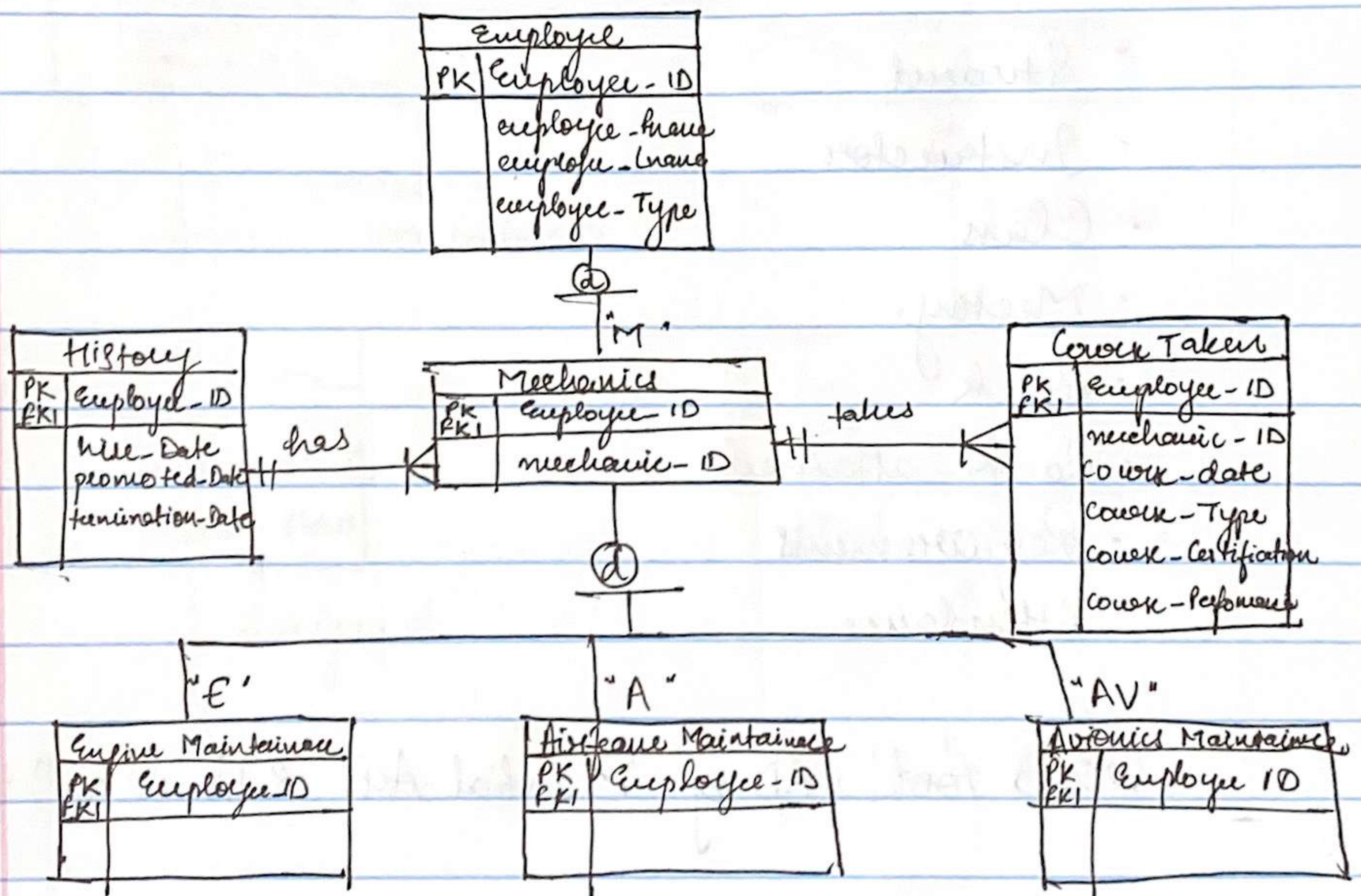
Again Salary band employee is super class of Sales Employee representing partial participation.

From the above notation, 'd' represents distinct employee of type Salary, Hourly and Contract.

"O" represents Overlapped means same object is aggregating two specific outcomes which are overlapped.

They are salary band and sale based wage employees

#### 4. Crow's Foot ERD :-





From the above diagram all mechanics are PRC employees. Not all employees are mechanics. So mechanics are derived from employee.

There are three types of mechanics such as engine maintenance, airframe maintenance & avionics maintenance.

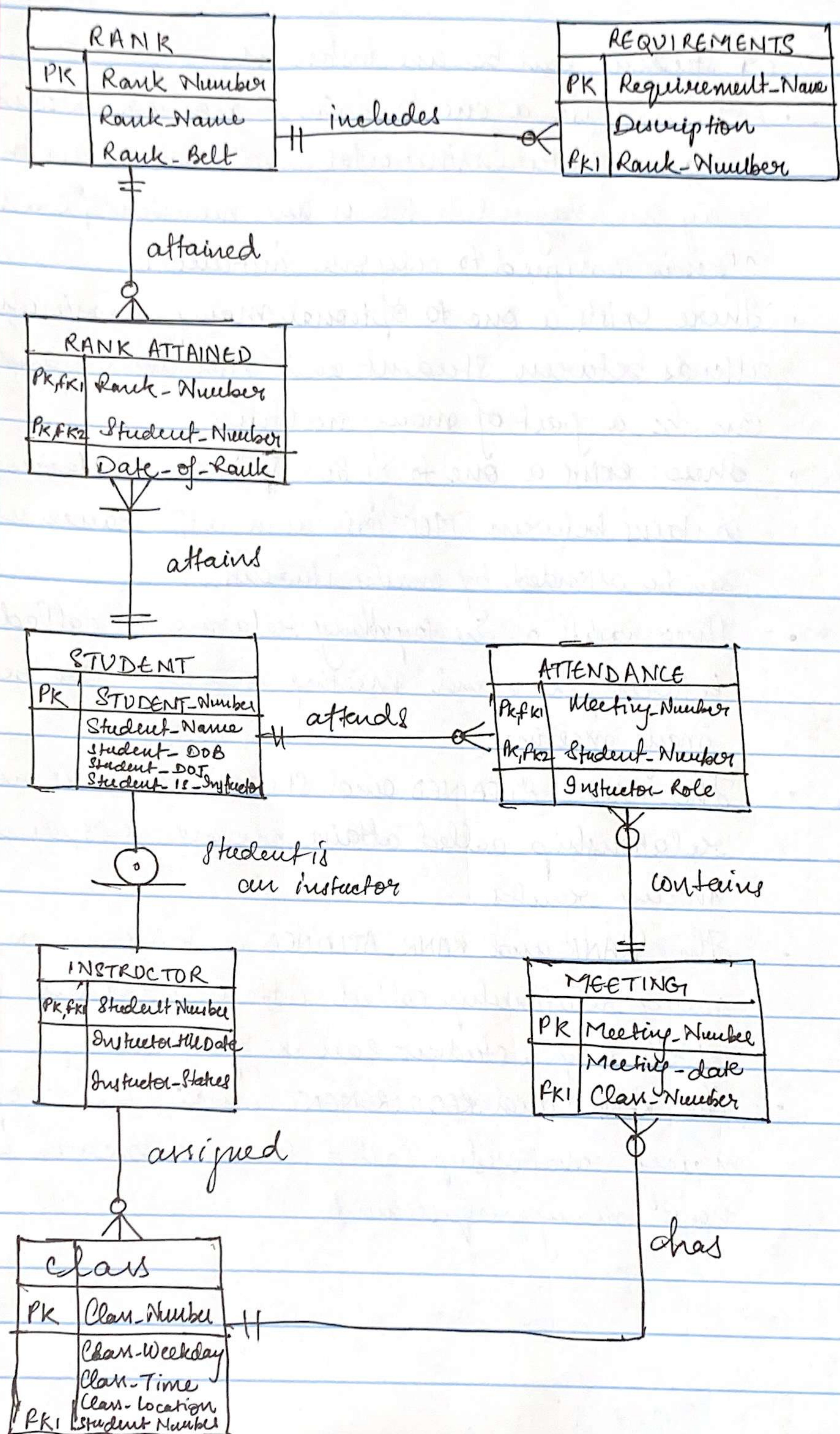
All mechanics takes course that is to be taken by also each mechanics has history. So it represents a one to many relationship.

5. The entities of the Martial Arts R U's (MARU) database are as follows:-

- Student
- Instructor
- Class
- Meeting
- Rank
- Rank - attained
- Requirements
- Attendance.

'Crow foot' ERD of Martial Arts R U's is as:-







- A Student can be an instructor.
- There exists a one to optional many relationship called assigned between instructor and class as an instructor may be assigned to teach any number of classes but a class is assigned to only one instructor.
- There exists a one to optional many relationship called attends between student and attendance as a student can be a part of many meetings.
- There exists a one to optional many relationship called contains between MEETING and attendance as a meeting can be attended by many students.
- There exists a one to many relationship called has between Class and Meeting as a class can be part of many meetings.
- The RANK- ATTAINED and Student contains one to many relationship called attain because a student can attain many ranks.
- The RANK and RANK-ATTAINED contains one to optional many relationship called attained because a rank attained by a student can be of different types.
- The RANK and REQUIREMENT contains one to optional many relationship called includes because a rank can have many requirements.