CS 1103
Assignment 5

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Part A:
1) Receipt_num -> date_time

2) Prod_id -> description, unit

3)receipt_num, line -> prod_id, qty

4) Adding date_time column will result in the line_item table not being in 2NF anymore because this will create a partial dependency between date_time and the receipt_num key.

5) Adding description or unit column will result in the line_item table not being in 3NF anymore but still keeps it's 2NF because this will create a transitive dependency between description , unit and prod_id a non_primary attribute.

Part B:
1) In Order to render EMP_DEPENDANTS an atomic element we can define a table called Dependants which will have a primary key called Dependant_ID and three other attributes: Relative_Name, Relationship(Spouse, son etc.) and EMP_NUM.
EMP_NUM will represent the employee number to which the dependant is related, and it will be a foreign key that points to the main table as we store the dependants' information in this new table.

2)Other Non-Atomic attributes in our table include: EMP_EDUCATION and EMP_TRAINING.
In order to put our table in 1NF we can define 2 new tables:

- Education Table: contains a primary key: DEGREE_ID.
  Contains also 2 attributes: Degree (BBA, MBA etc.) and EMP_NUM.
  EMP_NUM will be a foreign key that points to our employee table.
- Training Table: contains a primary key: TRAINING_ID.
  Contains also 2 more attributes: TRAINING_TYPE (L1, L2 etc.) and EMP_NUM.
  EMP_NUM will be a foreign key that points to the employee table

3) Our Table contains no partial dependencies

4) Our Table contains 2 Transitive Dependencies:

- DEPT_CODE -> DEPT_NAME.
- DEPT_CODE -> DEPT_MANAGER.

DEPT_CODE is non-key attribute, However, it determines DEPT_NAME and DEPT_MANAGER.
In order to put our table in 3NF we can move DEPT_CODE, DEPT_NAME and DEPT_MANAGER to a new Department table determined by the Primary key DEPT_ID.
We will have DEPT_ID in our employee as a foreign key that points to the Departments table.

5)

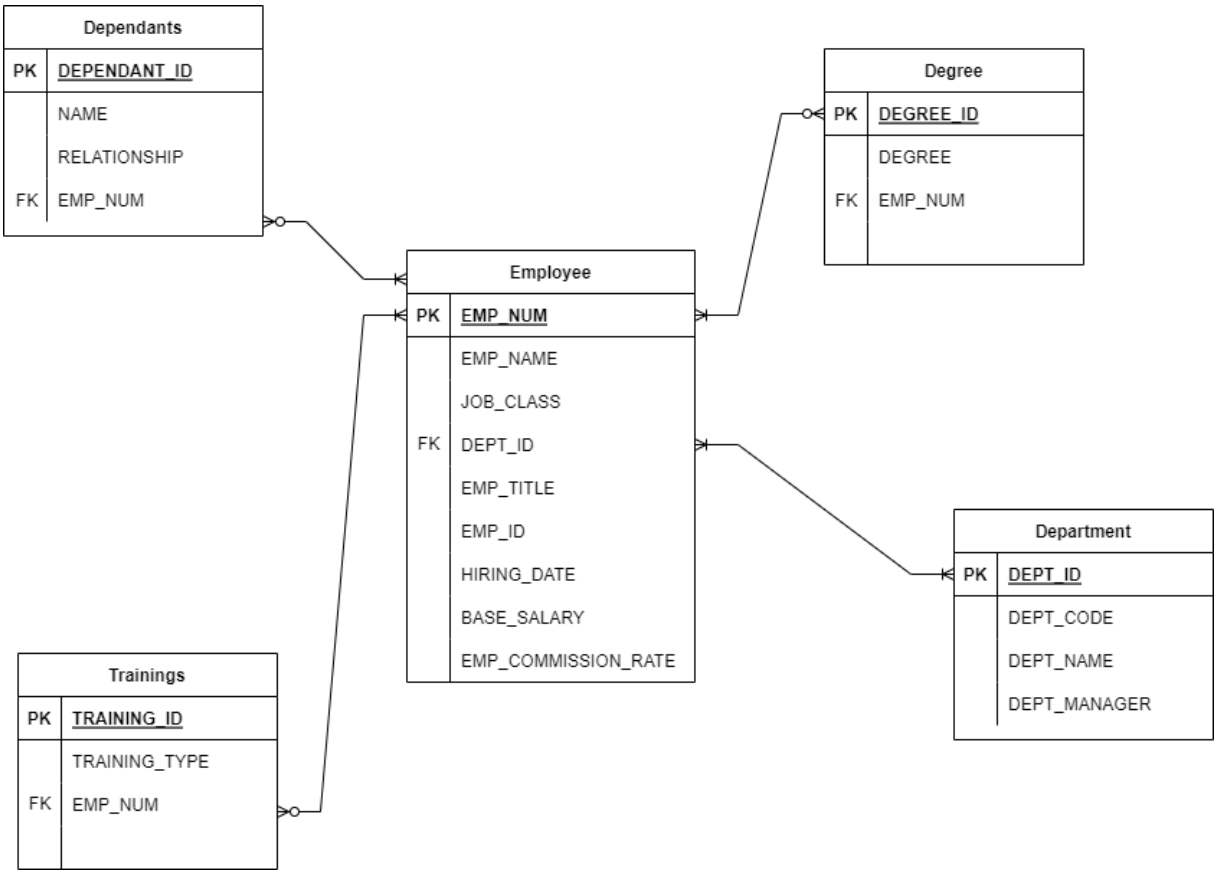
EMP_NUM	EMP_NAME	JOB_CLASS	DEPT_ID	EMP_TITLE	EMP_DOB	HIRING_DATE	BASE_SALARY	EMP_COMMISSION_RATE
1003	Willaker	SLS	1	Sales Agent	23-DEC-1968	14-OCT-1997	$38,225.00	0.015
1018	Smith	SLS	1	Sales Agent	28-MAR-1979	15-JAN-2006	$30,500.00	0.010
1019	Mcguire	JNT	2	Janitor	18-MAY-1982	21-APR-2003	$19,750.00	
1023	Mcguire	DBA	3	DB Admin	20-JUL-1959	15-JUL-1999	$127,900.00	

DEGREE_ID	DEGREE	EMP_NUM
1	BBA	1003
2	MBA	1003
3	BBA	1018
4	BS	1023
5	MS	1023
6	Ph.D.	1023

DEPENDANT_ID	NAME	RELATIONSHIP	EMP_NUM
100	Gerald	Spouse	1003
101	Mary	Daughter	1003
102	John	Son	1003
103	JoAnne	Spouse	1019
104	George	Spouse	1023
105	Jill	Daughter	1023

TRAINING_ID	TRAINING_TYPE	EMP_NUM
10001	L1	1003
10002	L2	1003
10003	L1	1018
10004	L1	1019
10005	L1	1023
10006	L3	1023
10007	L8	1023
10008	L15	1023

DEPT_ID	DEPT_CODE	DEPT_NAME	DEPT_MANAGER
1	MKTG	Marketing	Jill H.Martin
2	SVC	General Services	Hank B.Jones
3	INFS	Info. Systems	Carlos G.Ortez



Functional dependencies:

1. Employee table:
   EMP_NUM -> EMP_NAME, JOB_CLASS, DEPT_ID, EMP_TITLE, EMP_DOB, HIRING_DATE
   BASE_SALARY, EMP_COMMISSION_RATE.
2. Degree Table:
   DEGREE_ID -> DEGREE, EMP_NUM
3. Dependants Table:
   DEPENDANT_ID-> NAME, RELATIONSHIP, EMP_NUM
4. Training Table:
   TRAINING_ID -> TRAINING_TYPE, EMP_NUM
5. Department Table:
   DEPT_ID -> DEPT_CODE, DEPT_NAME, DEPT_MANAGER