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| **VALLURUPALLI NAGESWARA RAO VIGNANA JYOTHI**  **INSTITUTE OF ENGINEERING AND TECHNOLOGY** |
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| **Vignana Jyothi Nagar, Pragathi Nagar, Nizampet (S.O), Hyderabad TS 500 090 India**  **COURSE BASED PROJECT: TRAINING AND PLACEMENT SYSTEM**  **SUBMITTED BY:**  **ADDI SATHVIKA 19071A0501**  **AMETI SADHANA 19071A0502**  **ANNAM NAVYA SREE 19071A0503**  **ANUSHA KADALI 19071A0504**  **BALAGA SATEESH 19071A0505**    **SCHEMA REFINEMENT OF TRAINING AND PLACEMENT SYSTEM DATABASE**  **ER-DIAGRAM FOR THE ABOVE DATA-BASE:** |

**REDUCTION TO RELATIONAL SCHEMA:**

The next stage in Database Design involves the reduction of the above ER model to Relational Schema. This can be done as follows:

Schemas related to our Database design:

**Student(sid,name,branch,cgpa,doj)**

**Company(cid ,cname,sid,branch,cgpa,package)**

**Training(tname,branch,duration)**

**Roles(cid,rname,time)**

But in further it can be divided into several schemas but as far as now the above attributes have no objection in maintaining and holding the data perfectly.

So after certain changes too…, there is difference in schema design , so we kept as the same design obtained in the first level of abstraction of schema.

**SCHEMA REFINEMENT THROUGH NORMALIZTION:**

The next phase of database design involves schema refinement., i.e., Normalization of the relational schema.

**1. First Normal Form (1NF):**

“We say that a relation schema ‘R’ is in first normal form (1NF) if the domains of all attributes of ‘R’ are atomic.” Here, A domain is said to be atomic if elements of the domain are considered to be indivisible units. In short, 1NF requires that there be no multi-valued attributes, no repeating groups and no composite attributes.

There are possibilities for violation of 1NF in the following relational schemas:

By verifying the above schemas the attributes can be classified into composite, multivalued or single. Our job is to make the data non redundant and the attributes as indivisible via 1NF

* **Student(sid,name,branch,cgpa,doj)**

In the above student schema the name attribute is a multivalued attribute because the name attribute has first name middle name and last name. So to make data clear and efficient, we should divide the above attribute into single attribute.

Name🡪 Multi Valued Attribute

So divide the name into first name and last name

To get 1NF for the above relations: When it comes to the multi-valued attribute, create a separate tuple for each value of the multivalued attribute.

So after 1NF, the following schema is obtained

* **Student(sid,fname,lname,branch,cgpa,doj)**

**2. Second Normal Form (2NF):**

Before defining 2NF, it is necessary to mention the following concepts:

**Functional Dependency:**

Given an instance of r(R), we say that the instance satisfies the functional dependency α→β if for all pairs of tuples t1 and t2 in the instance such that t1[α] = t2[α], it is also the case that t1[β] = t2[β].

In the functional dependency α→β The left side of FD (α) is known as a determinant, the right side (β) is known as a dependent, and it can be said as “α determines β”.

**Partial Dependency:**

If the proper subset of candidate key determines non-prime attribute, it is called partial dependency. Hence, the Second Normal Form can be defined as follows: “A relation is in 2NF if it is in 1NF and has No Partial Dependency, i.e., no non-prime attribute (attributes which are not part of any candidate key) is dependent on any proper subset of any candidate key of the table.”

There are possibilities for violation of 2NF in the following relational schemas:

**Student(sid,fname,lname,branch,cgpa,doj)**

**Company(cid ,cname,sid,branch,cgpa,package)**

Let us consider the following schema:

**Roles(cid,rname,time)**

In the above schemas sid and cid are the prime attributes and rname and time are non-prime attributes.

After finding the closures of the above schemas there are no extra or redundant terms to remove. Hence the schemas are remained same.

**3. Third Normal Form (3NF):**

“A relation is in third normal form, if no non-prime attribute is transitively dependent on the key of the relation, and is in second normal form.” Simply put, A relation is in 3NF if at least one of the following conditions holds in every non-trivial function dependency X → Y:

• X is a super key.

• Y is a prime attribute (each element of Y is part of some candidate key).

**4. Boyce-Codd Normal Form (BCNF):**

“A relation is in BCNF if and only if in every non-trivial functional dependency X –> Y, X is a super key, and is also in third normal form” i.e., A relation R is in BCNF if R is in Third Normal Form and for every FD, LHS is super key None of the above relations have been identified violating BCNF.

We don’t have any schemas violating the 3NF and BCNF. If we go deep into it, all the tables will go with single valued or null attributes. Hence our schema got refined with 1NF and 2NF.

**Final Schema:**

**Student(sid,fname,lname,branch,cgpa,doj)**

**Company(cid ,cname,sid,branch,cgpa,package)**

**Training(tname,branch,duration)**

**Roles(cid,rname,time)**