Normalization Question Set Discussion

https://github.com/Root-YT/RDBMS-Fundamentals

Normalize the following Databases and write the 1NF, 2NF and 3NF forms separately and provide justification for the assumptions and decisions made. Furnish other details as required.

1. Students(Name, class, section, dateofbirth, address, studentphone, blood group, email, classroom number, class strength, classteacher name, classteacher phone, classteacher address)

(Assume that not more than one student will have the same name in a class in a particular section)

Before 1 NF:

Students(Name, class, section, dateofbirth, address, studentphone, blood group, email, classroom number, class strength, classteacher name, classteacher phone, classteacher address)

After 1 NF:

1. Students(Name, class, section, dateofbirth, **StudentAddressID**, studentphone, blood group, email, classroom number, class strength, classteacher name, classteacher phone, **ClassteacherAddressID**)

2. Address(**AddressID**, DoorNo, StreetName, City, PinCode)

Before 2 NF:

1. Students(Name, class, section, dateofbirth, **StudentAddressID**, studentphone, blood group, email, classroom number, class strength, classteacher name, classteacher phone, **ClassteacherAddressID**)

2. Address(**AddressID**, DoorNo, StreetName, City, PinCode)

2NF:
Table 1: Students

Students(Name, class, section, dateofbirth, **StudentAddressID**, studentphone, blood group, email, classroom number, class strength, classteacher name, classteacher phone, **ClassteacherAddressID**)

X {Name, Class, Section}

Y {dateofbirth, **StudentAddressID**, studentphone, blood group, email, classroom number, class strength, classteacher name, classteacher phone, **ClassteacherAddressID**}

X' = {} => Nothing
X''= {Name} => Nothing
X'''= {Class} => Nothing
X''''= {Section} => Nothing
X'''''= {Name, Class} => Nothing
X''''''= {Name, Section} => Nothing
X'''''''= {Class, Section} => {classroom number, class strength, classteacher name, classteacher phone, **ClassteacherAddressID**}
X''''''''= {Name, Class, Section} => {dateofbirth, **StudentAddressID**, studentphone, blood group, email}

Table 2: Address

Address(**AddressID**, DoorNo, StreetName, City, PinCode)

It is already in 2NF as there is just a single attribute as primary key

End of 2NF:

1. StudentDetails{**Name, Class, Section,** dateofbirth, **StudentAddressID**, studentphone, blood group, email}

2. ClassDetails{**Class, Section**, classroom number, class strength, classteacher name, classteacher phone, **ClassteacherAddressID}**

3. Address(**AddressID**, DoorNo, StreetName, City, PinCode)

Before 3 NF:

1. StudentDetails{**Name, Class, Section,** dateofbirth, **StudentAddressID**, studentphone, blood group, email}

2. ClassDetails{**Class, Section**, classroom number, class strength, classteacher name, classteacher phone, **ClassteacherAddressID}**

3. Address(**AddressID**, DoorNo, StreetName, City, PinCode)

3 NF:

1. No transitive dependency in StudentDetails, so already in 3NF

2. ClassDetails{**Class, Section**, classroom number, class strength, classteacher name, classteacher Phone, **ClassteacherAddressID}**

Class and Section determines the teachername and teacher name in turn decides phone and address. So we need to break the transitive dependency

ClassDetails{Class, Section, RoomNumber, ClassStrength, **TeacherName**}

TeacherDetails{**Name**, Phone, **AddressID**}

3. Address(**AddressID**, DoorNo, StreetName, City, PinCode)

AddressID determines City and City determines the PinCode. So we need to break the transitive dependency

Address(**AddressID**, DoorNo, StreetName, **City**)

Cities(**City**, PinCode)

After 3 NF:

1. **StudentDetails**{**Name, Class, Section,** dateofbirth, **StudentAddressID**, studentphone, blood group, email}

2. **ClassDetails{Class, Section**, RoomNumber, ClassStrength, **TeacherName**}

3. **TeacherDetails**{**Name**, Phone, **AddressID**}

4. **Address**(**AddressID**, DoorNo, StreetName, **City**)

5. **Cities**(**City**, PinCode)