

Lab 1

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1

a. There is no clear primary key for this table. The smallest primary key that would work for this table would be the teacher's last or first name, along with the days and time of the class. However, this assumes that there are no teachers with the same name who teach at the same time. There are multiple instances of the same BUILDING_CODE and ROOM_CODE combinations. There are also teachers who are stored in multiple places in the table. This is redundant, because the same information is stored in the table multiple times. In some cases, there are entire rows that share identical attributes except for the DAYS_TIME attribute. This is an inefficient use of space.

b. If the building KOM were to be deleted, all of the information about the teachers Maria Cordoza and Anne Hawkins would be completely erased. This is because the information about the teachers is not stored separately from the information about the buildings or classrooms for each class.

2

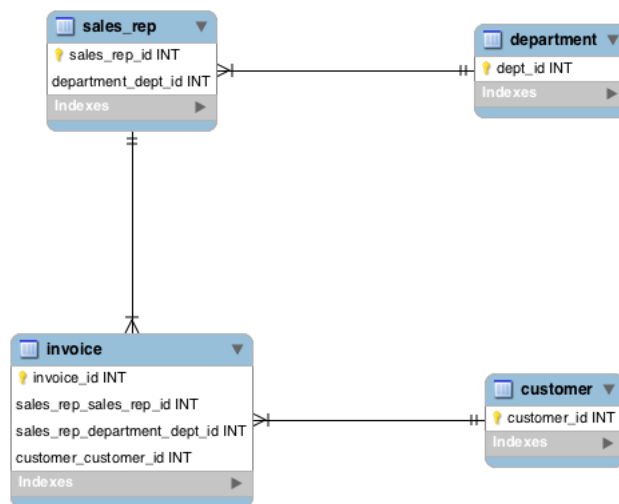


Figure 1: ERD for the business rules for the ProdCo company.

3

The following business rules are reflected in the ERD:

1. Each athlete plays for one or more athlete groups
2. Each athlete has an injury status
3. Each athlete group plays on one and only one team
4. A team has one or more athlete groups play on it
5. Each team plays only one sport
6. A sport is played by one and only one team
7. A sport is coached by one or more coaching groups
8. A coaching group coaches only one sport
9. A coach is a member of one or more coaching groups

4

- a. The names of all employees who work for First Bank Corporation:

$$\Pi_{personName}(\sigma_{(companyName='FirstBankCorporation')}works)$$

- b. The names and cities of residence of all employees who work for First Bank Corporation:

$$\Pi_{(personName,city)}(\sigma_{(companyName='FirstBankCorporation')}(employee \bowtie works))$$

- c. The names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than \$10,000:

$$\Pi_{(personName,street,city)}(\sigma_{(companyName='FirstBankCorporation' \wedge salary > 10,000)}(employee \bowtie works))$$

- d. The names of all employees in this database who live in the same city as the company for which they work:

$$\Pi_{personName}(company \bowtie (employee \bowtie works))$$

- e. All companies located in every city in which Small Bank Corporation is located (excluding Small Bank Corporation itself):

$$\Pi_{company,companyName}(\sigma_{(comp.companyName='SmallBankCorporation' \wedge company.city=comp.city)}(company \times \rho_{comp}company))$$

$$-\Pi_{companyName}(\sigma_{companyName='SmallBankCorporation'}company)$$

5

a.

T1.a	T1.b	T1.c	T2.x	T2.y	T2.z
10	R	7	10	R	5
10	R	7	10	S	11

b.

T2.z
5

c.

T1.a	T1.b	T1.c
5	Q	3
10	R	7
15	Q	11
25	R	13
10	R	5
10	S	11

d.

T1.a	T1.b	T1.c	T2.x	T2.y	T2.z
5	Q	3	25	R	13
5	Q	3	10	R	5
5	Q	3	10	S	11
10	R	7	25	R	13
10	R	7	10	R	5
10	R	7	10	S	11
15	Q	11	25	R	13
15	Q	11	10	R	5
15	Q	11	10	S	11

e.

T1.a	T1.b	T1.c	T2.x	T2.y	T2.z
5	Q	3	25	R	13
5	Q	3	10	R	5
5	Q	3	10	S	11
10	R	7	25	R	13
15	Q	11	25	R	13

f.

T1.a	T1.c	T2.x
10	7	10