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CSCI 3287

Spring 2016 Database System

Assignment 1

Exercise 2.2.1: In Fig. 2.6 are instances of two relations that might constitute part of a banking database. Indicate the following:

a) The attributes of each relation.

    Accounts Relation:

        acctNo, type, balance

    Customers Relation:

        firstName, lastName, idNo, account

b) The tuples of each relation.

    Accounts Relation:

        (12345, savings, 12000)

        (23456, checking, 1000)

        (34567, savings, 25)

    Customers Relation:

        (Robbie, Banks, 901-222, 12345)

        (Lena, Hand, 805-333, 12345)

        (Lena, Hand, 805-333, 23456)

c) The components of one tuple from each relation.

    Accounts Relation:

        The first tuple has components:

            12345, savings, 12000

        for attributes acctNo, type, balance.

    Customers Relation:

        The first tuple has components:

            Robbie, Banks, 901-222, 12345

        for attributes firstName, lastName, idNo, account.

d) The relation schema for each relation.

    Accounts relation schema:

        Accounts(acctNo, type, balance)

    Customers relation schema:

        Customers(firstName, lastName, idNo, account)

e) The database schema.

        Accounts(acctNo: int, type: String, balance: int)

Customers(firstName: String, lastName:String, idNo:String, account:String)

f) A suitable domain for each attribute.

Accounts:

acctNo	real
type	string
balance	real

Customers:

firstName	string
lastName	string
idNo	string
account	string

g) Another equivalent way to present each relation.

Accounts:

acctNo	balance	type
12345	12000	savings
34567	25	savings
23456	1000	checking

Customers:

idNo	account	lastName	firstName
805-333	12345	Hand	Lena
805-333	23456	Hand	Lena
901-222	12345	Banks	Robbie

Exercise 2.2.2: In Section 2.2.7 we suggested that there are many examples of attributes that are created for the purpose of serving as keys of relations. Give some additional examples.

For a database dealing with courses within a college, a course number can be used as a key attribute, as it is unique for each course. Another example would be a student ID number for a database of kids in a particular school, each child would have a one-of-a-kind ID number.

Exercise 2.2.3: How many different ways (considering orders of tuples and attributes) are there to represent a relation instance if that instance has:

a) Three attributes and three tuples, like the relation Accounts of Fig. 2.6?

3! * 3! = 36

b) Four attributes and five tuples?

4! * 5! = 24 * 120 = 2880

c) n attributes and m tuples?

n! * m!