Algorithms and datastructures
Exercises

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2022

Contents

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6.1 Indicate the following according to figure 1.

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

The relation **Accounts**

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

The relation **Customers**

Figure 1: Two relations of a banking database

6.1.a The attributes of each realtion

Accounts: $acctNo$, $type$, $balance$
Customers: $firstName$, $lastName$, $idNo$, $account$

6.1.b The tuples of each realtion

- 12345, $savings$, 12000

- 23456, $checking$, 1000

- 34567, $savings$, 25

- *Robbie, Banks, 901 − 222, 12345*

- *Lena, Hand, 805 − 333, 12345*

- *Lena, Hand, 805 − 333, 23456*

6.1.c   The components of one tuble of each realtion

12000
Banks

6.1.d   The relation schema of each realtion

$Accounts(acctNo, type, balance)$
$Customers(firstName, lastName, idNo, account)$

6.1.e   The database schema

$Accounts, Customers$

6.1.f   A suitable domain of each attribute

- $acctNo$ - INT

- $type$ - $VARCHAR[20]$

- $balance$ - INT

- $firstName$ - $VARCHAR[20]$

- $lastName$ - $VARCHAR[20]$

- $idNo$ - $CHAR[7]$

- $account$ - INT

6.1.g   Another equivalent way to present each relation.

The attributes could simply just be in a different order.

6.2 In a table with the following attributes which are valid example of keys

$$title, year, length, genre, studioName, producerC\#$$

- title, year

- title, year, studioName

- title, length

- length, genre, studioName, year

6.3 How many ways can relation be represented if it has:

6.3.a Four attributes and five tuples

$4! \cdot 5! = 2880$

6.3.b n attributes and m tuples

$n! \cdot m!$

6.4 Write a database schema of the following relations

The datasbase schema includes
$Product(make, model, type)$
$PC(model, speed, ramhd, price)$
$Laptop(model, speed, ram, hd, screen, price)$
$Printer(model, color, type, price)$

6.4.a Write a schema for $Product$

CREATE TABLE Product(VARCHAR[20] maker, INT model, INT type)
The type is here an int where 0 is PC, 1 is laptop and 2 is printer. There is no foreign keys due to it being the lookup table for the other relations

6.4.b Write a schema for PC

CREATE TABLE PC(INT model, FLOAT speed, INT ram, BOOLEAN hd, FLOAT prize, FOREIGN KEY(Products) REFERENCES Products(model))
Here the model is a reference to products, speed is gigahertz of CPU

6.4.c   Write a schema for *Printer*

CREATE TABLE Printer(INT model, BOOLEAN color, VARCHAR[20] type, FLOAT price, FOREIGN KEY(Products) REFERENCES Products(model))

6.4.d   Write an alternation for Printer and delete the attribute color

ALTER Printer DROP color

6.4.e   Add an *od* **attribute for PC, which defaults to none an otherwise can be cd or dvd**

ALTER PC ADD VARCHAR[20] od DEFAULT 'none'