UECS2344 Software Design: Lecture 8

Database Design: Mapping Entity Classes to Database Tables

Exercise A

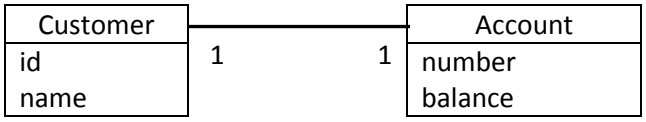
From each of the examples given below, generate a general mapping rule that is applicable.

<table>
<tr><th>Entity Classes</th><th>Database Tables
Note: primary key; f.k.=foreign key</th></tr>
<tr><td>Example 1

<table><tr><td>Account</td></tr><tr><td>number
balance</td></tr></table></td><td>Account(number, balance)

Sample Data<table><tr><td>number</td><td>balance</td></tr><tr><td>1234</td><td>398.05</td></tr><tr><td>5678</td><td>436.70</td></tr><tr><td>1287</td><td>8555.85</td></tr></table></td></tr>
</table>

Example 2



Customer(id, name)

Sample Data

id	name
111	Orlie
222	George
333	Shaw

Account(number, balance, customerid)

f.k.

Sample Data

number	balance	customerid
1234	398.05	111
5678	436.70	333
1287	8555.85	222

OR

Customer(id, name accountNumber)

f.k.

Sample Data

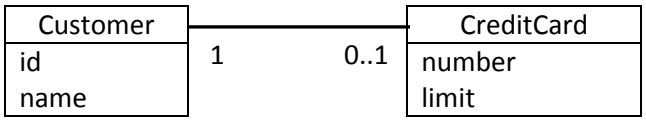
id	name	accountNumber
111	Orlie	1234
222	George	1287
333	Shaw	5678

Account(number, balance)

Sample Data

number	balance
1234	398.05
5678	436.70
1287	8555.85

Example 3



Customer(id, name)

Sample Data

id	name
111	Orlie
222	George
333	Shaw

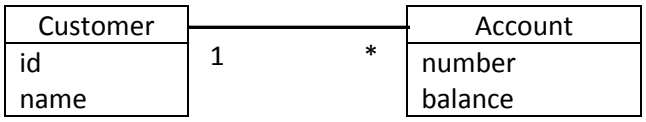
CreditCard(number, limit, customerid)

f.k.

Sample Data

number	limit	customerid
5555111122223333	25000	111
5555666677778888	20000	333

Example 4



Customer(id, name)

Sample Data

id	name
111	Orlie
222	George
333	Shaw

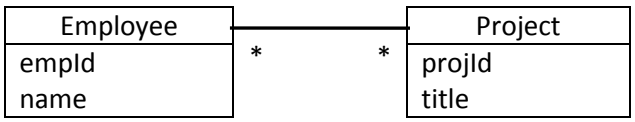
Account(number, balance, customerid)

f.k.

Sample Data

number	balance	customerid
1234	398.05	111
5678	436.70	333
1287	8555.85	222
6677	446.90	111
5544	9432.00	222

Example 5



Employee(empId, name)

Sample Data

empId	name
E1	John
E2	Grace
E3	Harry

Project(projId, title)

Sample Data

projId	title
P1	Payroll System
P2	HR System

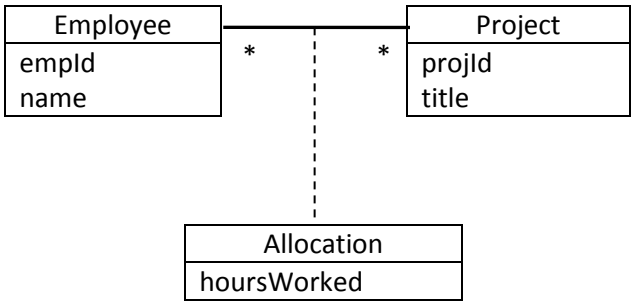
Allocation(empId, projId)

f.k. f.k.

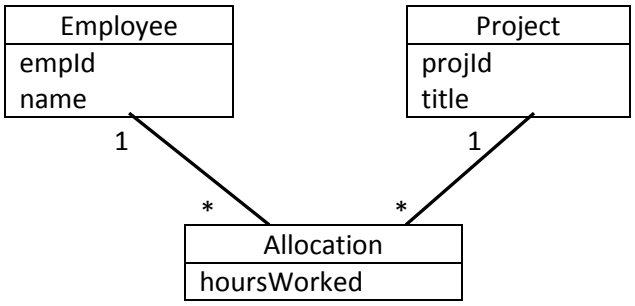
Sample Data

empId	projID
E1	P1
E1	P2
E2	P1
E3	P1
E3	P2

Example 6



Can be interpreted as:



Employee(empId, name)

Sample Data

empId	name
E1	John
E2	Grace
E3	Harry

Project(projId, title)

Sample Data

projId	title
P1	Payroll System
P2	HR System

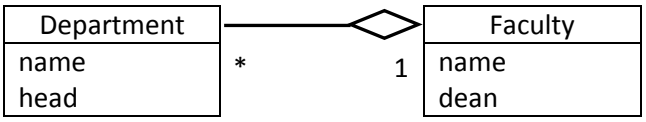
Allocation(empId, projID, hoursWorked)

f.k. f.k.

Sample Data

empId	projID	hoursWorked
E1	P1	10
E1	P2	30
E2	P1	40
E3	P1	25
E3	P2	15

Example 7



Faculty(<u>name</u>, dean)

Sample Data

name	dean
Science	Prof Andrew
Engineering	Prof Francis
Arts	Prof Janet

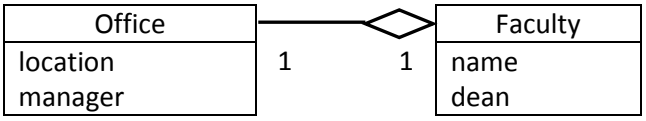
Department(<u>name</u>, head, faculty)

f.k.

Sample Data

name	head	faculty
Biology	Dr Kenny	Science
Chemistry	Dr Jacob	Science
Electrical	Dr Janet	Engineering
Humanities	Dr Opal	Arts

Example 8



Faculty(<u>name</u>, dean)

Sample Data

name	dean
Science	Prof Andrew
Engineering	Prof Francis
Arts	Prof Janet

Office(<u>location</u>, manager, faculty)

f.k.

Sample Data

location	manager	faculty
A101	Ms Agnes	Science
A201	Mr David	Engineering
B101	Ms Rena	Arts

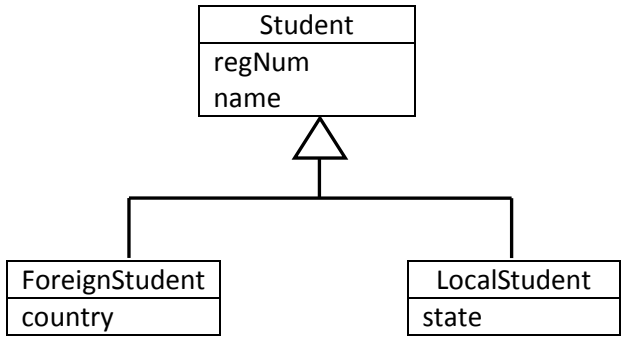
OR

Faculty(<u>name</u>, dean, officeLocation)

f.k.

Sample Data

name	dean	office Location
Science	Prof Andrew	A101
Engineering	Prof Francis	A201
Arts	Prof Janet	B101

	Office(<u>location</u>, manager) Sample Data location | manager A101 | Ms Agnes A201 | Mr David B101 | Ms Rena
Example 9  	Student(<u>regNum</u>, name) ForeignStudent(<u>regNum</u>, country) LocalStudent(<u>regNum</u>, state) OR ForeignStudent(<u>regNum</u>, name, country) LocalStudent(<u>regNum</u>, name, state) OR Student (<u>regNum</u>, studentType, name, country, state)

Exercise B

Given the database tables below that represent student data based on version 1, illustrate how the data will be represented in database tables based on the other 2 versions listed in Example 9.

Student

regNum	name
111	Sally
222	Charlie
333	Mili
444	Henry

ForeignStudent

regNum	country
222	England
333	France

LocalStudent

regNum	state
111	Johor
444	Penang

Exercise C

Given the data below that represents course and student data, design the classes and database tables needed to represent the entities and their relationships.

course code	course title	student id	student name	grade
C1	Java	111	Alice	A
C2	PHP	111	Alice	B
C1	Java	222	Bob	B
C2	PHP	222	Bob	A
C1	Java	333	Cindy	A