DORMITORY MANAGEMENT SYSTEM DATABASE PROJECT DESIGN

GROUP 5	
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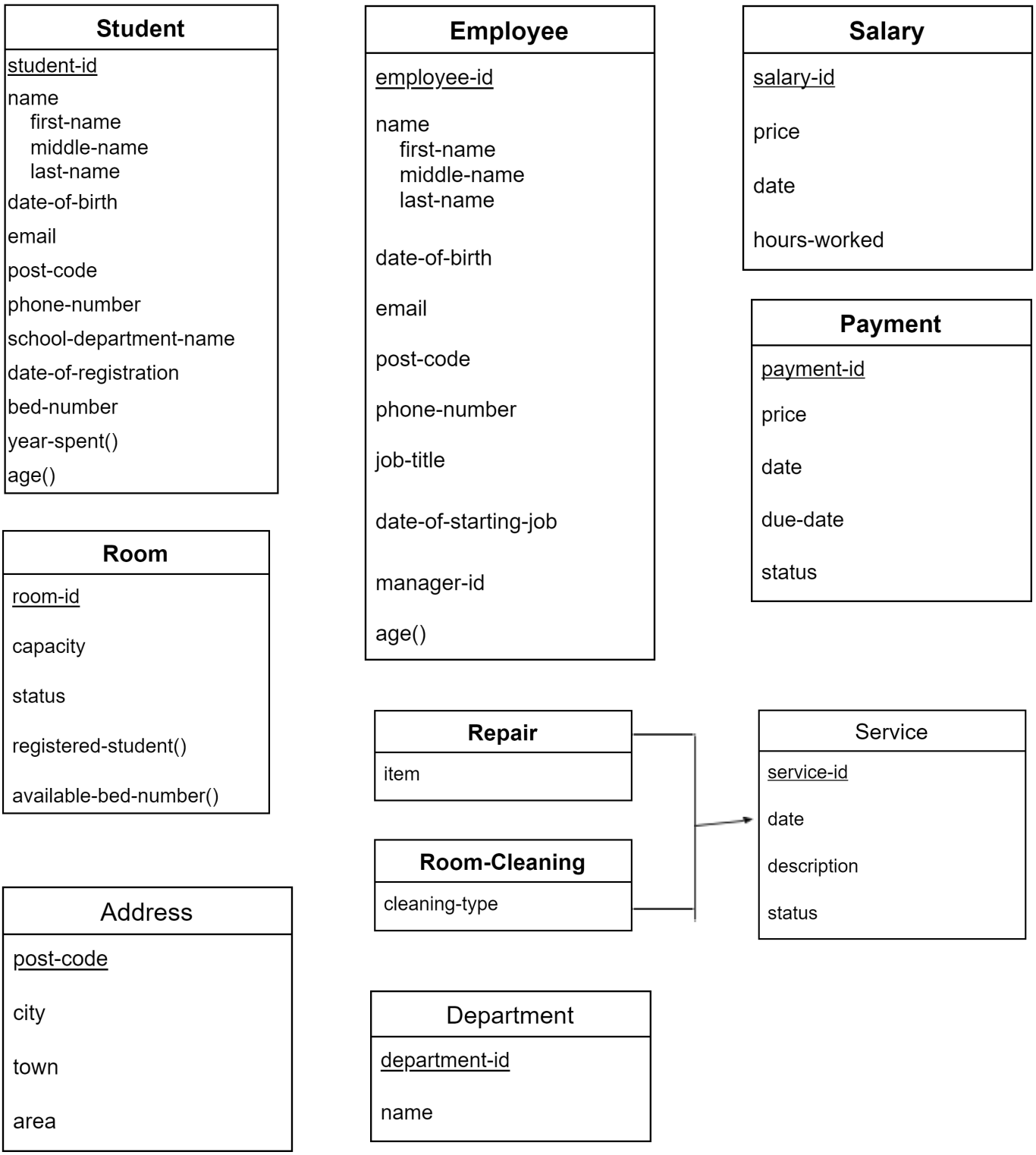
Entity Sets:


Student
student-id
name
first-name
middle-name
last-name
date-of-birth
email
post-code
phone-number
school-department-name
date-of-registration
bed-number
year-spent()
age()
Employee
employee-id
name
first-name
middle-name
last-name
date-of-birth
email
post-code
phone-number
job-title
date-of-starting-job
manager-id
age()
Salary
salary-id
price
date
hours-worked
Payment
payment-id
price
date
due-date
status
Room
room-id
capacity
status
registered-student()
available-bed-number()
Repair
item
Room-Cleaning
cleaning-type
Service
service-id
date
description
status
Address
post-code
city
town
area
Department
department-id
name

Entities

Student:

student-id

name

-first-name

-middle-name

-last-name

date-of-birth

email

post-code

phone-number

school-department-name

date-of-registration

bed-number

year-spent()

age()(now-date-of-birth)

Salary :

salary-id

price

date

hours-worked

Address: #decomposed from Employee and Student

post-code

city

Town

area

Employee :

employee-id

name

- first-name

- middle-name

- last-name

date-of-birth

email

address

- city

- town

- area

- post-code

phone-number

job-title

date-of-starting-job

manager-id

age() (now- date-of-birth)

Room-Cleaning : #(child of Service)

cleaning-type (defines floor cleaning, bathroom cleaning, bed cleaning)

Payment :

payment-id

price

date

due-date

status (paid or not paid.)

Room :

room-id

capacity

status

registered-student

available-bed-number() (capacity - registered-student)

Service : #(parent of Room-Cleaning and Repair)

service-id

date

description

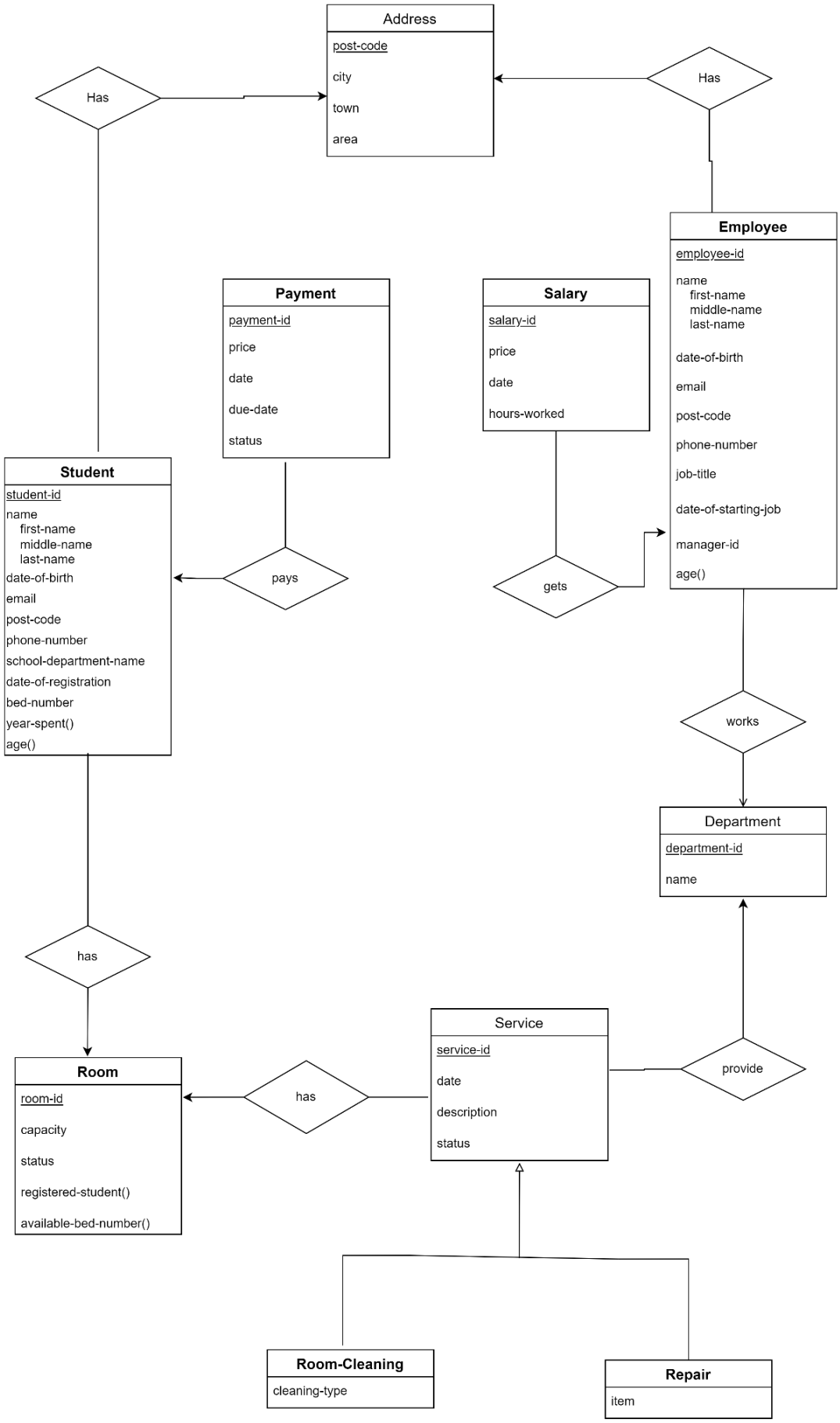
status

Repair : #(child of Service)

item (item in the room that needs repair)

Users of the system:

- ☐ Employee
- ☐ Student


Address
post-code
city
town
area
Has
Has
Employee
employee-id
name
first-name
middle-name
last-name
date-of-birth
email
post-code
phone-number
job-title
date-of-starting-job
manager-id
age()
Payment
payment-id
price
date
due-date
status
Salary
salary-id
price
date
hours-worked
Student
student-id
name
first-name
middle-name
last-name
date-of-birth
email
post-code
phone-number
school-department-name
date-of-registration
bed-number
year-spent()
age()
pays
gets
works
Department
department-id
name
has
Service
service-id
date
description
status
provide
Room
room-id
capacity
status
registered-student()
available-bed-number()
has
Room-Cleaning
cleaning-type
Repair
item

Assumptions:

The dormitory consists of a single building.

Every student must pay a payment.

Every student must have one room.

Every student has an address.

Every Employee must work for one department.

Every Employee has an address.

Every department must have zero or many employees.

Every service must be either a repair or room cleaning.

Every service must have zero or one room.

Every Room Cleaning must be a service.

Every Repair must be a service.

Every room must have zero or many services.

Every room must have zero or many students.

Every payment must be paid by one student.

Every employee can get zero or many salaries.

Every salary must be got by one employee.

Every department must provide zero or many services.

Every service must be provided by a department.

Every address has a student.

Every address has an employee.

(A room can be serviced more than once (such as 2 cleanings on Monday, a repair on Tuesday etc..) However, a service can only be given to one room. This does not mean that the cleaning or repair service is given to only one room, more than one repair and cleaning service can e recorded with different dates.)

Business Rules:

A student must pay the price of payment before the due date.

A student must be accommodated in only a room.

A room must have at most 3 students.

-A student must be accommodated for at most 5 years in the dormitory.

DECOMPOSING

FOR STUDENT

Student (student-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, phone-number, school-department-name, date-of-registration, bed-number, year-spent(), age())

FDs: post-code -> area, area -> town, town -> city

FDs violate BCNF, so we decompose.

R: (student-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, phone-number, school-department-name, date-of-registration, bed-number, year-spent(), age())

FD: post-code -> area,town,city

post-code += post-code, area, town, city

R1: (student-id, first-name, middle-name, last-name, date-of-birth, email, post-code, phone-number, school-department-name, date-of-registration, bed-number, year-spent(), age())

R2: (post-code, city, town, area)

R1 and R2 do not violate BCNF, no need more decomposition.

FOR EMPLOYEE

Employee (employee-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, phone-number, job-title, date-of-starting-job, manager-id)

FDs: post-code -> area, area -> town, town -> city

FDs violate BCNF, so we decompose.

R: (employee-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, phone-number, job-title, date-of-starting-job, manager-id)

FD: post-code -> area,town,city

post-code += post-code, area, town, city

R1: (employee-id, first-name, middle-name, last-name, date-of-birth, email, post-code, phone-number, job-title, date-of-starting-job, manager-id)

R2: (post-code, city, town, area)

R1 and R2 do not violate BCNF, no need more decomposition.

Payment, Salary, Department, Room, Service, Room-Cleaning, Repair have no FD. No need to decompose them.

Relational Schema

Without Relation :

Student (student-id, first-name, middle-name, last-name, date-of-birth, email, post-code, phone-number, school-department-name, date-of-registration, bed-number, year-spent(), age())

Employee (employee-id, first-name, middle-name, last-name, date-of-birth, email, post-code, phone-number, job-title, date-of-starting-job, manager-id)

Address(post-code, city, town, area)

Room (room-id, capacity, status, registered-student(), available-bed-number())

Payment (payment-id, price, date, due-date, status)

Salary (salary-id, price, date, hours-worked)

Service (service-id, date, description, status)

Repairing (service-id, date, description, status, item)

Room-Cleaning (service-id, date, description, status, cleaning-type)

Department(department-id , name)

Relations:

Pays (payment-id, student-id): between Student and Payment

Gets (salary-id, employee-id): between Employee and Salary

Has (student-id, room-id): between Student and Room

Has (service-id, room-id): between Service and Room

Works (employee-id, department-id): between Employee and Department

Provide(service-id, department-id): between Service and Department

Has(student-id, post-code): between Student and Address

Has(employee-id, post-code): between Employee and Address

With Relation:

Student (student-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, {phone-number}, school-department-name, date-of-registration, bed-number, year-spent(), age(), room-id, address-id)

Employee (employee-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, job-title, date-of-starting-job, manager-id, department-id, address-id)

Room (room-id, capacity, status, registered-student(), available-bed-number())

Payment (payment-id, price, date, due-date, status, student-id)

Salary (salary-id, price, date, hours-worked, employee-id)

Service (service-id, date, description, status, room-id, department-id)

Repairing (service-id, date, description, status, item)

Room-Cleaning (service-id, date, description, status, cleaning-type)

Department(department-id, name)

~~Works(employee-id, department-id)~~

~~Pays (student-id, payment-id)~~

~~Gets (employee-id, salary-id)~~

~~Has (student-id, room-id)~~

~~Has (service-id, room-id)~~

~~Provide(service-id, department-id)~~

~~Has (student-id, address-id)~~

~~Has (employee-id, address-id)~~

LAST RELATIONAL SCHEMA

Student (student-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, {phone-number}, school-department-name, date-of-registration, bed-number, year-spent(), age(), room-id, address-id)

Employee (employee-id, first-name, middle-name, last-name, date-of-birth, email, city, town, area, post-code, job-title, date-of-starting-job, manager-id, department-id, address-id)

Room (room-id, capacity, status, registered-student(), available-bed-number())

Payment (payment-id, price, date, due-date, status, student-id)

Salary (salary-id, price, date, hours-worked, employee-id)

Service (service-id, date, description, status, room-id, department-id)

Repairing (service-id, date, description, status, item)

Room-Cleaning (service-id, date, description, status, cleaning-type)

Department(department-id, name)