

**Task A.**

1. In each of our four relations, the primary key is the only key.
2. In addition, all the attributes other than the primary key are solely functionally dependent on the primary key.
3. Below is the list of functional dependencies for each relation:
4. Current\_cages:

{Cage\_id→Strain\_name, Cage\_id→Gender, Cage\_id→Birth\_date, Cage\_id→Current\_amount, Cage\_id→Breeder, Cage\_id→Parent, Cage\_id→Entry\_date, Cage\_id→End\_date}

1. Lab\_member:

{Member\_id→Member\_name, Member\_id→Start\_date, Member\_id→End\_date}

1. Strain:

{Strain\_name→Strain\_location, Strain\_name→Strain\_manager}

1. Use:

{Usage\_record\_id→Cage\_id, Usage\_record\_id→Member\_id, Usage\_record\_id→Usage\_amount, Usage\_record\_id→Usage\_date}

Therefore, all of our four relations meet the requirement for BCNF and is thus in the form of BCNF.

**Task B.**

1. readme.txt

Our data comes from the mouse colonies currently maintained in Dr. Yuan Lu’s laboratory in URMC.

1. create.sql

drop schema if exists proj1;

create schema proj1;

use proj1;

drop table if exists Current\_cages;

drop table if exists Lab\_member;

drop table if exists Strain;

drop table if exists Uses;

create table Current\_cages

(Cage\_id varchar(30) not null,

Strain\_name varchar(30) not null,

Gender char(1) not null,

Birth\_date Date not null,

Current\_amount int not null,

Breeder char(1) not null,

Parent varchar(30),

Entry\_date date not null,

End\_date date default null,

primary key (Cage\_id));

create table Lab\_member

(Member\_id int not null,

Member\_name varchar(30) not null,

Start\_date date not null,

End\_date date default null,

primary key (Member\_id));

create table Strain

(Strain\_name varchar(30) not null,

Strain\_location varchar(30) not null,

Strain\_manager int not null,

primary key (Strain\_name));

create table Uses

(Usage\_record\_id int not null,

Cage\_id varchar(30) not null,

Member\_id int not null,

Usage\_amount int not null,

Usage\_date date not null,

primary key (Usage\_record\_id));

alter table Current\_cages add constraint foreign key(Strain\_name) references Strain(Strain\_name)

on delete restrict on update cascade;

alter table Strain add constraint foreign key(Strain\_manager) references Lab\_member(Member\_id)

on delete restrict on update cascade;

alter table Uses add constraint foreign key(Cage\_id) references Current\_cages(Cage\_id)

on delete restrict on update cascade;

alter table Uses add constraint foreign key(Member\_id) references Lab\_member(Member\_id)

on delete restrict on update cascade;

load.sql

Because the tuples in relation Uses is automatically generated by queries on the Current\_cages relation and we don’t have a usage history kept in the lab, no data will be loaded into Use initially.

use proj1;

LOAD DATA LOCAL INFILE "Current\_cages.csv"

INTO TABLE Current\_cages

FIELDS TERMINATED BY ",";

LOAD DATA LOCAL INFILE "Lab\_member"

INTO TABLE Lab\_member

FIELDS TERMINATED BY ",";

LOAD DATA LOCAL INFILE "Strain.csv"

INTO TABLE Strain

FIELDS TERMINATED BY ",";