Information System - Lab work 8

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1 Requirement

A Non-Government Organization (NGO) wants to prepare a database for all its projects. It has diverse head offices in several countries which take manage and coordinate the projects of that country.
On head offices, an identifier, the city and country where it is located, its address, a phone number and the name of the director are stored. Every head office manages a set of projects, with a code, a title, dates of beginning and end, the assigned budget and the name of the person in charge. One project is formed by a set of actions that can affect to several cities.
We want to know what actions are realised in each city, storing its name, country and no of inhabitants. We also need an identifier to differentiate them. Also there is wished the investment of the project that corresponds to the city and a small description of the action.

2 Design Database

2.1 Determine concepts that needs to be stored

- Head_Office
- Projects
- Actions
- Cities
- Directors

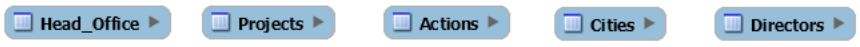


Figure 1: Concepts

2.2 Determine attributes of each concept

- Head_Office(HO_id, address, phone_no)
- Projects(code, title, from_date, to_date, budget)
- Actions(action_id, name, wished_investment, description)
- Cities(city_id, name, country, no_of_habitants)
- Directors(id, name, gender, email, address)

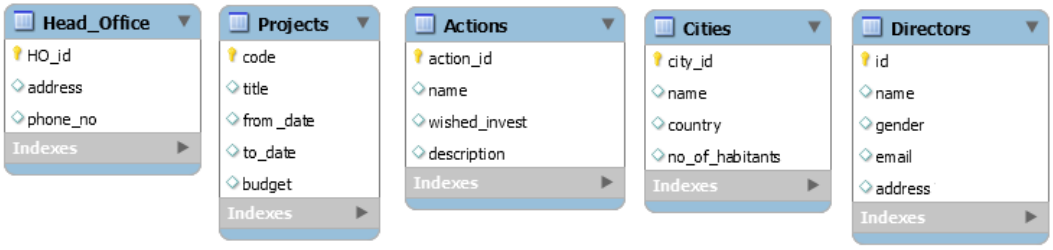


Figure 2: Attributes

2.3 Determine links (relationships) between them

- Head_Office and Directors ("in charge")
- Head_Office and Cities ("situated in")
- Projects and Actions ("have")
- Directors and Projects ("in charge")
- Actions and Cities ("implement")

2.4 Determine types of each concept attribute

- Head_Office
  - HO_id INT
  - address VARCHAR(100)
  - phone_no INT
- Projects
  - code INT
  - title VARCHAR(50)
  - from_date DATE

  - to_date DATE
  - budget INT

- Actions
  - action_id INT
  - address VARCHAR(50)
  - wished_invest INT
  - description VARCHAR(250)

- Cities
  - city_id INT
  - name VARCHAR(45)
  - country VARCHAR(45)
  - no_of_habitants INT

- Directors
  - id INT
  - name VARCHAR(45)
  - gender ENUM("M","F")
  - email VARCHAR(50)
  - address VARCHAR(100)

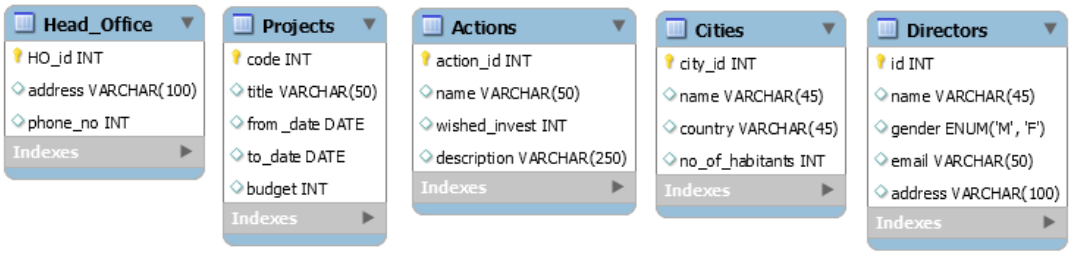


Figure 3: Type of attributes

2.5 Solve foreign key links

- Head_Office
  - HO_id INT
  - address VARCHAR(100)
  - phone_no INT

  - Cities_city_id INT

- Projects
  - code INT
  - title VARCHAR(50)
  - from_date DATE
  - to_date DATE
  - budget INT
  - Directors_id INT

- Actions
  - action_id INT
  - address VARCHAR(50)
  - wished_invest INT
  - description VARCHAR(250)
  - Projects_code INT
  - Cities_city_id INT

- Cities
  - city_id INT
  - name VARCHAR(45)
  - country VARCHAR(45)
  - no_of_habitants INT

- Directors
  - id INT
  - name VARCHAR(45)
  - gender ENUM("M","F")
  - email VARCHAR(50)
  - address VARCHAR(100)
  - HO_id INT

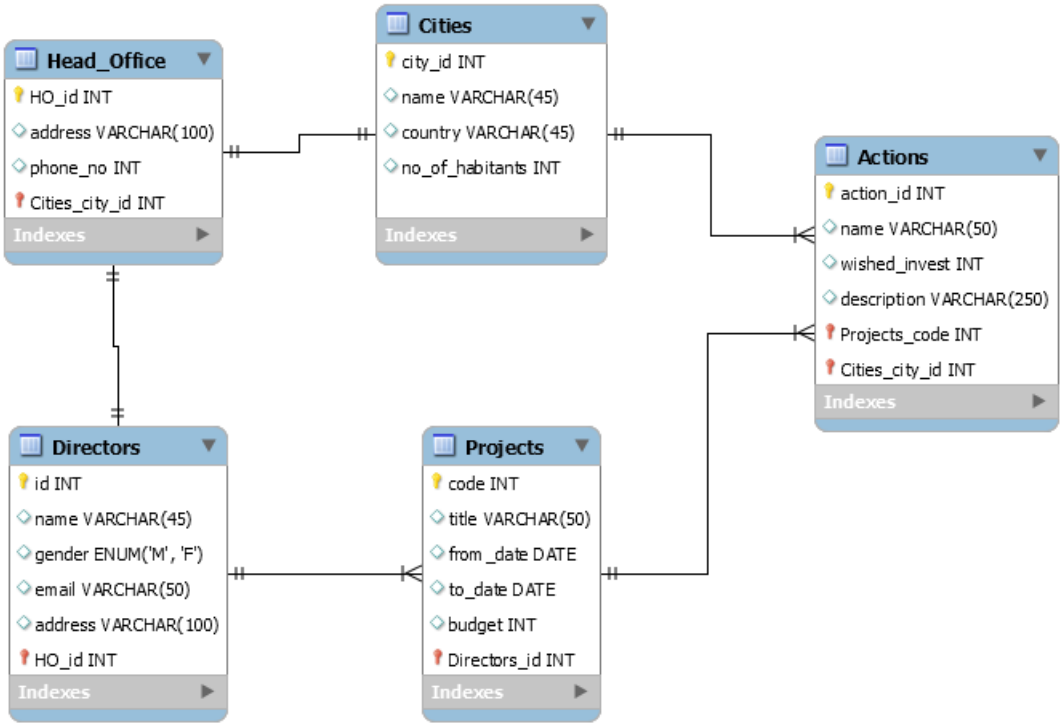
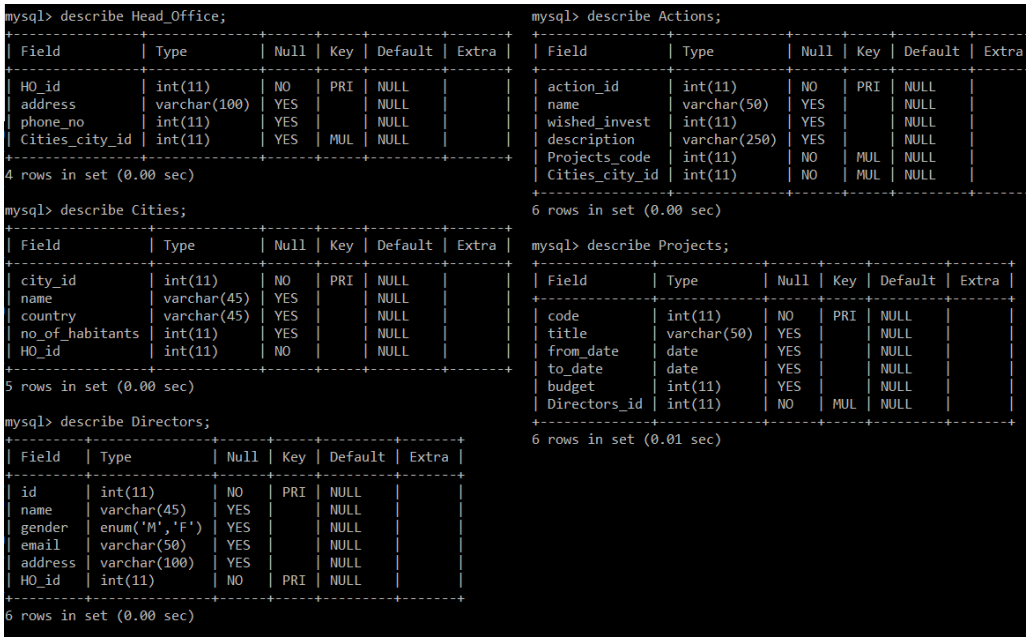


Figure 4: Solve foreign key links

2.6 Implementation

```
CREATE DATABASE NGO1;
USE NGO1;

CREATE TABLE Cities (
   city_id INT NOT NULL,
   name VARCHAR(45) ,
   country VARCHAR(45) ,
   no_of_habitants INT ,
   HO_id INT NOT NULL,
   PRIMARY KEY (city_id)
);

CREATE TABLE Head_Office (
   HO_id INT NOT NULL,
   address VARCHAR(100),
   phone_no INT,
   Cities_city_id INT,
```

```
  PRIMARY KEY (HO_id),
  FOREIGN KEY (Cities_city_id)
  REFERENCES Cities(city_id)
);


CREATE TABLE Directors (
  id INT NOT NULL,
  name VARCHAR(45),
  gender ENUM('M', 'F'),
  email VARCHAR(50),
  address VARCHAR(100),
  HO_id INT NOT NULL,
  PRIMARY KEY (id, HO_id),
  FOREIGN KEY (HO_id)
  REFERENCES Head_Office(HO_id)
);


CREATE TABLE Projects (
  code INT NOT NULL,
  title VARCHAR(50),
  from_date DATE,
  to_date DATE,
  budget INT NULL,
  Directors_id INT NOT NULL,
  PRIMARY KEY (code),
  FOREIGN KEY (Directors_id)
  REFERENCES Directors(id)
);


CREATE TABLE Actions (
  action_id INT NOT NULL,
  name VARCHAR(50),
  wished_invest INT,
  description VARCHAR(250) NULL,
  Projects_code INT NOT NULL,
  Cities_city_id INT NOT NULL,
  PRIMARY KEY (action_id),
  FOREIGN KEY (Projects_code)
  REFERENCES Projects(code),
  FOREIGN KEY (Cities_city_id)
  REFERENCES Cities(city_id)
);
```



```
mysql> describe Head_Office;
+----------------+-------------+------+-----+---------+-------+
| Field          | Type        | Null | Key | Default | Extra |
+----------------+-------------+------+-----+---------+-------+
| HO_id          | int(11)     | NO   | PRI | NULL    |       |
| address        | varchar(100)| YES  |     | NULL    |       |
| phone_no       | int(11)     | YES  |     | NULL    |       |
| Cities_city_id | int(11)     | YES  | MUL | NULL    |       |
+----------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> describe Cities;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| city_id         | int(11)     | NO   | PRI | NULL    |       |
| name            | varchar(45) | YES  |     | NULL    |       |
| country         | varchar(45) | YES  |     | NULL    |       |
| no_of_habitants | int(11)     | YES  |     | NULL    |       |
| HO_id           | int(11)     | NO   |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql> describe Directors;
+---------+---------------+------+-----+---------+-------+
| Field   | Type          | Null | Key | Default | Extra |
+---------+---------------+------+-----+---------+-------+
| id      | int(11)       | NO   | PRI | NULL    |       |
| name    | varchar(45)   | YES  |     | NULL    |       |
| gender  | enum('M','F') | YES  |     | NULL    |       |
| email   | varchar(50)   | YES  |     | NULL    |       |
| address | varchar(100)  | YES  |     | NULL    |       |
| HO_id   | int(11)       | NO   | PRI | NULL    |       |
+---------+---------------+------+-----+---------+-------+
6 rows in set (0.00 sec)

mysql> describe Actions;
+----------------+-------------+------+-----+---------+-------
| Field          | Type        | Null | Key | Default | Extra
+----------------+-------------+------+-----+---------+-------
| action_id      | int(11)     | NO   | PRI | NULL    |
| name           | varchar(50) | YES  |     | NULL    |
| wished_invest  | int(11)     | YES  |     | NULL    |
| description    | varchar(250)| YES  |     | NULL    |
| Projects_code  | int(11)     | NO   | MUL | NULL    |
| Cities_city_id | int(11)     | NO   | MUL | NULL    |
+----------------+-------------+------+-----+---------+-------
6 rows in set (0.00 sec)

mysql> describe Projects;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| code        | int(11)    | NO   | PRI | NULL    |       |
| title       | varchar(50)| YES  |     | NULL    |       |
| from_date   | date       | YES  |     | NULL    |       |
| to_date     | date       | YES  |     | NULL    |       |
| budget      | int(11)    | YES  |     | NULL    |       |
| Directors_id| int(11)    | NO   | MUL | NULL    |       |
+-------------+------------+------+-----+---------+-------+
6 rows in set (0.01 sec)
```

Figure 5: Output