1. Determine the concept that needs to be stored
    - Country
    - City
    - Employee
    - EmpDirector
    - HeadOFfice
    - HeadOfficeEmployees
    - Project
    - ProjectAction
    - ProjectInvestment
2. Determine attributes of each concept
    (a) Country
        - country_id
        - name

    (b) City
        - city_id
        - name
        - inhabitants

    (c) Employee
        - emp_id
        - first_name
        - last_name
        - birth_date
        - gender

    (d) EmpDirector
        - emp_id
        - from_date
        - to_date

    (e) HeadOffice
        - headOffice_id
        - address
        - phone

    (f) HeadOfficeEmployees
        - emp_id
        - from_date

- to_date

(g) Project

- project_id
- title
- budget
- begin_date
- end_date

(h) ProjectAction

- action_id
- name

(i) ProjectInvestment

- project_id
- description

3. Determine links (relationships) between them

- EmpDirector (Is A) Employee
- Country (Has) City
- City (Has) HeadOffice
- HeadOffice (Has) Employee
- HeadOffice (Has) Project
- Employee (Has) Project
- Project (Has) Action
- City (has) Action
- Project (has) Investment

4. Determine types of attributes

(a) Country

- country_id **int**
- name **varchar(30)**

(b) City

- city_id **int**
- name **varchar(30)**
- inhabitants **int**

(c) Employee

- emp_id **int**
- first_name **varchar(30)**
- last_name **varchar(30)**

- birth_date **date**
- gender **char(1)**

(d) EmpDirector

- emp_id **int**
- from_date **date**
- to_date **date**

(e) HeadOffice

- headOffice_id **int**
- address **varchar(100)**
- phone **varchar(30)**

(f) HeadOfficeEmployees

- emp_id **int**
- from_date **date**
- to_date **date**

(g) Project

- project_id **int**
- title **varchar(50)**
- budget **float**
- begin_date **date**
- end_date **date**

(h) ProjectAction

- action_id **int**
- name **varchar(50)**

(i) ProjectInvestment

- project_id **int**
- description **varchar(100)**

5. Solve foreign key links:

(a) add primary key

i. Country

- **country_id int**
- name varchar(30)

ii. City

- **city_id int**
- name varchar(30)
- inhabitants int

iii. Employee

- **emp_id int**

- first_name varchar(30)
- last_name varchar(30)
- birth_date date
- gender char(1)

iv. EmpDirector
- **emp_id int**
- from_date date
- to_date date

v. HeadOffice
- **headOffice_id int**
- address varchar(100)
- phone varchar(30)

vi. HeadOfficeEmployees
- **emp_id int**
- headOffice_id int
- from_date date
- to_date date

vii. Project
- **project_id int**
- title varchar(50)
- budget float
- begin_date date
- end_date date

viii. ProjectAction
- **action_id int**
- name varchar(50)

ix. ProjectInvestment
- **project_id int**
- description varchar(100)

(b) add foreign key for n-n
- **NONE**

(c) add foreign key for 1-n

i. Country
- country_id int
- name varchar(30)

ii. City
- city_id int
- **country_id int**
- name varchar(30)

- inhabitants int

iii. Employee
- emp_id int
- first_name varchar(30)
- last_name varchar(30)
- birth_date date
- gender char(1)

iv. EmpDirector
- **emp_id int**
- from_date date
- to_date date

v. HeadOffice
- headOffice_id int
- **city_id int**
- **emp_id int**
- address varchar(100)
- phone varchar(30)

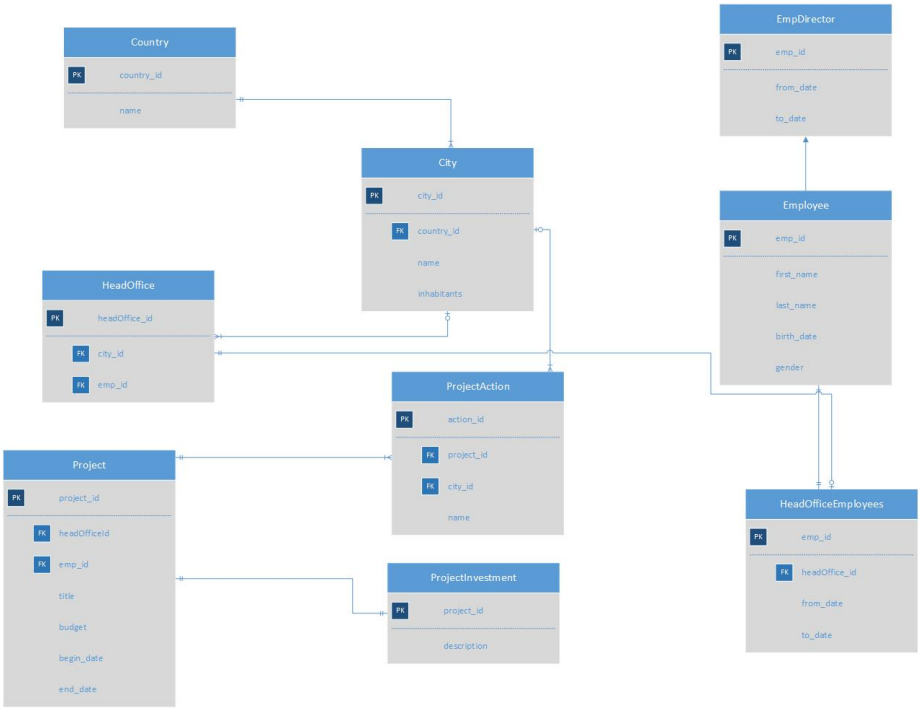
vi. HeadOfficeEmployees
- **emp_id int**
- **headOffice_id int**
- from_date date
- to_date date

vii. Project
- project_id int
- **headOffice_id int**
- **emp_id int**
- title varchar(50)
- budget float
- begin_date date
- end_date date

viii. ProjectAction
- action_id int
- **project_id int**
- **city_id int**
- name varchar(50)

ix. ProjectInvestment
- **project_id int**
- description varchar(100)

6. EERD Diagram



7. Implementation

   (a) Database

   ```
   CREATE database NGODB;
   ```

   (b) Tables

   ```
   CREATE TABLE Country(
   country_id int primary key auto_increment,
   name varchar(30)
   );

   CREATE TABLE City(
   city_id int primary key auto_increment,
   country_id int,
   name varchar(30),
   inhabitants int,
   foreign key(country_id) references Country(country_id)
   );

   CREATE TABLE Employee(
   ```

```
emp_id int primary key auto_increment,
first_name varchar(30),
last_name varchar(30),
birth_date date,
gender char(1)
);

CREATE TABLE EmpDirector(
emp_id int primary key,
from_date date,
to_date date,
foreign key(emp_id) references Employee(emp_id)
);

CREATE TABLE HeadOffice(
headoffice_id int primary key auto_increment,
city_id int,
emp_id int,
address varchar(100),
phone varchar(30),
foreign key(city_id) references City(city_id),
foreign key(emp_id) references EmpDirector(emp_id)
);

CREATE TABLE HeadOfficeEmployees(
emp_id int primary key,
headoffice_id int,
from_date date,
to_date date,
foreign key(emp_id) references Employee(emp_id),
foreign key(headoffice_id) references HeadOffice(headoffice_id)
);

CREATE TABLE Project(
project_id int primary key auto_increment,
headoffice_id int,
emp_id int,
title varchar(50),
budget float,
begin_date date,
end_date date,
foreign key(headoffice_id) references HeadOffice(headoffice_id),
foreign key(emp_id) references Employee(emp_id)
);

CREATE TABLE ProjectAction(
```

```
action_id int primary key auto_increment,
project_id int,
city_id int,
name varchar(50),
foreign key(project_id) references Project(project_id),
foreign key(city_id) references City(city_id)
);

CREATE TABLE ProjectInvestment(
project_id int primary key,
description varchar(100),
foreign key(project_id) references Project(project_id)
);
```

(c) Show Tables

```
SHOW tables;

+---------------------+
| Tables_in_ngodb     |
+---------------------+
| city                |
| country             |
| empdirector         |
| employee            |
| headoffice          |
| headofficeemployees |
| project             |
| projectaction       |
| projectinvestment   |
+---------------------+
9 rows in set (0.00 sec)
```