

Код для создания таблиц:

```
CREATE TABLE City (
    Name VARCHAR(40),
    Population INT,
    Area INT,
    Country VARCHAR(40),
    PRIMARY KEY(Name)
);
CREATE TABLE Country (
    Name VARCHAR(40),
    Population INT,
    Area INT,
    Capital VARCHAR(40),
    PRIMARY KEY(Name)
);
CREATE TABLE Festival (
    Name VARCHAR(40),
    City VARCHAR(40),
    Places INT,
    Country VARCHAR(40),
    Organizer VARCHAR(40),
    PRIMARY KEY(Name)
);
CREATE TABLE FestivalOrganizer (
    Name VARCHAR(40),
    AccreditationCountry VARCHAR(40),
    PRIMARY KEY(Name, AccreditationCountry)
);
```

Код для заполнения таблиц:

```
INSERT INTO Country VALUE ('Russia', 142200000, 17098242, 'Moscow');
INSERT INTO Country VALUE ('Denmark', 5532531, 43094, 'Copenhagen');
INSERT INTO Country VALUE ('Finland', 5502138, 338145, 'Helsinki');
INSERT INTO Country VALUE ('Germany', 81757600, 357022, 'Berlin');
INSERT INTO Country VALUE ('Iceland', 318452, 103000, 'Reykjavik');
INSERT INTO Country VALUE ('Italy', 60200060, 301318, 'Roma');
INSERT INTO Country VALUE ('Japan', 127387000, 377873, 'Tokyo');
INSERT INTO Country VALUE ('France', 62793432, 551500, 'Paris');
INSERT INTO Country VALUE ('Netherlands', 17110000, 41526, 'Amsterdam');
INSERT INTO Country VALUE ('Canada', 33740000, 9984670, 'Ottawa');

INSERT INTO City VALUE ('Moscow', 12108257, 1091, 'Russia');
INSERT INTO City VALUE ('Copenhagen', 518574, 456, 'Denmark');
INSERT INTO City VALUE ('Tokyo', 13051965, 2187, 'Japan');
INSERT INTO City VALUE ('Helsinki', 588941, 715, 'Finland');
INSERT INTO City VALUE ('Paris', 2233818, 105, 'France');
INSERT INTO City VALUE ('Amsterdam', 790044, 219, 'Netherlands');
INSERT INTO City VALUE ('Ottawa', 883391, 2790, 'Canada');
INSERT INTO City VALUE ('Roma', 2870493, 1287, 'Italy');
INSERT INTO City VALUE ('Reykjavik', 118814, 275, 'Iceland');
INSERT INTO City VALUE ('Berlin', 3490800, 892, 'Germany');
INSERT INTO City VALUE ('Kagoshima', 606153, 547, 'Japan');
INSERT INTO City VALUE ('Samara', 1170910, 382, 'Russia');
INSERT INTO City VALUE ('Munich', 1526149, 310, 'Germany');

INSERT INTO Festival VALUE ('Ultra', 'Moscow', 2, 'Russia', 'SuperOrg');
INSERT INTO Festival VALUE ('Tomorrowland', 'Roma', 2, 'Italy', 'MadBird');
INSERT INTO Festival VALUE ('ElectDaisy', 'Berlin', 2, 'Germany', 'MadBird');
INSERT INTO Festival VALUE ('JazzHeritage', 'Paris', 2, 'France', 'SamIzdat');
INSERT INTO Festival VALUE ('Essence', 'Paris', 2, 'France', 'SamIzdat');
INSERT INTO Festival VALUE ('RockTokyo', 'Tokyo', 2, 'Japan', 'JapOrganize');
INSERT INTO Festival VALUE ('Summerfest', 'Ottawa', 2, 'Canada', 'SuperOrg');
INSERT INTO Festival VALUE ('Maazine', 'Helsinki', 2, 'Finland', 'YoungHome');
INSERT INTO Festival VALUE ('Donaunselfest', 'Roma', 2, 'Italy', 'YoungHome');
INSERT INTO Festival VALUE ('OknaOtkroi', 'Moscow', 2, 'Russia', 'SamIzdat');
```

```

INSERT INTO FestivalOrganizer VALUE ('SuperOrg','Russia');
INSERT INTO FestivalOrganizer VALUE ('SamIzdat','Russia');
INSERT INTO FestivalOrganizer VALUE ('MadBird','Italy');
INSERT INTO FestivalOrganizer VALUE ('MadBird','Germany');
INSERT INTO FestivalOrganizer VALUE ('SuperOrg','Canada');
INSERT INTO FestivalOrganizer VALUE ('YoungHome','Finland');
INSERT INTO FestivalOrganizer VALUE ('YoungHome','Italy');
INSERT INTO FestivalOrganizer VALUE ('JapOrganize','Japan');
INSERT INTO FestivalOrganizer VALUE ('MadBird','Iceland');
INSERT INTO FestivalOrganizer VALUE ('SamIzdat','France');

```

Код для добавление внешних ключей:

```

ALTER TABLE City ADD CONSTRAINT FOREIGN KEY (Country)
REFERENCES Country(Name);

```

```

ALTER TABLE Country ADD CONSTRAINT FOREIGN KEY (Capital)
REFERENCES City(Name);

```

```

ALTER TABLE Festival ADD CONSTRAINT FOREIGN KEY (City)
REFERENCES City(Name);

```

```

ALTER TABLE Festival ADD CONSTRAINT FOREIGN KEY (Country)
REFERENCES Country(Name);

```

```

ALTER TABLE FestivalOrganizer ADD CONSTRAINT FOREIGN KEY (AccreditationCountry)
REFERENCES Country(Name);

```

```

ALTER TABLE Festival ADD CONSTRAINT FOREIGN KEY (Country,Organizer)
REFERENCES FestivalOrganizer(AccreditationCountry,Name);

```

Результаты:

1) SHOW CREATE TABLE <tableName>

```

| Country | CREATE TABLE `Country` (
  `Name` varchar(40) NOT NULL,
  `Population` int(11) DEFAULT NULL,
  `Area` int(11) DEFAULT NULL,
  `Capital` varchar(40) DEFAULT NULL,
  PRIMARY KEY (`Name`),
  KEY `Capital` (`Capital`),
  CONSTRAINT `country_ibfk_1` FOREIGN KEY (`Capital`) REFERENCES `City` (`Name`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |

| City | CREATE TABLE `City` (
  `Name` varchar(40) NOT NULL,
  `Population` int(11) DEFAULT NULL,
  `Area` int(11) DEFAULT NULL,
  `Country` varchar(40) DEFAULT NULL,
  PRIMARY KEY (`Name`),
  KEY `Country` (`Country`),
  CONSTRAINT `city_ibfk_1` FOREIGN KEY (`Country`) REFERENCES `Country` (`Name`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |

| Festival | CREATE TABLE `Festival` (
  `Name` varchar(40) NOT NULL,
  `City` varchar(40) DEFAULT NULL,
  `Places` int(11) DEFAULT NULL,
  `Country` varchar(40) DEFAULT NULL,
  `Organizer` varchar(40) DEFAULT NULL,
  PRIMARY KEY (`Name`),
  KEY `City` (`City`),
  KEY `Country` (`Country`,`Organizer`),
  CONSTRAINT `festival_ibfk_1` FOREIGN KEY (`City`) REFERENCES `City` (`Name`),
  CONSTRAINT `festival_ibfk_2` FOREIGN KEY (`Country`) REFERENCES `Country` (`Name`),
  CONSTRAINT `festival_ibfk_3` FOREIGN KEY (`Country`,`Organizer`) REFERENCES `FestivalOrganizer` (`AccreditationCountry`,`Name`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |

| FestivalOrganizer | CREATE TABLE `FestivalOrganizer` (
  `Name` varchar(40) NOT NULL,
  `AccreditationCountry` varchar(40) NOT NULL,
  PRIMARY KEY (`Name`,`AccreditationCountry`),
  KEY `AccreditationCountry` (`AccreditationCountry`),
  CONSTRAINT `festivalorganizer_ibfk_1` FOREIGN KEY (`AccreditationCountry`) REFERENCES `Country` (`Name`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |

```

2) SELECT * FROM <tableName>

```
[mysql> SELECT * FROM Country;
```

Name	Population	Area	Capital
Canada	33740000	9984670	Ottawa
Denmark	5532531	43094	Copenhagen
Finland	5502138	338145	Helsinki
France	62793432	551500	Paris
Germany	81757600	357022	Berlin
Iceland	318452	103000	Reykjavik
Italy	60200060	301318	Roma
Japan	127387000	377873	Tokyo
Netherlands	17110000	41526	Amsterdam
Russia	142200000	17098242	Moscow

10 rows in set (0,00 sec)

```
[mysql> SELECT * FROM City
```

```
[ -> ;
```

Name	Population	Area	Country
Amsterdam	790044	219	Netherlands
Berlin	3490800	892	Germany
Copenhagen	518574	456	Denmark
Helsinki	588941	715	Finland
Kagoshima	606153	547	Japan
Moscow	12108257	1091	Russia
Munich	1526149	310	Germany
Ottawa	883391	2790	Canada
Paris	2233818	105	France
Reykjavik	118814	275	Iceland
Roma	2870493	1287	Italy
Samara	1170910	382	Russia
Tokyo	13051965	2187	Japan

```
[mysql> SELECT * FROM Festival;
```

Name	City	Places	Country	Organizer
Donaunselfest	Roma	2	Italy	YoungHome
ElectDaisy	Berlin	2	Germany	MadBird
Essence	Paris	2	France	SamIzdat
JazzHeritage	Paris	2	France	SamIzdat
Maazine	Helsinki	2	Finland	YoungHome
Okna0tkroi	Moscow	2	Russia	SamIzdat
RockTokyo	Tokyo	2	Japan	JapOrganize
Summerfest	Ottawa	2	Canada	SuperOrg
Tomorrowland	Roma	2	Italy	MadBird
Ultra	Moscow	2	Russia	SuperOrg

```
[mysql> SELECT * FROM FestivalOrganizer;
```

Name	AccreditationCountry
SuperOrg	Canada
YoungHome	Finland
SamIzdat	France
MadBird	Germany
MadBird	Iceland
MadBird	Italy
YoungHome	Italy
JapOrganize	Japan
SamIzdat	Russia
SuperOrg	Russia

10 rows in set (0,00 sec)

Запросы:

1) Вывести информацию по стране, передаваемой в качестве параметра в where (Germany), включающую в себя все города для этой страны с их населением.

```
SELECT City.name, City.population
FROM Country JOIN City ON Country.name=City.Country
WHERE Country.name='Germany';
```

name	population
Berlin	3490800
Munich	1526149

2) Вывести сумму площади по городам в рамках каждой страны.

```
SELECT Country.name, SUM(City.Area)
FROM Country JOIN City ON Country.name=City.Country
GROUP BY Country.name;
```

name	SUM(City.Area)
Canada	2790
Denmark	456
Finland	715
France	105
Germany	1202
Iceland	275
Italy	1287
Japan	2734
Netherlands	219
Russia	1473

3) Вывести все фестивали, которые проводятся в стране с наибольшим населением.

```
SELECT Festival.name
FROM Country JOIN Festival ON Festival.Country=Country.name
WHERE Country.Population=
(SELECT MAX(Country.Population) FROM Country);
```

name
OknaOtkroi
Ultra

4) Вывести все фестивали, которые проводятся в городах с населением большим, чем N (N выбрать самостоятельно, в зависимости от ваших данных).

```
SELECT Festival.name
FROM Festival JOIN City ON City.name=Festival.City
WHERE City.Population>1000000;
```

name
ElectDaisy
OknaOtkroi
Ultra
Essence
JazzHeritage
Donaunselfest
Tomorrowland
RockTokyo

5) Рассчитать среднее население городов в странах, в городах которых проходят 3 крупнейших фестиваля. Крупнейшим считается фестиваль в городе с населением большим, чем во всех остальных городах.

```
//Вспомогательные представления
CREATE VIEW FestCity AS
SELECT City.name, City.Population
FROM City JOIN Festival ON Festival.City=City.Name
WHERE City.Population<
(SELECT MAX(City.Population)
FROM City JOIN Festival ON Festival.City=City.Name);

CREATE VIEW FestCityless AS
SELECT * FROM FestCity
WHERE FestCity.Population<
(SELECT MAX(FestCity.Population) FROM FestCity);

CREATE VIEW FestCitylessx2 AS
SELECT * FROM FestCityless
WHERE FestCityless.Population<
(SELECT MAX(FestCityless.Population) FROM FestCityless);

//Сам запрос
SELECT Country.name, AVG(City.Population)
FROM Country JOIN City ON Country.name=City.Country
WHERE City.Name IN
(SELECT City.name
FROM City JOIN Festival ON Festival.City=City.Name
WHERE City.name NOT IN
(SELECT FestCitylessx2.name FROM FestCitylessx2))
GROUP BY Country.name;

//Удаляем вспомогательные представления
DROP VIEW FestCity;
DROP VIEW FestCityless;
DROP VIEW FestCitylessx2;
```

