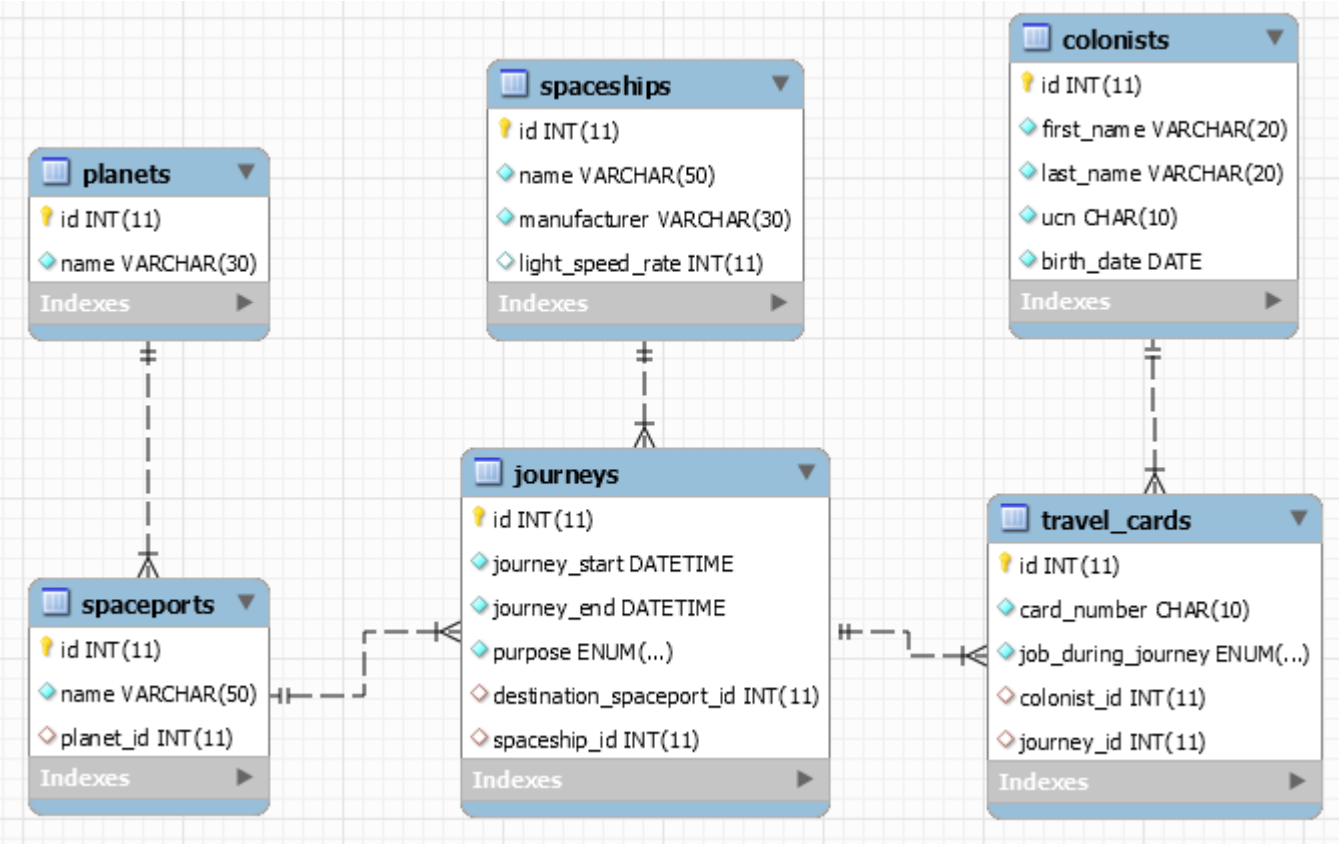
Database Basics (MySQL) Exam

Colonial Journey Management System

2000 years from now, the known space is colonized by the human race. However, the four Citadel Council races are planning to populate new home worlds in the SoftUnia Galaxy as part of a strategy called the SoftUnia Initiative. 20000 citizens are send aboard space transportation vessels. The Council has asked you to create a Colonization Management system so they can keep track of the colonists' journeys trough the stars.

1. Section: Database Overview

You have given an Entity / Relationship Diagram of the CJMS Database:



The CJMS Database holds information about colonists, their travel cards, information about the journeys, types of space vessels and destination planets. Your task is to create a database called **colonial_journey_management_system_db**. Then you will have to create several **tables**.

- **planets** – contains information about **planets**.
- **spaceports** – contains information about **space ports**.
- **spaceships –** contains information about **space ships**.
- **colonists –** contains information about **colonists**.
- **journeys –** contains information about **journeys**.
- **travel_ cards –** contains information about **travel cards**.

Make sure you implement the whole database correctly on your local machine, so that you could work with it.

The instructions you are given will be the minimal needed for you to implement the database.

2. Section: Data Definition Language (DDL) – 40pts

You have been tasked to create the tables in the database by the following models:

planets

Column Name	Data Type	Constraints
`id`	**Integer,** from **1** to **2,147,483,647.**	**Primary Key AUTO_INCREMENT**
`name`	A **string** containing a maximum of **30 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.**

spaceports

Column Name	Data Type	Constraints
`id`	**Integer,** from **1** to **2,147,483,647.**	**Primary Key AUTO_INCREMENT**
`name`	A **string** containing a maximum of **50 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.**
`planet_id`	**Integer,** from **1** to **2,147,483,647.**	Relationship with table **planets.**

spaceships

Column Name	Data Type	Constraints
`id`	**Integer,** from **1** to **2,147,483,647.**	**Primary Key AUTO_INCREMENT**
`name`	A **string** containing a maximum of **50 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.**
`manufacturer`	A **string** containing a maximum of **30 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.**
`light_speed_rate`	**Integer,** from **0** to **2,147,483,647.**	Has a **default value** of 0.

colonists

Column Name	Data Type	Constraints
`id`	**Integer,** from **1** to **2,147,483,647.**	**Primary Key AUTO_INCREMENT**
`first_name`	A **string** containing a maximum of **20 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.**

`last_name`	A **string** containing a maximum of **20 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.**
`ucn`	A **string** containing exactly **10 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.** **UNIQUE** values.
`birth_date`	Date **without** time.	**NULL** is **NOT** permitted**.**

journeys

Column Name	Data Type	Constraints
`id`	**Integer,** from **1** to **2,147,483,647.**	**Primary Key** **AUTO_INCREMENT**
`journey_start`	Date **with** time.	**NULL** is **NOT** permitted**.**
`journey_end`	Date **with** time.	**NULL** is **NOT** permitted**.**
`purpose`	**A string** containing a maximum of **11 characters**. Unicode is **NOT** needed.	Should **only** contain one of the following purposes: "**Medical**", "**Technical**", "**Educational**", "**Military**"
`destination_spaceport_id`	**Integer,** from **1** to **2,147,483,647.**	Relationship with table **spaceports.**
`spaceship_id`	**Integer,** from **1** to **2,147,483,647.**	Relationship with table **spaceships.**

travel_cards

Column Name	Data Type	Constraints
`id`	**Integer,** from **1** to **2,147,483,647.**	**Primary Key** **AUTO_INCREMENT**
`card_number`	A **string** containing exactly **10 characters**. Unicode is **NOT** needed.	**NULL** is **NOT** permitted**.** **UNIQUE** values.
`job_during_journey`	A **string** containing a maximum of **6** characters. Unicode is **NOT** needed.	Should **only** contain one of the following jobs: "**Pilot**", "**Engineer**", "**Trooper**", "**Cleaner**", "**Cook**"
`colonist_id`	**Integer,** from **1** to **2,147,483,647.**	Relationship with table **colonists.**
`journey_id`	**Integer,** from **1** to **2,147,483,647.**	Relationship with table **journeys.**

Submit your solutions in Judge for task 00. Table Design. Submit **all** SQL table creation statements.

You will also be given a **`data.sql`** file. It will contain a **dataset** with random data which you will need to **store** in your **local database**. This data will be given to you so you will not have to think of data and lose essential time in the process. The data is in the form of **INSERT** statement queries.

3. Section: Data Manipulation Language (DML) – 30 pts

Here we need to do several manipulations in the database, like changing data, adding data etc.

01. Data Insertion

You will have to **INSERT** records of data into the **`travel_cards`** table, based on the **colonists** table.

For colonists with id between **96** and **100(inclusive)**, **insert data** in the **travel_cards** table with the following values:

- For **colonists** born after '**1980-01-01**', the **card_number** must be combination between the **year of birth**, **day** and the **first 4 digits** from the **ucn**. For the rest – **year of birth**, **month** and the **last 4 digits** from the **ucn**.
- For **colonists** with **id** that can be divided by **2** without remainder, job must be **'Pilot',** for colonists with id that can be divided by **3** without remainder – '**Cook**', and everyone else – '**Engineer**'.
- **Journey id** is the **first digit** from the colonist's **ucn**.

02. Data Update

UPDATE those journeys' purpose, which meet the following conditions:

- If the journey's **id** is dividable by **2** without remainder – **'Medical'**.
- If the journey's **id** is dividable by **3** without remainder – **'Technical'**.
- If the journey's **id** is dividable by **5** without remainder – **'Educational'**.
- If the journey's **id** is dividable by **7** without remainder – **'Military'**.

03. Data Deletion

REMOVE from **colonists**, those which **are not** assigned to any **journey**.

4. Section: Querying – 100 pts

And now we need to do some data extraction. **Note** that the **example results** from **this section** use a **fresh database**. It is **highly recommended** that you **clear** the **database** that has been **manipulated** by the **previous problems** from the **DML section** and **insert again** the **dataset** you've been given, to ensure **maximum consistency** with the **examples** given in this section.

04. Extract all travel cards

Extract from the database, all **travel cards.** Sort the results by **card number ascending.**

Required Columns

- **card_number**
- **job_during_journey**

Example

card_number	job_during_journey
0032031181	Engineer

0037637193	Engineer
...	...

05. Extract all colonists

Extract from the database, all **colonists.** Sort the results by **first name**, them by **last name**, and finally by **id** in **ascending** order.

Required Columns

- **id**
- **full_name(**first_name + last_name separated by a single space**)**
- **ucn**

Example

id	full_name	ucn
35	Aigneis McConville	9225403496
92	Althea Kelinge	9998159318
...	...	...

06. Extract all military journeys

Extract from the database, all **Military** journeys. Sort the results **ascending** by **journey start.**

Required Columns

- **id**
- **journey_start**
- **journey_end**

Example

id	journey_start	journey_end
7	2019-01-04 23:44:40	2049-12-09 04:00:54
3	2019-02-21 22:06:34	2049-01-03 11:00:22
...	...	...

07.Extract all pilots

Extract from the database all colonists, which have a **pilot job.** Sort the result by **id, ascending.**

Required Columns

- **id**
- **full_name**

Example

id	full_name
6	Clark Cowan
18	Wald Bim
...	...

08.Count all colonists that are on technical journey

Count all colonists, that are on **technical journey.**

Required Columns

- **Count**

Example

count
16

09.Extract the fastest spaceship

Extract from the database the fastest **spaceship** and its destination **spaceport name**. In other words, the ship with the **highest** light speed rate.

Required Columns

- **spaceship_name**
- **spaceport_name**

Example

spaceship_name	spaceport_name
SSE Priestess	Yggdrasil Station

10.Extract spaceships with pilots younger than 30 years

Extract from the database those **spaceships**, which have pilots, **younger** than 30 years old. In other words, 30 years from 01/01/2019. Sort the results **alphabetically** by spaceship **name**.

Required Columns

- **name**
- **manufacturer**

Example

name	manufacturer
Anarchy	Fivebridge
...	...

11. Extract all educational mission planets and spaceports

Extract from the database names of all **planets** and their **spaceports**, which have **educational** missions. Sort the results by **spaceport name** in **descending** order.

Required Columns

- **planet_name**
- **spaceport_name**

Example

planet_name	spaceport_name
Kascarth	Yggdrasil Station
Lescore	Tartarus
...	...

12. Extract all planets and their journey count

Extract from the database all **planets' names** and their **journeys count**. Order the results by journeys **count**, **descending** and by **planet name ascending**.

Required Columns

- **planet_name**
- **journeys_count**

Example

planet_name	journeys_count
Otroyphus	4
Eipra	2
...	...

13.Extract the shortest journey

Extract from the database the **shortest journey,** its destination **spaceport name**, **planet name** and **purpose**.

Required Columns

- **Id**
- **planet_name**
- **spaceport_name**
- **journey_purpose**

Example

id	planet_name	spaceport_name	journey_purpose
3	Casmadus	Minerva Station	Military

14.Extract the less popular job

Extract from the database the **less popular job** in the **longest journey**. In other words, the job with less assign colonists.

Required Columns

- **job_name**

Example

job_name
Engineer

5. Section: Programmability – 30 pts

15. Get colonists count

Create a **user defined function** with the name **udf_count_colonists_by_destination_planet (planet_name VARCHAR (30))** that receives **planet name** and returns the count of all colonists sent to that planet.

Example

Query

`SELECT p.name, udf_count_colonists_by_destination_planet('Otroyphus') AS count`
`FROM planets AS p`
`WHERE p.name = 'Otroyphus';`

name	count
Otroyphus	35

16. Modify spaceship

Create a **user defined stored procedure** with the name **udp_modify_spaceship_light_speed_rate(spaceship_name VARCHAR(50), light_speed_rate_increse INT(11))** that receives a **spaceship name** and **light speed increase value** and increases spaceship light speed **only if** the given spaceship **exists**. If the modifying is not successful **rollback** any changes and throw an **exception** with **error code '45000'** and **message**: "Spaceship you are trying to modify does not exists."

Example

Query
`CALL udp_modify_spaceship_light_speed_rate ('Na Pesho koraba', 1914);` `SELECT name, light_speed_rate FROM spacheships WHERE name = 'Na Pesho koraba'`
Response
Spaceship you are trying to modify does not exists.
Query
`CALL udp_modify_spaceship_light_speed_rate ('USS Templar', 5);` `SELECT name, light_speed_rate FROM spaceships WHERE name = 'USS Templar'`

name	light_speed_rate
USS Templar	11