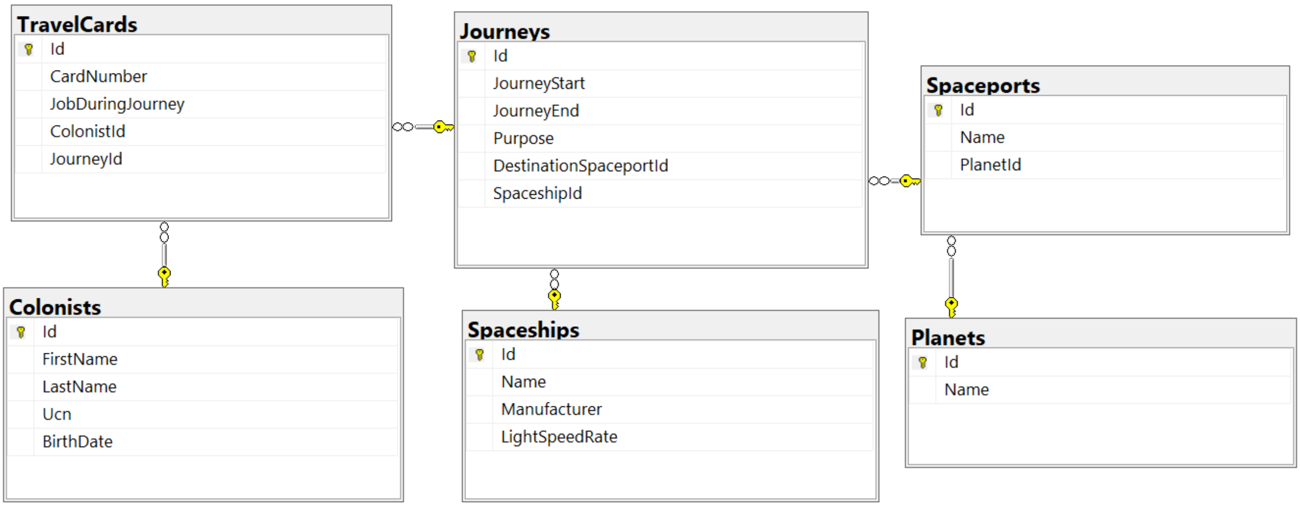
Database Basics (MSSQL) Demo Exam

Colonial Journey

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.

Database Overview

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



The **ColonialJourney** 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 **ColonialJourney**. 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**.
- **TravelCards –** 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.

Section 1. DDL (30 pts)

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

Planets

Column	Data Type	Constraints
Id	**Integer,** from **1** to **2,147,483,647.**	Unique table **identificator**, **Identity**
Name	**String** up to 30 symbols. Non Unicode	**NULL** is **not** allowed

Spaceports

Column	Data Type	Constraints
Id	**Integer,** from **1** to **2,147,483,647.**	Unique table **identificator**, **Identity**
Name	**String** up to 50 symbols. Non Unicode	**NULL** is **not** allowed
PlanetId	**Integer,** from **1** to **2,147,483,647.**	**NULL** is **not** allowed, Relationship with table Planets

Spaceships

Column	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Name	**String** up to 50 symbols. Non Unicode	**NULL** is **not** allowed
Manufacturer	**String** up to 30 symbols. Non Unicode	**NULL** is **not** allowed
LightSpeedRate	**Integer** from **0** to **2,147,483,647**	Has a **default value** of 0.

Colonists

Column	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
FirstName	**String** up to 20 symbols. Non Unicode	**NULL** is **not** allowed
LastName	**String** up to 20 symbols. Non Unicode	**NULL** is **not** allowed
Ucn	**String** up to 10 symbols. Non Unicode	**NULL** is **not** allowed **UNIQUE** values.
BirthDate	**Date**	**NULL** is **not** allowed

Journeys

Column	Data Type	Constraints
`Id`	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
`JourneyStart`	**DateTime**	**NULL** is **not** allowed
`JourneyEnd`	**DateTime**	**NULL** is **not** allowed
`Purpose`	**String** up to 11 symbols. Non Unicode	Should **only** contain one of the following purposes: "**Medical**", "**Technical**", "**Educational**", "**Military**"
`DestinationSpaceportId`	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Spaceports.
`SpaceshipId`	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Spaceships

TravelCards

Column	Data Type	Constraints
`Id`	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
`CardNumber`	A **string** containing exactly **10 characters**.Non Unicode	**NULL** is **not** allowed **UNIQUE** values.
`JobDuringJourney`	**String** up to 8 symbols. Non Unicode	Should **only** contain one of the following jobs: "**Pilot**", "**Engineer**", "**Trooper**", "**Cleaner**", "**Cook**"
`ColonistId`	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Colonists
`JourneyId`	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Journeys

1. Database Design

Submit all of yours **create statements** to the **Judge** system.

Section 2. DML (10 pts)

Before you start, you must import "`DataSet-ColonialJourney.sql`". If you have created the structure correctly, the data should be successfully inserted without any errors.

In this section, you have to do some data manipulations:

2. Insert

Insert sample data into the database. Write a query to add the following records into the corresponding tables. **All Ids should be auto-generated**.

Planets

Name
Mars
Earth
Jupiter
Saturn

Spaceships

Name	Manufacturer	LightSpeedRate
Golf	VW	3
WakaWaka	Wakanda	4
Falcon9	SpaceX	1
Bed	Vidolov	6

3. Update

Update all spaceships light speed rate with 1 where the **Id** is between **8** and **12.**

4. Delete

Delete first three inserted **`Journeys`** (be careful with the relationships).

Section 3. Querying (40 pts)

You need to start with a fresh dataset, so recreate your DB and import the sample data again (`DataSet-ColonialJourney.sql`).

5. Select all travel cards

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

Required Columns

- **CardNumber**
- **JobDuringJourney**

Example

CardNumber	JobDuringJourney
0032031181	Engineer
0037637193	Engineer
...	...

6. Select 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**
- **FullName**
- **Ucn**

Example

Id	FullName	Ucn
35	Aigneis McConville	9225403496
92	Althea Kelinge	9998159318
...	...	...

7. Select all military journeys

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

Required Columns

- **Id**
- **JourneyStart**
- **JourneyEnd**

Example

Id	JourneyStart	JourneyEnd
7	04/01/2019	09/12/2049
3	21/02/2019	03/01/2049

...	...	...

8. Select all pilots

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

`Required Columns

- **Id**
- **FullName**

Example

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

9. Count colonists

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

Required Columns

- **Count**

Example

count
16

10. Select 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

- **SpaceshipName**
- **SpaceportName**

Example

SpaceshipName	SpaceportName
SSE Priestess	Yggdrasil Station

11. Select 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
...	...

12. Select 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

- **PlanetName**
- **SpaceportName**

Example

PlanetName	SpaceportName
Kascarth	Yggdrasil Station
Lescore	Tartarus
...	...

13. Select 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

- **PlanetName**
- **JourneysCount**

Example

PlanetName	JourneysCount
Otroyphus	4

Eipra	2
...	...

14. Select the shortest journey

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

Required Columns

- **Id**
- **PlanetName**
- **SpaceportName**
- **JourneyPurpose**

Example

Id	PlanetName	SpaceportName	JourneyPurpose
3	Casmadus	Minerva Station	Military

15. Select 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

- **JourneyId**
- **JobName**

Example

JourneyId	JobName
7	Engineer

16. Select Second Oldest Important Colonist

Find all colonists and their job during journey with rank 2. Keep in mind that all the selected colonists with rank 2 must be the oldest ones. You can use ranking over their job during their journey.

Required Columns

- **JobDuringJourney**
- **FullName**
- **JobRank**

Example

JobDuringJourney	FullName	JobRank

Cleaner	Hale O'Doireidh	2
Cook	Laurie Askin	2
…	…	…

17. Planets and Spaceports

Find all planets and all of their spaceports. Select planet name and the count of the spaceports. Sort them by spaceports count (descending), then by name (ascending).

Required Columns

- **Name**
- **Count**

Example

Name	Count
Kascarth	4
Jeayama	3
…	…

Section 4. Programmability (20 pts)

18. Get Colonists Count

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

Example

Query	
SELECT dbo.udf_GetColonistsCount('Otroyphus')	
PlanetName	**Count**
Otroyphus	35

19. Change Journey Purpose

Create a **user defined stored procedure**, named **usp_ChangeJourneyPurpose**(**@JourneyId, @NewPurpose**), that receives an **journey id** and **purpose**, and attempts to **change the purpose of that journey**. An purpose will only be changed if all of these conditions **pass**:

- If the **journey id** doesn't exists, then it **cannot be changed. Raise an error** with the message "**The journey does not exist!**"

- If the **journey** has already that purpose, **raise an error** with the message "**`You cannot change the purpose!`**"

If all the above conditions pass, **change the purpose of that journey**.

Example

Query	Output

`EXEC usp_ChangeJourneyPurpose 1, 'Technical'`
`SELECT * FROM Journeys`
	`998`
	`2455`

`EXEC usp_ChangeJourneyPurpose 2, 'Educational'`	`You cannot change the purpose!`
`EXEC usp_ChangeJourneyPurpose 196, 'Technical'`	`The journey does not exist!`

20. Deleted Journeys

Create a new table **"DeletedJourneys**" with columns **(Id, JourneyStart, JourneyEnd, Purpose, DestinationSpaceportId, SpaceshipId)**. Create a **trigger**, which fires when journey is deleted. After deleting the journey, **insert all of the data into the new table "DeletedJourneys"**.

Note: Submit only your **CREATE TRIGGER** statement!

Example

Query

`DELETE FROM TravelCards`
`WHERE JourneyId =  1`
 	
`DELETE FROM Journeys`
`WHERE Id =  1`

Response

`(5 rows affected)`
`(1 rows affected)`
`(1 rows affected)`