# Database Basics MS SQL Retake Exam – 10 Dec 2021

**Exam problems for the** [**"Database Basics" course @ SoftUni**](https://softuni.bg/trainings/3531/ms-sql-september-2021)**.**

**Submit your solutions in the SoftUni Judge system at the** [**judge**](https://judge.softuni.org/Contests/3301/Databases-MSSQL-Server-Retake-Exam-10-Dec-2021)**.**

# Section 1. DDL (30 pts)

You have been given the E/R Diagram of the **Airport**



Create a database called **Airport**. You need to create **7 tables**:

* **Passengers** – contains information about the **passenger**
  + Each passenger has a full name column and an email column
* **Pilots** – contains information about the **pilot**
  + Each pilot has first and last name columns, an age column, and a rating column
* **AircraftTypes** – contains information about the **aircraft type**
  + Contains the name of the type of aircraft
* **Aircraft** – contains information about the **aircraft**
  + Each aircraft has a **manufacturer**, a model column, a year column, a **flight hours** column, a condition column, and an **aircraft type** column
* **PilotsAircraft** – a many to many mapping tables between the **aircraft** and the **pilots**
  + Have composite primary key from the **AircraftId** column and the **PilotId** column
* **Airports** – contains information about airport **name** and the **country**
* **FlightDestinations** – contains information about the **flight destination**
  + Each **flight destination** has an **airport Id** column, a start column, an **aircraft** Id column, a passenger Id column, and a price of the ticket column

**Passengers**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Id | Integer from 0 to 2,147,483,647. | PK, Unique table identification, Identity |
| FullName | String up to 100 symbols. | Unique, null is **not** allowed. |
| Email | String up to 50 symbols. | Unique, null is **not** allowed. |

**Pilots**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Id | Integer from 0 to 2,147,483,647. | PK, Unique table identification, Identity |
| FirstName | String up to 30 symbols. | Unique, null is **not** allowed. |
| LastName | String up to 30 symbols. | Unique, null is **not** allowed. |
| Age | Tinyint | Age should be between 21 and 62 both inclusively, null is **not** allowed |
| Rating | **Floating point** number. | Rating should be between 0.0 and 10.0 both inclusively, null **is** allowed. |

**AircraftTypes**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Id | Integer from 0 to 2,147,483,647. | PK, Unique table identification, Identity |
| TypeName | String up to 30 symbols. | Unique, null is **not** allowed. |

**Aircraft**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Id | Integer from 0 to 2,147,483,647. | PK, Unique table identification, Identity |
| Manufacturer | String up to 25 symbols. | Null is **not** allowed. |
| Model | String up to 30 symbols. | Null is **not** allowed. |
| Year | Integer from 0 to 2,147,483,647. | Null is **not** allowed. |
| FlightHours | Integer from 0 to 2,147,483,647. | Null **is** allowed. |
| Condition | **A character** that shows the **condition** of the aircraft. One character. | Null is **not** allowed. |
| TypeId | Integer from 0 to 2,147,483,647 | Relationship with table AircraftTypes. Null is **not** allowed. |

**PilotsAircraft**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| AircraftId | Integer from 0 to 2,147,483,647. | PK, Unique table identification, Relationship with table Aircraft, null **is not** allowed. |
| PilotId | Integer from 0 to 2,147,483,647. | PK, Unique table identification, Relationship with table Pilots, null **is not** allowed. |

**Airports**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Id | Integer from 0 to 2,147,483,647. | PK, Unique table identification, Identity. |
| AirportName | String up to 70 symbols. | Unique, null is **not** allowed. |
| Country | String up to 100 symbols. | Unique, null is **not** allowed. |

**FlightDestinations**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Id | Integer from 0 to 2,147,483,647 | PK, Unique table identification, Identity. |
| AirportId | Integer from 0 to 2,147,483,647 | Relationship with table Airports. Null is **not** allowed. |
| Start | The **DateTime** when the flight starts | Null is **not** allowed. |
| AircraftId | Integer from 0 to 2,147,483,647 | Relationship with table Aircraft. Null is **not** allowed. |
| PassengerId | Integer from 0 to 2,147,483,647 | Relationship with table Passengers. Null is **not** allowed. |
| TicketPrice | **DECIMAL**, up to **18 digits**, **2** of which after the **decimal point**. | **The DEFAULT value** is 15, null is **not** allowed. |

**N.B: Keep in mind that Judge doesn’t accept the “ALTER” statement and square brackets naming when the names are not keywords.**

## Database design

Submit all of your **created** **statements** to Judge (only creation of tables).

# Section 2. DML (10 pts)

**Before you start you have to import "*DDL\_Dataset.sql* ". If you have created the structure correctly the data should be successfully inserted.**

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

## Insert

Write a query to insert data into the **Passengers** table, based on the **Pilots** table.For all **Pilots** with an **id between 5 and 15** (**both** **inclusive**), **insert data** in the **Passengers** table with the **following values**:

* **FullName**  –get the first and last name of the pilot separated by a single space
  + **Example** – **'Lois Leidle'**
* **Email** – set it to start with **full name with no space** and add **'C' - 'FullName@gmail.com'**
  + **Example** – **'LoisLeidle@gmail.com'**

## Update

Update all **Aircraft, which**:

* Have a condition of **'C'** or **'B'** and
* Have **FlightHours Null** or **up to** **100 (inclusive)** and
* Have **Year** after 2013 **(inclusive)**

By setting their **condition** to **'A'**.

## Delete

Delete every passenger whose **FullName** **is up to** 10 characters (**inclusive) long**.

# Section 3. Querying (40 pts)

**You need to start with a fresh dataset, so recreate your DB and import the sample data again (01. DDL\_Dataset.sql).**

## Aircraft

Extract information about all the **Aircraft**. **Order** the results by **aircraft’s FlightHours descending.**

Required columns:

* **Manufacturer**
* **Model**
* **FlightHours**
* **Condition**

### Example:

|  |  |  |  |
| --- | --- | --- | --- |
| **Manufacturer** | **Model** | **FlightHours** | **Condition** |
| Northrop Grumman | Bat | 149039 | C |
| Airbus | A330 | 999 | B |
| Rolls-Royce Holdings | Trent 900 | 958 | B |
| GE Aviation | CF6 | 936 | C |
| Boeing | BBJ | 925 | C |
| Northrop Grumman | X-47A Pegasus | 906 | B |
| … | … | … | … |

## Pilots and Aircraft

Select **pilots** and **aircraft** that they operate. Extract the pilot’s **First**, **Last** names, **aircraft’s Manufacturer**, **Model,** and **FlightHours**. **Skip** all plains with **NULLs and up to 304 FlightHours**. **Order** the result by the **FlightHours** in **descending** order, then by the pilot’s **FirstName** **alphabetically**.

Required columns:

* **FirstName**
* **LastName**
* **Manufacturer**
* **Model**
* **FlightHours**

### Example:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FirstName** | **LastName** | **Manufacturer** | **Model** | **FlightHours** |
| Genna | Jaquet | Safran | SaM146 | 303 |
| Jaynell | Kidson | Safran | SaM146 | 303 |
| Lexie | Salasar | Safran | SaM146 | 303 |
| Roddie | Gribben | Safran | SaM146 | 303 |
| Delaney | Stove | GE Aviation | CT10 | 275 |
| Crosby | Godlee | Lockheed Martin | F-22 Raptor | 271 |
| … | … | … | … | … |

## Top 20 Flight Destinations

Select top **20 flight destinations**, where **Start** **day** is an even number. Extract **DestinationId, Start date**, **passenger's FullName**, **AirportName,** and **TicketPrice**. Order the result by **TicketPrice descending**, then by **AirportName ascending**.

Required columns:

* **DestinationId**
* **Start**
* **FullName (passenger)**
* **AirportName**
* **TicketPrice**

### Example:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DestinationId** | **Start** | **FullName** | **AirportName** | **TicketPrice** |
| 95 | 2020-07-02 15:27:47.000 | Cullan Dogerty | Kisangani Bangoka International Airport | 5048.89 |
| 9 | 2020-02-06 22:32:14.000 | Lanita Crockatt | Providenciales Airport | 4100.49 |
| 56 | 2021-02-20 21:04:53.000 | Gaye Sillars | Netaji Subhas Chandra Bose International Airport | 4002.21 |
| 55 | 2021-02-28 13:13:55.000 | Zeke Rowston | Sir Seretse Khama International Airport | 3700.65 |
| 32 | 2020-09-10 01:55:19.000 | Jacquelynn Plackstone | Bujumbura International Airport | 3690.22 |
| 38 | 2020-11-28 17:58:40.000 | Jeralee Tue | Winnipeg James Armstrong Richardson International Airport | 3390.81 |
| … | … | … | … | … |

## Number of Flights for Each Aircraft

Extract information about all the **Aircraft** and the **count** of their **FlightDestinations**. Display **average** **ticket price** (**AvgPrice**) of each flight destination by the **Aircraft**, rounded to the second digit. **Take only** the aircraft with **at least 2** **FlightDestinations**. **Order** the results by **count** of **flight destinations descending,** then bythe **aircraft’s id ascending**.

Required columns:

* **AircraftId**
* **Manufacturer**
* **FlightHours**
* **FlightDestinationsCount**
* **AvgPrice**

### Example:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AircraftId** | **Manufacturer** | **FlightHours** | **FlightDestinationsCount** | **AvgPrice** |
| 13 | Safran | 849 | 4 | 3208.200000 |
| 80 | Lockheed Martin | 714 | 4 | 1743.140000 |
| 1 | Safran | 559 | 3 | 1347.710000 |
| 8 | Safran | 527 | 3 | 1366.200000 |
| 25 | Northrop Grumman | 414 | 3 | 452.960000 |
| 37 | GE Aviation | 4 | 3 | 896.950000 |
| … | … | … | … | … |

## Regular Passengers

Extract **all passengers**, who have flown in **more than one aircraft** and have an '**a**' as the second letter of their full name. Select the **full name**, the **count of aircraft** that he/she traveled, and the total sum which was **paid**.

Order the result by passenger's **FullName**.

Required columns:

* FullName
* CountOfAircraft
* TotalPayed

### Example:

|  |  |  |
| --- | --- | --- |
| **FullName** | **CountOfAircraft** | **TotalPayed** |
| Danny Simoneau | 2 | 7587.68 |
| Haven Seaton | 2 | 5390.92 |
| Jacquelynn Plackstone | 2 | 4398.36 |
| Kaylee Coushe | 4 | 4286.71 |
| Lanita Crockatt | 2 | 4704.12 |
| Parker McGeorge | 4 | 3896.57 |
| … | … | … |

## Full Info for Flight Destinations

Extract information about **all flight destinations** which **Start** between hours: **6:00** and **20:00** (both inclusive) and have ticket prices **higher than 2500**. Select the **airport's name, time of the day,** **price of the ticket**, passenger's **full name**, **aircraft** **manufacturer**, and aircraft **model**. Order the result by **aircraft model ascending**.

Required columns:

* AirportName
* DayTime
* TicketPrice
* FullName (passenger)
* Manufacturer
* Model

### Example:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **AirportName** | **DayTime** | **TicketPrice** | **FullName** | **Manufacturer** | **Model** |
| N'Djamena International Airport | 2020-09-12 18:14:55.000 | 3096.19 | Owen Strivens | Boeing | 737 |
| Hosea Kutako International Airport | 2020-08-02 15:43:34.000 | 3010.46 | Courtnay Devoy | Boeing | 787 |
| Winnipeg James Armstrong Richardson International Airport | 2020-11-28 17:58:40.000 | 3390.81 | Jeralee Tue | Airbus | A330 |
| Monastir Habib Bourguiba International Airport | 2020-08-23 14:33:46.000 | 4807.43 | Danny Simoneau | Northrop Grumman | B-21 Raider |
| Modibo Keita International Airport | 2021-02-04 14:38:44.000 | 2930.91 | Abbey Pedrinson | Rolls-Royce Holdings | EJ200 |
| King Mswati III International Airport | 2020-06-13 10:53:40.000 | 3190.57 | Juane Gorrynsen | Lockheed Martin | F-117 Nighthawk |
| … | … | … | … | … | … |

# Section 4. Programmability (20 pts)

## Find all Destinations by Email Address

Create a **user-defined function** named **udf\_****FlightDestinationsByEmail(@email)** that receives a **passenger’s email address** and returns the number of **flight destinations** that the passenger has in the database.

### Examples:

|  |
| --- |
| **Query** |
| **SELECT dbo.udf\_FlightDestinationsByEmail ('PierretteDunmuir@gmail.com')** |
| **Output** |
| **1** |

|  |
| --- |
| **Query** |
| **SELECT dbo.udf\_FlightDestinationsByEmail('Montacute@gmail.com')** |
| **Output** |
| **3** |

|  |
| --- |
| **Query** |
| **SELECT dbo.udf\_FlightDestinationsByEmail(****'MerisShale@gmail.com')** |
| **Output** |
| **0** |

## Full Info for Airports

Create a **stored procedure**, named **usp\_SearchByAirportName,** which accepts the following parameters:

* airportName(with max length 70)

Extract information about the **airport locations** with the given **airport name.** The needed data is the **name** of the **airport**, **full name** of the **passenger**, **level of the ticket price** (depends on flight destination’s ticket price: **'Low'**– lower than **400** (inclusive), **'Medium'** – between **401** and **1500** (inclusive), and **'High' –** more than **1501**), **manufacturer** and **condition** of the aircraft, and the **name** of the **aircraft type**.

**Order** the result by **Manufacturer,** then by passenger’s **full** **name**.

Required columns:

* AirportName
* FullName (passenger)
* LevelOfTickerPrice
* Manifacturer
* Condition
* **TypeName (aircraft type)**

### Example:

|  |
| --- |
| **Query** |
| **EXEC usp\_SearchByAirportName 'Sir Seretse Khama International Airport'** |

#### Result

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **AirportName** | **FullName** | **LevelOfTickerPrice** | **Manufacturer** | **Condition** | **TypeName** |
| Sir Seretse Khama International Airport | Alyson Jankowski | Low | Airbus | B | Private Single Engine |
| Sir Seretse Khama International Airport | Bev Wrigglesworth | Medium | Airbus | B | Private Single Engine |
| Sir Seretse Khama International Airport | Kelcy Viccary | High | Airbus | B | Mid-Size Passenger Jets |
| Sir Seretse Khama International Airport | Courtnay Devoy | Low | GE Aviation | B | Heavy Business Jets |
| Sir Seretse Khama International Airport | Joyann Garrettson | Low | Lockheed Martin | A | Twin Turboprops |
| Sir Seretse Khama International Airport | Zeke Rowston | High | Lockheed Martin | A | Private Single Engine |