# Exercises: Built-in Functions

This document defines the **exercise assignments** for the ["Databases Basics - MSSQL" course @ Software University.](https://softuni.bg/trainings/3491/ms-sql-september-2021)

# Part I – Queries for SoftUni Database

## Find Names of All Employees by First Name

Create an SQL query that finds all employees whose **first name starts with** "**Sa**"**. As a result, display "FirstName" and "LastName"**

### Example

|  |  |
| --- | --- |
| **FirstName** | **LastName** |
| Sariya | Harnpadoungsataya |
| Sandra | Reategui Alayo |
| … | … |

SELECT [FirstName], [LastName] FROM [Employees]

WHERE LEFT([FirstName], 2) = 'Sa'

--or--

SELECT [FirstName], [LastName] FROM [Employees]

WHERE SUBSTRING([FirstName], 1, 2) = 'Sa'

--or--

SELECT [FirstName], [LastName] FROM [Employees]

WHERE [FirstName] LIKE 'Sa%'

## Find Names of All employees by Last Name

Create an SQL query that finds all employees whose last **name contains**"**ei**"**. As a result, display "FirstName" and "LastName"**

### Example

|  |  |
| --- | --- |
| **FirstName** | **LastName** |
| Kendall | Keil |
| Christian | Kleinerman |
| … | … |

SELECT [FirstName], [LastName] FROM [Employees]

WHERE CHARINDEX('ei', [LastName]) <> 0

--or--

SELECT [FirstName], [LastName] FROM [Employees]

WHERE [LastName] LIKE '%ei%'

## Find First Names of All Employees

Create an SQL query that finds the **first names** of all employees which **department** **ID is 3 or 10,** and **the hire year** is **between 1995 and 2005 inclusive**.

### Example

|  |
| --- |
| **FirstName** |
| Deborah |
| Wendy |
| Candy |
| … |

SELECT [FirstName] FROM [Employees]

WHERE [DepartmentID] IN (3, 10) AND YEAR([HireDate]) BETWEEN 1995 AND 2005

## Find All Employees Except Engineers

Create an SQL query that finds the **first**and**last names** of every employee which **job titles do not contain** "**engineer**".

### Example

|  |  |
| --- | --- |
| **FirstName** | **LastName** |
| Guy | Gilbert |
| Kevin | Brown |
| Rob | Walters |
| … | … |

## Find Towns with Name Length

Create an SQL query that finds town names **5** or **6 symbols long.** **Order** the result **alphabetically by town name**.

### Example

|  |
| --- |
| **Name** |
| Berlin |
| Duluth |
| Duvall |
| … |

SELECT [Name] FROM [Towns]

WHERE LEN([Name]) IN (5, 6)

ORDER BY [Name]

--or--

SELECT [Name] FROM [Towns]

WHERE DATALENGTH([Name]) IN (5, 6)

ORDER BY [Name]

## Find Towns Starting With

Create an SQL query that finds all towns with names **starting with** **M**, **K**, **B**, or **E**. Order the result **alphabetically** by town name.

### Example

|  |  |
| --- | --- |
| **TownID** | **Name** |
| 5 | Bellevue |
| 31 | Berlin |
| 30 | Bordeaux |
| … | … |

SELECT \* FROM [Towns]

WHERE LEFT([Name], 1) IN ('M', 'K', 'B', 'E')

ORDER BY [Name]

--or--

SELECT \* FROM [Towns]

WHERE [Name] LIKE '[mkbe]%'

ORDER BY [Name]

## Find Towns Not Starting With

Create an SQL query that finds all towns that **do not start with** **R**, **B,** or **D**. Order the result **alphabetically** by name.

### Example

|  |  |
| --- | --- |
| **TownID** | **Name** |
| 2 | Calgary |
| 23 | Cambridge |
| 15 | Carnation |
| … | … |

## Create View Employees Hired After 2000 Year

Create an SQL query that creates view "**V\_EmployeesHiredAfter2000"** with **the first and last name** for all employees **hired after the year 2000.**

### Example

|  |  |
| --- | --- |
| **FirstName** | **LastName** |
| Steven | Selikoff |
| Peter | Krebs |
| Stuart | Munson |
| ... | ... |

## Length of Last Name

Create an SQL query that finds **all employees** whose **last name** is **exactly** **5 characters long.**

### Example

|  |  |
| --- | --- |
| **FirstName** | **LastName** |
| Kevin | Brown |
| Terri | Duffy |
| Jo | Brown |
| Diane | Glimp |
| … | … |

## Rank Employees by Salary

Write a query that **ranks** all employees using **DENSE\_RANK**. In the DENSE\_RANK function, employees need to be **partitioned** by **Salary** and **ordered** by **EmployeeID**. You need to find **only** the employees whose **Salary** is between 10000 and 50000 and **order** them by **Salary** in **descending** **order**.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EmployeeID** | **FirstName** | **LastName** | **Salary** | **Rank** |
| 268 | Stephen | Jiang | 48100.00 | 1 |
| 284 | Amy | Alberts | 48100.00 | 2 |
| 288 | Syed | Abbas | 48100.00 | 3 |
| … | … | … | … | … |

SELECT [EmployeeID], [FirstName], [LastName], [Salary],

DENSE\_RANK() OVER(PARTITION BY [Salary]

ORDER BY [EmployeeID]) AS [Rank]

FROM [Employees]

WHERE [Salary] BETWEEN 10000 AND 50000

ORDER BY [Salary] DESC

## Find All Employees with Rank 2 \*

Upgrade the query from the previous problem, so it finds only the employee with **a Rank** is 2. O**rder** the result by **Salary (descending)**.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EmployeeID** | **FirstName** | **LastName** | **Salary** | **Rank** |
| 284 | Amy | Alberts | 48100.00 | 2 |
| 292 | Martin | Kulov | 48000.00 | 2 |
| 71 | Wendy | Kahn | 43300.00 | 2 |
| … | … | … | … | … |

SELECT \* FROM (

SELECT [EmployeeID], [FirstName], [LastName], [Salary],

DENSE\_RANK() OVER(PARTITION BY [Salary]

ORDER BY [EmployeeID]) AS [Rank]

FROM [Employees]

WHERE [Salary] BETWEEN 10000 AND 50000

)

AS [RankingTable]

WHERE [Rank] = 2

ORDER BY [Salary] DESC

# Part II – Queries for Geography Database

## Countries Holding ‘A’ 3 or More Times

Find all countries that hold the letter 'A' at least 3 times in their name (case-insensitively). Sort the result by ISO code and display the "**Country Name"** and "**ISO Code"**.

### Example

|  |  |
| --- | --- |
| **Country Name** | **ISO Code** |
| Afghanistan | AFG |
| Albania | ALB |
| … | … |

USE [Geography]

SELECT [CountryName] AS [Country Name],

[IsoCode] AS [Iso Code]

FROM [Countries]

WHERE [CountryName] LIKE '%a%a%a%'

ORDER BY [IsoCode]

## Mix of Peak and River Names

Combine all peak names with all river names, so that the **last letter** of each **peak name** is the **same** **as** the **first letter** of its corresponding **river** **name**. Display the peak names, river names, and the obtained mix (mix should be in lowercase). **Sort** the results **by** the **obtained mix**.

### Example

|  |  |  |
| --- | --- | --- |
| **PeakName** | **RiverName** | **Mix** |
| Aconcagua | Amazon | aconcaguamazon |
| Aconcagua | Amur | aconcaguamur |
| Banski Suhodol | Lena | banski suhodolena |
| … | … | … |

SELECT p.[PeakName],

r.[RiverName],

LOWER(CONCAT(LEFT(p.[PeakName], LEN(p.[PeakName]) - 1), r.[RiverName]))

AS [Mix]

FROM [Peaks] AS [p],

[Rivers] AS [r]

WHERE LOWER(RIGHT(p.[PeakName], 1)) = LOWER(LEFT(r.[RiverName], 1))

ORDER BY [Mix]

# Part III – Queries for Diablo Database

## Games from 2011 and 2012 year

Find and display the top 50 games which start date is from 2011 and 2012 year, ordered by start date, then by name of the game. The start date should be in the following format: "**yyyy-MM-dd**".

### Example

|  |  |
| --- | --- |
| **Name** | **Start** |
| Rose Royalty | 2011-01-05 |
| London | 2011-01-13 |
| Broadway | 2011-01-16 |
| … | … |

## User Email Providers

Find all users along with information about their email providers. Display the username and email provider. Sort the results by email provider alphabetically, then by username.

### Example

|  |  |
| --- | --- |
| **Username** | **Email Provider** |
| Pesho | abv.bg |
| monoxidecos | astonrasuna.com |
| bashsassafras | balibless |
| … | … |

## Get Users with IPAdress Like Pattern

Find all users along with their IP addresses sorted by username alphabetically. Display only rows that IP address matches the pattern: "**\*\*\*.1^.^.\*\*\***".

Legend: **\*** - one symbol, **^** - one or more symbols  
Example

|  |  |
| --- | --- |
| **Username** | **IP Address** |
| bindbawdy | 192.157.20.222 |
| evolvingimportant | 223.175.227.173 |
| inguinalself | 255.111.250.207 |
| … | … |

## Show All Games with Duration and Part of the Day

Find all games with part of the day and duration sorted by game name alphabetically then by duration (alphabetically, not by the timespan) and part of the day (all ascending). **Parts of the day** should be **Morning** (time is >= 0 and < 12), **Afternoon** (time is >= 12 and < 18), **Evening** (time is >= 18 and < 24). **Duration** should be **Extra** **Short** (smaller or equal to 3), **Short** (between 4 and 6 including), **Long** (greater than 6) and **Extra Long** (without duration).

### Example

|  |  |  |
| --- | --- | --- |
| **Game** | **Part of the Day** | **Duration** |
| Ablajeck | Morning | Long |
| Ablajeck | Afternoon | Short |
| Abregado Rae | Afternoon | Long |
| Abrion | Morning | Extra Short |
| Acaeria | Evening | Long |
| … | … | … |

USE [Diablo]

SELECT [Name] AS [Game],

CASE

WHEN DATEPART(HOUR, [Start]) >= 0 AND DATEPART(HOUR, [Start]) < 12 THEN 'Morning'

WHEN DATEPART(HOUR, [Start]) >= 12 AND DATEPART(HOUR, [Start]) < 18 THEN 'Afternoon'

ELSE 'Evening'

END

AS [Part of the Day],

CASE

WHEN [Duration] <= 3 THEN 'Extra Short'

WHEN [Duration] BETWEEN 4 AND 6 THEN 'Short'

WHEN [Duration] > 6 THEN 'Long'

ELSE 'Extra Long'

END

AS [Duration]

FROM [Games]

ORDER BY [Game], [Duration], [Part of the Day]

# Part IV – Date Functions Queries

## Orders Table

You are given a table **Orders(Id, ProductName, OrderDate)** filled with data. Consider that the **payment** for that order must be accomplished **within 3 days after the order date**. Also the **delivery date is up to 1 month**. Write a query to show each product’s **name**, **order date**, **pay and deliver due dates**.

### Original Table

|  |  |  |
| --- | --- | --- |
| **Id** | **ProductName** | **OrderDate** |
| 1 | Butter | 2016-09-19 00:00:00.000 |
| 2 | Milk | 2016-09-30 00:00:00.000 |
| 3 | Cheese | 2016-09-04 00:00:00.000 |
| 4 | Bread | 2015-12-20 00:00:00.000 |
| 5 | Tomatoes | 2015-12-30 00:00:00.000 |
| … | … | … |

### Output

|  |  |  |  |
| --- | --- | --- | --- |
| **ProductName** | **OrderDate** | **Pay Due** | **Deliver Due** |
| Butter | 2016-09-19 00:00:00.000 | 2016-09-22 00:00:00.000 | 2016-10-19 00:00:00.000 |
| Milk | 2016-09-30 00:00:00.000 | 2016-10-03 00:00:00.000 | 2016-10-30 00:00:00.000 |
| Cheese | 2016-09-04 00:00:00.000 | 2016-09-07 00:00:00.000 | 2016-10-04 00:00:00.000 |
| Bread | 2015-12-20 00:00:00.000 | 2015-12-23 00:00:00.000 | 2016-01-20 00:00:00.000 |
| Tomatoes | 2015-12-30 00:00:00.000 | 2016-01-02 00:00:00.000 | 2016-01-30 00:00:00.000 |
| … | … | … | … |

## People Table

Create a table **People(Id, Name, Birthdate).** Write a query to **find** **age in years**, **months**, **days** and **minutes** for each person for the **current time** of executing the query.

### Original Table

|  |  |  |
| --- | --- | --- |
| **Id** | **Name** | **Birthdate** |
| 1 | Victor | 2000-12-07 00:00:00.000 |
| 2 | Steven | 1992-09-10 00:00:00.000 |
| 3 | Stephen | 1910-09-19 00:00:00.000 |
| 4 | John | 2010-01-06 00:00:00.000 |
| … | … | … |

### Example Output

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Age in Years** | **Age in Months** | **Age in Days** | **Age in Minutes** |
| Victor | 16 | 189 | 5754 | 8286787 |
| Steven | 24 | 288 | 8764 | 12621187 |
| Stephen | 106 | 1272 | 38706 | 55737667 |
| John | 6 | 80 | 2437 | 3510307 |
| … | … | … | … | … |