Database Basics MSSQL Exam – 17 Feb 2019

Exam problems for the [“Database Basics” course @ SoftUni](#).

Submit your solutions in the SoftUni Judge system at https://judge.softuni.bg/

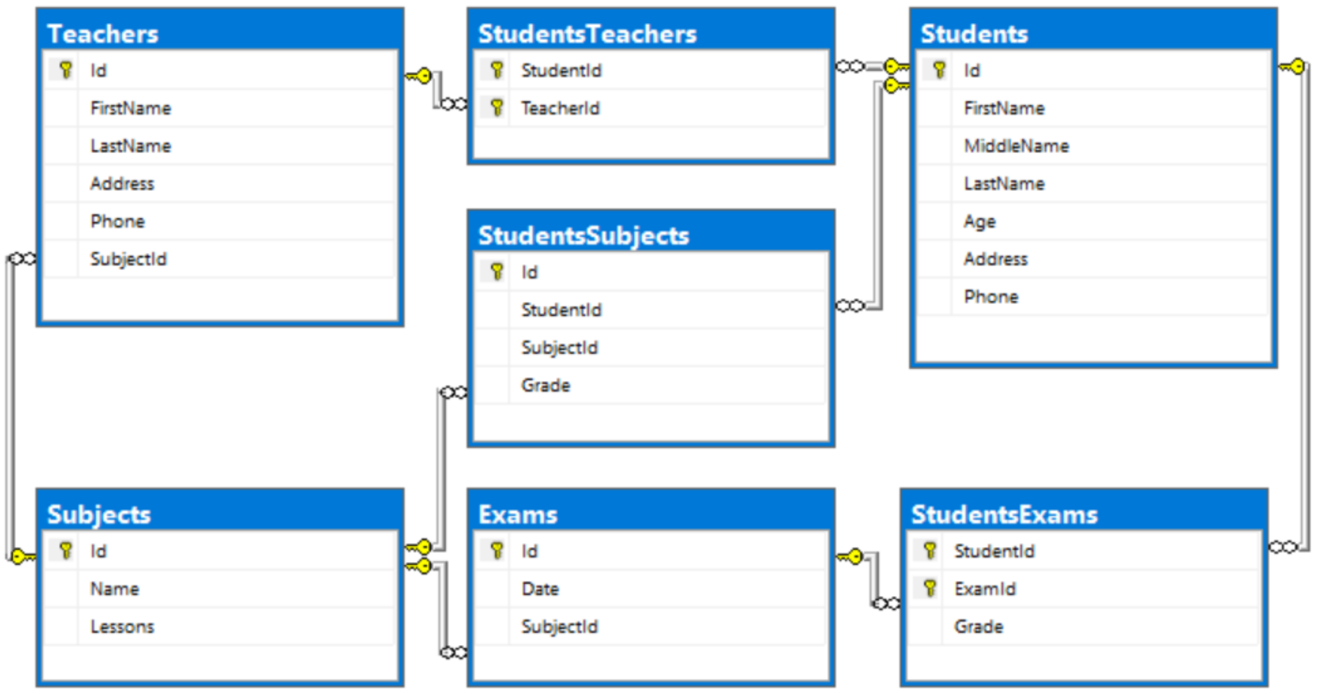
School

Don’t be so stressed! Today you must build a very simple school system and execute some queries over it to check if it works correctly. From the very beginning **SoftUni** saw a huge potential in you and has assigned you a very exciting project. In **4 hours**, you must develop a complicated system for a small school.

Your database must contain information about the **students with their teachers and exams.** Also, it must contain information about the **subjects** in the school

Section 1. DDL (30 pts)

You are given an E/R Diagram of the School:



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

- **Students** – contains information about the students.
- **`Subjects`** – contains information about the subjects.
- **`StudentsSubjects`** – contains information about every student’s subjects.
- **`Exams`** – contains information about the exams.
- **`StudentsExams`** – contains information about every student’s exams.
- **`Teachers`** – contains information about the teachers.
- **`StudentsTeachers`** – contains information about every student’s teachers.

Students

Column	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
FirstName	**String** up to **30** symbols, Unicode	**NULL** is **not** allowed
MiddleName	**String** up to **25** symbols, Unicode	None
LastName	**String** up to **30** symbols, Unicode	**NULL** is **not** allowed
Age	**Integer** from **5** to **100**	**Negative or zero numbers** are **not allowed**
Address	**String** up to **50** symbols, Unicode	None
Phone	**String** with **exactly** 10 symbols, Unicode	None

Subjects

Column	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Name	**String** up to **20** symbols, Unicode	**NULL** is **not** allowed
Lessons	**Integer** must be more than 0	**NULL** is **not** allowed

StudentsSubjects

Column	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
StudentId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Students**
SubjectId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Subjects**
Grade	**Decimal** number with **two-digit** precision	**Grade** must be between 2 and 6, **NULL** is **not** allowed

Exams

Column	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Date	**DateTime**	None
SubjectId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Subjects**

StudentsExams

Column	Data Type	Constraints
StudentId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Students**
ExamId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Exams**
Grade	**Decimal** number with **two-digit** precision	**Grade** must be between 2 and 6, **NULL** is **not** allowed

Teachers

Column	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
FirstName	**String** up to **20** symbols, Unicode	**NULL** is **not** allowed
LastName	**String** up to **20** symbols, Unicode	**NULL** is **not** allowed
Address	**String** up to **20** symbols, Unicode	**NULL** is **not** allowed
Phone	**String** with **exactly 10** symbols	None
SubjectId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Subjects**

StudentsTeachers

Column	Data Type	Constraints
StudentId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Students**
TeacherId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table **Teachers**

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

Teachers

FirstName	LastName	Address	Phone	SubjectId
Ruthanne	Bamb	84948 Mesta Junction	3105500146	6
Gerrard	Lowin	370 Talisman Plaza	3324874824	2
Merrile	Lambdin	81 Dahle Plaza	4373065154	5
Bert	Ivie	2 Gateway Circle	4409584510	4

Subjects

Name	Lessons
Geometry	12
Health	10
Drama	7
Sports	9

3. Update

Make all grades 6.00, where the subject id is 1 or 2, if the **grade** is above or equal to 5.50

4. Delete

Delete all teachers, whose phone number contains '72'.

Section 3. Querying (40 pts)

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

5. Teen Students

Select all **students** who are teenagers (their age is above or equal to 12). Order them by **first name (alphabetically)**, then by **last name (alphabetically)**. Select their first name, last name and their age.

Example

FirstName	LastName	Age
Agace	Sneddon	12
Andres	Colliard	12
Brose	Yeats	13
Casper	Tite	12
…	…	…

6. Students Teachers

Select all students and the count of teachers each one has.

Example

FirstName	LastName	TeachersCount
Sandy	Abbison	10
Baxter	Abrahart	13
Demott	Addison	13
Deane	Adess	10
…	…	…

7. Students to Go

Find all students, who have not attended an exam. Select their full name (first name + last name).

Order the results by full name (**ascending**)**.**

Example

Full Name
Bernardine Purrier
…

8. Top Students

Find top 10 students, who have highest average grades from the exams.

Format the grade, two symbols after the decimal point.

Order them by grade (**descending**), then by first name (**ascending**), then by last name (**ascending**)

Example

First Name	Last Name	Grade
Lurlene	Orgee	6.00
Ivy	Bilovsky	5.70
Chariot	Giacobbo	5.50
…	…	

9. Not So In The Studying

Find all students **who don't have any subjects**. Select **their full name**. The full name is combination of first name, middle name and last name. Order the result by **full name**

NOTE: If the middle name is null you have to concatenate the first name and last name separated with single space.

Example

Full Name
Allen Storre Piniur
Andria Geleman Andrioletti
Ashley Morecombe Summerell
Bobby Leggitt Domnin
…

10. Average Grade per Subject

Find the **average grade** for each subject. Select the subject name and the average grade.

Sort them by **subject id (ascending)**.

Example

Name	AverageGrade
Biology	4.059055
History	3.880370
English	4.060546
Math	3.957876
Music	3.923984
Art	4.070898
…	…

Section 4. Programmability (20 pts)

11. Exam Grades

Create a **user defined function**, named **`udf_ExamGradesToUpdate(@studentId, @grade)`**, that receives a **student id and grade**.

The function should return the count of grades, for the student with the given id, which are above the received grade and under the received grade with **0.50** added (**example:** you are given grade **3.50** and you have to find all grades for the provided student which are between **3.50** and **4.00** inclusive):

If the condition is true, you must return following message in the format:

- "**`You have to update {count} grades for the student {student first name}`**"

If the provided student id is not in the database the function should return "**`The student with provided id does not exist in the school!`**"

If the provided grade is above **6.00** the function should return "**`Grade cannot be above 6.00!`**"

Note: Do not update any records in the database!

Example:

Query
`SELECT dbo.udf_ExamGradesToUpdate(12, 6.20)`
Output
`Grade cannot be above 6.00!`

Query
`SELECT dbo.udf_ExamGradesToUpdate(12, 5.50)`
Output
`You have to update 2 grades for the student Agace`

Query
`SELECT dbo.udf_ExamGradesToUpdate(121, 5.50)`
Output
`The student with provided id does not exist in the school!`

12. Exclude from school

Create a **user defined stored procedure**, named **`usp_ExcludeFromSchool(@StudentId)`**, that receives a **student id** and attempts to **delete the current student**. A student will only be deleted if all of these conditions **pass**:

- If the **student** doesn't exist, then it **cannot be deleted. Raise an error** with the message "**`This school has no student with the provided id!`**"

If all the above conditions pass, **delete the student and ALL OF HIS REFERENCES**!

Example usage:

Query	Output

`EXEC usp_ExcludeFromSchool 1`
`SELECT COUNT(*) FROM Students`
	`119`

`EXEC usp_ExcludeFromSchool 301`	`This school has no student with the provided id!`