Database Basics MS SQL Exam – 13 October 2019

Exam problems for the "Database Basics" course @ SoftUni.

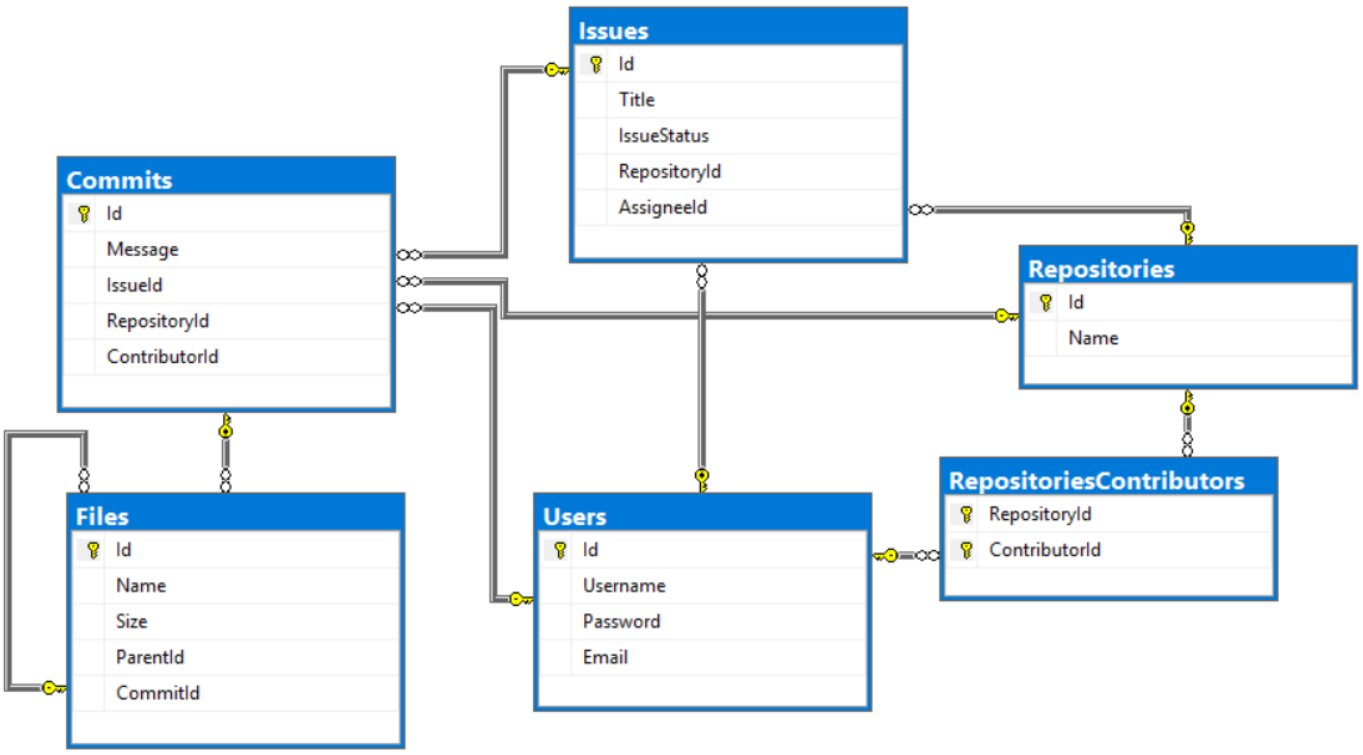
Submit your solutions in the SoftUni Judge system at https://judge.softuni.bg/

Bitbucket

You've most likely heard of Github. Well … There is a side project called "Bitbucket" which is the back-up data of Github. You are one of the few selected to work in the multi-billion company, as one of the back-up database managers. You'll need to prove your skills by designing and manipulating data in the Instagraph prototype.

Section 1. DDL (30 pts)

You are given an E/R Diagram of the Trip Service:



Create a database called **`Bitbucket`**. You need to create **6 tables**:

- **`Users`** – contains information about the **users**.
- **`Repositories`** – contains information about the **repositories**.
- **`RepositoriesContributors`** – a **many** to **many mapping** table between the **repositories** and the **users**.
- **`Issues`** – contains information about the **issues**.
  - Each **`issue`** has a **`repository`**.
  - Each **`issue`** has an **`assignee`** (**`user`**).
- **`Commits`** – contains information about the **commits**.
  - Each **`commit`** **MAY** have an **`issue`**.
  - Each **`commit`** has a **`repository`**.
  - Each **`commit`** has a **`contributor`** (**`user`**)**.**
- **`Files`** – contains information about the **files**.
  - Each **`file`** **MAY** have a **`parent`** (**`file`**).

- Each **`file`** has a **`commit`**.

Users

Column Name	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Username	**String** up to 30 symbols	**NULL** is **not** allowed
Password	**String** up to 30 symbols	**NULL** is **not** allowed
Email	**String** up to 50 symbols	**NULL** is **not** allowed

Repositories

Column Name	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Name	**String** up to 50 symbols	**NULL** is **not** allowed

RepositoriesContributors

Column Name	Data Type	Constraints
RepositoryId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Repositories
ContributorId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Users

Issues

Column Name	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Title	**String** up to 255 symbols	**NULL** is **not** allowed
IssueStatus	**String** with **exactly 6** symbols	**NULL** is **not** allowed
RepositoryId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Repositories
AssigneeId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Users

Commits

Column Name	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Message	**String** up to 255 symbols	**NULL** is **not** allowed
IssueId	**Integer** from **0** to **2,147,483,647**	Relationship with table Issues
RepositoryId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Repositories
ContributorId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Users

Files

Column Name	Data Type	Constraints
Id	**Integer** from **0** to **2,147,483,647**	Unique table **identificator**, **Identity**
Name	**String** up to 100 symbols	**NULL** is **not** allowed
Size	**Decimal** number with **two-digit** precision	**NULL** is **not** allowed
ParentId	**Integer** from **0** to **2,147,483,647**	Relationship with table Files
CommitId	**Integer** from **0** to **2,147,483,647**	**NULL** is **not** allowed, Relationship with table Commits

1. Database Design

Submit all of yours **create statements** to Judge (only creation of tables).

Section 2. DML (10 pts)

Before you start, you must import "`DataSet-Bitbucket.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**.

Files

Name	Size	ParentId	CommitId
Trade.idk	2598.0	1	1
menu.net	9238.31	2	2
Administrate.soshy	1246.93	3	3
Controller.php	7353.15	4	4
Find.java	9957.86	5	5
Controller.json	14034.87	3	6
Operate.xix	7662.92	7	7

Issues

Title	IssueStatus	RepositoryId	AssigneeId
Critical Problem with HomeController.cs file	open	1	4
Typo fix in Judge.html	open	4	3
Implement documentation for UsersService.cs	closed	8	2
Unreachable code in Index.cs	open	9	8

3. Update

Make issue status 'closed' where Assignee Id is 6.

4. Delete

Delete repository "**Softuni-Teamwork**" in repository **contributors** and **issues**.

Section 3. Querying (40 pts)

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

5. Commits

Select all commits from the database. Order them by **id** (ascending), **message** (ascending), **repository id** (ascending) and **contributor id** (ascending).

Examples

Id	Message	RepositoryId	ContributorId
1	Deleted deprecated functionality from index.cpp	17	8
2	Created README.MD	14	8
3	Initial Commit	24	1
4	Implemented config.json functionality	10	12
...	...	...	...

6. Heavy HTML

Select all of the **files**, which have **size, greater** than **1000**, and their **name** contains "`html`". Order them by **size** (descending), **id** (ascending) and by **file name** (ascending)

Examples

Id	Name	Size
49	compile.html	27402.59
17	Login.html	2863.23
...	...	..

7. Issues and Users

Select all of the `issues`, and the `users` that are **assigned** to them, so that they end up in the following format: {**username**} : {**issueTitle**}. Order them by **issue id** (descending) and **issue assignee** (ascending).

Examples

Id	IssueAssignee
75	TheDivineBel : Critical bug in Controller.php ruins application when executed
74	DarkImmagidsa : Compilation failed while trying to execute init.xml
73	ScoreAntigarein : Loose Cohesion and Strong Coupling in Beat.html

…	…

8. Non-Directory Files

Examples

Select all of the **files**, which are NOT a **parent** to any other file. Select their size of the file and add "**KB**" to the end of it. Order them file **id** (ascending), **file name** (ascending) and **file size** (descending).

Id	Name	Size
6	Controller.json	14034.87KB
12	Model.MD	4753.67KB
17	Login.html	2863.23KB
…	…	..

9. Most Contributed Repositories

Select the **top 5** repositories in terms of **count** of **commits**. Order them by **commits count** (descending), **repository id** (ascending) then by **repository name** (ascending).

Examples

Id	Name	Commits
1	WorkWork	20
7	DundaApp	16
10	SortedTupleJS	12
…	…	..

10. User and Files

Select all users which have **commits**. Select their username and average size of the file, which were uploaded by them. Order the results by **average upload size** (descending) and by **username** (ascending).

Examples

Username	Size
RoundInspecindi	19506.877500
BlaAntigadsa	18397.434000
…	…

Section 4. Programmability (20 pts)

11. User Total Commits

Create a **user defined function**, named **`udf_UserTotalCommits(@username)`** that receives a username.

The function must return count of all commits for the user:

Example:

Query
`SELECT dbo.udf_UserTotalCommits('UnderSinduxrein')`
Output
6

12. Find by Extensions

Create a **user defined stored procedure**, named **`usp_FindByExtension(@extension)`**, that receives a files extensions.
The procedure must print the **id**, **name** and **size** of the file. Add "**KB**" in the end of the size. Order them by **id** (ascending), **file name** (ascending) and **file size** (descending)

Example:

Query		
`EXEC usp_FindByExtension 'txt'`		
Output		
Id	**Name**	**Size**
28	Jason.txt	10317.54KB
31	file.txt	5514.02KB
43	init.txt	16089.79KB