

Data bases Laboratory Work Nr.1

Title: Creation and Maintenance of Database

Prerequisites: SQL Server 2019, SQL Server Management Studio

Objectives: Gather some basic skills and knowledge of data base creation and maintenance in MS SQL Server.

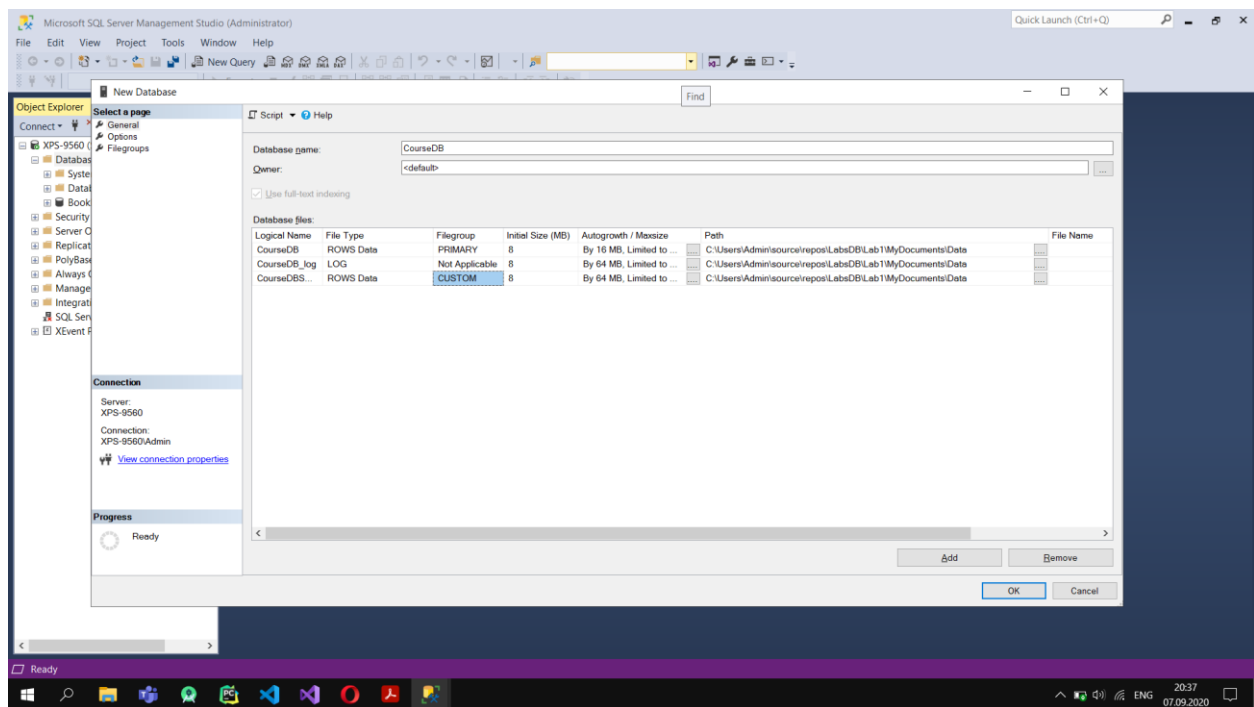
Tasks:

1. Creați o bază de date plasată fizic în mapa MyDocuments\Data, fixând o creștere a fișierului primar a bazei de 16MB cu limita de creștere de 128 MB și a log-ului de 64 MB cu limita de creștere de 1024 MB. Pentru fișierele secundare să se definească un Filegroup nou implicit, setând creșterea fișierelor secundare de 64 MB cu limita de 1024 MB.
2. Creați o bază de date, unde fișierul log să fie fizic plasat în mapa MyDocuments\Log, numele fișierului log în mediul sistemului de operare trebuie să se deosebească de cel logic definit în schema fizică. Este important ca baza de date creată să fie compatibilă cu sistemul MS SQL Server 2017 și ea să fie accesibilă numai unui singur utilizator într-un moment de timp.
3. Creați planul de întreținere a bazei de date, construită în sarcina 1. Spațiul neutilizat de fișierele bazei de date trebuie împărțit atunci când el atinge mărimea 2000Mb. Spațiul eliberat trebuie să fie returnat sistemului de operare. Această operațiune trebuie să ruleze în fiecare vineri, la ora 00:00. Raportul executării planului de întreținere trebuie salvat în dosarul MyDocuments\SQL_event_logs. Inițializați executarea planului. După executare, verificați rezultatele în fișierul log.
4. Creați planul de întreținere a bazei de date, construit în exercitiul 2. Numele planului va fi: „Reconstruire index”. În cadrul acestui plan, sistemul trebuie să realizeze reconstruirea indexurilor numai asupra tabelor de bază (exclusiv viziunilor) din toate schemele care există în baza de date în cauza. Spațiul liber pe pagină trebuie să fie 10%. Sortarea indexurilor trebuie să se realizeze în tempdb. După reconstruire, trebuie să urmeze colectarea statisticilor complete despre indexuri reconstruiți. Al treilea pas al planului trebuie să constituie sarcina de curățare a istoriei despre operațiile de Backup-Restore ce au avut loc pe SQL Server. Trebuie curățat istoricul care este mai vechi de 6 săptămâni. Acest plan trebuie să fie executat în fiecare prima duminică a lunii. Creați dosarul MyDocuments\SQL_reports. Raportul de executare a planului trebuie să fie adăugat în acest fișier. Procesul de mentenanță - să fie logat în mod extended. Inițializați executarea planului. După executare, verificați rezultatele în fișierul log generat.

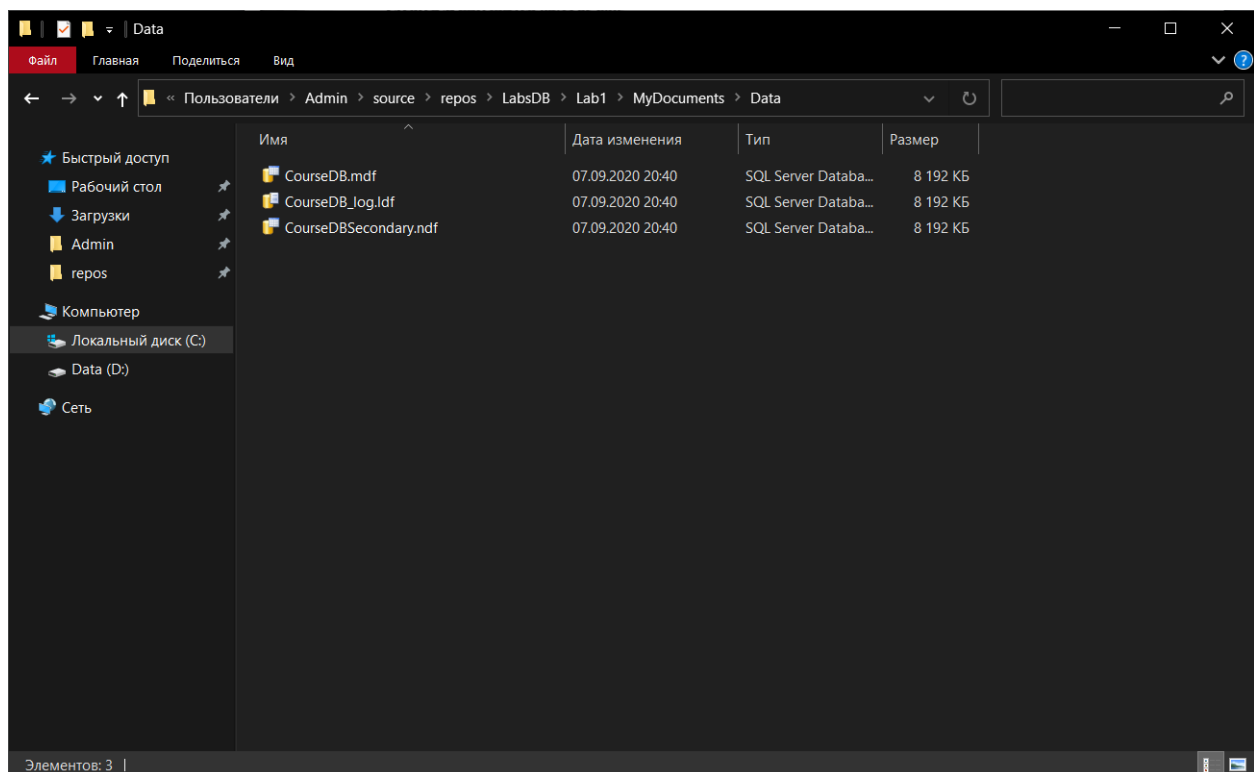
Implementation:

1.

Firstly, while creating the database I changed growth size and maximal size of files. Then, I changed their location. At the next step I added new file and created a new filegroup for it (set this new filegroup as default):

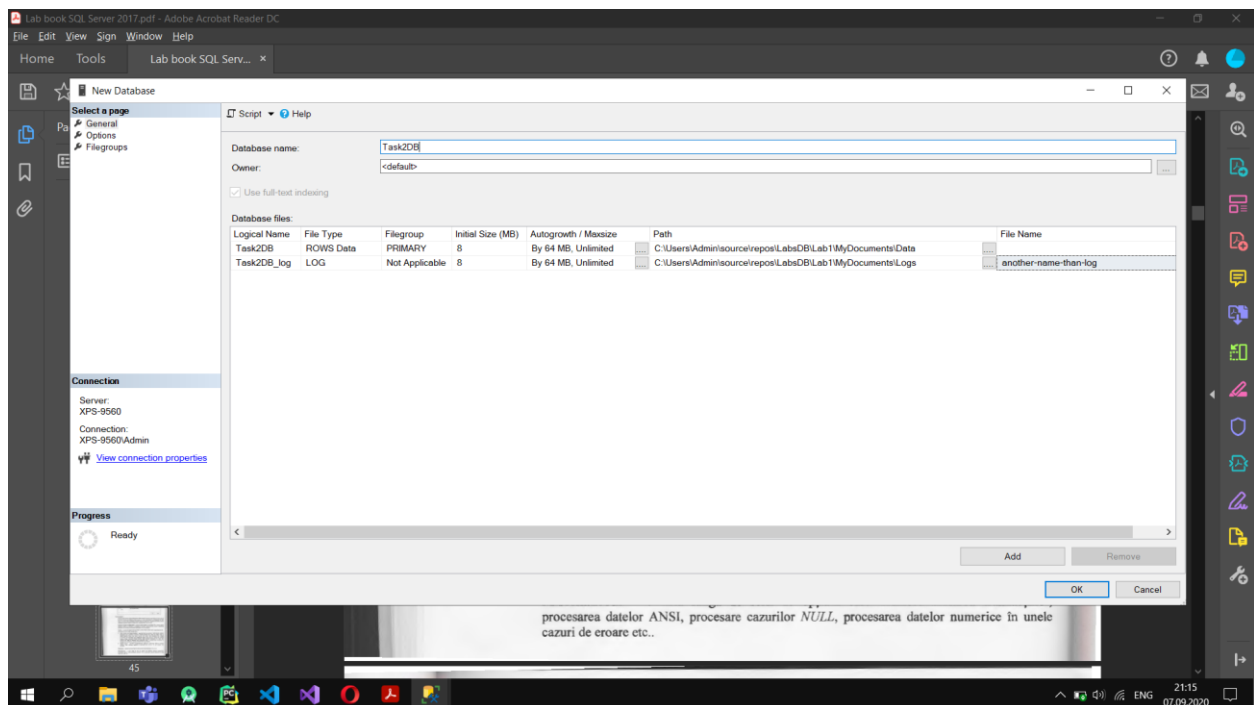


Finally, I got the following results:

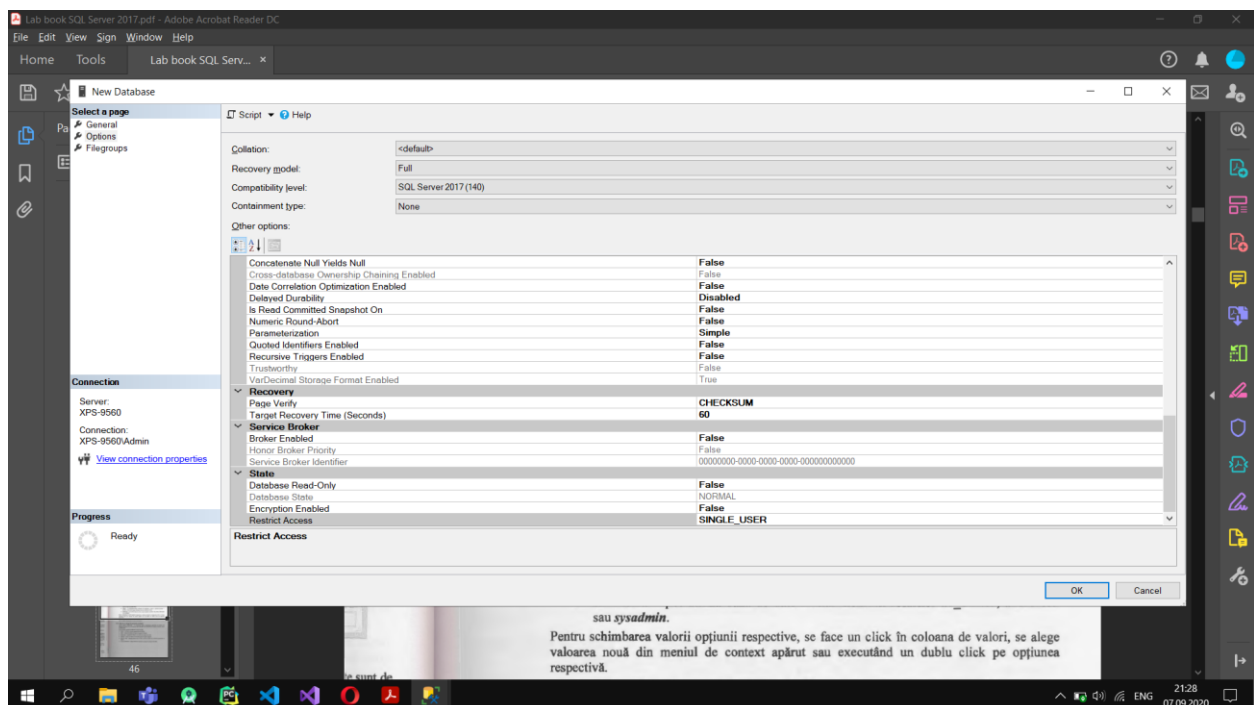


2.

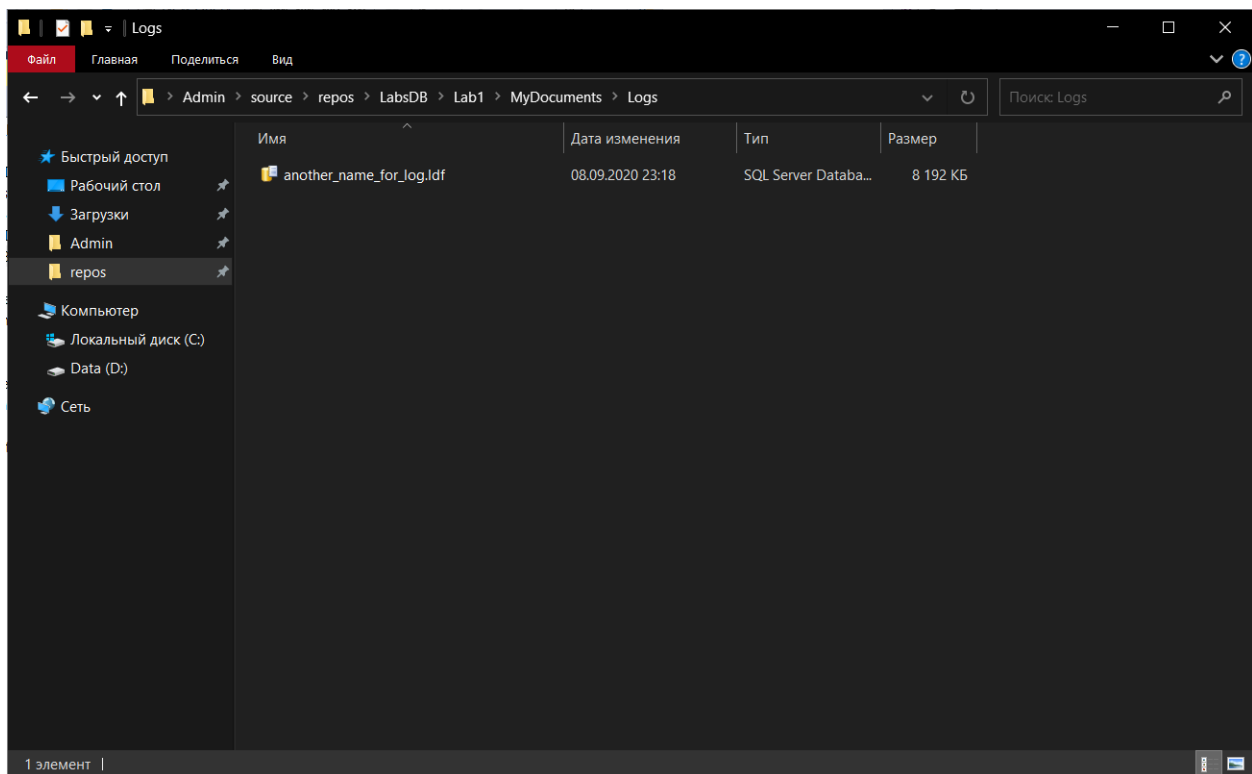
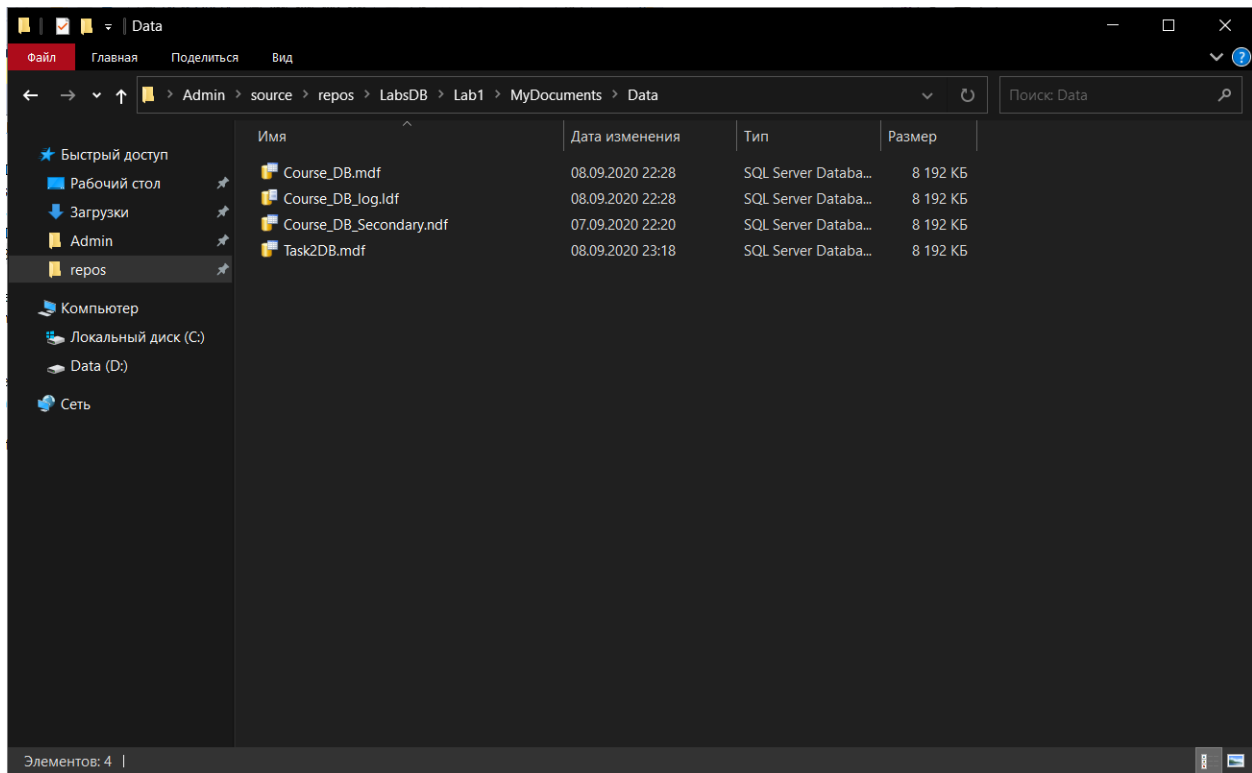
In “New Database” window I changed file’s paths and changed “File Name” of log file:



Then I set compatibility level to SQL Server 2017 and changed Restrict Access to SINGLE_USER:



Results:



3.

First step in maintenance plan wizard was settings the time for plan to execute (every Friday at 0:00:00):

New Job Schedule

Name: Jobs in Schedule

Schedule type: Recurring ☒ Enabled

One-time occurrence

Date: Time:

Frequency

Occurs: Weekly

Recurs every: week(s) on

☐ Monday ☐ Wednesday ☒ Friday ☐ Saturday
☐ Tuesday ☐ Thursday ☐ Sunday

Daily frequency

☒ Occurs once at:

☐ Occurs every: hour(s) Starting at: Ending at:

Duration

Start date: ☐ End date: ☒ No end date:

Summary

Description:

OK Cancel Help

Next was adding one step (Shrink database) and setting up this step: shrink DB when it grows beyond 2000 mb and return freed space to OS:

Maintenance Plan Wizard

Define Shrink Database Task
Configure the maintenance task.

Databases: Specific databases

Shrink database when it grows beyond: MB

Amount of free space to remain after shrink: %

☐ Retain freed space in database files
☒ Return freed space to operating system

Schedule: Change...

Help < Back Next > Finish >> Cancel

Set up location of text report:

Maintenance Plan Wizard

Select Report Options

Select options for saving or distributing a report of the maintenance plan actions.

☒ Write a report to a text file

Folder location: ...

☐ E-mail report

To:


Help < Back Next > Finish >> Cancel

Results:






Maintenance Plan Wizard

Maintenance Plan Wizard Progress

Click Stop to interrupt the operation.

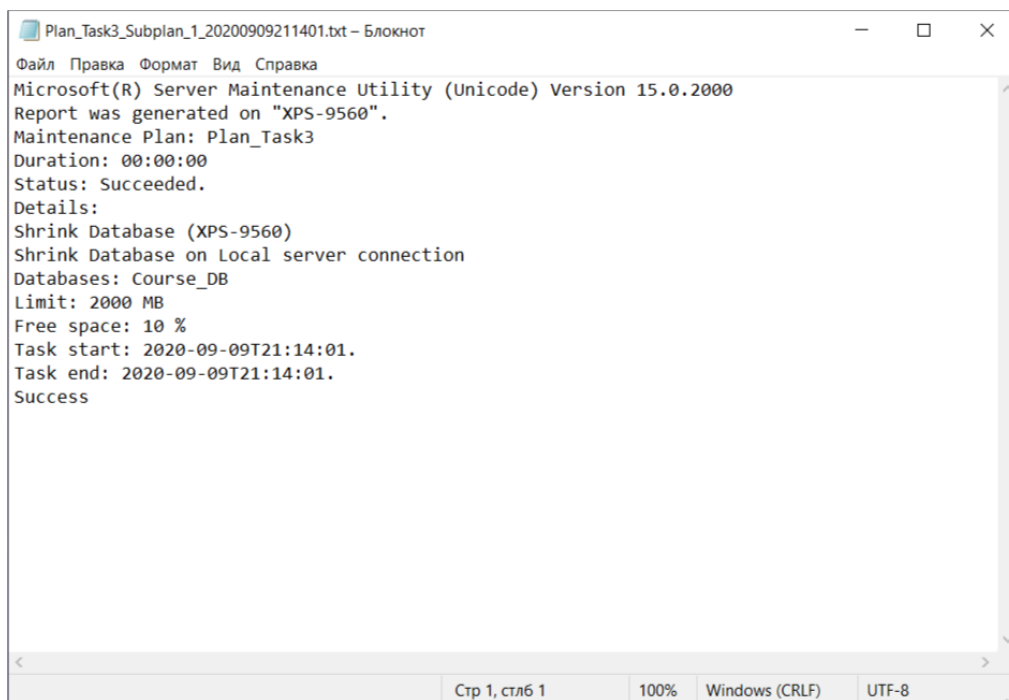
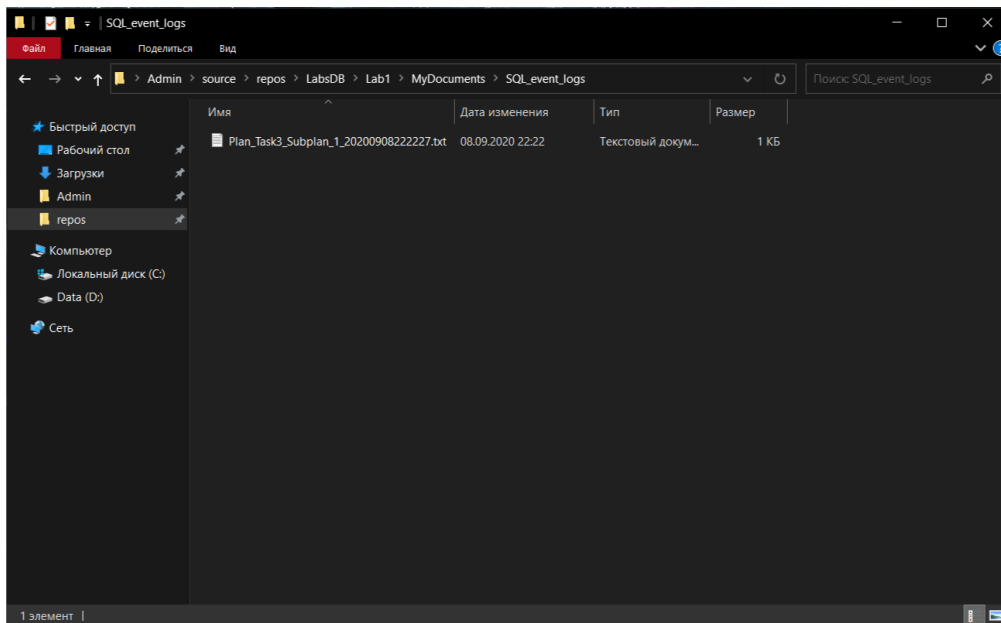
 **Success** 5 Total 0 Error
5 Success 0 Warning

Details:

Action	Status	Message
 Creating maintenance plan "Plan_Task3"	Success	
 Adding tasks to the maintenance plan	Success	
 Adding scheduling options	Success	
 Adding reporting options	Success	
 Saving maintenance plan "Plan_Task3"	Success	

Stop Report ▼

Close



4.

Set up time for following maintenance plan:

New Job Schedule

Name: Jobs in Schedule

Schedule type: Recurring ☒ Enabled

One-time occurrence

Date: Time:

Frequency

Occurs: Monthly

☐ Day of every month(s)

☒ The first Sunday of every month(s)

Daily frequency

☒ Occurs once at:

☐ Occurs every: hour(s) Starting at: Ending at:

Duration

Start date: ☐ End date:

☒ No end date:

Summary

Description:

Occurs every first Sunday of every 1 month(s) at 0:00:00. Schedule will be used starting on 07.09.2020.

OK Cancel Help

Then chose what tasks I want to perform:

Maintenance Plan Wizard

Select Maintenance Task Order
In which order should these tasks be performed?

Select the order for the tasks to execute:

Rebuild Index

Update Statistics

Clean Up History

Move Up... Move Down...

The Update Statistics task ensures the query optimizer has up-to-date information about the distribution of data values in the tables. This allows the optimizer to make better judgments about data access strategies.

Help < Back Next > Finish Cancel

Setting up these tasks according to requirements:

Maintenance Plan Wizard

Define Rebuild Index Task

Configure the maintenance task.

Databases: Specific databases

Object: Table

Selection: All

Free space options

☐ Default free space per page

☒ Change free space per page to: 10 %

Advanced options

☒ Sort results in Pad

☐ Keep index MAXDOP 1

For index types that do not support online index rebuild:

☒ Do not rebuild indexes

☐ Rebuild indexes offline

☐ Low Priority Used

Abort After Wait: None

Max Duration: 0 mins

Index Stats Options

Scan type: ☒ Fast ☐ Sampled ☐ Detailed

Optimize index only if:

Help < Back Next > Finish >> Cancel

Maintenance Plan Wizard

Define Update Statistics Task

Configure the maintenance task.

Databases: Specific databases

Object: Table

Selection: All

Update:

☐ All existing statistics

☐ Column statistics only

☒ Index statistics only

Scan type:

☒ Full scan

☐ Sample by 50 %

Schedule:

Not scheduled (On Demand) Change...

Help < Back Next > Finish >> Cancel

Maintenance Plan Wizard

Define History Cleanup Task

Configure the maintenance task.

Select the historical data to delete:

☒ Backup and restore history

☐ SQL Server Agent job history

☐ Maintenance plan history

Remove historical data older than:

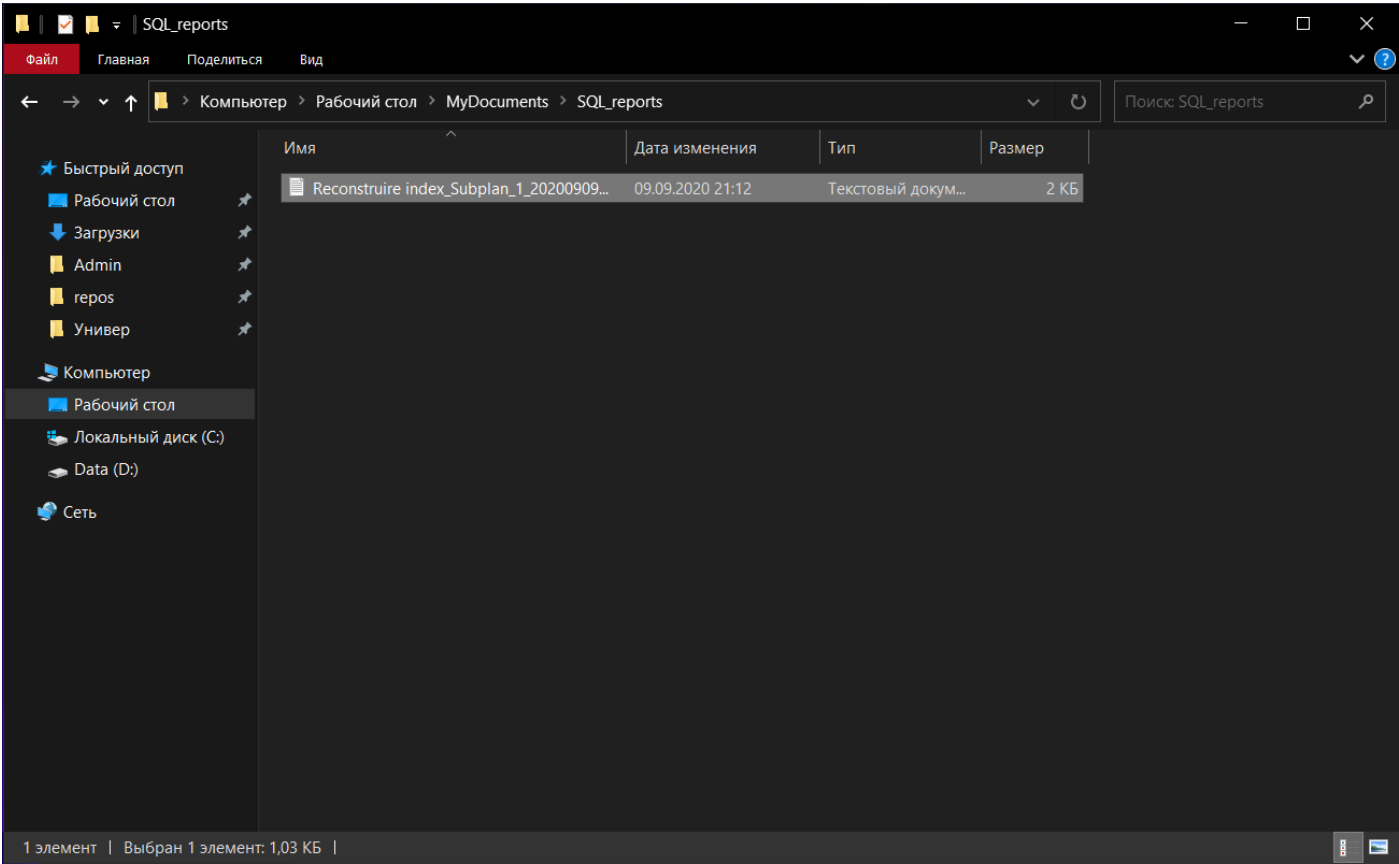
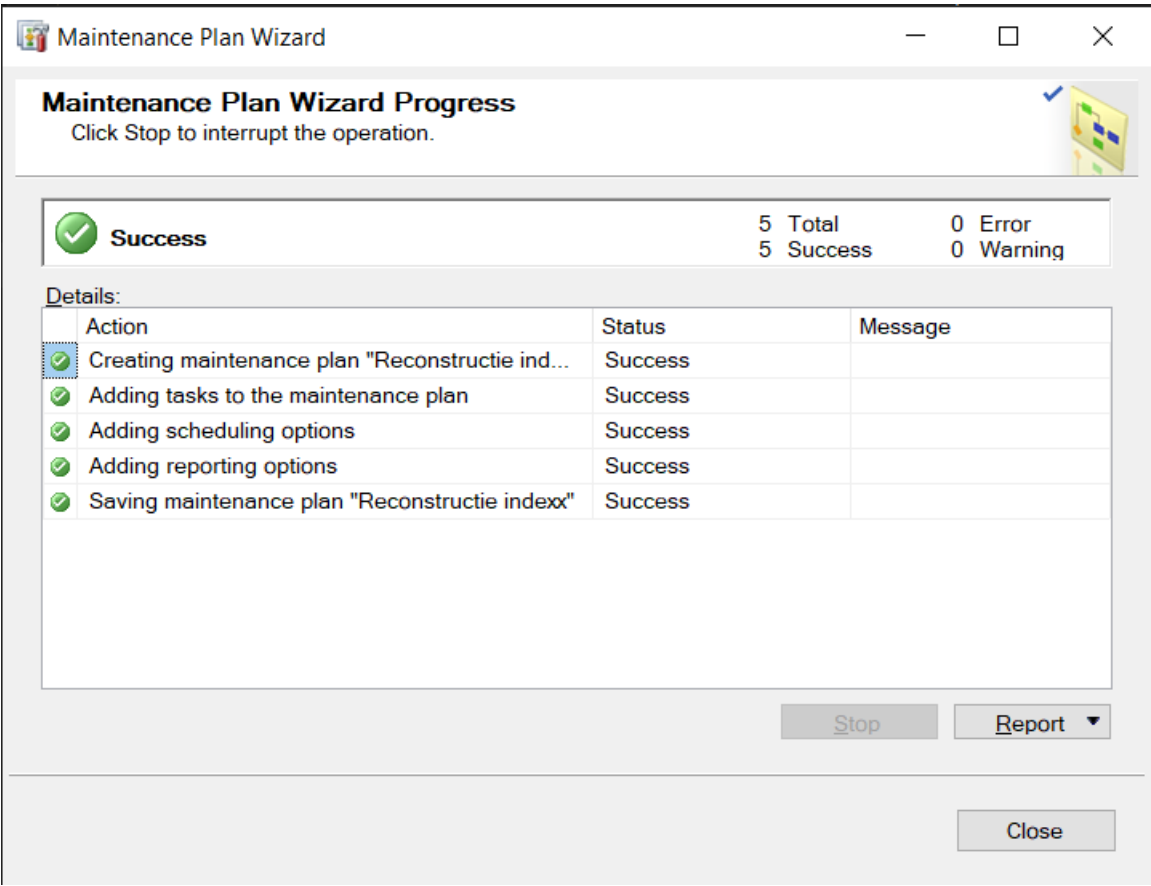
6 Week(s)

Schedule:

Not scheduled (On Demand) Change...

Help < Back Next > Finish >> Cancel

Obtained results:



```
Reconstruire index_Subplan_1_20200909211206.txt – Блокнот
Файл Правка Формат Вид Справка
Microsoft(R) Server Maintenance Utility (Unicode) Version 15.0.2000
Report was generated on "XPS-9560".
Maintenance Plan: Reconstruire index
Duration: 00:00:01
Status: Succeeded.
Details:
Rebuild Index (XPS-9560)
Rebuild index on Local server connection
Databases: Task2DB
Object: Table
Tables/Views: dbo.TestTable
Task start: 2020-09-09T21:12:05.
Task end: 2020-09-09T21:12:05.
Success
Command:
GO

Update Statistics (XPS-9560)
Update Statistics on Local server connection
Databases: Task2DB
Object: Table
Tables/Views: dbo.TestTable
Task start: 2020-09-09T21:12:06.
Task end: 2020-09-09T21:12:06.
Success
Command:use [Task2DB]
GO
UPDATE STATISTICS [dbo].[TestTable]
WITH FULLSCAN
GO

Clean Up History (XPS-9560)
Cleanup history on Local server connection
History type: Backup
Age: Older than 6 Weeks
Task start: 2020-09-09T21:12:06.
Task end: 2020-09-09T21:12:06.
Success
Command:declare @dt datetime select @dt = cast(N'2020-07-29T21:12:06' as datetime) exec msdb.dbo.sp_delete_backuphistory @dt
GO
```

Conclusion

During this laboratory work I gained knowledge and practical experience on creating database in SQL Server, with custom files, filegroups and different options. Also, I got experience on creating custom maintenance plans for DB's. Another important facts which I learned are: how is database saved in filesystem and what's the difference between .mdf, .ndf and .ldf files; how is database structured and operated by RDBMS; how should databases be created, what is their purpose and what techniques can be used to maintain them.