Microsoft SQL server set up and the Entity Framework for Windows

YKUMAR 2021-02-07, updated 2023-02-11.

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1. SQL server installation and set up

1.1. Download and install SQL server Express.

Open link - https://www.microsoft.com/en-us/sql-server/sql-server-downloads
and scroll down to install SQL server Express Edition.

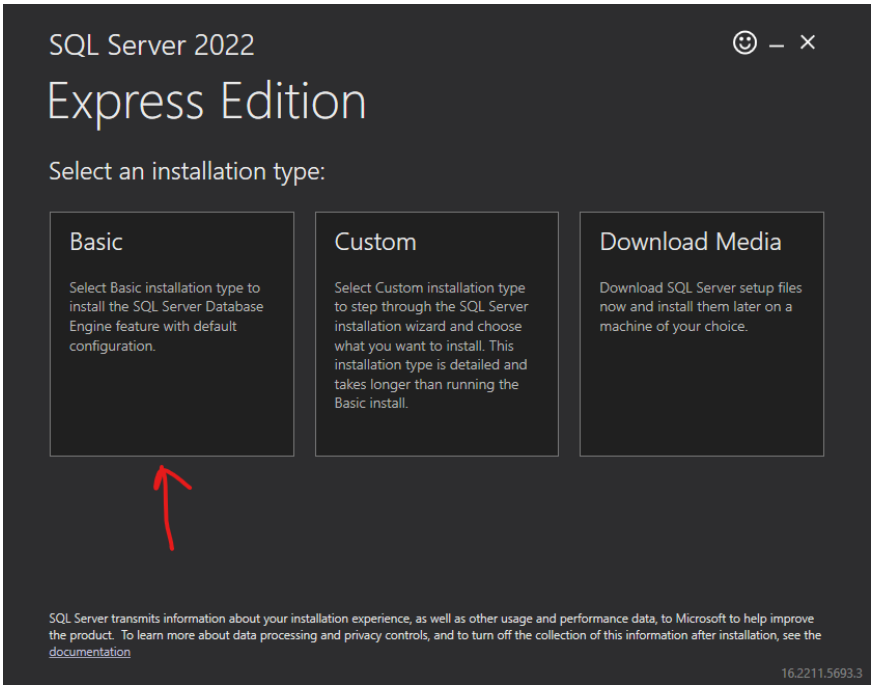
Click download now – the Installer 

should appear at the bottom of the screen. Right click on it - **Show in Folder** – Right click - **Run as administrator.**

1

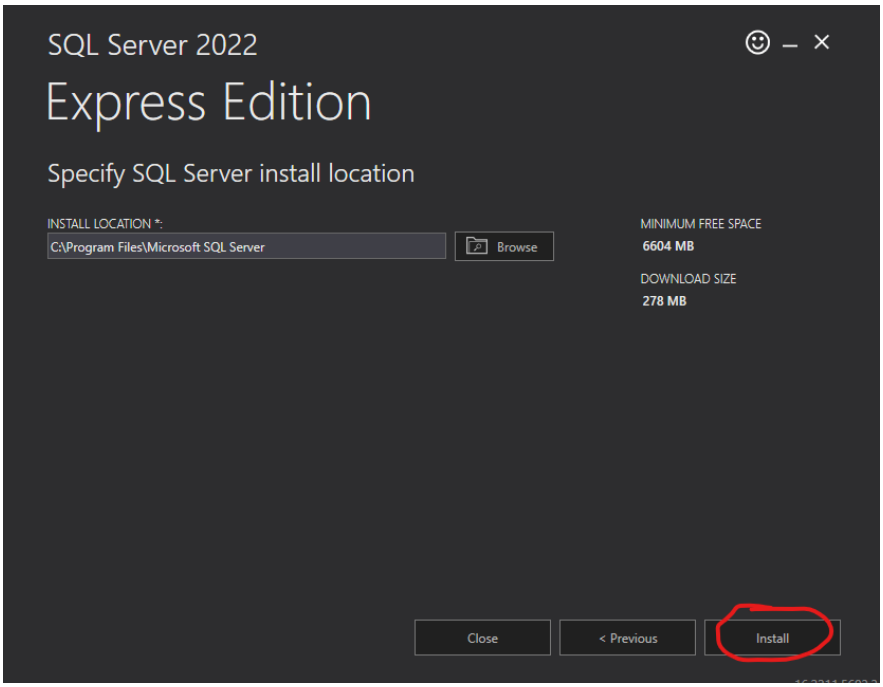
Accept making changes on your device.

Choose the Basic Installation type:



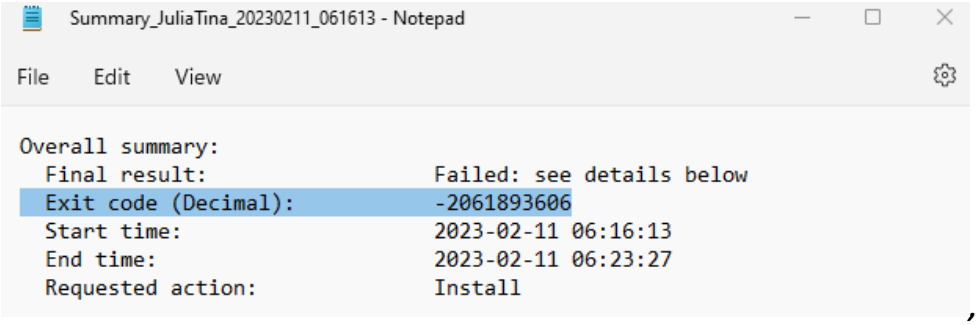
Accept the License Terms.

Choose the **default location (it is recommend to proceed with defaults)**. Click Install



Click Install. **Wait for download and installation to complete.**

***In case of errors ONLY*: In case of installation error, research on it before making a second attempt. In the folder you prompted to locate an error, find the Summary.txt file and / or Detail.txt, open and check. Example below:**

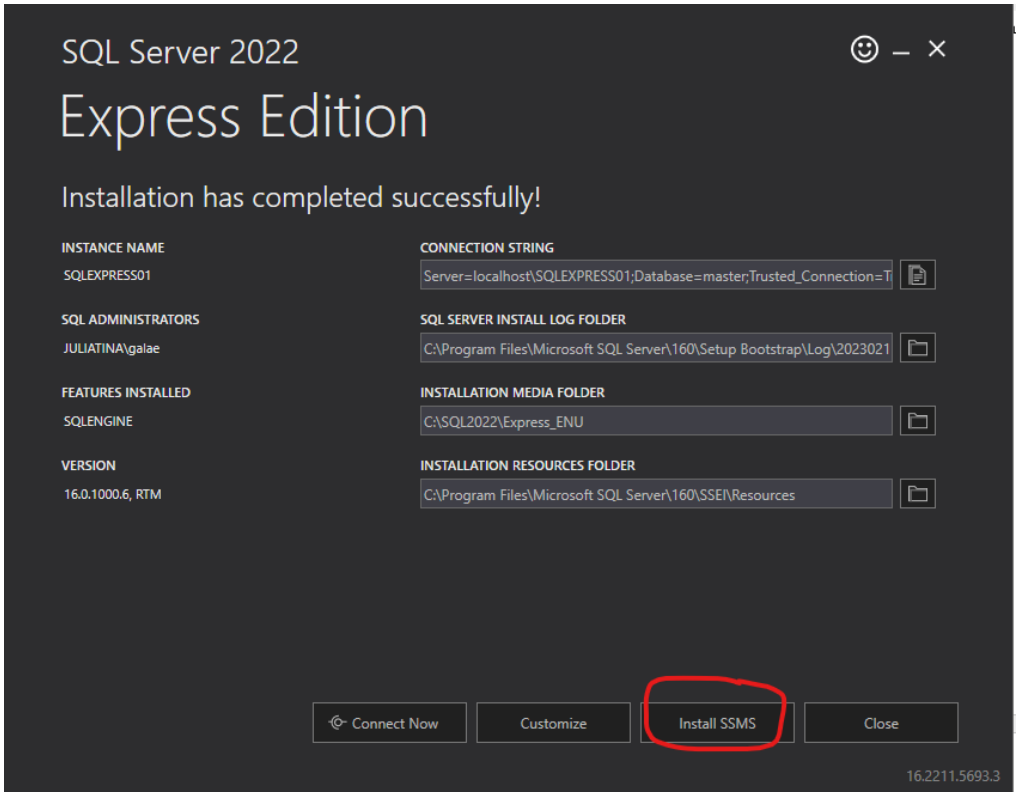


find out the Exit code and Google it (the outcome might vary). Uninstall SQL server first in case of re-installation (Search for the app and choose to uninstall, sort Apps by date). Debug the issue until it is resolved. I had to perform the following on Command line as an admin and reboot: https://learn.microsoft.com/en-us/troubleshoot/sql/database-engine/database-file-operations/troubleshoot-os-4kb-disk-sector-size

REG ADD "HKLM\SYSTEM\CurrentControlSet\Services\stornvme\Parameters\Device" /v "ForcedPhysicalSectorSizeInBytes" /t REG_MULTI_SZ /d "* 4095" /f

REG QUERY "HKLM\SYSTEM\CurrentControlSet\Services\stornvme\Parameters\Device" /v "ForcedPhysicalSectorSizeInBytes"

Expected result:



TASK 1: Once the installation fully *completes successfully* take a screenshot. The screenshot should contain your name(s) course, section, Lab # and the Semester (you can use a docx with such text or open Notepad for it).

2. SQL Server Management Studio (SSMS) and Azure studio (by default) installation and set up

2.1. Download and install SSMS.

Click on **Install SSMS from the screen** above, you can also do this from https://learn.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-ver16.

Download the link:

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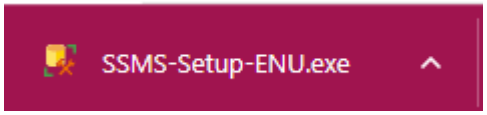
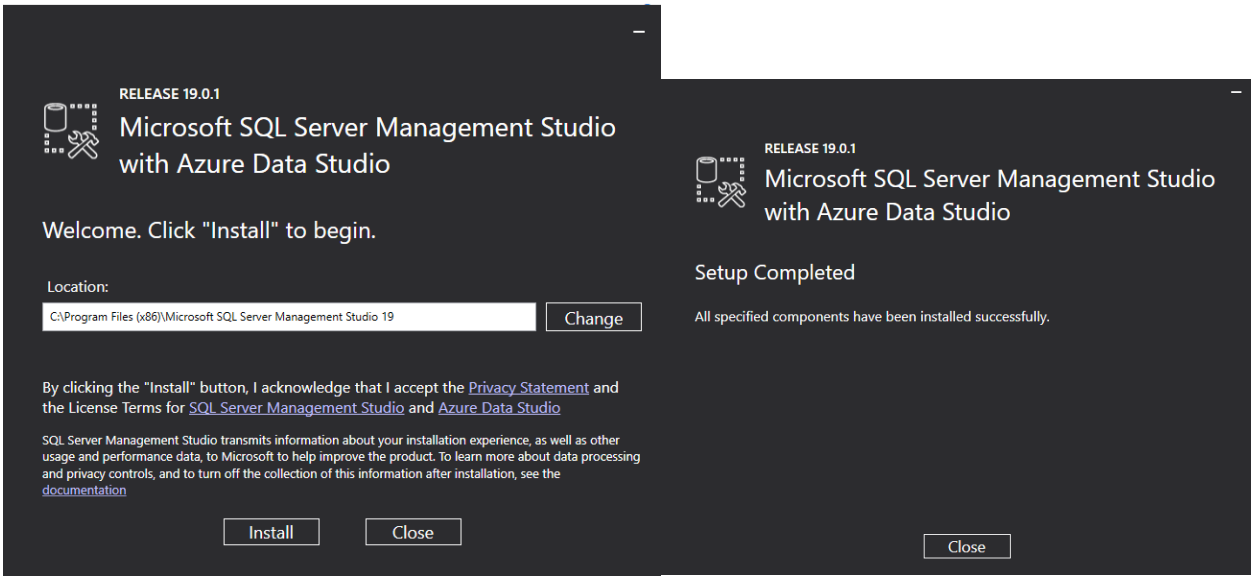
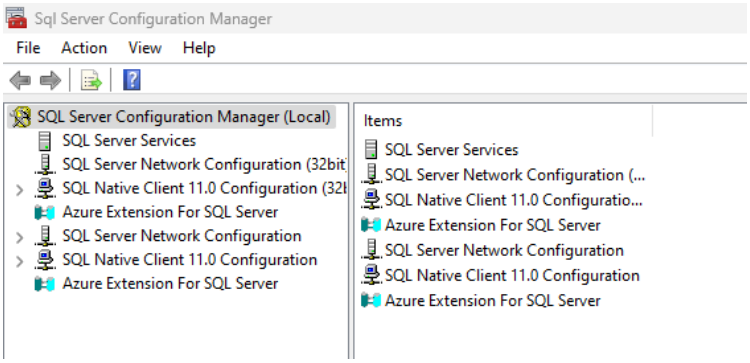
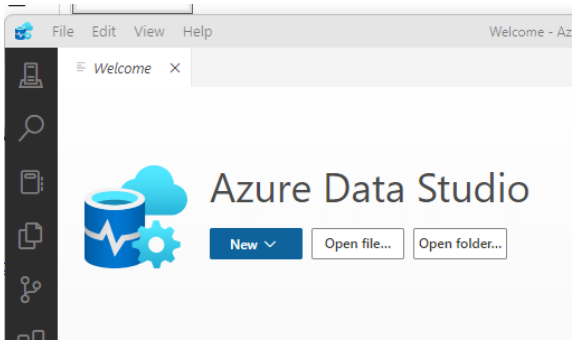
Double-click on the installer:





Click **Install**. Allow changes. Attempt to open both SSMS and Azure Studio. Expected results:



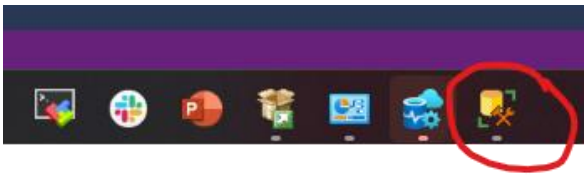


TASK 2: Once the installation fully completes take a screenshot. The screenshot should contain your name(s) course, section, Lab # and the Semester and both apps open fully visible (you can use a docx with such text or open Notepad for it).

3. SQL Server Connection

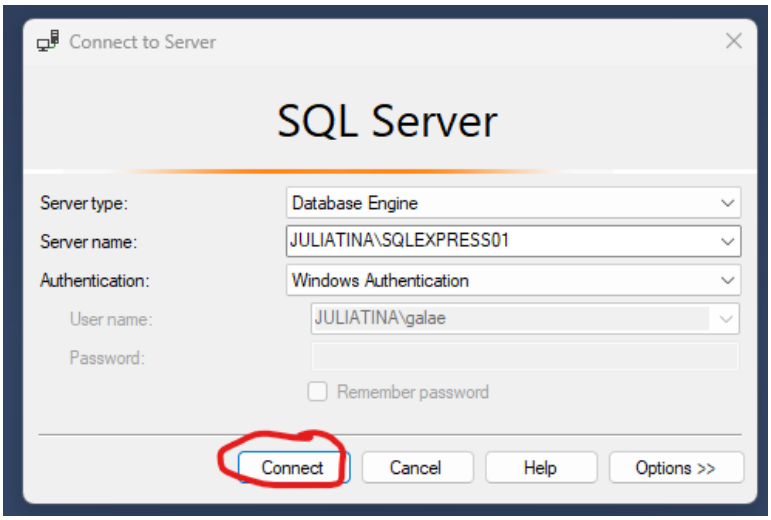
3.1. Connect to the server.

Type and Find **SSMS** in search and Right-click – run as administrator. (close it if was already open)

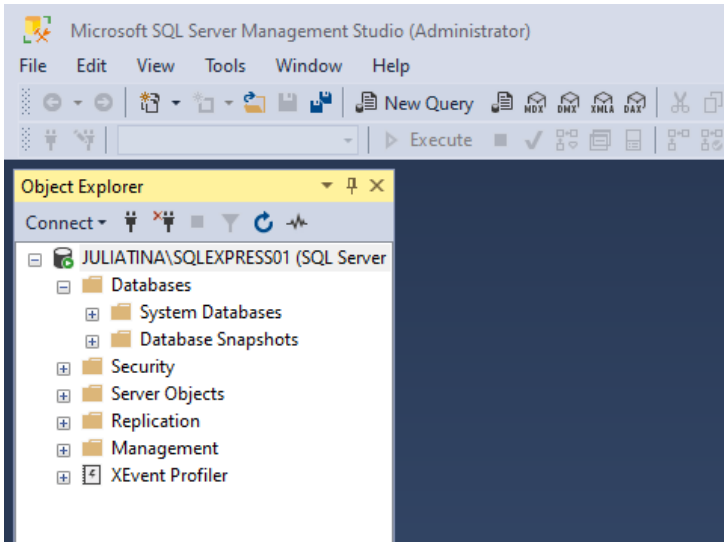


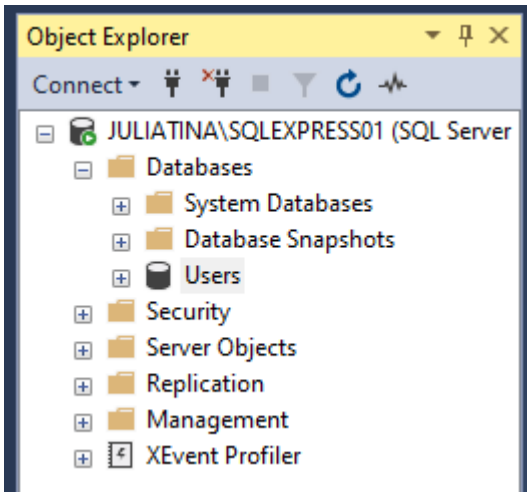
Allow changes. Right-click on the icon - pin into taskbar

Expected result:



Keep **defaults**, attempt to connect.



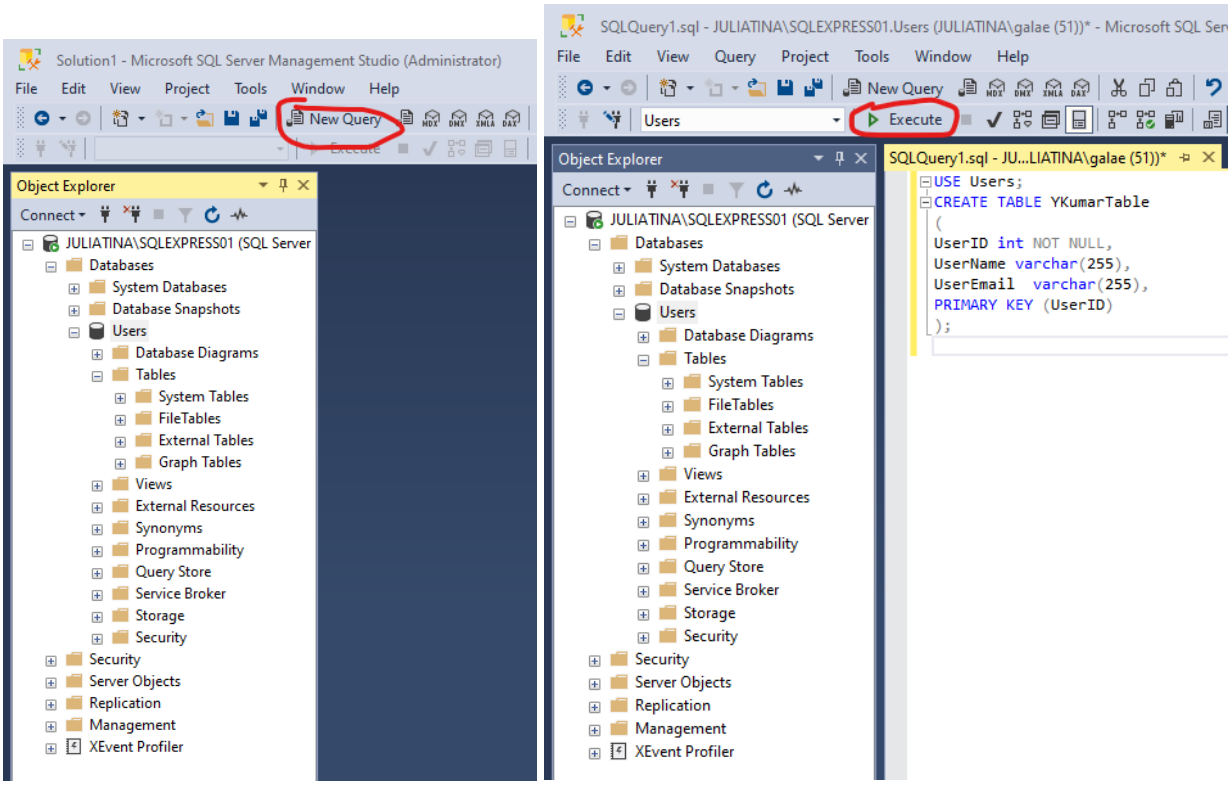


3.2. Create a Database and a Table.

Right-click on Databases folder → New Database

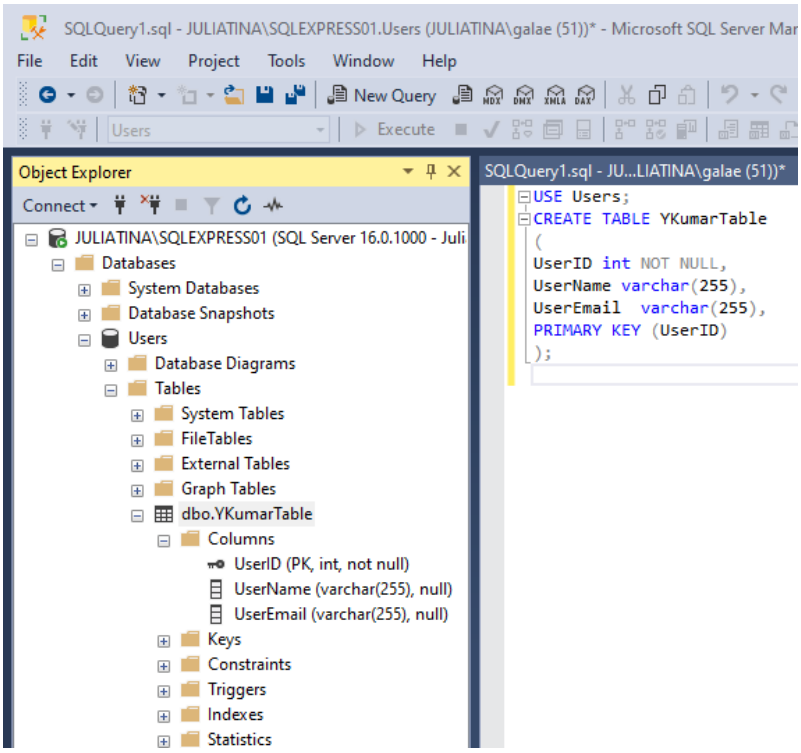
and add database **Users. Click OK. (see result above).**

Start a new Query




```
USE Users;
CREATE TABLE YKumarTable
(
UserID int NOT NULL,
UserName varchar(255),
UserEmail  varchar(255),
PRIMARY KEY (UserID)
);
```

Right-click, refresh Tables, Observe the result.

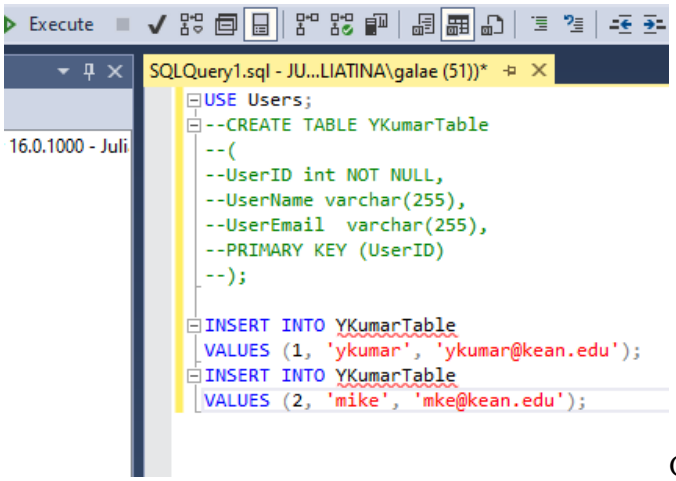


3.3. Insert and Select the Data

Re-write the previous query with

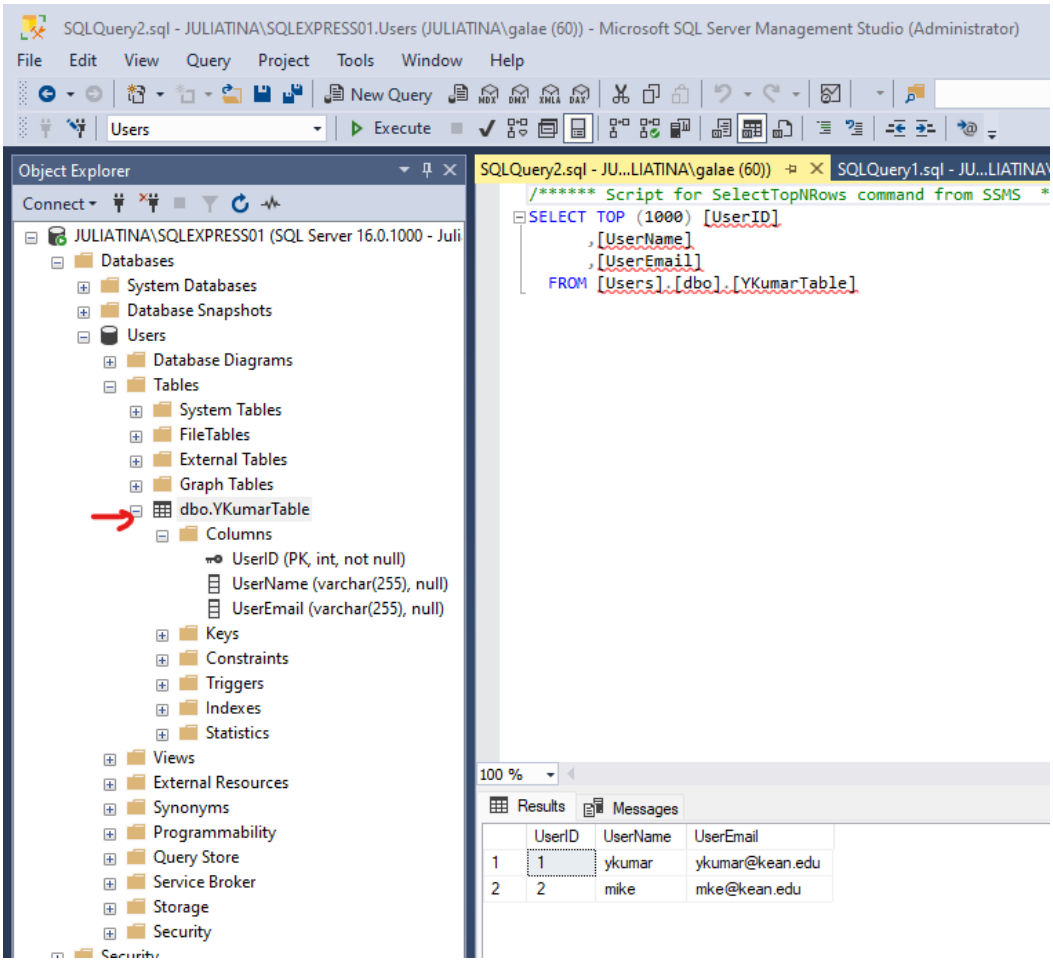
```
USE Users;
--CREATE TABLE YKumarTable
--(
--UserID int NOT NULL,
--UserName varchar(255),
--UserEmail  varchar(255),
--PRIMARY KEY (UserID)
--);
INSERT INTO YKumarTable
VALUES (1, 'ykumar', 'ykumar@kean.edu');
INSERT INTO YKumarTable
VALUES (2, 'mike', 'mke@kean.edu');
```

User your username. Execute



Observe the result:

Right click on the table name, Select top 1000 records:

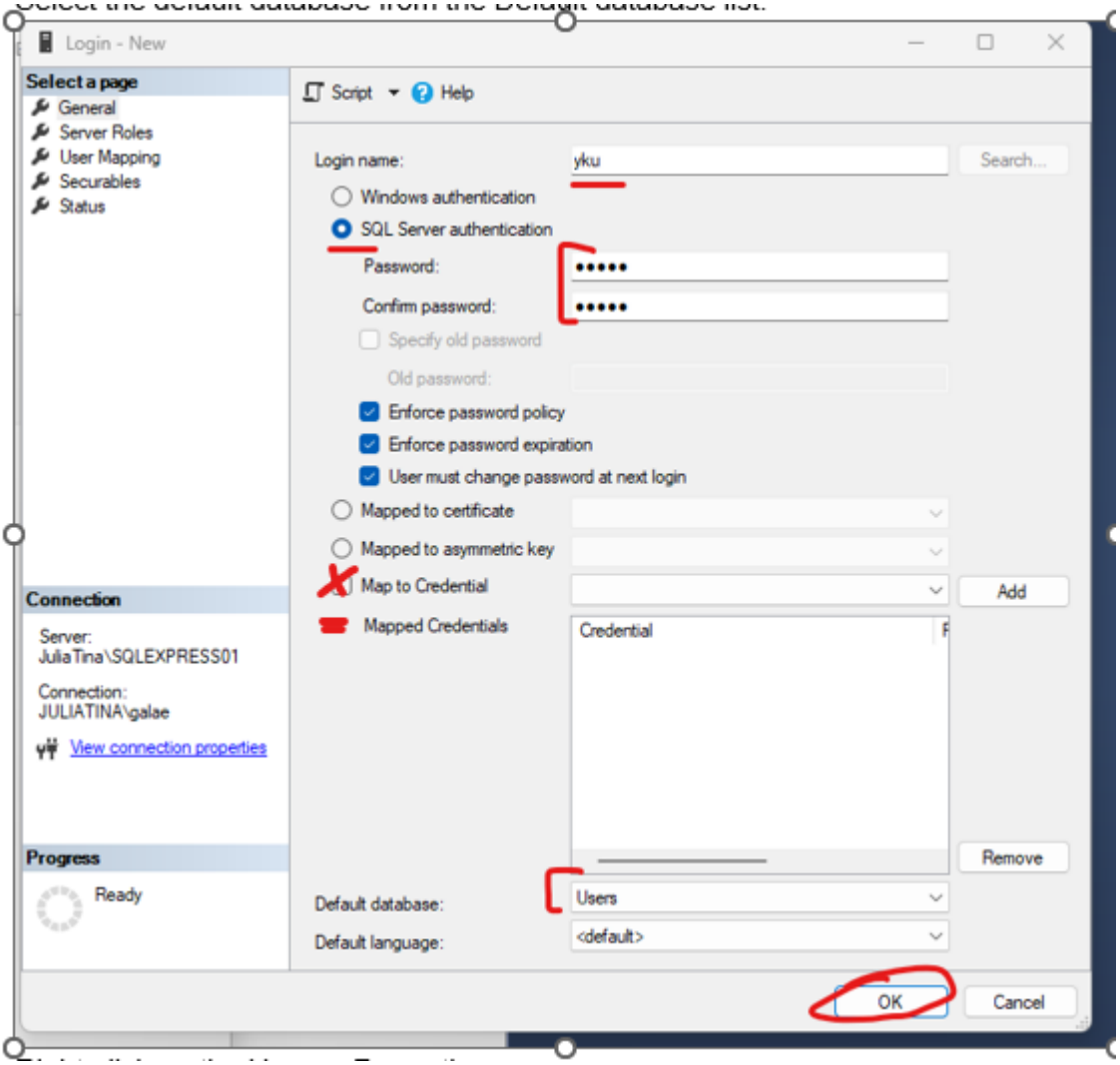


TASK 3: Take a screenshot of your result. The table should have your (or your teammate username), the first recods / records of the table should display your name / all teammate names.

3.3. Create a User.

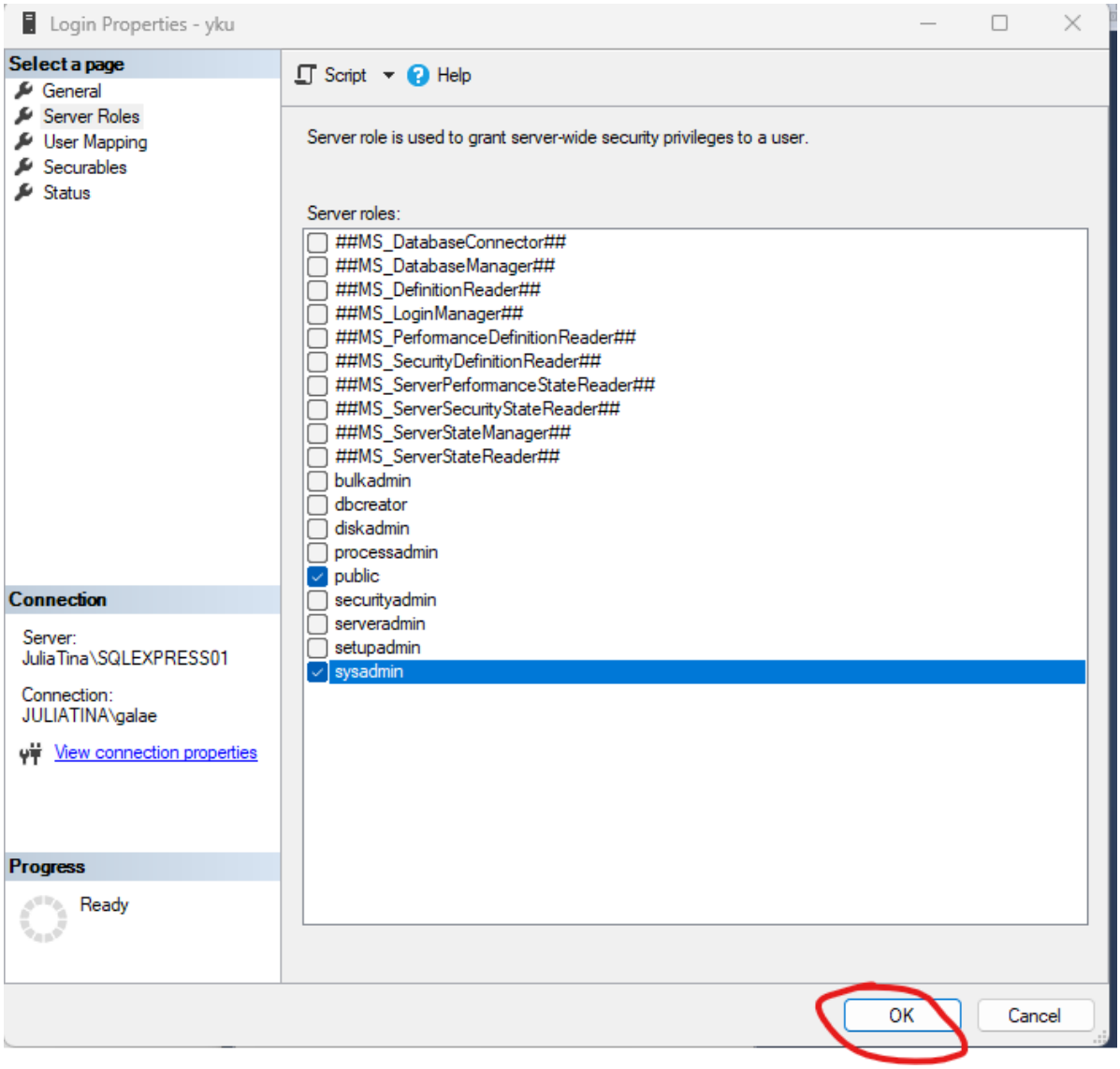
Reference: https://www.microfocus.com/documentation/silk-test/200/en/silktestworkbench-help-en/SILKTEST-7FFBB86A-CREATINGNEWSQLSERVERADMINUSER-TSK.html

1. To create a new user with system administrator rights, perform the following steps:
2. In the Object Explorer of SQL Server Management Studio, navigate to the Security folder and expand it.
3. Right-click the Logins folder and choose New Login. The Login - New dialog box opens.
4. Select the **General** page, and then enter a user name in the Login name text box.
5. Select SQL Server Authentication and enter a password.
6. Select the default database from the Default database list.



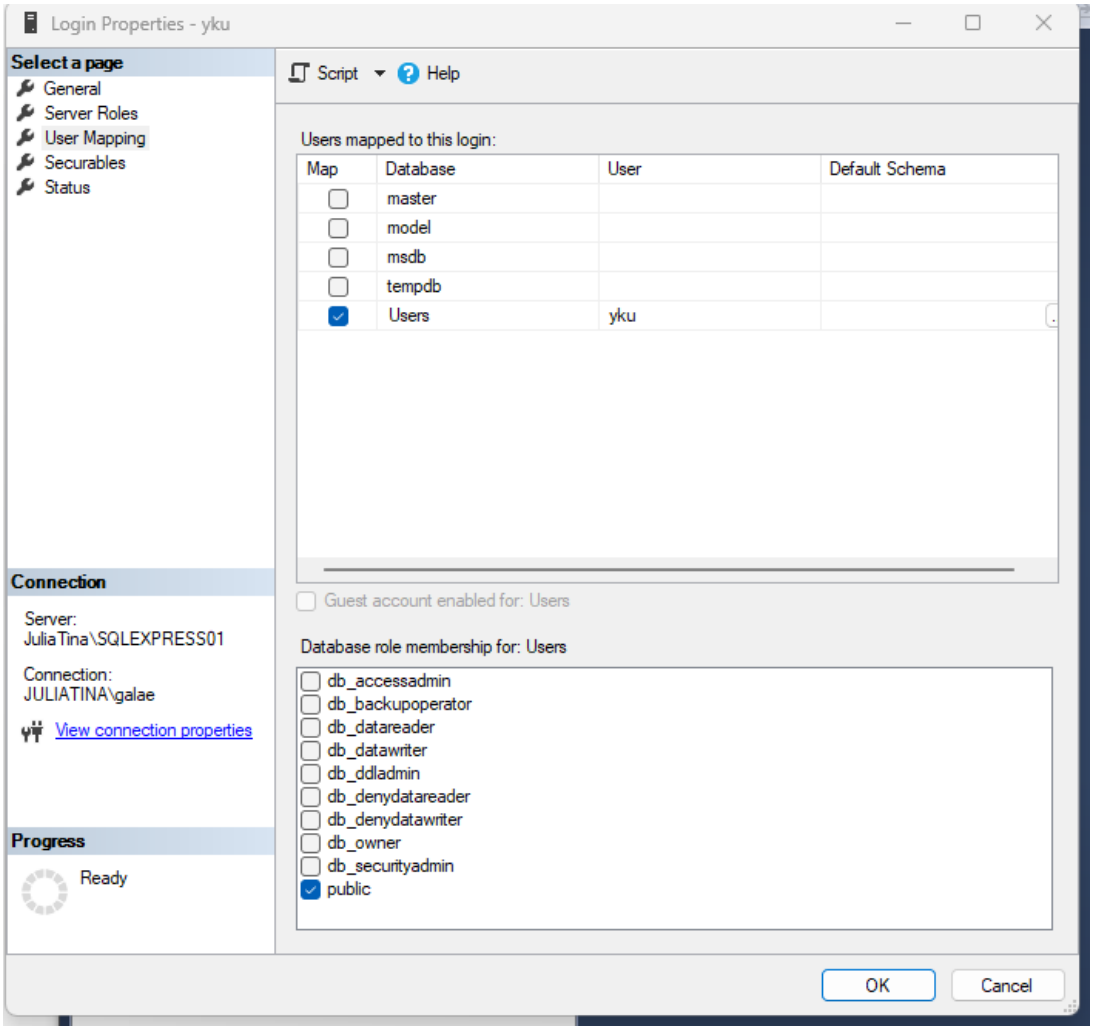
Make sure the user is mapped to credentials
Right-click on the User -> Properties

7. Select the **Server Roles** page, and then check the sysadmin check box in the Server roles list.

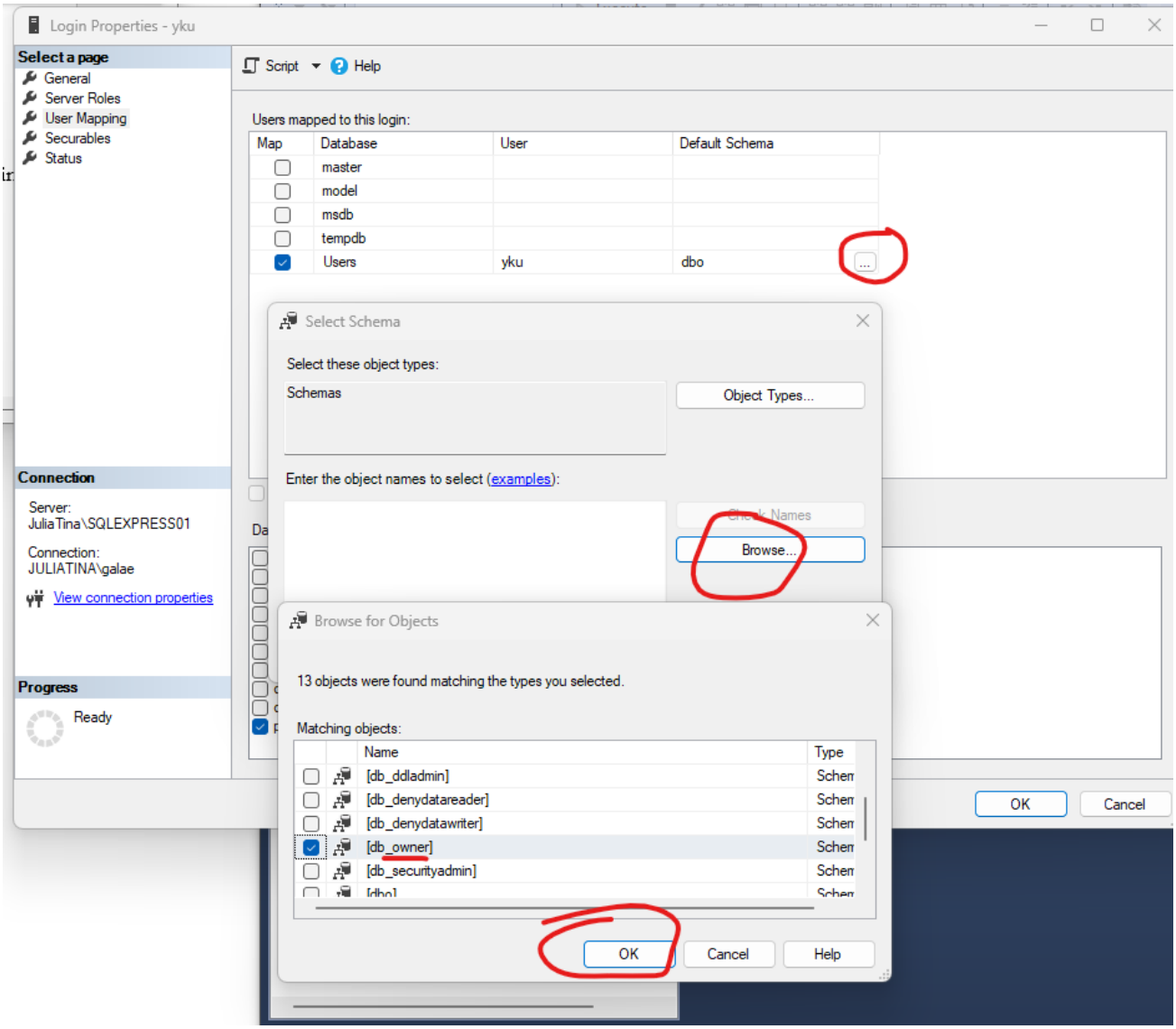


Right-click on Roles -> refresh, make sure the sysadmin is there?

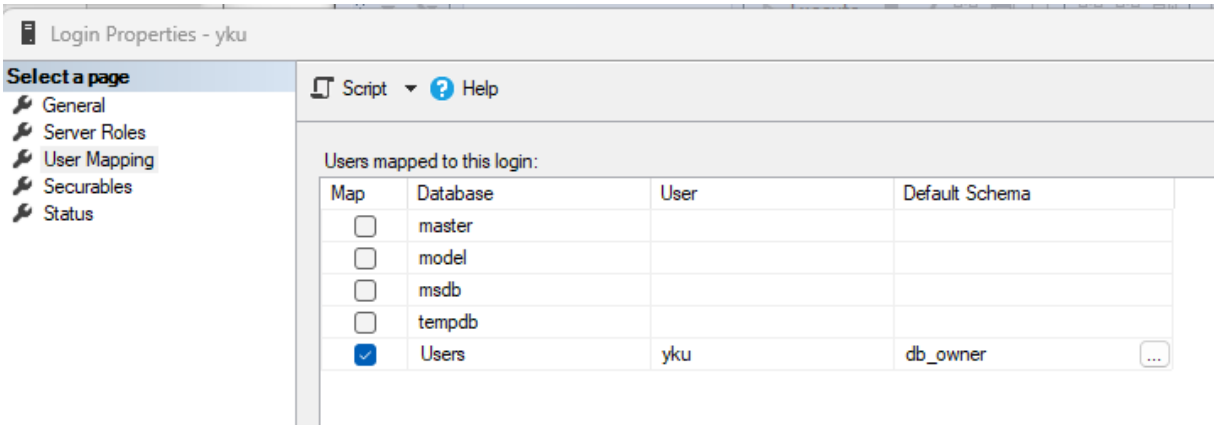
8. Select the User Mapping page.
9. In the Map column, check the check box for the database that the new login can access. By default, the login name appears in the User column. Leave this value.



10. In the Database role membership for list, check the db_owner check box.
11. Click OK.



Result

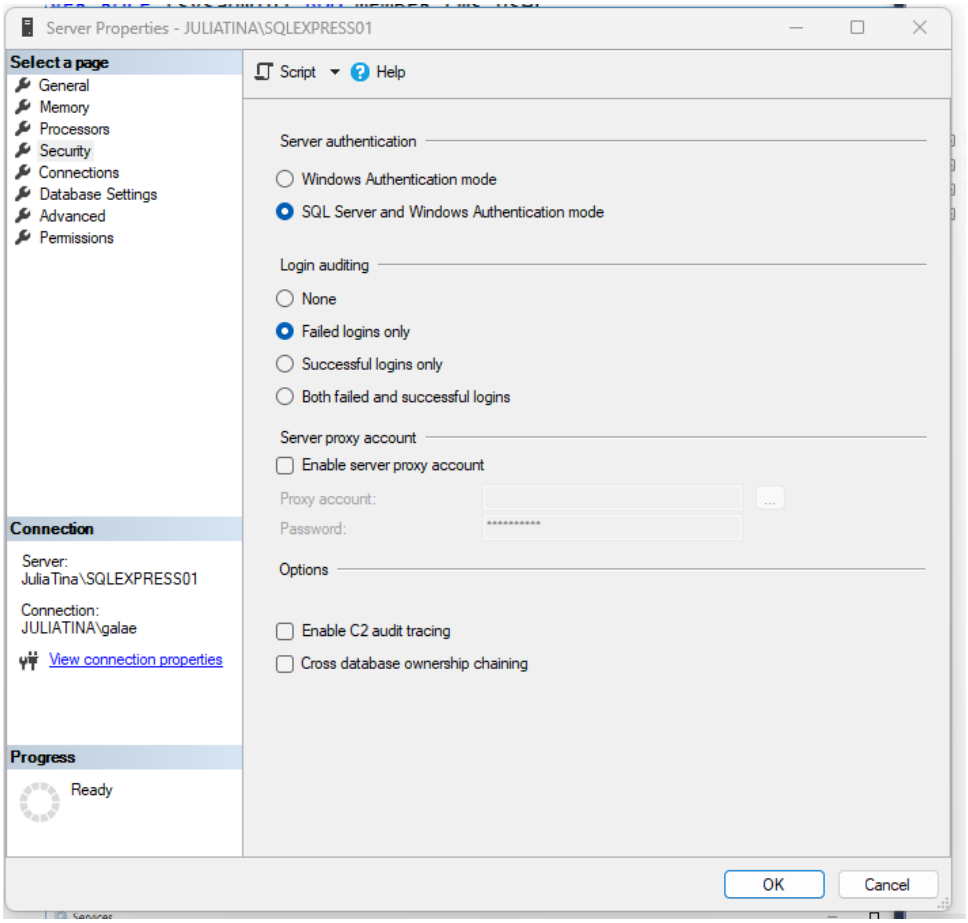


1. Using admin account right click on your server name (SQLEXPRESS01), go to properties

2 - Go to option **Security**

3 - Check the option "**SQL Server and Windows Authentication mode**"

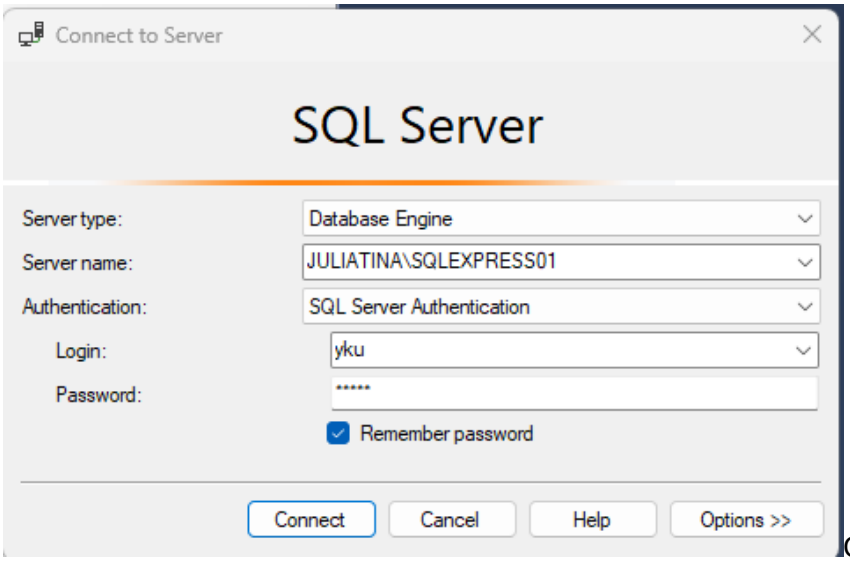
4 - Click on the **Ok** button



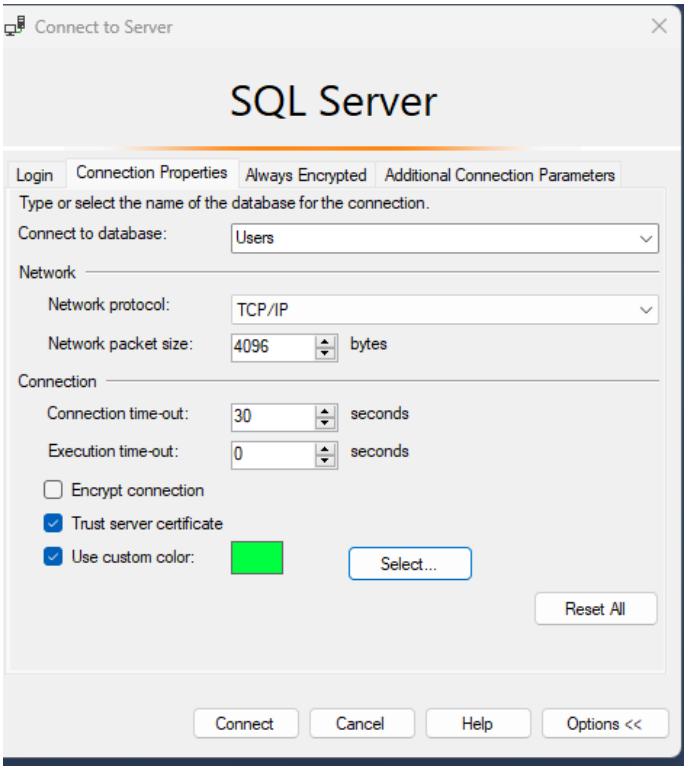
Restart the server

3.4. Try to connect with the new User.

Make services automatic, stop and start them. They should run

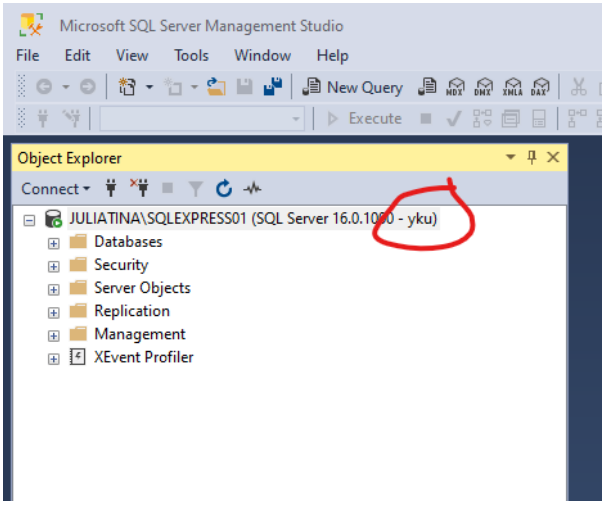


Go to **Options** ,



choose your favorite color

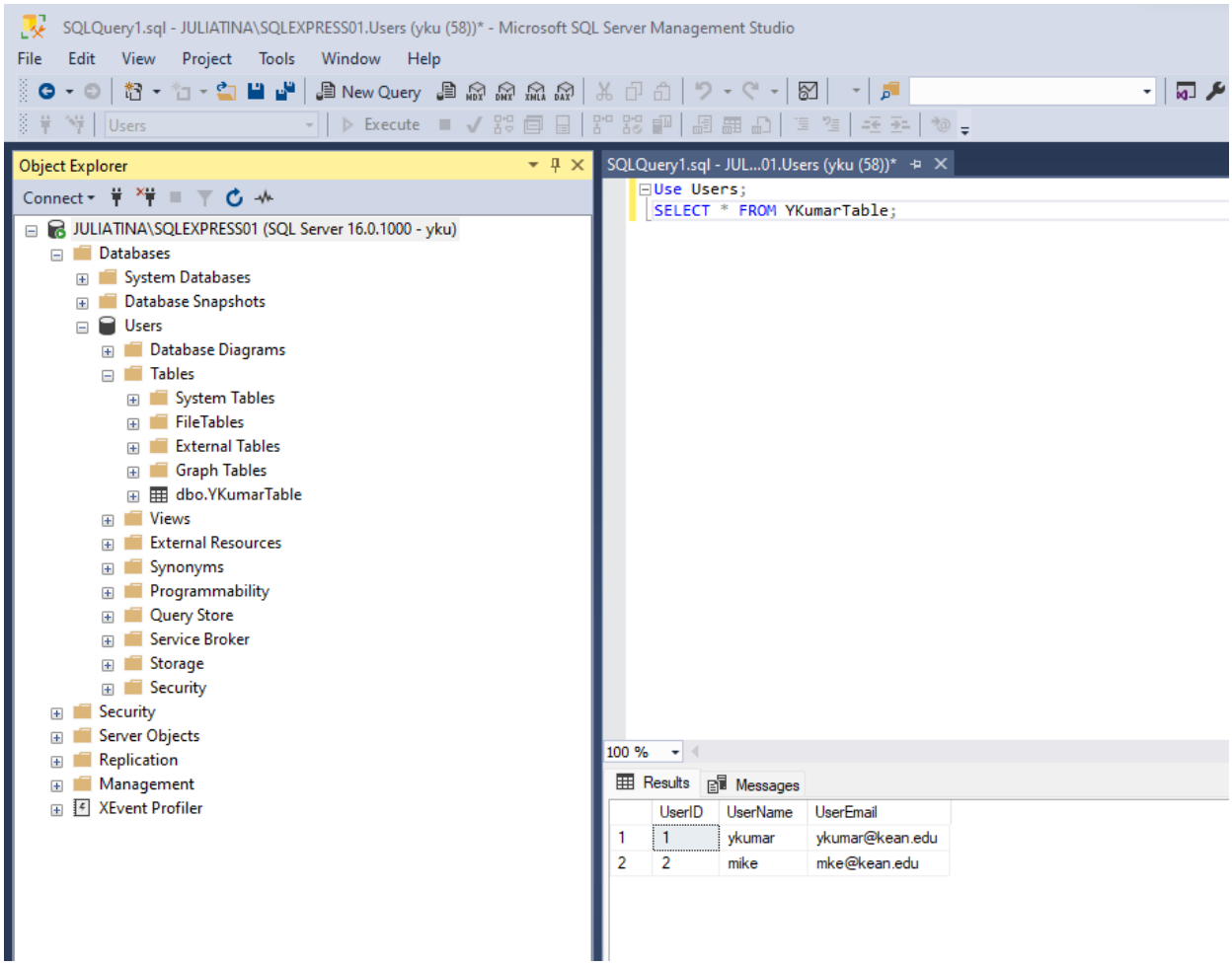
Click Connect



Test select

Use Users;

SELECT * FROM YKumarTable;



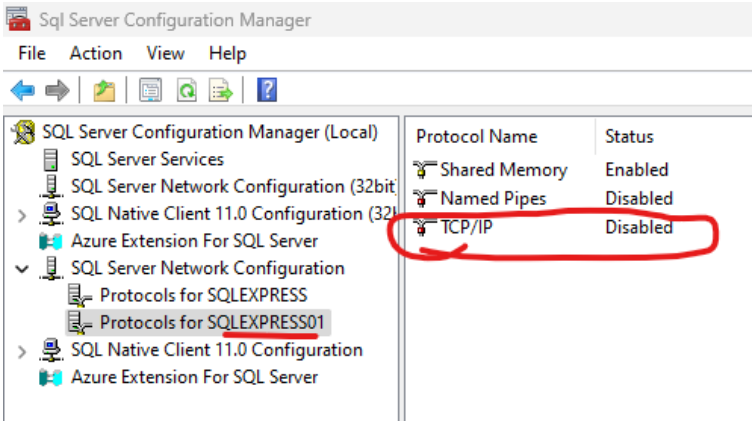
TASK 4: Take a screenshot of your result. The user should have your (your teammate username).

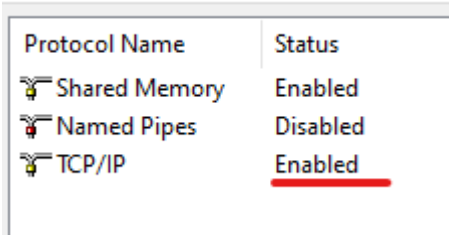
Possible troubleshooting / in case of error:

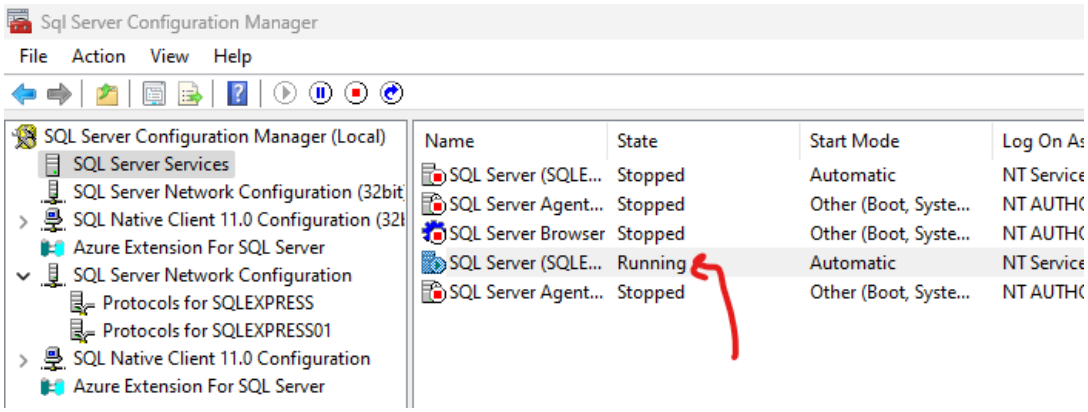
Make sure that the server, Agent and Browser are all running, their start mode is automatic, TCP/IP is enabled.

Close the studio, open **SSMS** as administrator.

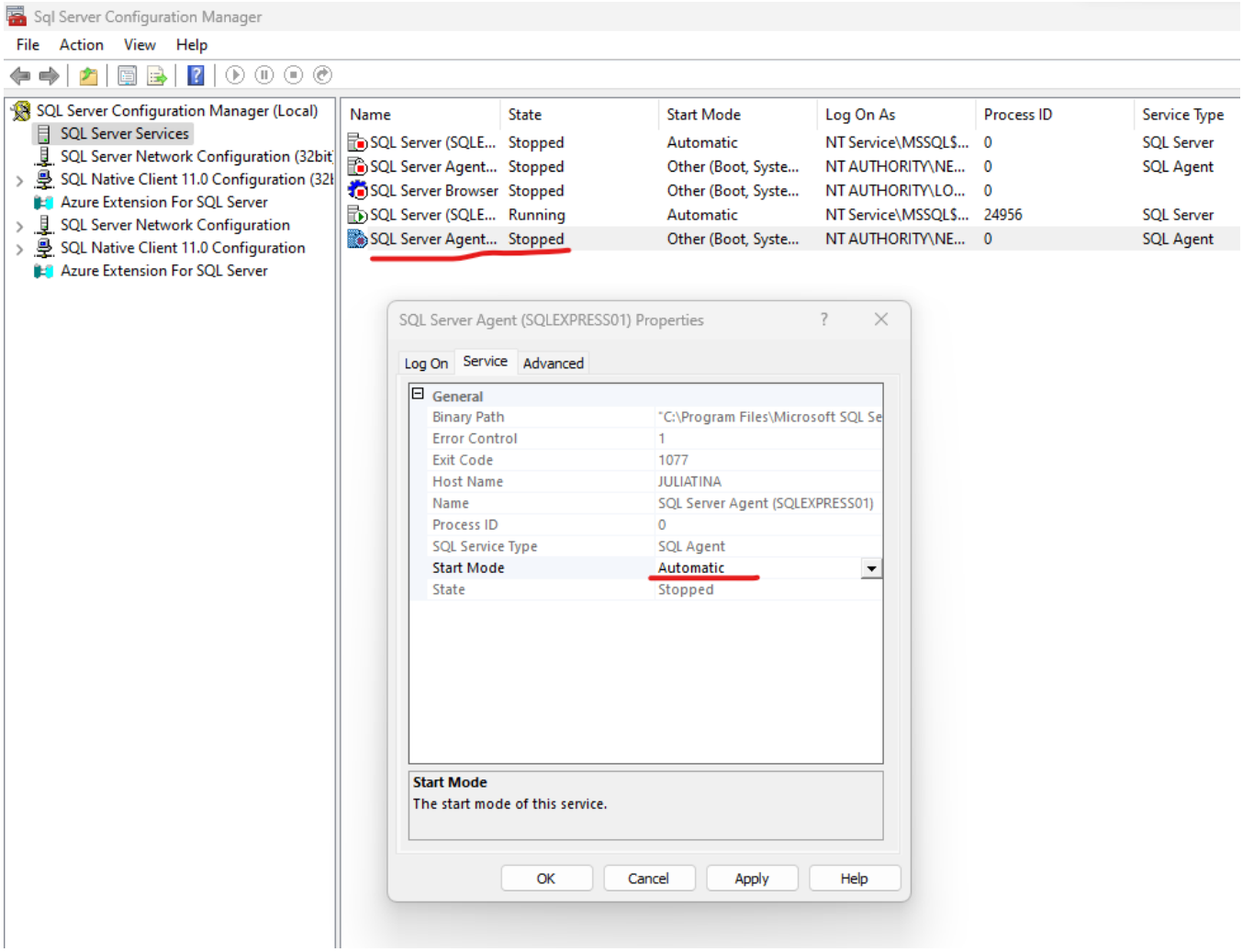
Initially TCP/IP disabled. Right-click - enable

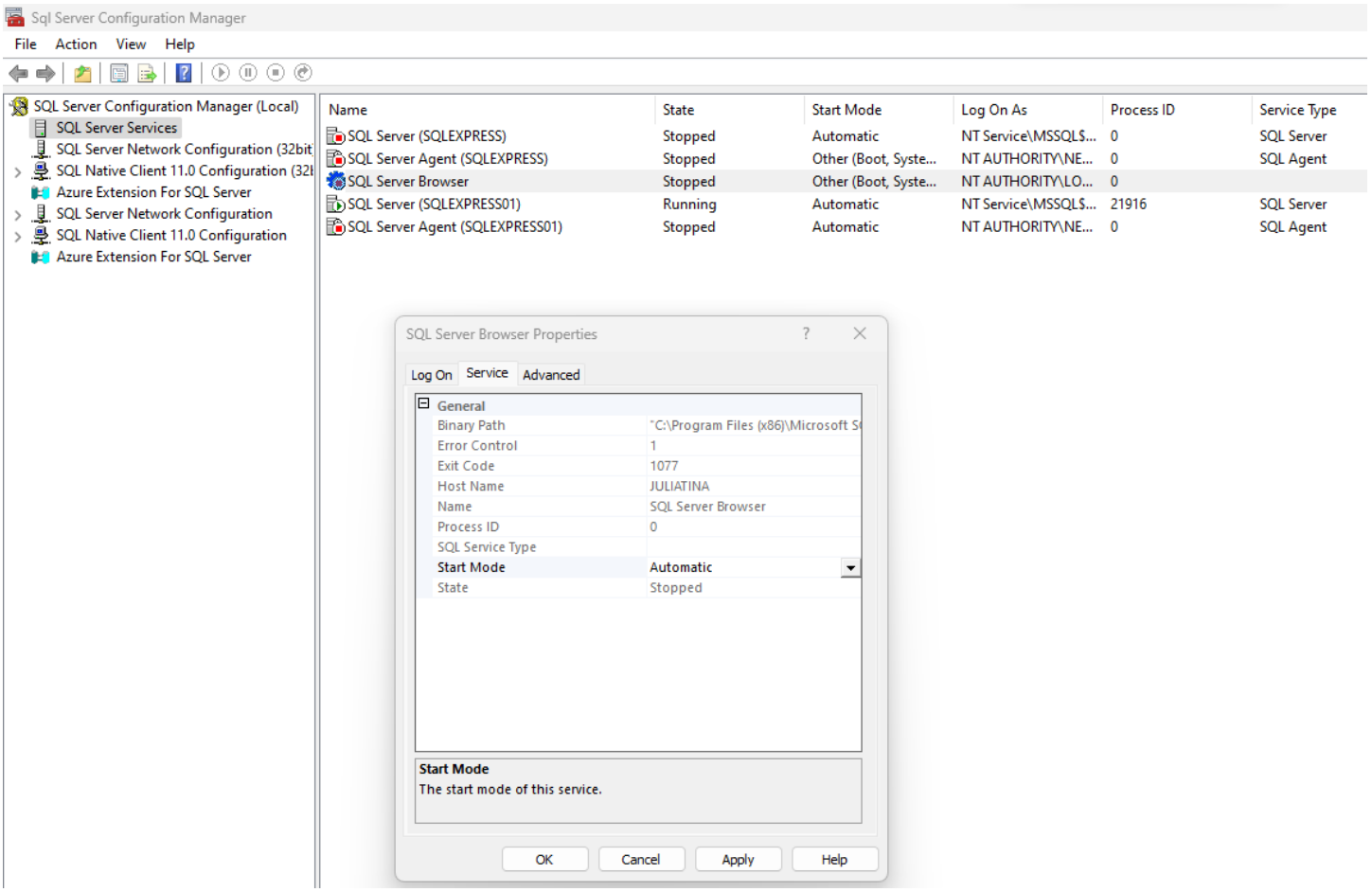






Find the server, **Start** or right-click - > **Stop**, then **Start. You might need to change start mode to Automatic.**



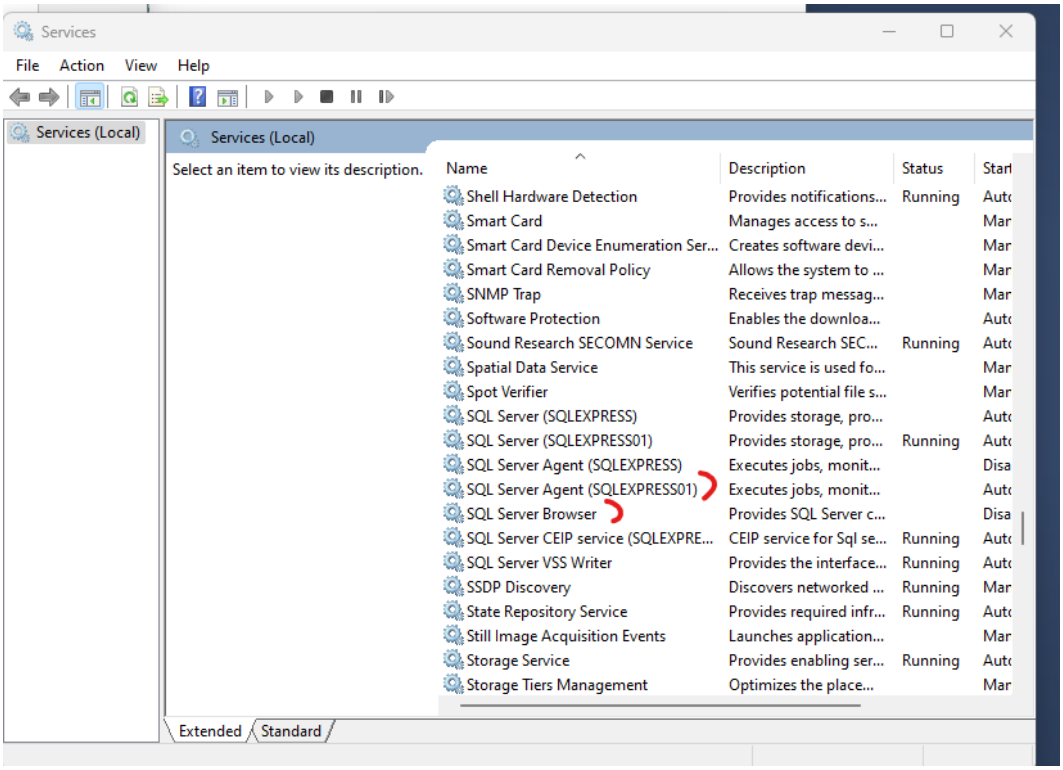


Reference: https://learn.microsoft.com/en-us/sql/tools/configuration-manager/sql-server-browser-service?view=sql-server-ver16

If the server / agent or browser do not still start:

If it is disabled, go to **Control Panel->Administrative Tools->Services**, and look for the **SQL Server Agent**. Right-click, and select **Properties** From the **Startup Type** dropdown, change from **Disabled** to **Automatic**.

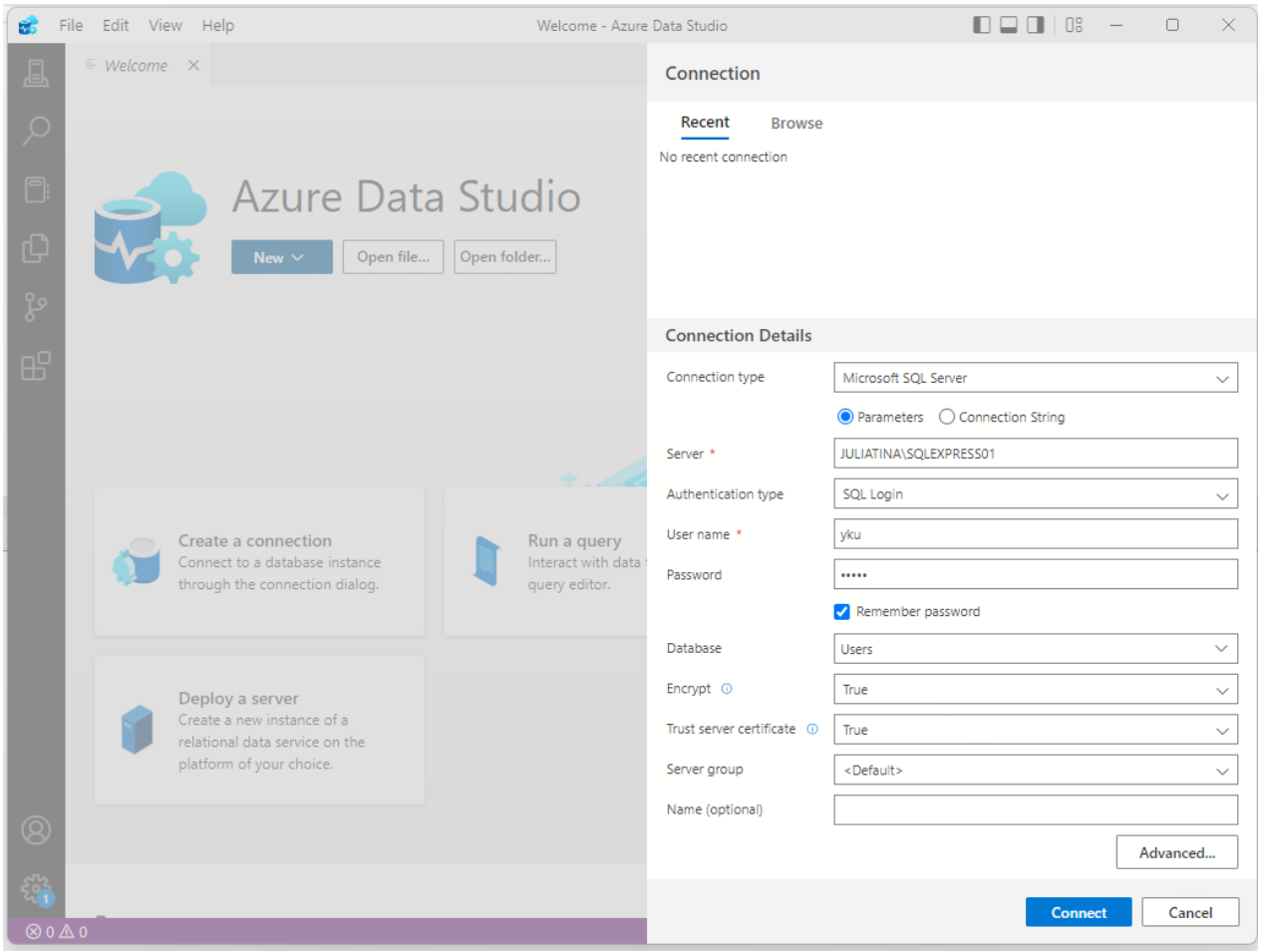
Search for "**Services**" on your computer

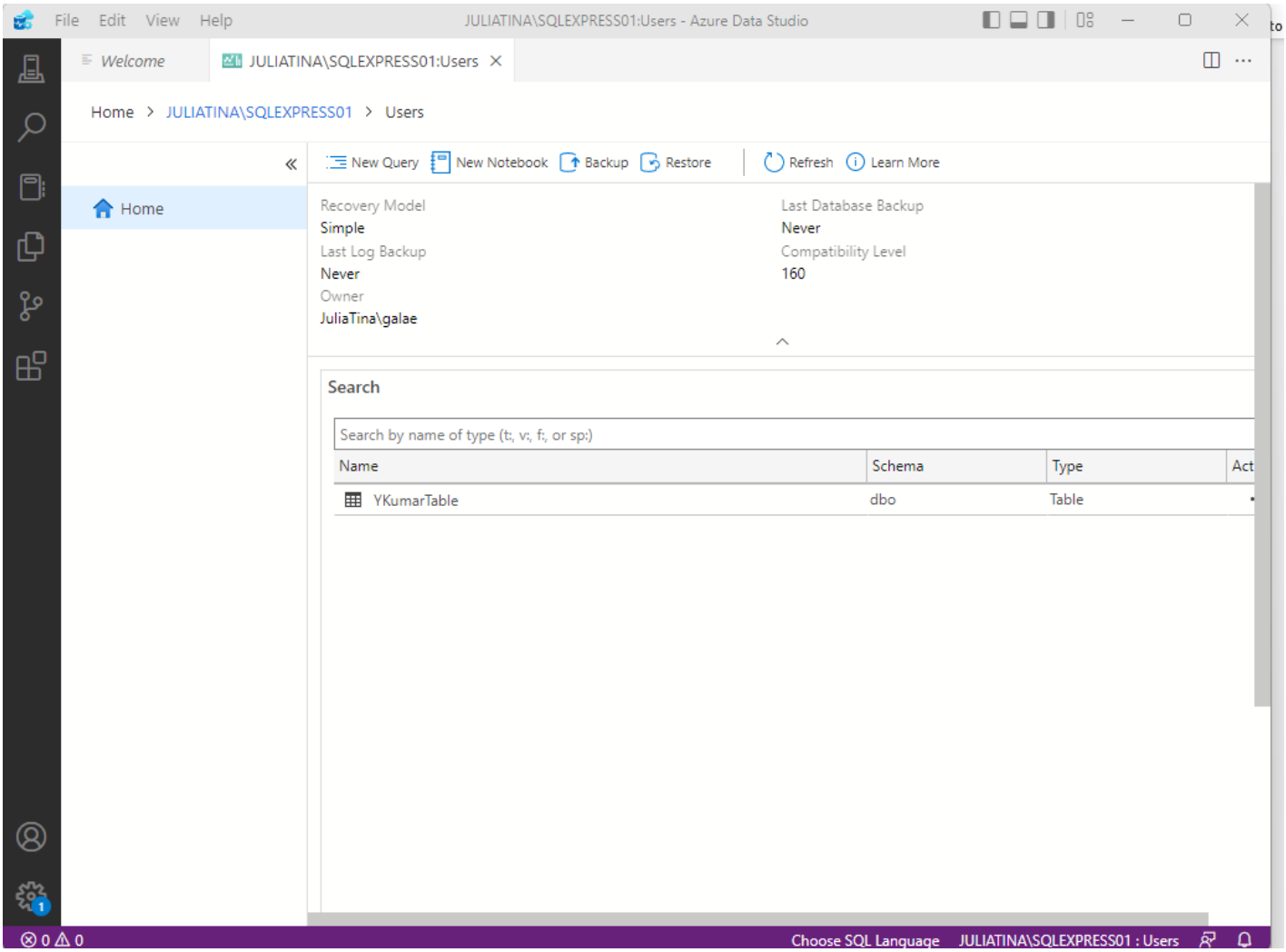


Make services automatic, stop and start them. They should run

3.4. Try to connect with the new User from Azure Data Studio.

Allow changes.

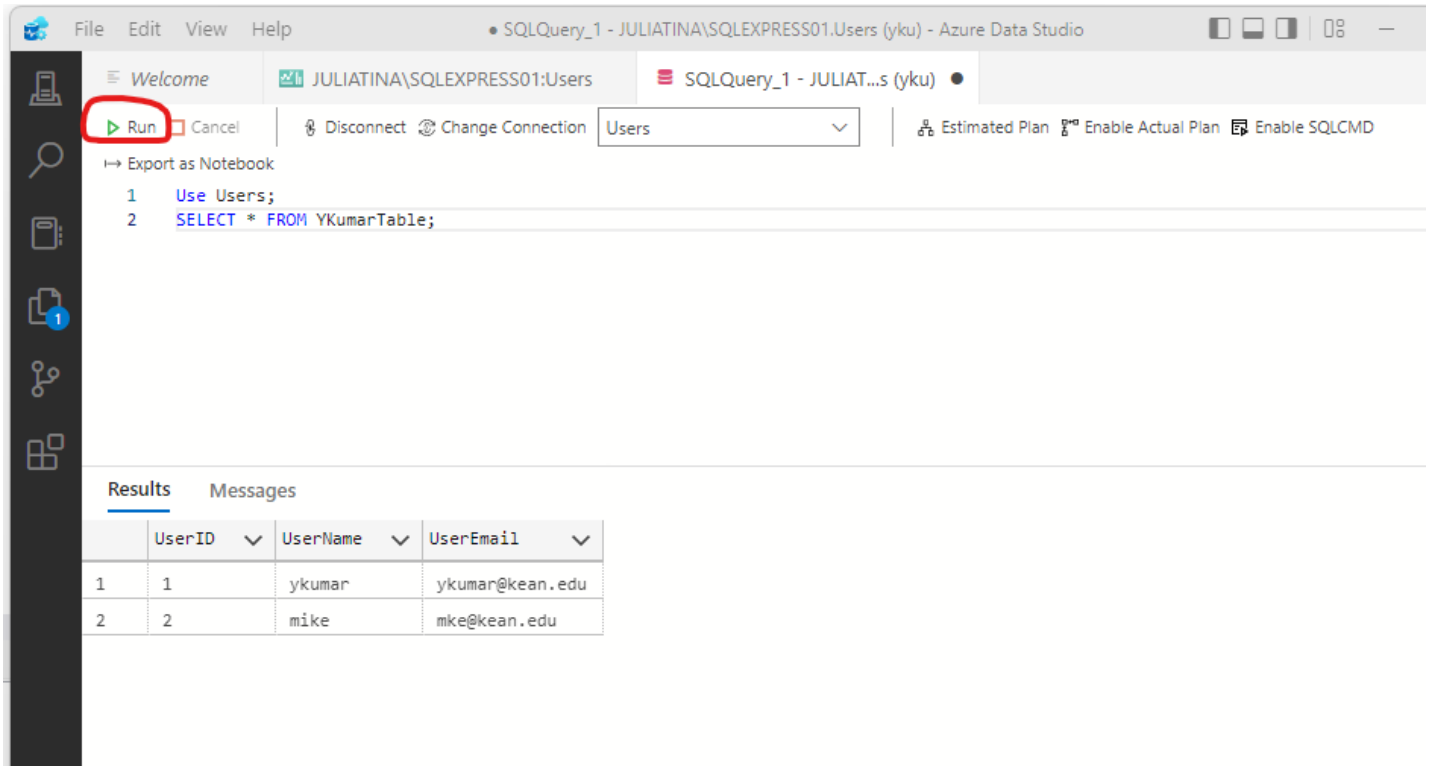

File Edit View Help
Welcome - Azure Data Studio
Welcome
Azure Data Studio
New
Open file...
Open folder...
Create a connection
Connect to a database instance through the connection dialog.
Run a query
Interact with data
query editor.
Deploy a server
Create a new instance of a relational data service on the platform of your choice.
Connection
Recent
Browse
No recent connection
Connection Details
Connection type
Microsoft SQL Server
Parameters
Connection String
Server *
JULIATINA\SQLEXPRESS01
Authentication type
SQL Login
User name *
yku
Password
Remember password
Database
Users
Encrypt
True
Trust server certificate
True
Server group
<Default>
Name (optional)
Advanced...
Connect
Cancel



New Query ->Test Select

Use Users;

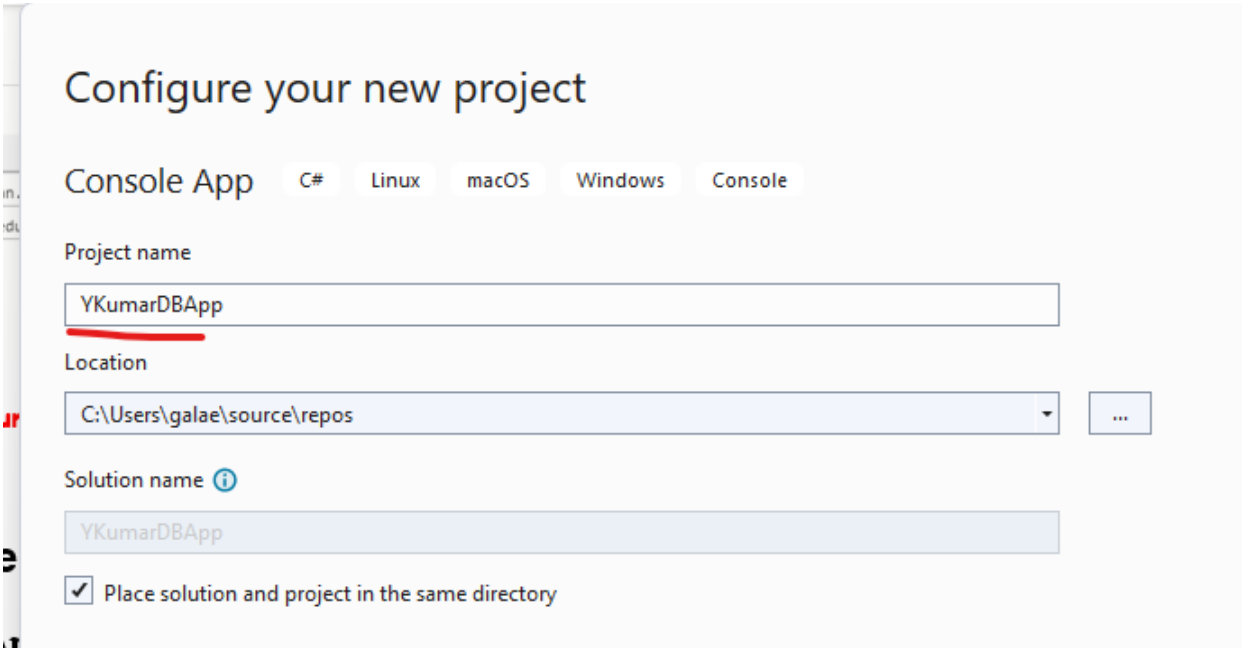
SELECT * FROM YKumarTable;



TASK 5: Take a screenshot of your result. The user and table should have your (or your teammate username).

4. Connect with C# code

4.1. Create a new Console App in Visual Studio

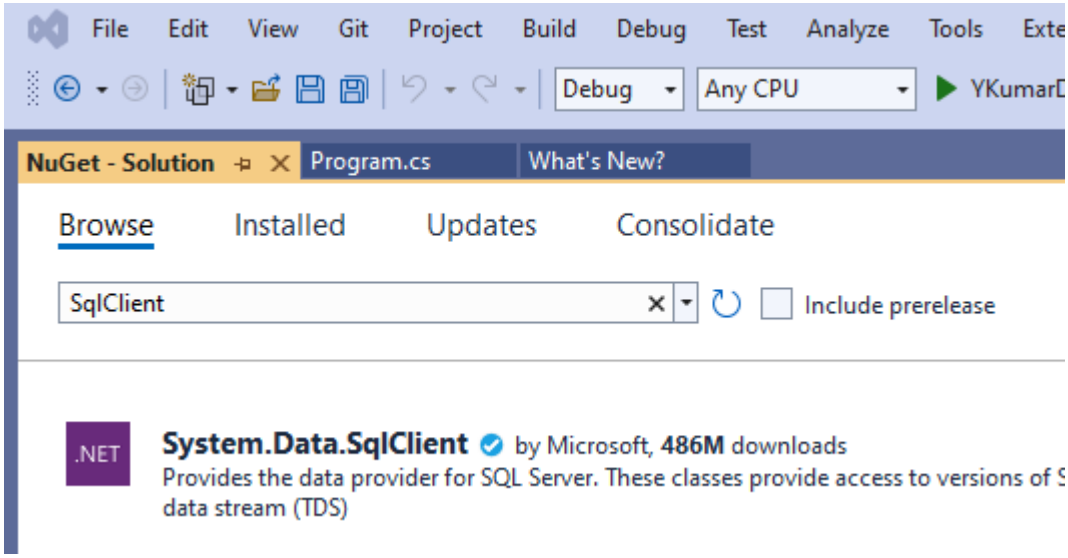


Use your name.

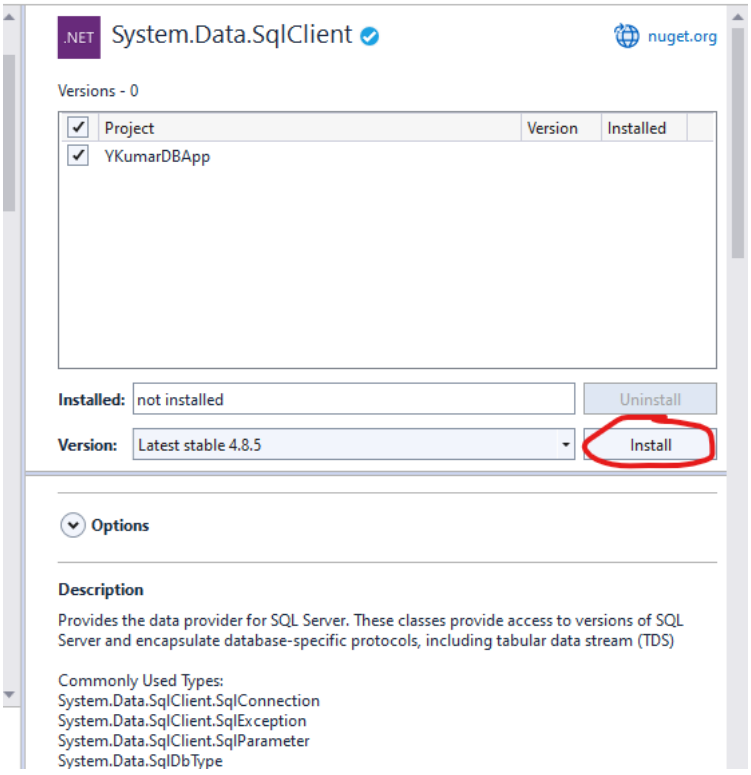
4.2. Import Nugget Packages

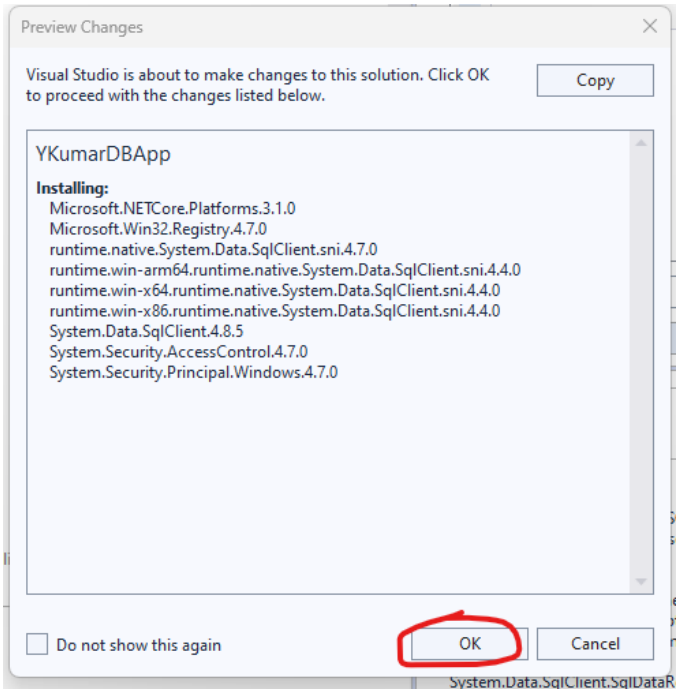
Right-click on Solution Explorer for your project – **Manage Nugget packages**.

Type the name of the assembly and Browse**: SqlClient**



Choose the package, install.



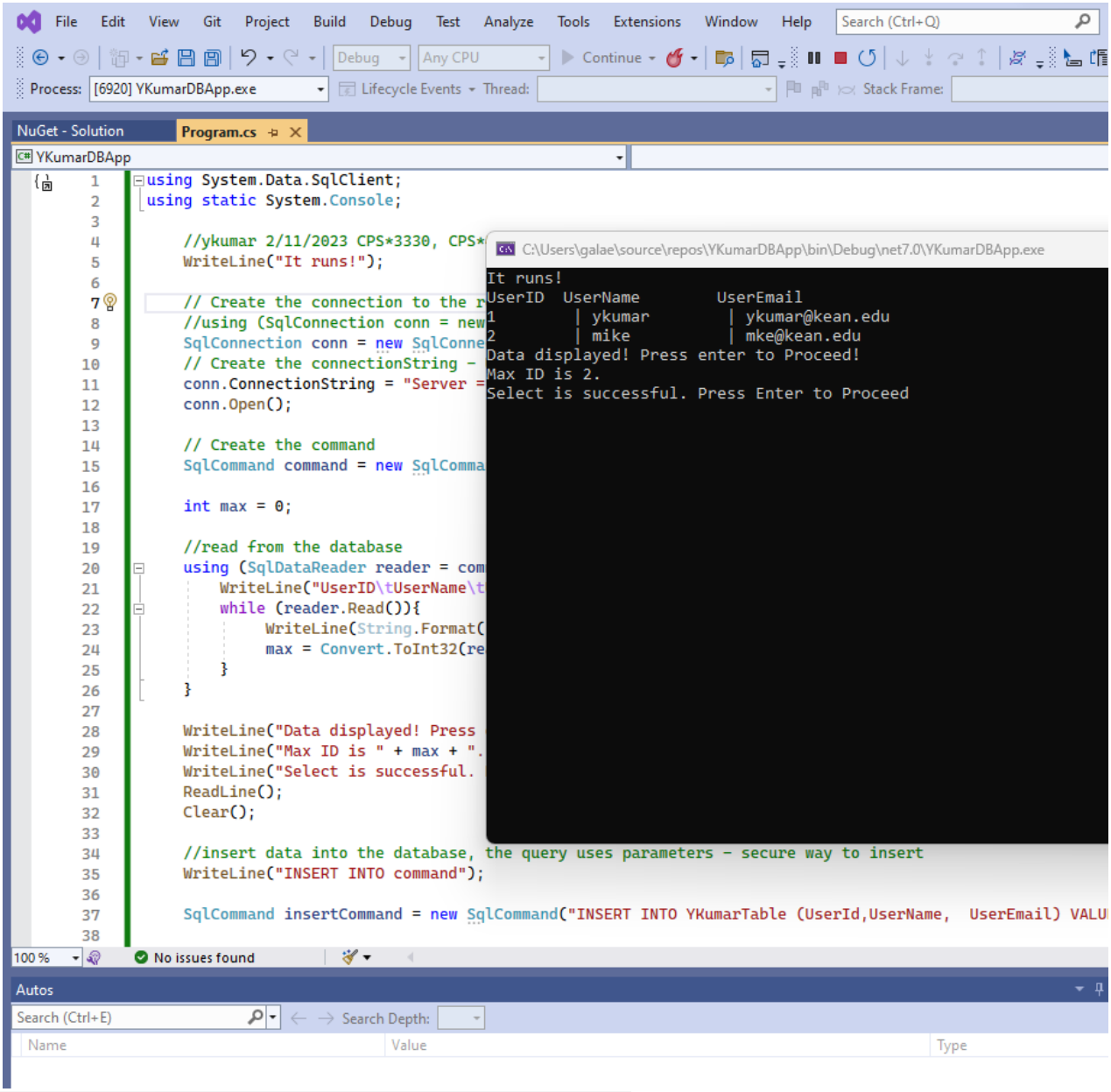


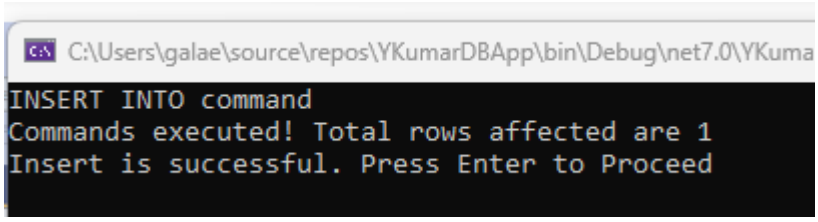
accept

4.3. Run the code and debug if needed.

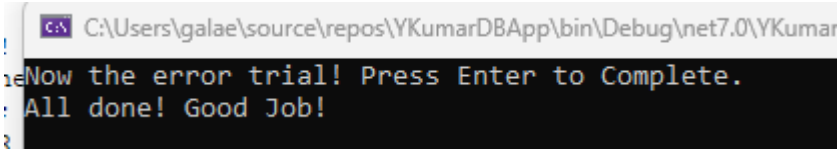
Copy-paste and run this code: http://eve.kean.edu/~ykumar/CPS3330_SP2023/SQLserver.txt

Expected result:

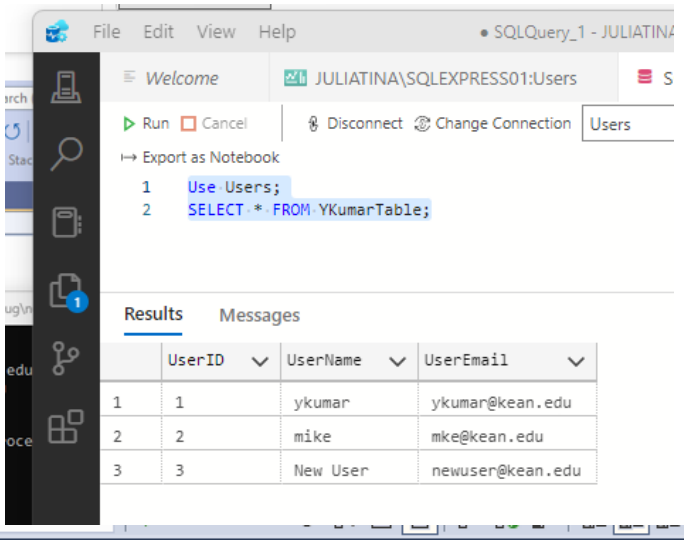


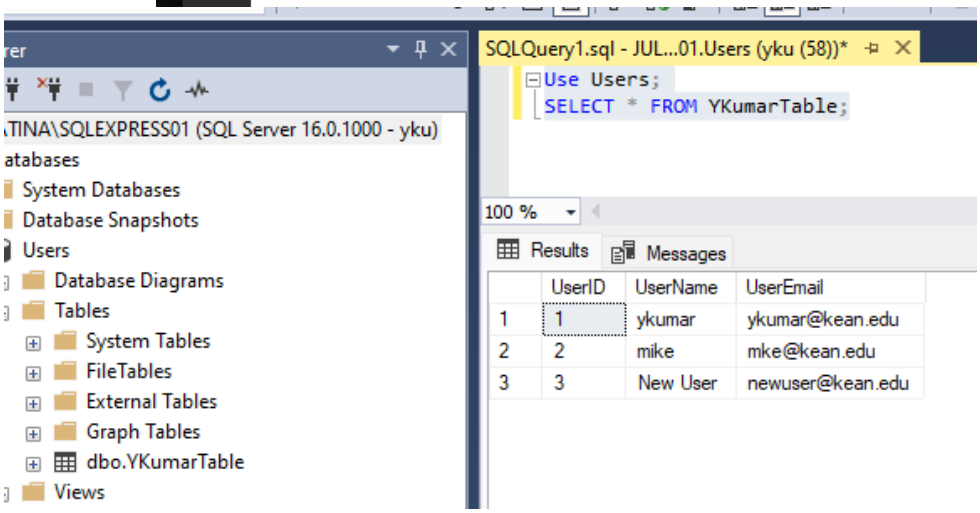


press Enter

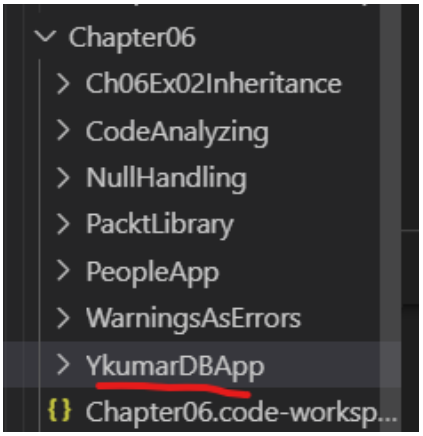


Check changes in the Database:





See, if the code runs in VSC:

Create new folder 

right-click, open in integrated terminal,

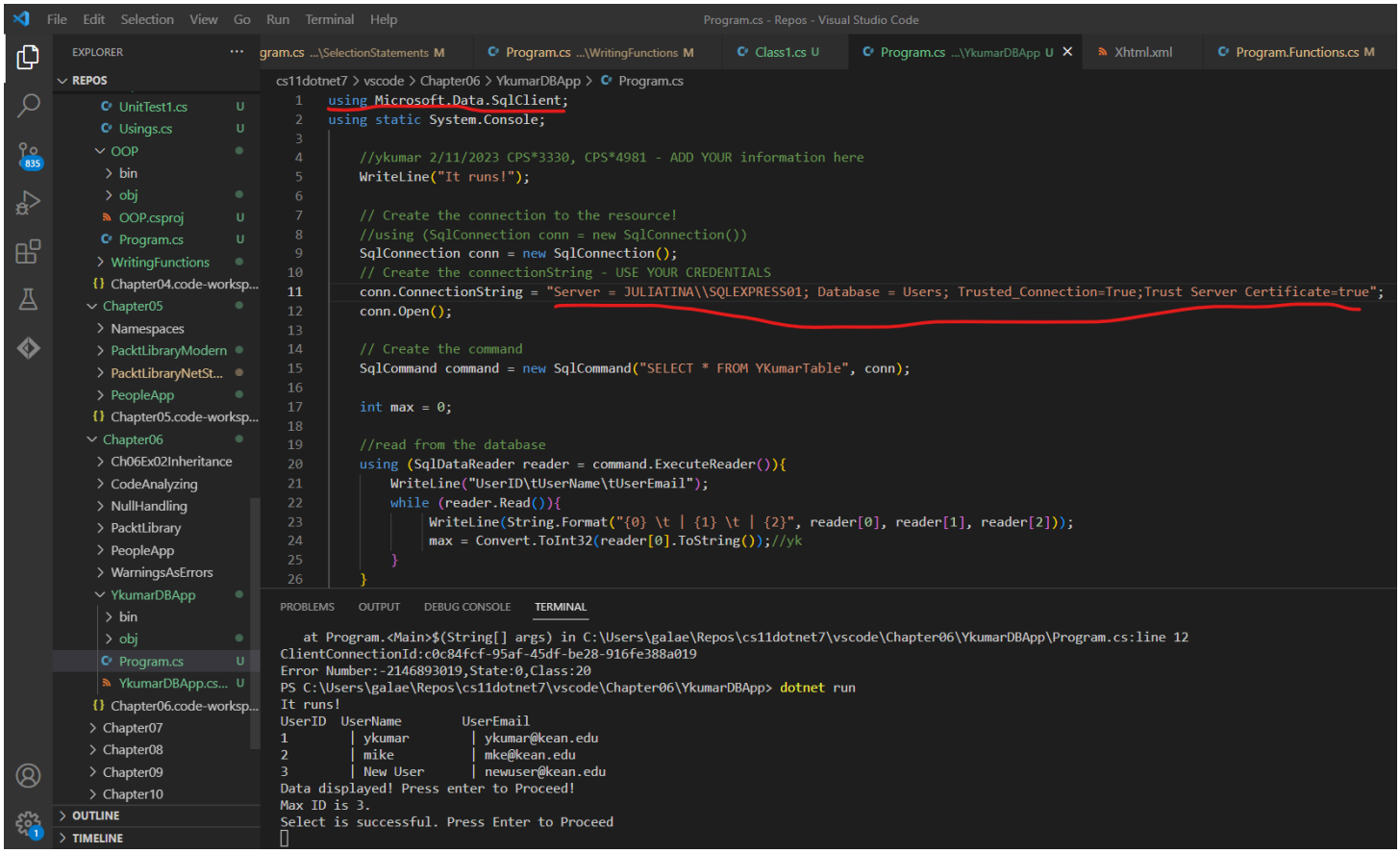
```
PS C:\Users\galae\Repos\cs11dotnet7\vscode\Chapter06\YkumarDBApp> dotnet new console
```

Stand on Program.cs in the created project, right-click, open in integrated terminal. Type the commands

dotnet tool install --global dotnet-ef
dotnet add package Microsoft.EntityFrameworkCore.SQLServer
dotnet add package Microsoft.EntityFrameworkCore.Design
dotnet add package Microsoft.EntityFrameworkCore.Tools

```
PS C:\Users\galae\Repos\cs11dotnet7\vscode\Chapter06\YkumarDBApp> dotnet tool install --global dotnet-ef
You can invoke the tool using the following command: dotnet-ef
Tool 'dotnet-ef' (version '7.0.2') was successfully installed.
PS C:\Users\galae\Repos\cs11dotnet7\vscode\Chapter06\YkumarDBApp> dotnet add package Microsoft.EntityFrameworkCore.SQLServer
  Determining projects to restore...
  Writing C:\Users\galae\AppData\Local\Temp\tmp41EE.tmp
```

Try the code:
We need to slightly update 2 lines of code (underlined below)



TASK 6: Take a screenshot of your results from both IDEs (VSC and Visual studio) and from the Database. The table should have your (or your teammate username).

5. Entity Framework Set up

Entity Framework (EF) Core is a lightweight, extensible, open source and cross-platform version of the popular Entity Framework data access technology.

EF Core can serve as an object-relational mapper (O/RM), which:

Enables .NET developers to work with a database using .NET objects.
Eliminates the need for most of the data-access code that typically needs to be written.
Reference: https://learn.microsoft.com/en-us/ef/core/

Development Approaches with Entity Framework

There are three different approaches you can use while developing your application using Entity Framework:

1. Database-First
2. Code-First
3. Model-First

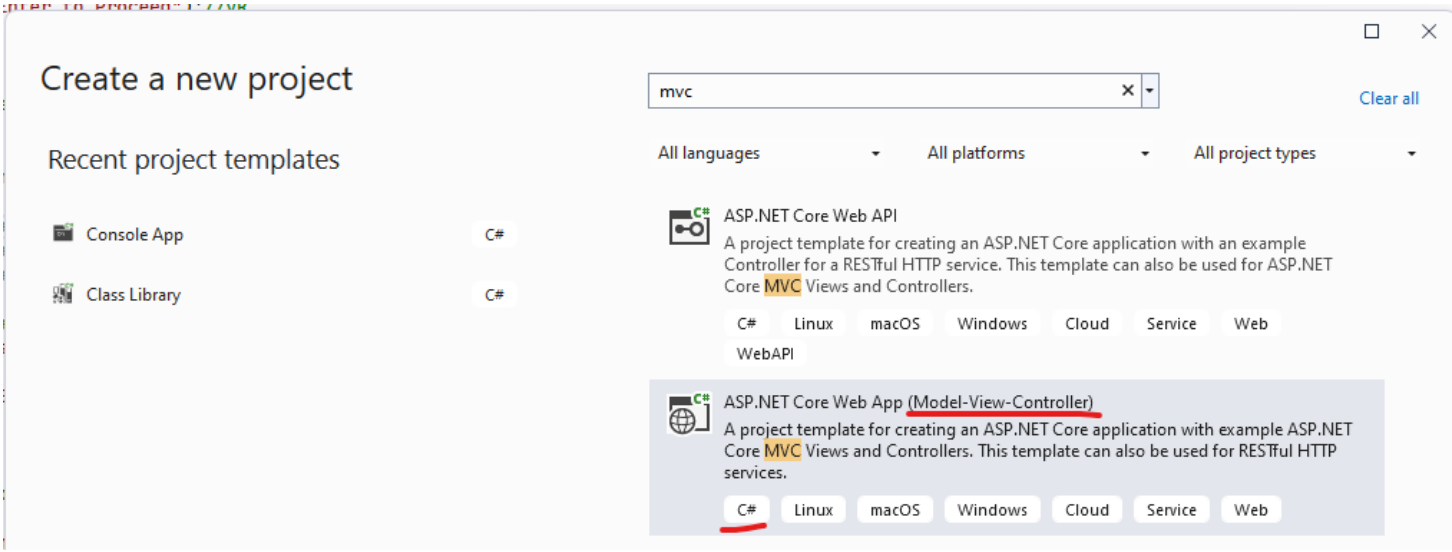
Database-First Approach

In the database-first development approach, you generate the context and entities for the existing database using EDM wizard integrated in Visual Studio or executing EF commands.

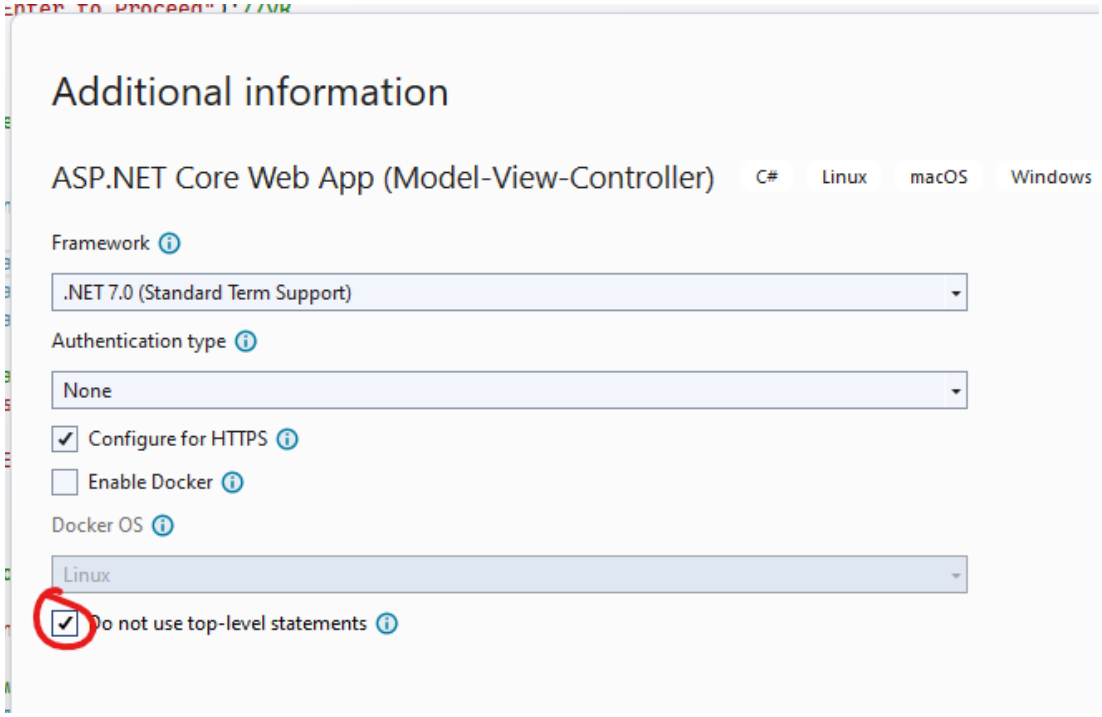
In simple words you are creating OOP code (entities with their properties) automatically based on Database data

Pretty much it will automatically create an OOP code for you if you have a database or will create a database for you if you have an OOP code

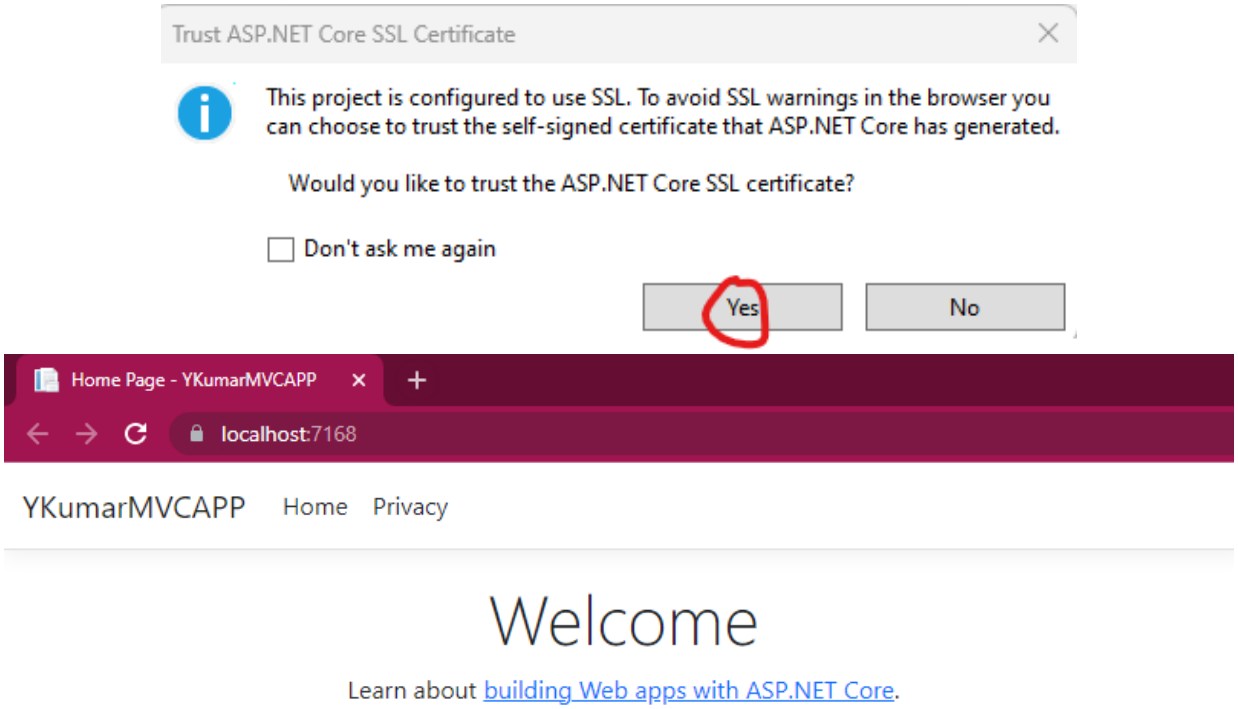
5.1. Create a new MVC Web App in Visual Studio



Use your name to name the app.



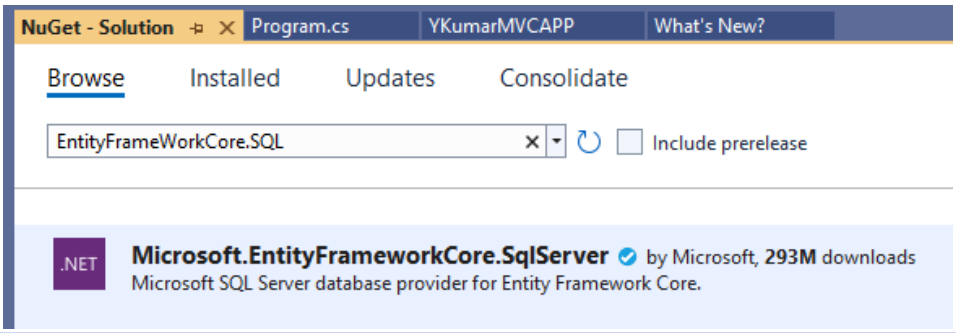
Run the project, the authentication / SSLmessage below might be displayed: say Yes

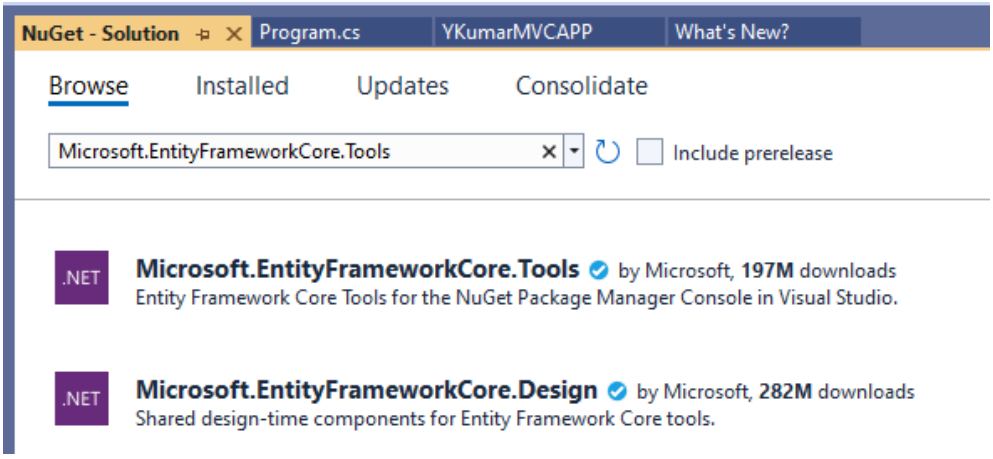


5.2. Add Nugget packages.

Right-click on Solution Explorer for your project – **Manage Nugget packages**.

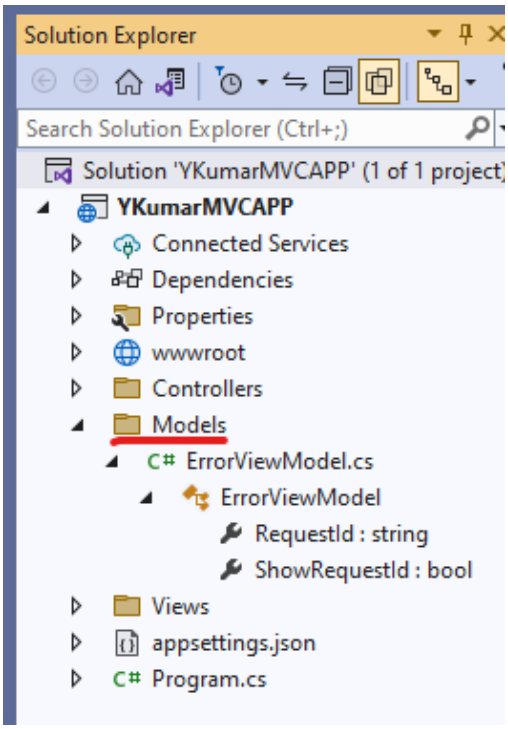
Browse for **Entity Framework Core SQLServer, install, accept.**
And Microsoft.EntityFrameworkCore.Tools, and .Design install, accept



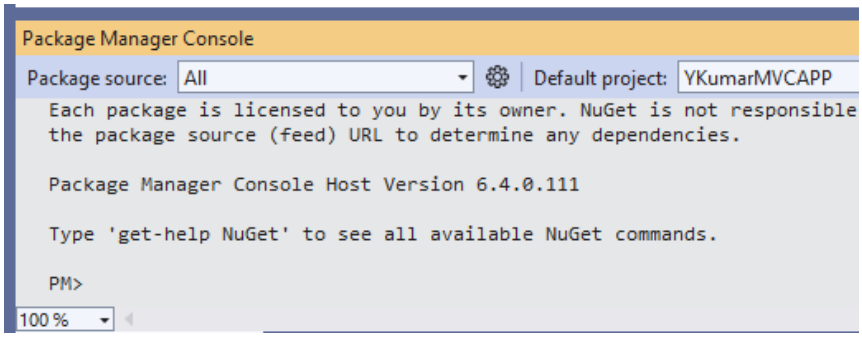


5.3. Create a new Entity.

Observe the model's folders in Solution Explorer



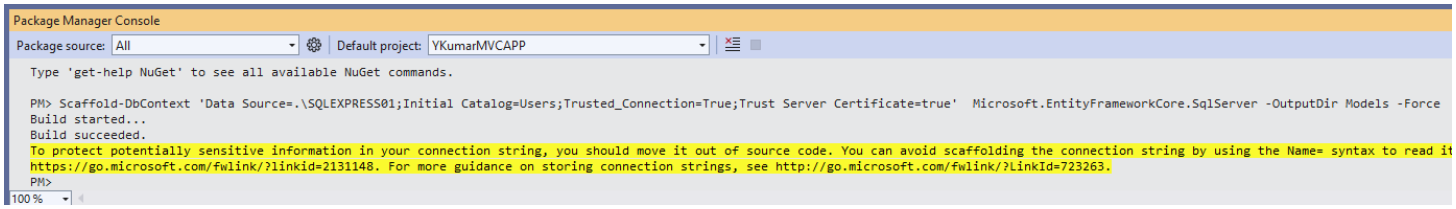
Go to **Tools → Nugget Package Manager → Package Manager Console**



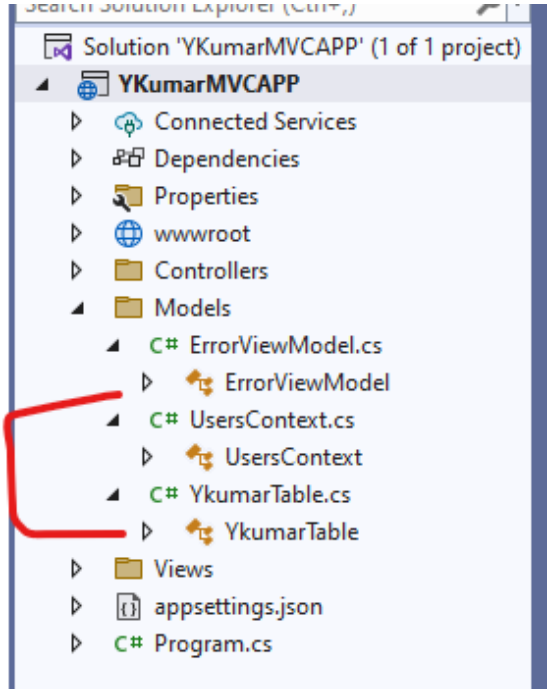
Copy-paste there the command below as is:

Scaffold-DbContext 'Data Source=.\SQLEXPRESS01;Initial Catalog=Users;Trusted_Connection=True;Trust Server Certificate=true' Microsoft.EntityFrameworkCore.SqlServer -OutputDir Models -Force

Press Enter



Observe the changes in the Model folder.

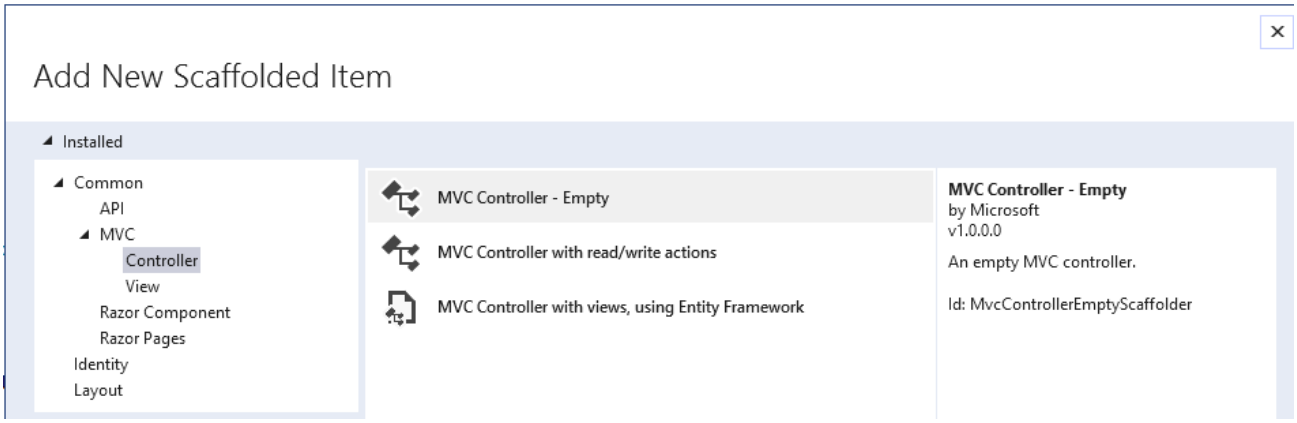


Take a screenshot.

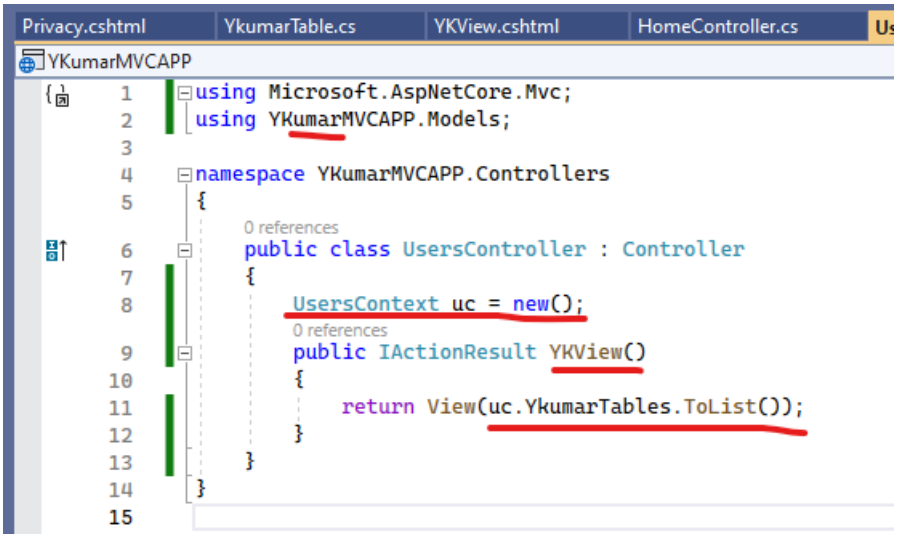
5.4. Add new Controller and a View.

Right-click on **Controllers** folder and **Add Controller**

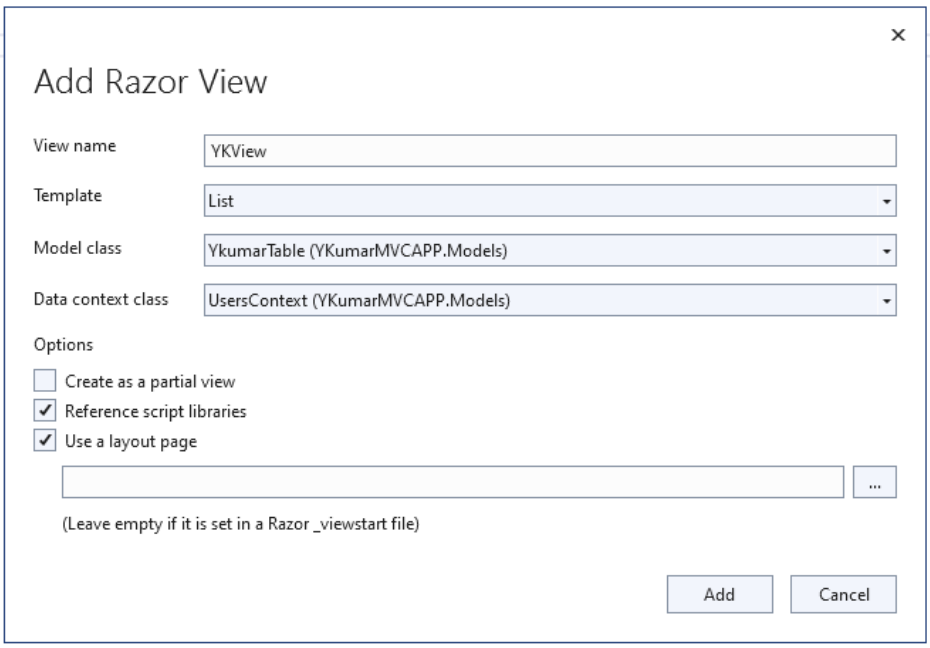
> **Controller → MVC controller – empty**, call it **UsersController.cs**



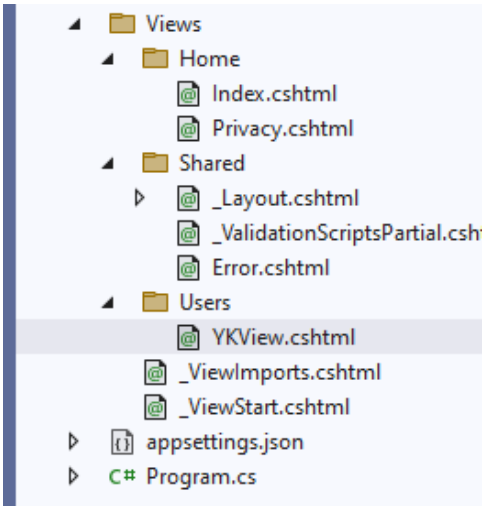
Make the following code adjustments:



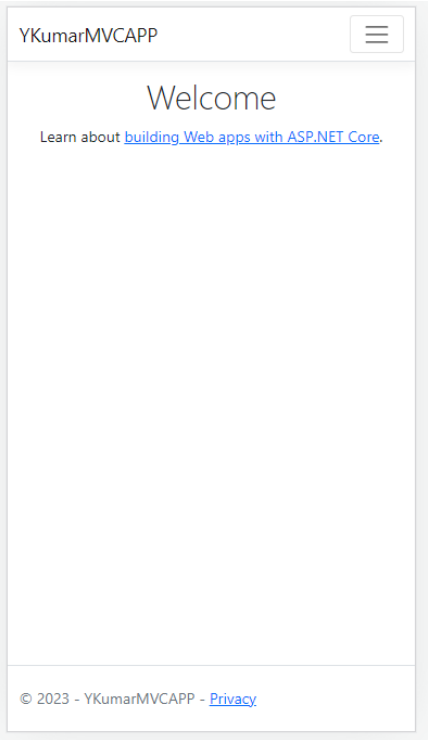
Right-click on **IActionResult** on line 9 in the Controller –> **Add View**

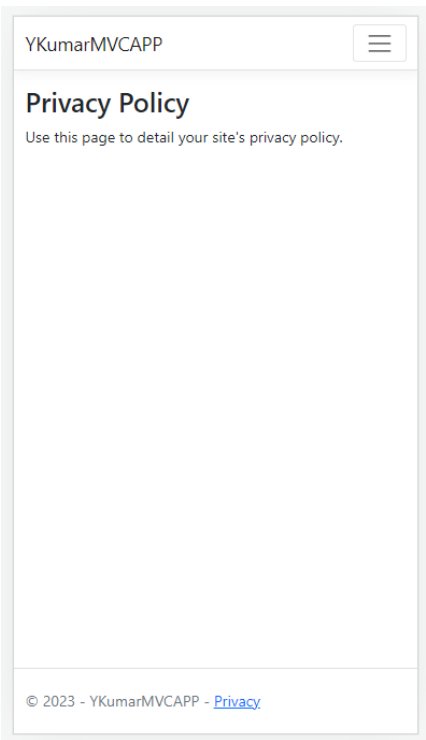


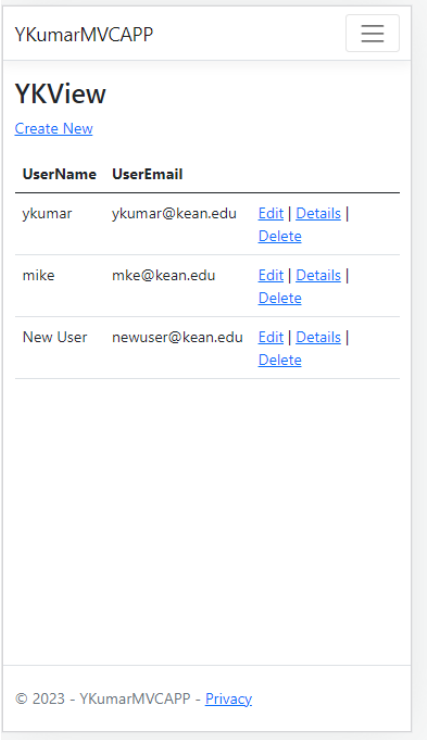
Observe the View folder:



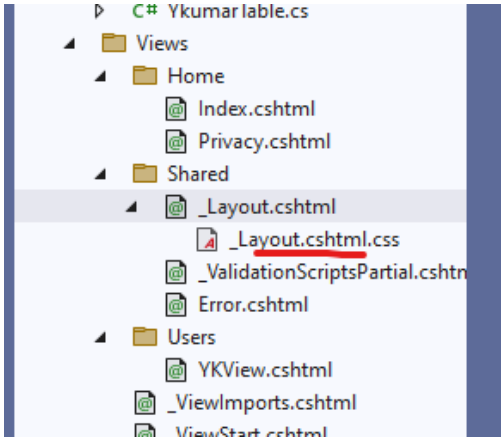
Run the app:







We will add users to the Navbar…
Navigate to Layout_cshtml.ss

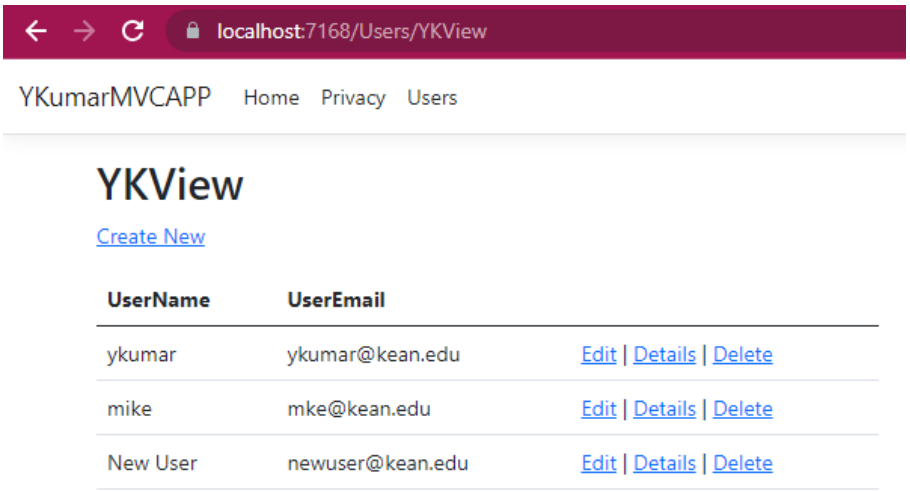


The code appeared:

```
<body>
    <header>
        <nav class="navbar navbar-expand-sm navbar-toggleable-sm navbar-light bg-white border-bottom box-shadow mb-3">
            <div class="container-fluid">
                <a class="navbar-brand" asp-area="" asp-controller="Home" asp-action="Index">YKumarMVCAPP</a>
                <button class="navbar-toggler" type="button" data-bs-toggle="collapse" data-bs-target=".navbar-collapse" aria-controls="navbarSupportedContent"
                        aria-expanded="false" aria-label="Toggle navigation">
                    <span class="navbar-toggler-icon"></span>
                </button>
                <div class="navbar-collapse collapse d-sm-inline-flex justify-content-between">
                    <ul class="navbar-nav flex-grow-1">
                        <li class="nav-item">
                            <a class="nav-link text-dark" asp-area="" asp-controller="Home" asp-action="Index">Home</a>
                        </li>
                        <li class="nav-item">
                            <a class="nav-link text-dark" asp-area="" asp-controller="Home" asp-action="Privacy">Privacy</a>
                        </li>
                    </ul>
                </div>
            </div>
```

We will add a link to our page:

**<li class="nav-item">Users
**



TASK 7: Take a screenshot of your results from Entity Framework part (both autogenerated and custom code + the browser output). The MVC APP should have your (or your teammate username). Push your results to GitHub.