

# INF 272

## Advanced Programming



UNIVERSITEIT VAN PRETORIA  
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YUNIBESITHI YA PRETORIA

**Faculty of Engineering,  
Built Environment and  
Information Technology**  
Fakulteit Ingenieurswese, Bou-omgewing en  
Inligtingtegnologie / Lefapha la Boetšenere,  
Tikologo ya Kago le Theknolotši ya Tshedimošo

## Session 02 - Getting started with Visual Studio and GitHub

## In today's session

Brief admin notes.

Getting started with Visual Studio 2022

The anatomy of a Visual Studio project

Getting started with GitHub



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# Brief Admin Notes

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**Please take note.**

## .....Practical registration

- Practical registration will close on Friday 13:00PM on 21 February.
- Students SHOULD register for a practical session as there will be work to be completed in the practical sessions. **Walk-in's will not be accommodated.**
- Please note, **when a session is full, then it is full.** No exceptions will be made.
- Student may have to reorganise their timetable to fit everything it.
- A lecture timetable is not a matter of convenience.
- Practical session will start in the week of 24 February. If a student misses a practical session x2 times after each other without making the coordinator aware of it, then the student will be deregistered from the chosen session.
- Marking will only be done in the practical sessions. If the necessary work is not downloaded from GitHub during the session, then the work will not be marked.



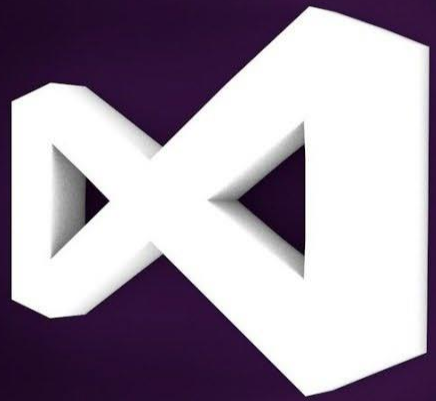
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# Getting started with Visual Studio 2022

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The following a very simplified very quick example. Read what is stated.  
Students will make use of a lot more VS functionality than was used previously.



# Visual Studio

## **Why VS2022 and not VS2019?**

- More functionality
- Less resource intensive
- Additional learning support for users
- Can keep up with the .NET development roadmap
- To keep up with latest functionality and processes

# Visual Studio 2022

## Open recent

As you use Visual Studio, any projects, folders, or files that you open will show up here for quick access.

You can pin anything that you open frequently so that it's always at the top of the list.

Recent projects

Collaboration on existing  
code (GitHub)

Fresh project

Creating MVC Project

## Get started



### Clone a repository

Get code from an online repository like GitHub or Azure DevOps



### Open a project or solution

Open a local Visual Studio project or .sln file



### Open a local folder

Navigate and edit code within any folder



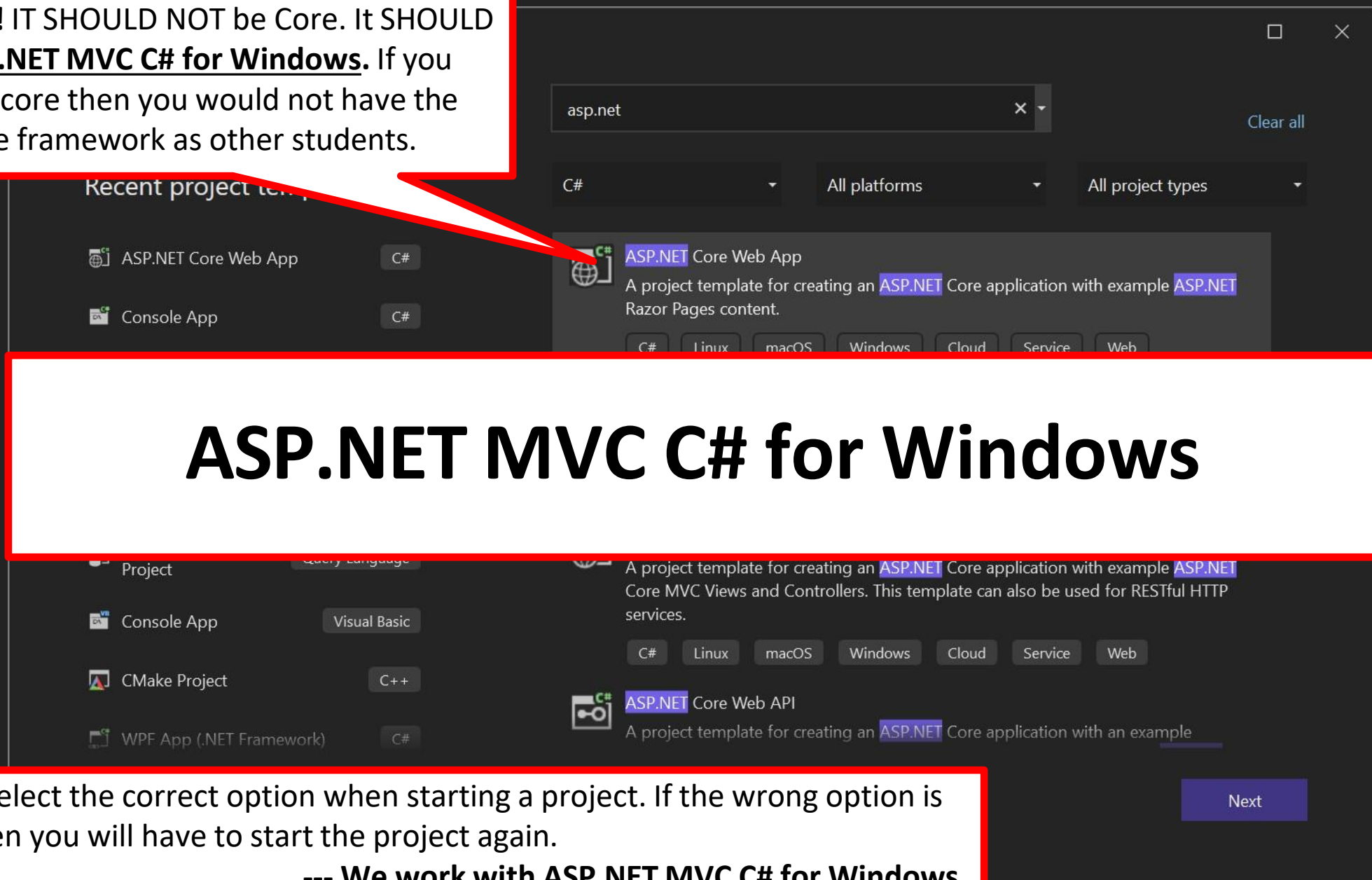
### Create a new project

Choose a project template with code scaffolding to get started

[Continue without code →](#)

Open without code

**Careful!!!!** IT SHOULD NOT be Core. It SHOULD be **ASP.NET MVC C# for Windows**. If you choose core then you would not have the same framework as other students.



# ASP.NET MVC C# for Windows

Carefully select the correct option when starting a project. If the wrong option is chosen then you will have to start the project again.

--- We work with **ASP.NET MVC C# for Windows**.



# Create a new project

## Recent project templates

A list of your recently accessed templates will be displayed here.


MVC

Clear all

C#

Windows

All project types

 ASP.NET Core Web API  
A project template for creating an ASP.NET Core application with an example Controller for a RESTful HTTP service. This template can also be used for ASP.NET Core MVC Views and Controllers.

C#

Linux

macOS


Windows

Cloud

Service

Web

WebAPI

 ASP.NET Core Web App (Model-View-Controller)  
A project template for creating an ASP.NET Core application with example ASP.NET Core MVC Views and Controllers. This template can also be used for RESTful HTTP services.

C#

Linux


macOS

Windows

Cloud

Service

Web

 ASP.NET Web Application (.NET Framework)  
Project templates for creating ASP.NET applications. You can create ASP.NET Web Forms, MVC, or Web API applications and add many other features in ASP.NET.


C#

Windows

Cloud

Web

Other results based on your search

 ASP.NET Web Application (.NET Framework)  
Project templates for creating ASP.NET applications. You can create ASP.NET Web Forms, MVC, or Web API applications and add many other features in ASP.NET.

Visual Basic

Windows

Cloud

Web

Back

Next

Creating MVC Project

## Configure your new project

ASP.NET Web Application (.NET Framework)

C#

Windows

Cloud

Web

Project name

WebApplication1

Location

C:\Users\User\source\repos

Solution name ⓘ

WebApplication1

☐ Place solution and project in the same directory

Framework

.NET Framework 4.7.2

Project will be created in "C:\Users\User\source\repos\WebApplication1\WebApplication1"

**Always** review the project configuration to make sure that it clearly states **ASP.NET MVC C# for Windows**. If it states WPF, anything core, anything "anything".... Press the "Back" button.

Careful to select the correct framework. The most relevant framework would be .NET Framework 4.7.2. For now, keep the framework as 4.7.2.

**Creating MVC Project**

Back

Create

# Configure your new project

ASP.NET Web Application (.NET Framework)

C#

Windows

Cloud

Web

Project name

WebApplication1

Location

C:\Users\User\source\repos

Solution name ⓘ

WebApplication1

☐ Place solution and project in the same directory

Framework

.NET Framework 4.7.2

Project will be created in "C:\Users\User\source\repos\WebApplication1\WebApplication1\"

- Note the type of project.
- Choose a reasonable name. Do not add numbers to the beginning of the project and do not add spaces.
- Note the location. The folder and file path is very short. If the folder and file path grows in length, then you will eventually not be able to run a program. The folders need to be “traversed” to access resources. If it is too long then VS cannot access the resources anymore.
- For now, keep the framework as is. We are making use of generally “vanilla” straightforward functionality that would not require 4.8. If we do, we will inform students about it in class.

**Creating MVC Project**

Back

Create

# Create a new ASP.NET Web Application



## Empty

An empty project template for creating ASP.NET applications. This template does not have any content in it.



## Web Forms

A project template for creating ASP.NET Web Forms applications. ASP.NET Web Forms lets you build dynamic websites using a familiar drag-and-drop, event-driven model. A design surface and hundreds of controls and components let you rapidly build sophisticated, powerful UI-driven sites with data access.



## MVC

A project template for creating ASP.NET MVC applications. ASP.NET MVC allows you to build applications using the Model-View-Controller architecture. ASP.NET MVC includes many features that enable fast, test-driven development for creating applications that use the latest standards.



## Web API

A project template for creating RESTful HTTP services that can reach a broad range of clients including browsers and mobile devices.



## Single Page Application

A project template for creating rich client side JavaScript driven HTML5 applications using ASP.NET Web API. Single Page Applications provide a rich user experience which includes client-side interactions using HTML5, CSS3, and JavaScript.

## Authentication

None

## Add folders & core references

- ☐ Web Forms
- ☒ MVC
- ☐ Web API

## Advanced

- ☒ Configure for HTTPS
- ☐ Docker support  
(Requires [Docker Desktop](#))
- ☐ Also create a project for unit tests

WebApplication1.Tests

**Creating MVC Project**

Back

Create

# Configure your new project

ASP.NET Web Application (.NET Framework)

C#

Windows

Cloud

Web

Project name

WebApplication1

Location

C:\Users\User\source\repos

Solution name ⓘ

WebApplication1

☐ Place solution and project in the same directory

Framework

.NET Framework 4.7.2

Microsoft Visual Studio

Creating project...

Cancel

Project will be created in "C:\Users\User\source\repos\WebApplication1\WebApplication1\"

The creation of the project will take between 30 second up to a minute (or so) depending on your configuration of your computer hardware as well as the additional programs, services, start-up's that is running on your computer. The number of resources being added to the project is numerically more than that of a desktop application.

Back

Create

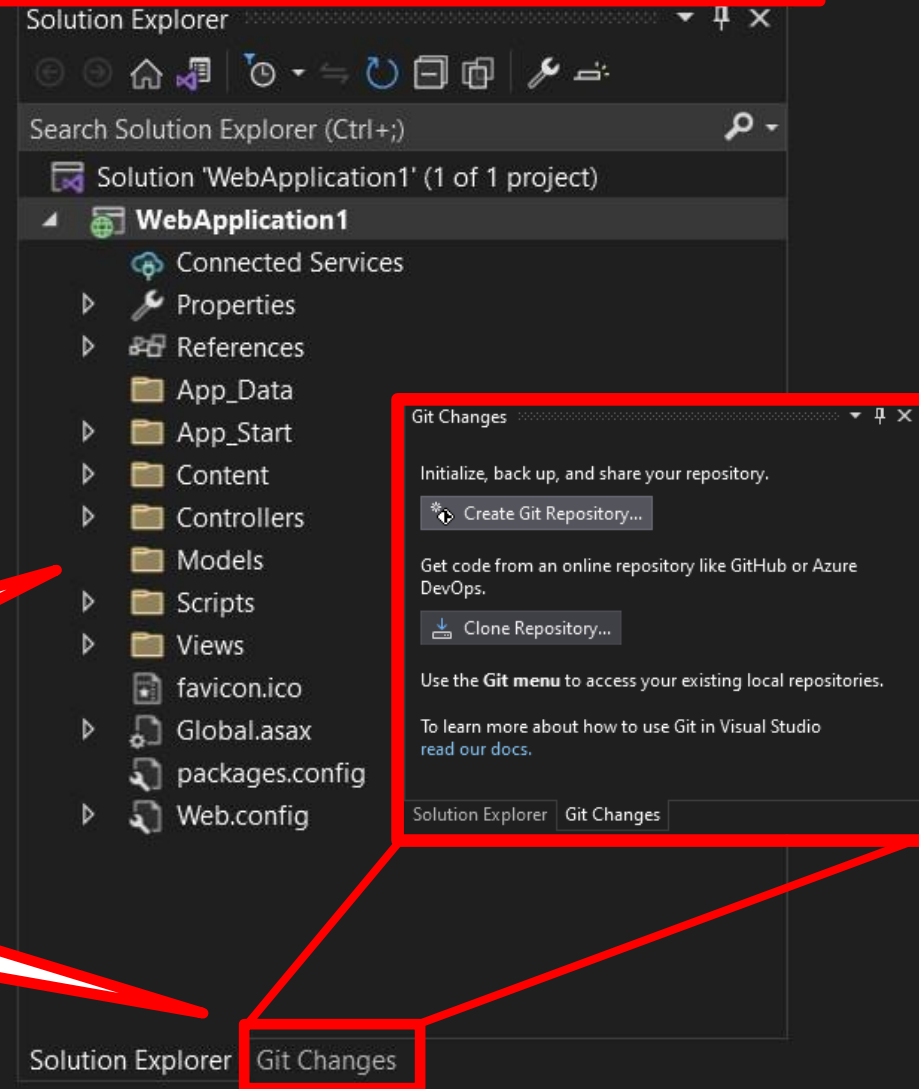
# Visual Studio Integrated Development Environment

New Project, Open,  
Save, Save All

Run Code  
In this case Firefox.

Application Components

Collaboration on code  
projects with GitHub





**VS IDE**


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help

The screenshot shows the 'View' menu in Visual Studio, which is used to toggle the visibility of various tool windows. The menu is organized into several sections, with each item accompanied by a small icon and a keyboard shortcut. The items are as follows:

- <> Code** (F7)
- Open**
- Open With...**
- Solution Explorer** (Ctrl+Alt+L)
- Git Changes** (Ctrl+0, Ctrl+G)
- Git Repository** (Ctrl+0, Ctrl+R)
- Team Explorer** (Ctrl+\, Ctrl+M)
- Server Explorer** (Ctrl+Alt+S)
- SQL Server Object Explorer** (Ctrl+\, Ctrl+S)
- Test Explorer** (Ctrl+E, T)
- Bookmark Window** (Ctrl+K, Ctrl+W)
- Call Hierarchy** (Ctrl+Alt+K)
- Class View** (Ctrl+Shift+C)
- Code Definition Window** (Ctrl+\, D)
- Object Browser** (Ctrl+Alt+J)
- Error List** (Ctrl+\, E)
- Output** (Ctrl+Alt+O)
- Task List** (Ctrl+\, T)
- Toolbox** (Ctrl+Alt+X)
- Notifications** (Ctrl+\, Ctrl+N)
- Terminal** (Ctrl+`)
- Other Windows** (indicated by a right-pointing arrow)
- Toolbars** (indicated by a right-pointing arrow)
- Full Screen** (Shift+Alt+Enter)
- All Windows** (Shift+Alt+M)
- Navigate Backward** (Ctrl+-)
- Navigate Forward** (Ctrl+Shift+-)
- Next Task**
- Previous Task**
- Properties Window** (F4)
- Property Pages** (Shift+F4)
- Refresh**

A screenshot of the 'Project' menu in Visual Studio. The menu is open, showing a list of options. At the top, there is a red circle with the number '2' inside it. The menu options are: Overview, Add Class... (with a plus and document icon), Add New Item... (with a plus and document icon), Add Existing Item... (with a plus and document icon), Add Application Insights Telemetry... (with a plus and lightbulb icon), Configure Application Insights... (with a plus and lightbulb icon), New Folder (with a folder icon), Add ASP.NET Folder (with a plus and document icon), Show All Files (with a document icon), Unload Project, Add Reference... (with a plus and document icon), Add Service Reference... (with a plus and document icon), Connected Services (with a plus and document icon), Add Analyzer... (with a plus and document icon), Configure Startup Projects... (with a gear icon), Set as Startup Project, Export Template... (with a plus and document icon), Manage NuGet Packages... (with a NuGet icon), Manage Client-Side Libraries... (with a NuGet icon), WebApplication1 Properties (with a wrench icon), and Convert to Web Application. The 'Add Class...' option is highlighted with a mouse cursor.

A screenshot of the 'Build' menu in Visual Studio. The menu is open, showing various build-related options. At the top left of the menu, there is a red circle with the number '3' inside. The menu items are: 'Build Solution' (with a keyboard shortcut 'Ctrl+Shift+B'), 'Rebuild Solution', 'Clean Solution', 'Run Code Analysis on Solution' (with a keyboard shortcut 'Alt+F11'), 'Build WebApplication1' (with a keyboard shortcut 'Ctrl+B'), 'Rebuild WebApplication1', 'Clean WebApplication1', 'Publish WebApplication1' (with a globe icon), 'Run Code Analysis on WebApplication1', 'Batch Build...', and 'Configuration Manager...'. The 'Build' menu title is highlighted with a grey bar.



5

Extensions

6

Manage Extensions

Customize Menu...

A screenshot of the 'Debug' menu in Visual Studio. The menu is open, showing various options. At the top, there is a red circle with the number '4'. The menu items are: 'Windows' (with a right arrow), 'Start Debugging' (F5), 'Start Without Debugging' (Ctrl+F5), 'Apply Code Changes' (Alt+F10), 'Performance Profiler...' (Alt+F2), 'Relaunch Performance Profiler', 'Attach to Process...' (Ctrl+Alt+P), 'Other Debug Targets' (with a right arrow), 'Step Into' (F11), 'Step Over' (F10), 'Toggle Breakpoint' (F9), 'New Breakpoint' (with a right arrow), 'Delete All Breakpoints' (Ctrl+Shift+F9), 'Options...', and 'WebApplication1 Debug Properties'.

Manage Extensions

Installed

Online

Visual Studio Marketplace

Controls

Templates

Tools

Updates (1)

Roaming Extension Manager

6

Change your settings for Extensions

Sort by: Highest Rating

PostSharp

PostSharp is the #1 pattern-aware extension to C# and VB. It allows developers to eradicate boilerplate...

Download

EF Core Power Tools

Useful design-time DbC context features, added to the Visual Studio Solution Explorer context menu.

ResXManager

The most popular tool to localize and manage all kind of applications with resx-based resources. Shows all resources of a solution and let...

SQLite and SQL Server Compact Toolbox

SQLite / SQL Server Compact Toolbox extension for Visual Studio. This extension adds several features to help your embedded database...

1 2 3 4 5 >

Search (Ctrl+E)

Created by: PostSharp Technologies

Installs: 483768

Pricing Category: Free

Ratings: ★★★★★ (578 Votes)

More Information

Report Extension to Microsoft

Scheduled For Install:

None

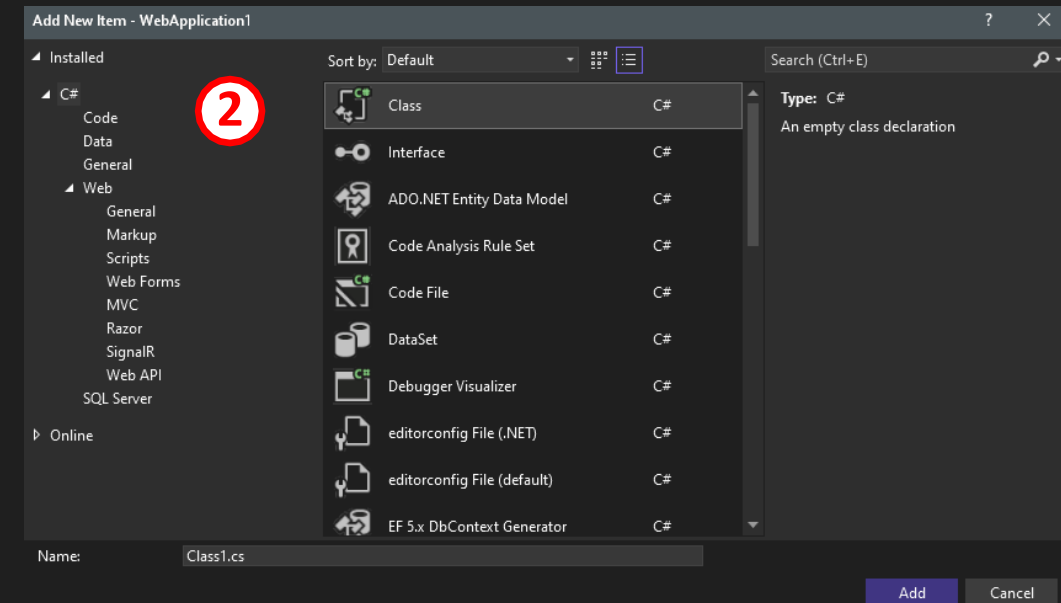
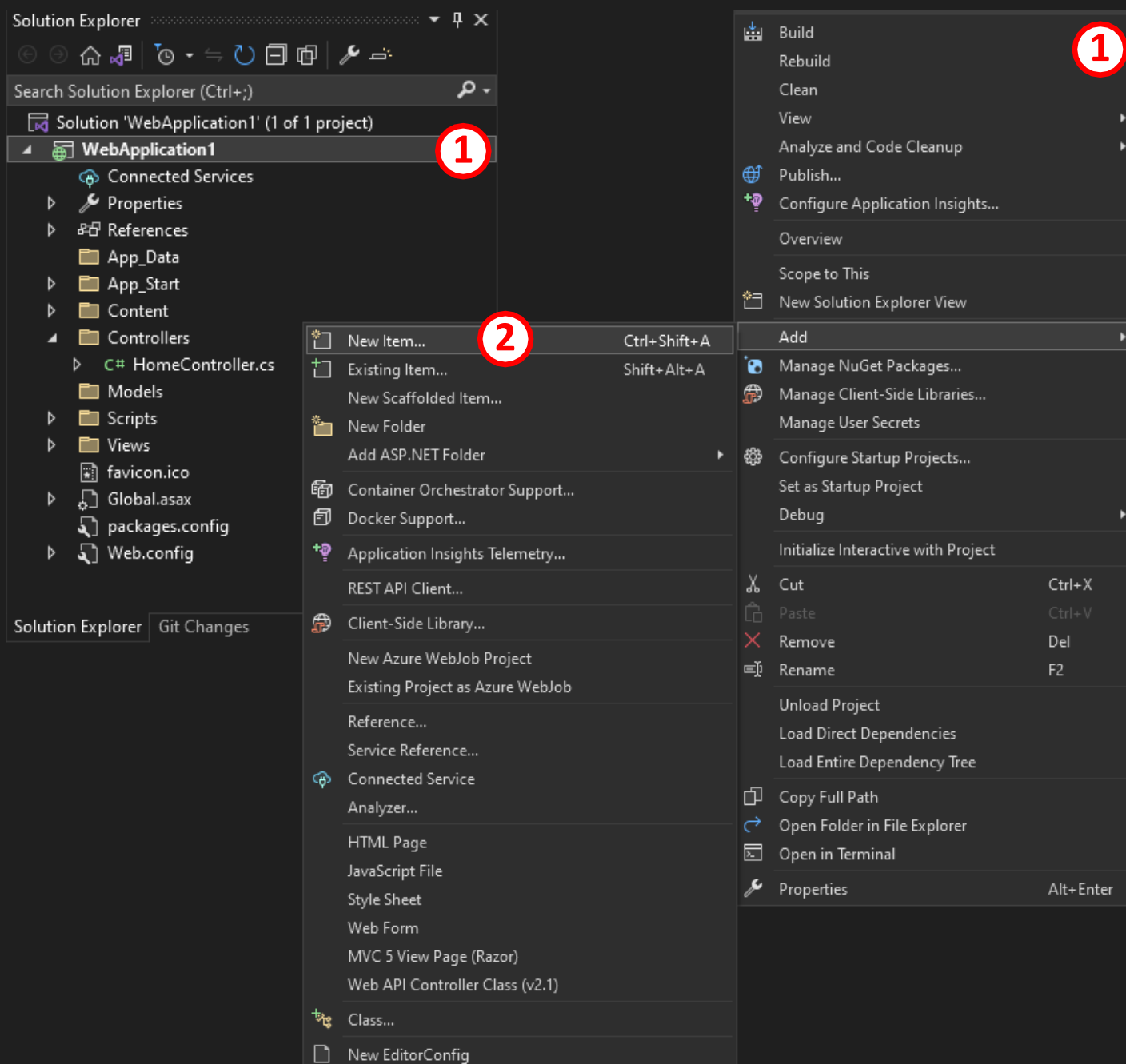
Scheduled For Update:

None

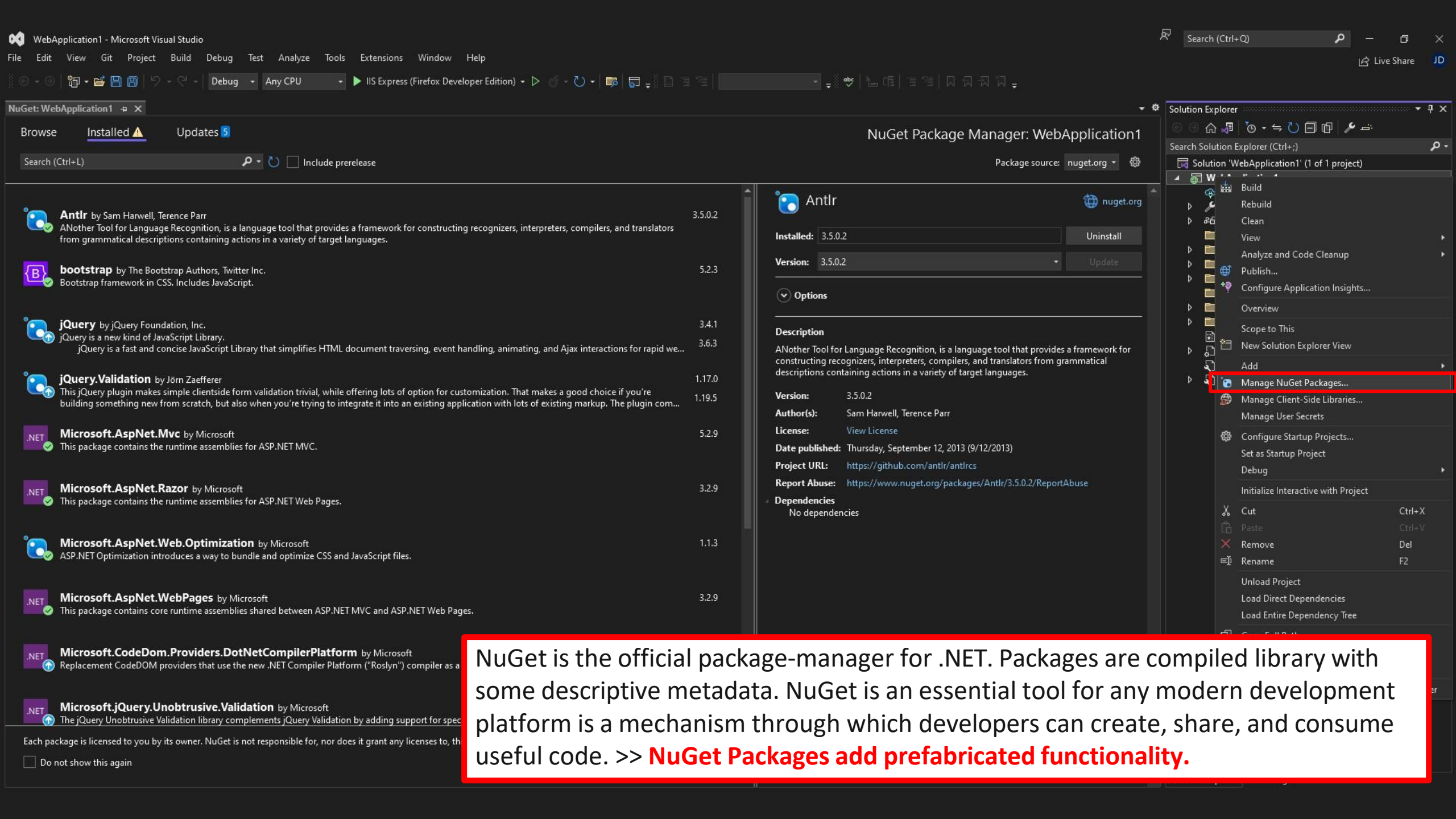
Scheduled For Uninstall:

Close

You will need to add several additional components to the your projects. This can be done by right clicking on the Solution.







NuGet is the official package-manager for .NET. Packages are compiled library with some descriptive metadata. NuGet is an essential tool for any modern development platform is a mechanism through which developers can create, share, and consume useful code. >> NuGet Packages add prefabricated functionality.



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# The anatomy of a Visual Studio project

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Comparing the files in a Visual Studio Project versus the files in the repository on your computer's drive.

# Please note...

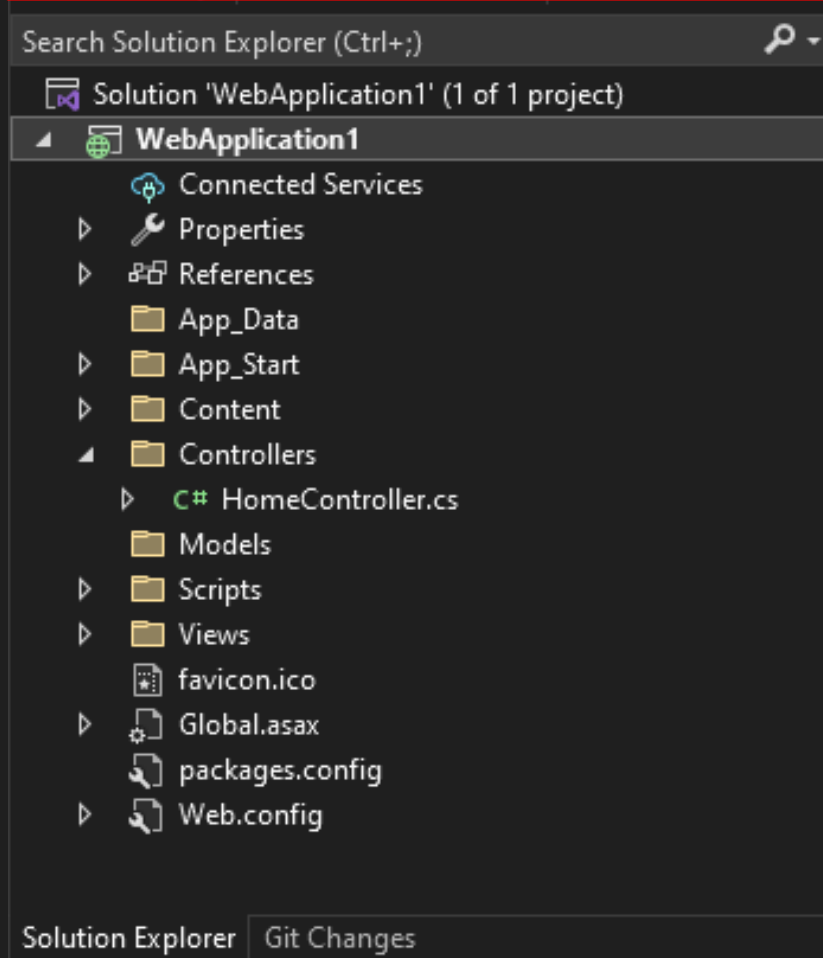
- Students have to upload project files to they're GitHub repository as they progress.
- The GitHub repository link will then be shared on ClickUP as the necessary upload.
- To ensure that all relevant files are committed in GitHub, a student needs to understand the basic anatomy of a Visual Studio Project.
- There is a common mistake that students consider the \*.sln file as the complete program. This is not and never will be true. The \*.sln is a VS project reference that allows VS to identify the location of the project file (\*.proj) that combines all the program resources. Do not make this mistake.

***\*.sln → Solution***

***\*.proj → Project***

## Solution Explorer.

.... *Inside Visual Studio*



packages

WebApplication1

WebApplication1.sln

Project in repository.  
File Explorer on drive.

.... *on your computer*

packages

- Antlr.3.5.0.2
- bootstrap.5.2.3
- jQuery.3.4.1
- jQuery.Validation.1.17.0
- Microsoft.AspNet.Mvc.5.2.9
- Microsoft.AspNet.Razor.3.2.9
- Microsoft.AspNet.Web.Optimization.1.1.3
- Microsoft.AspNet.WebPages.3.2.9
- Microsoft.CodeDom.Providers.DotNetCompilerPlatform.2.0.1
- Microsoft.jQuery.Unobtrusive.Validation.3.2.11
- Microsoft.Web.Infrastructure.2.0.1
- Modernizr.2.8.3
- Newtonsoft.Json.12.0.2
- WebGrease.1.6.0

Resources required to translate between different languages and integrate functionality such as internal validation and controls.

Resources required to translate between different languages and integrate functionality such as internal validation and controls.

packages

WebApplication1

WebApplication1.sln

Complete Project

WebApplication1.sln

```
Microsoft Visual Studio Solution File, Format Version 12.00
# Visual Studio Version 17
VisualStudioVersion = 17.5.33414.496
MinimumVisualStudioVersion = 10.0.40219.1
Project("{FAE04EC0-301F-11D3-BF4B-00C04F79EFBC}") = "WebApplication1", "WebApplication1\WebApplication1.csproj", "{5EA03B25-E5E2-473E-93BE-BC4E0063ABCD}"
EndProject
Global
    GlobalSection(SolutionConfigurationPlatforms) = preSolution
        Debug|Any CPU = Debug|Any CPU
        Release|Any CPU = Release|Any CPU
    EndGlobalSection
    GlobalSection(ProjectConfigurationPlatforms) = postSolution
        {5EA03B25-E5E2-473E-93BE-BC4E0063ABCD}.Debug|Any CPU.ActiveCfg = Debug|Any CPU
        {5EA03B25-E5E2-473E-93BE-BC4E0063ABCD}.Debug|Any CPU.Build.0 = Debug|Any CPU
        {5EA03B25-E5E2-473E-93BE-BC4E0063ABCD}.Release|Any CPU.ActiveCfg = Release|Any CPU
        {5EA03B25-E5E2-473E-93BE-BC4E0063ABCD}.Release|Any CPU.Build.0 = Release|Any CPU
    EndGlobalSection
    GlobalSection(SolutionProperties) = preSolution
        HideSolutionNode = FALSE
    EndGlobalSection
    GlobalSection(ExtensibilityGlobals) = postSolution
        SolutionGuid = {CA81B65A-F83A-4083-A7B7-0357B26E2390}
    EndGlobalSection
EndGlobal
```

Solution file. This is a reference file used to cross reference Visual Studio Projects. It starts the solution and IS NOT the program. It is a VS reference file required to access VS projects.

App\_Data

App\_Start

bin

Content

Controllers

Models

obj

Properties

Scripts

Views

favicon.ico

Global.asax

Global.asax.cs

packages.config

Web.config

Web.Debug.config

Web.Release.config

WebApplication1.csproj

WebApplication1.csproj.user

WebApplication1



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# Open a project from a GitHub repo

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Visual Studio GitHub resource page:

- <https://github.com/github>
- <https://visualstudio.microsoft.com/vs/github/>
- <https://learn.microsoft.com/en-us/visualstudio/ide/work-with-github-accounts?view=vs-2022>

# Visual Studio and GitHub better together

Use GitHub and Visual Studio to bring your source control and CI/CD workflows closer to your code. GitHub support is now built into Visual Studio.

[Download Visual Studio](#)

[Sign up for Git Learning Series >](#)



"I use the new Git integration a lot. It is a simple and clean Git experience!"  
– a GitHub user





Product ▾ Solutions ▾ Open Source ▾ Pricing

Search



Sign in

Sign up



GitHub

How people build software.

17.8k followers

San Francisco, CA

<https://github.com/about>

Verified

Overview

Repositories 456

Projects 1

Packages

People 272

Create account

Welcome to GitHub!

Let's begin the adventure

Enter your email

✓ phil.vandeventer@up.ac.za

Create a password

✓ ●●●●●●●●●●●●●●●●

Enter a username

✓ DrJPvanDeventer

Would you like to receive product updates and announcements via email?

Type "y" for yes or "n" for no



Continue

Student Settings

How many team members will be working with you?

This will help us guide you to the tools that are best suited for your projects.

Just me

2 - 5

5 - 10

10 - 20

20 - 50

50+

Are you a student or teacher?

Student

Teacher

Continue





# The tools you need to build what you want.






Soup to nuts, GitHub has it all.

Choose all relevant options and then click “Continue”.

After going to the next page, select the Free Option...etc, etc, etc. You can skip the personalisation if you choose to do so. But rather go through the personalisation options.

## What specific features are you interested in using?

Select all that apply so we can point you to the right GitHub plan.

- ☒  **Collaborative coding**  
Codespaces, Pull requests, Notifications, Code review, Code review assignments, Code owners, Draft pull requests, Protected branches, and more.
- ☐  **Automation and CI/CD**  
Actions, Packages, APIs, GitHub Pages, GitHub Marketplace, Webhooks, Hosted runners, Self-hosted runners, Secrets management, and more.
- ☐  **Security**  
Private repos, 2FA, Required reviews, Required status checks, Code scanning, Secret scanning, Dependency graph, Dependabot alerts, and more.
- ☐  **Client Apps**  
GitHub Mobile, GitHub CLI, and GitHub Desktop.
- ☒  **Project Management**



Search or jump to...



[Pull requests](#) [Issues](#) [Codespaces](#) [Marketplace](#) [Explore](#)

## Create your first project

Ready to start building? Create a repository for a new idea or bring over an existing repository to keep contributing to it.

Create repository

[Import repository](#)

## Recent activity

When you take actions across GitHub, we'll provide links to that activity here.

You can create a new repository for each project, practical and / or assignments. We will share a project link with you that you need to accept, but you still have to upload the repository URL to ClickUP for record keeping purposes.

## Join GitHub Global Campus!

Prepare for a career in tech by joining GitHub Global Campus. Global Campus will help you get the practical industry knowledge you need by giving you access to industry tools, events, learning resources and a growing student community.

Follow your Expert

Breaking into tech: internship edition with Helen Huang

Science & Technology

Level up your code with TwilioQuest

Talk Shows & Podcasts

Learning by teaching for your community - Cassidy Williams

Special Events

Popular offers you have not claimed:

Claim more offers

Connect your local Expert

Visit their profile

View projects at our gallery

Visit the Student Gallery

Learn more about an event

Click on an event

Watch a Campus TV episode

Visit GitHub Education on Twitch

Claimed a Student Pack offer

See popular offers

January 22, 2021

Level up your code with TwilioQuest

Ariel Kanter

February 1, 2021

GitHub Campus Experts applications are open

Juan Pablo Flores Cortés

Artificial Intelligence

6 assignments

Lists and Loops

Due by May 1, 2021, 12:00 PST

Week Five: Functions

Due by Aug 15, 2021, 14:00 PST

Web meet 2021

Web Meet

It is being partnered by GitHub- the biggest open source community

Join Global Campus



Microsoft Visual Studio



Search (Ctrl+Q)



File Edit View Git Project Debug Analyze Tools Extensions Window Help

Live Share

JD



- You will need to log into your GitHub account then make use of the git fetch, pull, push and sync for version control in Visual Studio.
- First make sure to create the necessary account.
  - You can create a repository in GitHub or you can create a repository in Visual Studio.
  - Files will be kept safe in GitHub.
  - When you start with collaborative coding then there will be additional information provided regarding branching, merging and managing the different versions being worked on.

Git Changes

Initialize, back up, and share your repository.



Create Git Repository...

Get code from an online repository like GitHub or Azure DevOps.



Clone Repository...

Use the **Git menu** to access your existing local repositories.

To learn more about how to use Git in Visual Studio [read our docs](#).

Solution Explorer

Git Changes



Ready

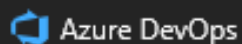


Select Repository



## Create a Git repository

## Push to a new remote



## Other



## Initialize a local Git repository

Local path ⓘ

C:\Users\User\Source\Repos\NewRepo ...

.gitignore template ⓘ

Default (VisualStudio) ▾

License template ⓘ

None ▾

☐ Add a README.md ⓘ

## Create a new GitHub repository

Account

+ Sign in... ▾

Owner ▾

Repository name ⓘ

NewRepo

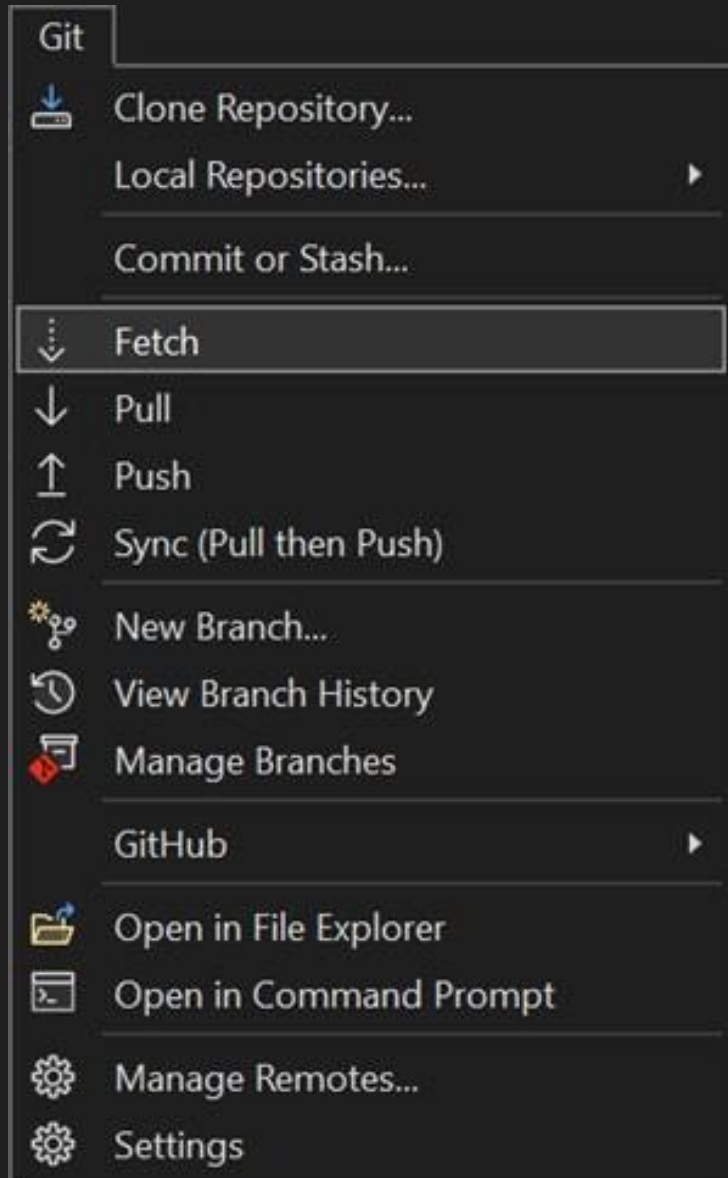
Description

Enter the description of the GitHub repository &lt;Optional&gt;

☒ Private repository ⓘ

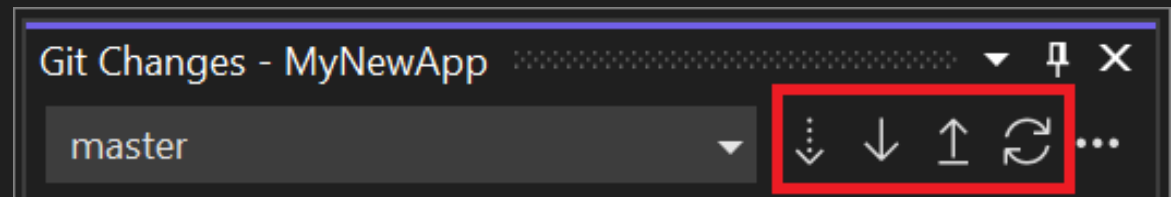
Create and Push

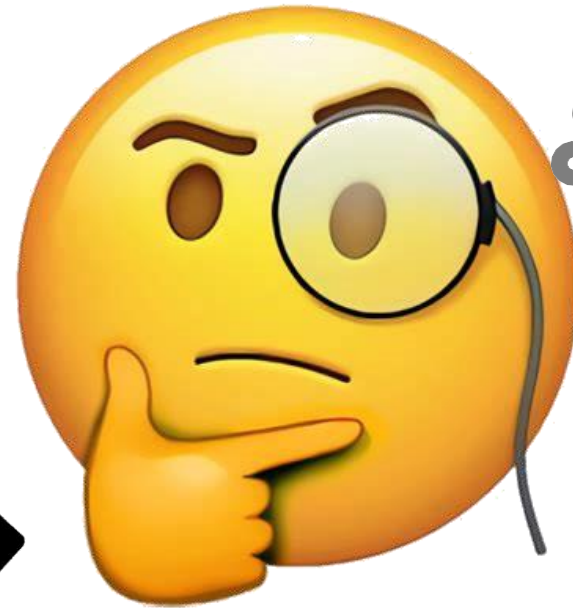
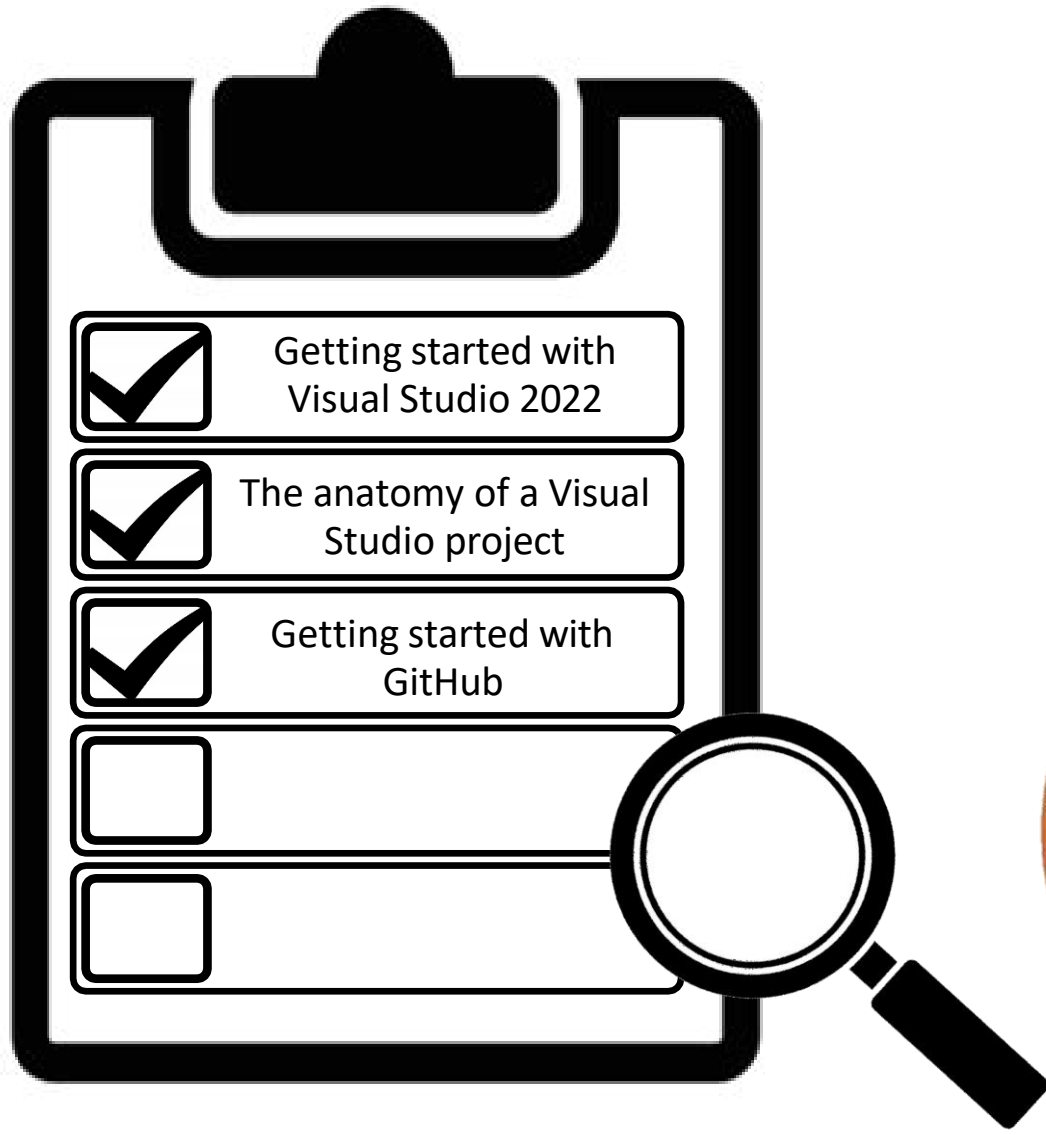
Cancel



Visual Studio helps you keep your local branch synchronized with your remote branch through download (fetch and pull) and upload (push) operations. You can fetch, pull, and sync in Visual Studio 2022 by using the **Git** menu.

You can also use the button controls in the **Git Changes** window to perform these operations, too.









**Until next time.**