CE103 Algorithms and Programming I

Week-2

Software Development Environments

Download DOC, SLIDE, PPTX

Outline

- Flowgorithm
- Introduction to Analysis of Algorithms
- Programming Environment Setup and Configuration
  - C/C++ (DevCpp,Code Blocks,MinGW,LLVM,VsCode,VisualStudio,Notepad++,Vi/Vim,Eclipse,Netbeans, Cmake/Make)
  - Java (VsCode,Notepad++,Eclipse,Netbeans,Cmake)
  - C# (VsCode,Notepad++,VsCode,VisualStudio,Cmake)

Outline

- Common Tools and Platforms
  - Fatih Kalem, Notepad++,HxD, MarktextApp,Cygwin,Dependency Walker,Doxygen,Sonarlint, Codepen.io, Codebeautify.org, Codeshare.io,AsciiFlow.com, Freemind, Mockflow, Wireflow, PlantUML,Drawio,Putty, MobaXterm,Teamviewer,AnyDesk,Paletton.com,Colorhunt.co,Understand,JD Project,Cutter,IDA Pro / Freeware,pythontutor,godbolt,scrcpy,Travis-CI,AppVeyor,Jenkins,Vagrant,Docker / Docker Compose / Kubernetes,Nuget,SCV Cryptomanager,Addario CryptoBench,Raymond's MD5 & SHA Checksum Utility,SlavaSoft HashCalc,Portable PGP, and more ...

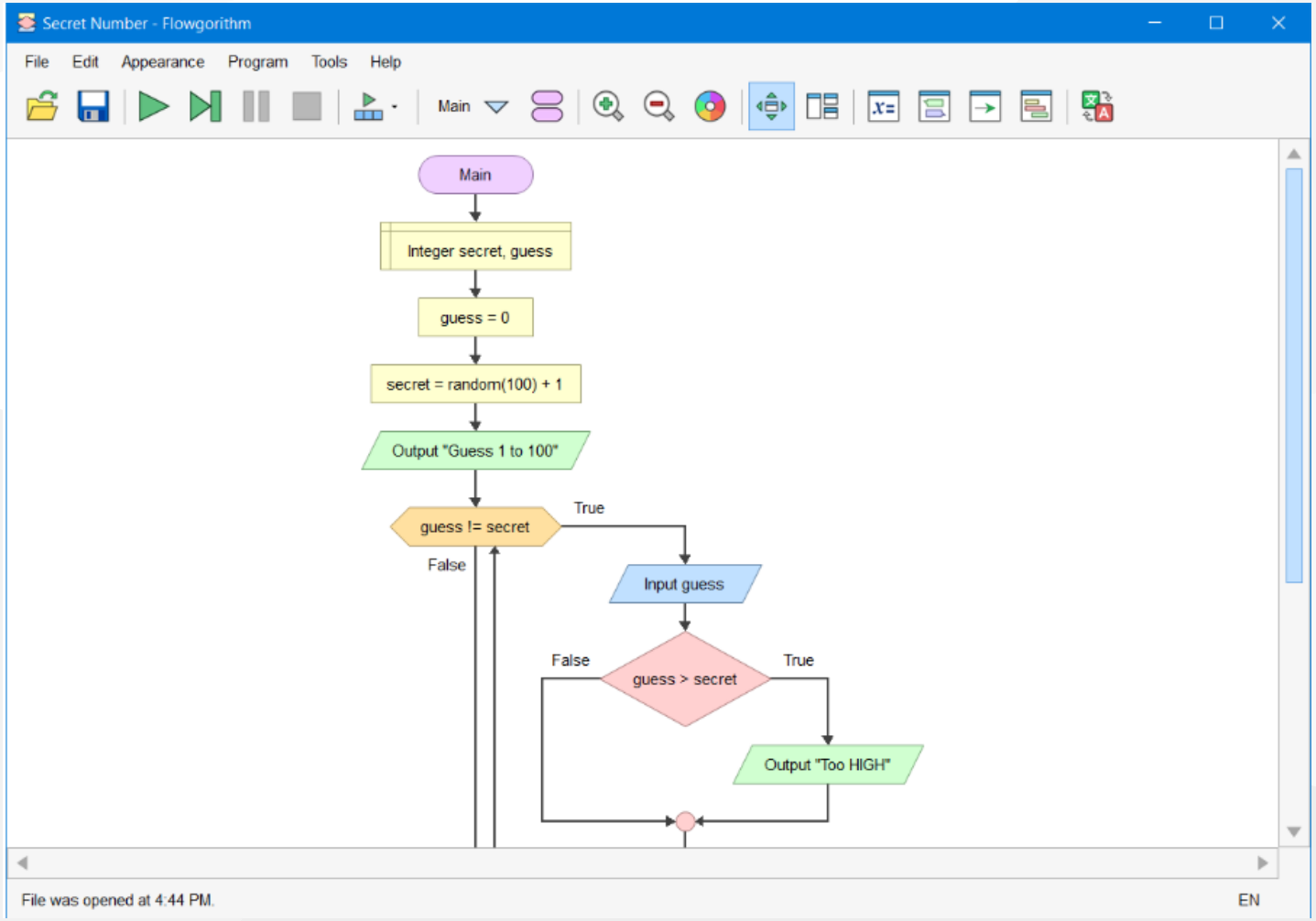
Algorithm Basics

Flowgorithm (1)

- http://www.flowgorithm.org/
- Flowgorithm - Documentation
- https://github.com/timoteoponce/flowgorithm-examples

Flowgorithm (2)

- Main Window

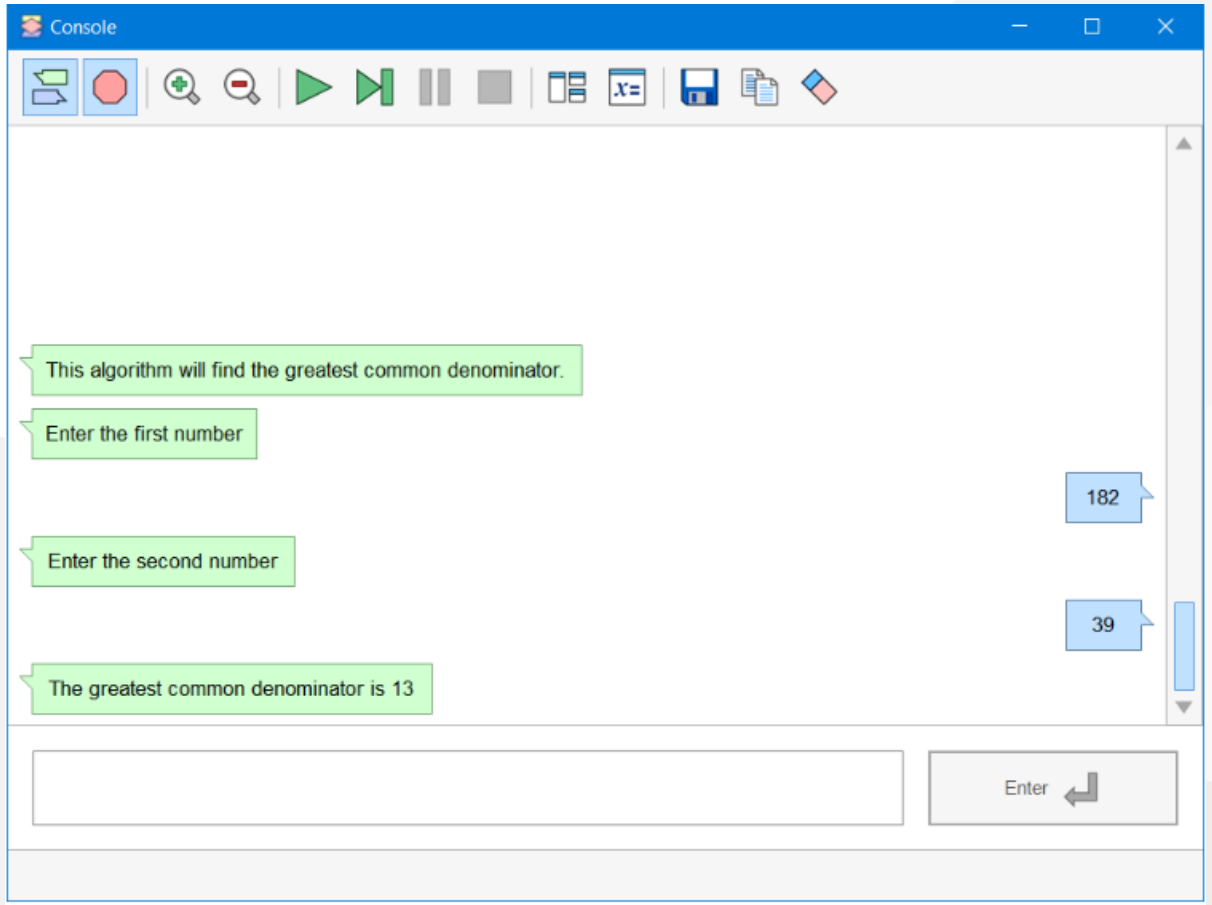


Flowgorithm (3)

- Console Window
  - The classic method to interact with the computer is to use the "Console". Flowgorithm attempts to make it look like a typical instant messenger window. The "chat bubbles" are color coded to match the Input and Output shapes used in the flowchart. If you don't want to use the chat bubbles, you can also toggle between them and the classical plain text.

Flowgorithm (4)

- Console Window

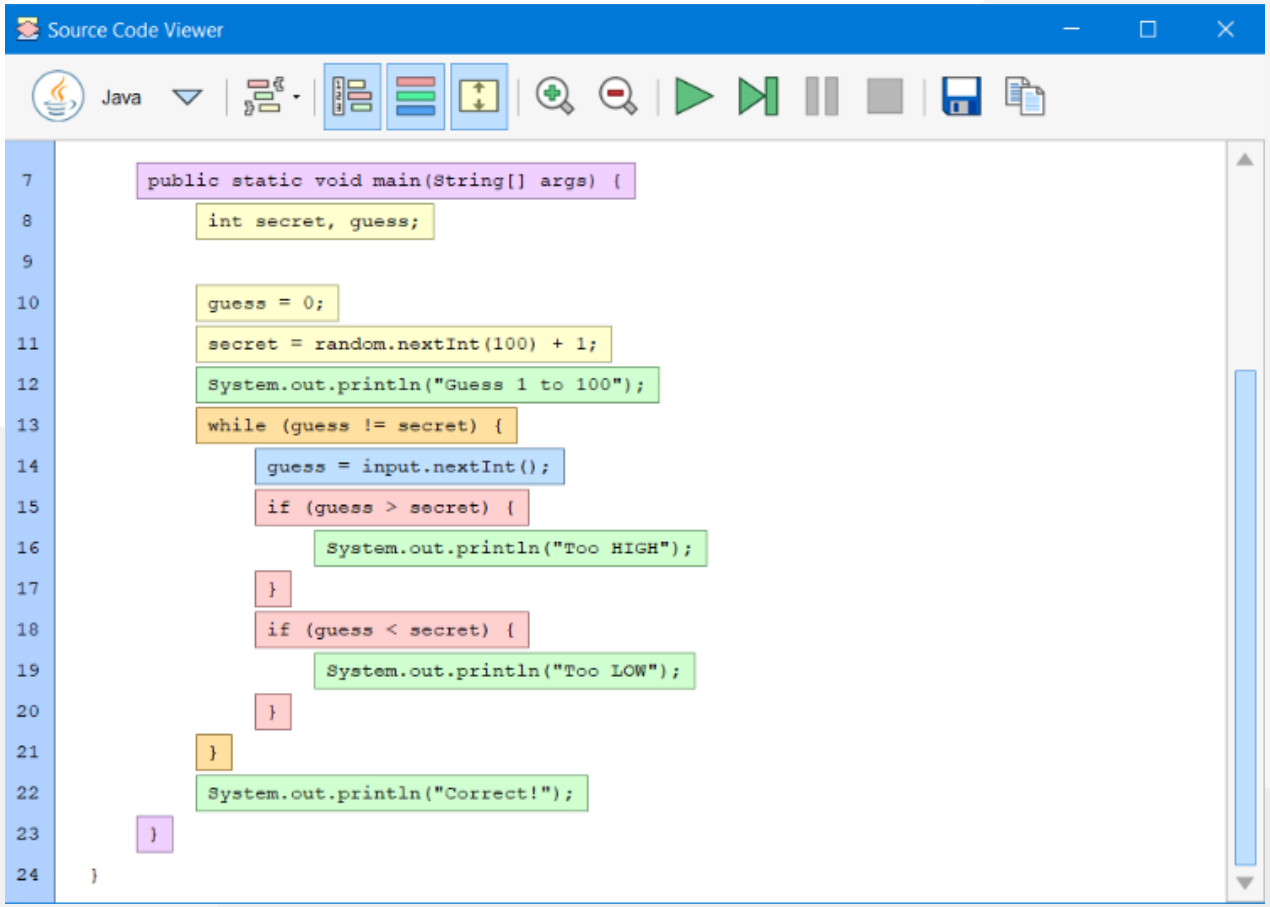


Flowgorithm (5)

- Source Code Viewer Window
  - The Source Code Viewer can convert your flowchart to several major programming languages. So, if you planning to learn a high-level language, then this feature should help you along the way.

Flowgorithm (6)

- Source Code Viewer Window

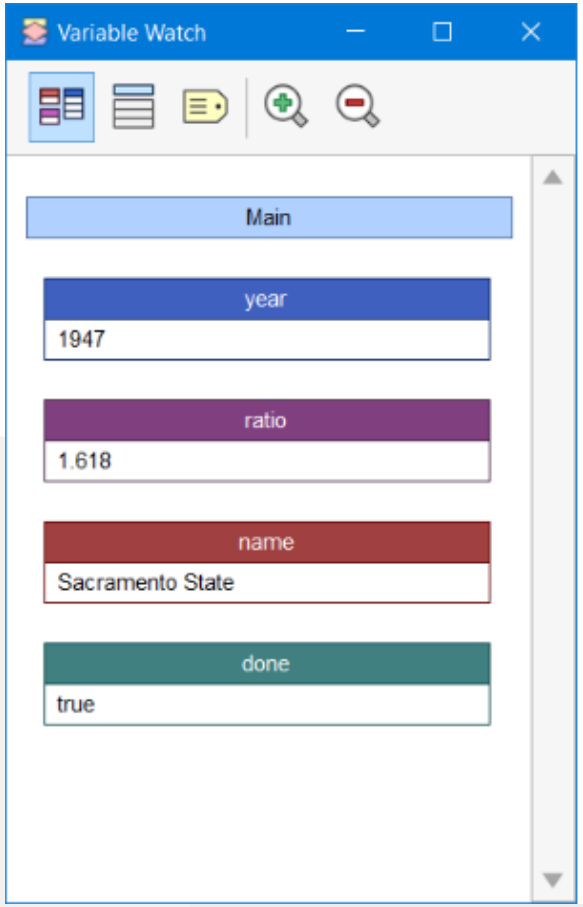


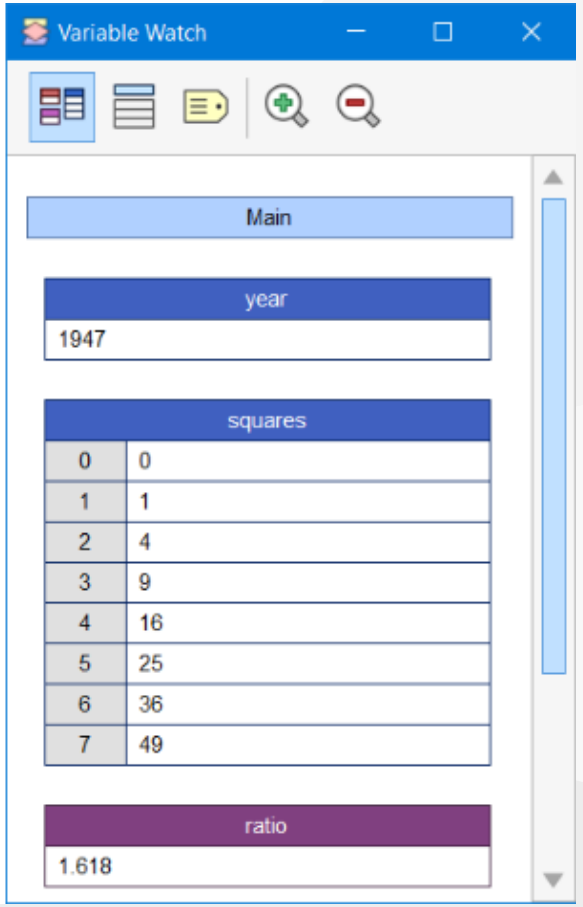
Flowgorithm (7)

- Variable Watch Window
  - The variable watch window is used to keep track of how your variables are changing as your program executes. Each variable is color-coded based on its data type. At a glance, you can tell exactly what type of data is being stored - and catch where you may want to use a different data type.

Flowgorithm (8)

- Variable Watch Window





Flowgorithm (8)

- More Resources for Flowgorithm
  - Flowgorithm Tutorial - TestingDocs.com

Pseudocode (1)

- Algorithm design language
  - Pseudocode - Wikipedia
  - Pseudocode Examples
  - How to write a Pseudo Code? - GeeksforGeeks

Introduction to Analysis of Algorithms

- In this course, we will learn how to code with several development environments and next term we will see an analysis of algorithms in detail.
- This topic is covered in the following link:
    - CE100 Introduction to Analysis of Algorithms

Programming Environment Setup and Configuration

- Programming life is not about only learning how to code. Mostly you need to use several code development environments and you need to learn how to use them efficiently.

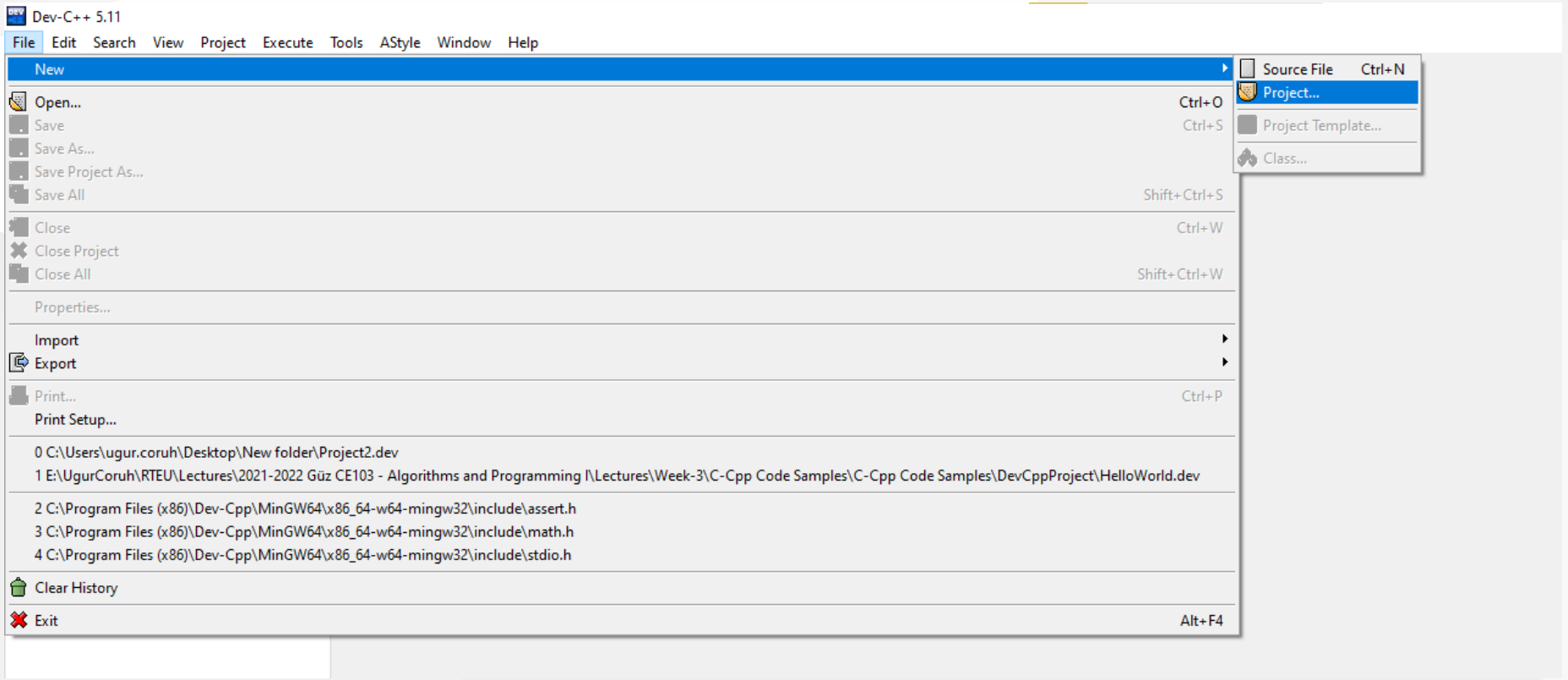
C / C++ Environment and Development

DevCpp (Install / Compile / Run / Debug) (1)

- Download DevC++ IDE from the following link
  - https://www.bloodshed.net/

DevCpp (Install / Compile / Run / Debug) (2)

- Open DevC++ IDE for C Project Generation `Open File->New->Project`



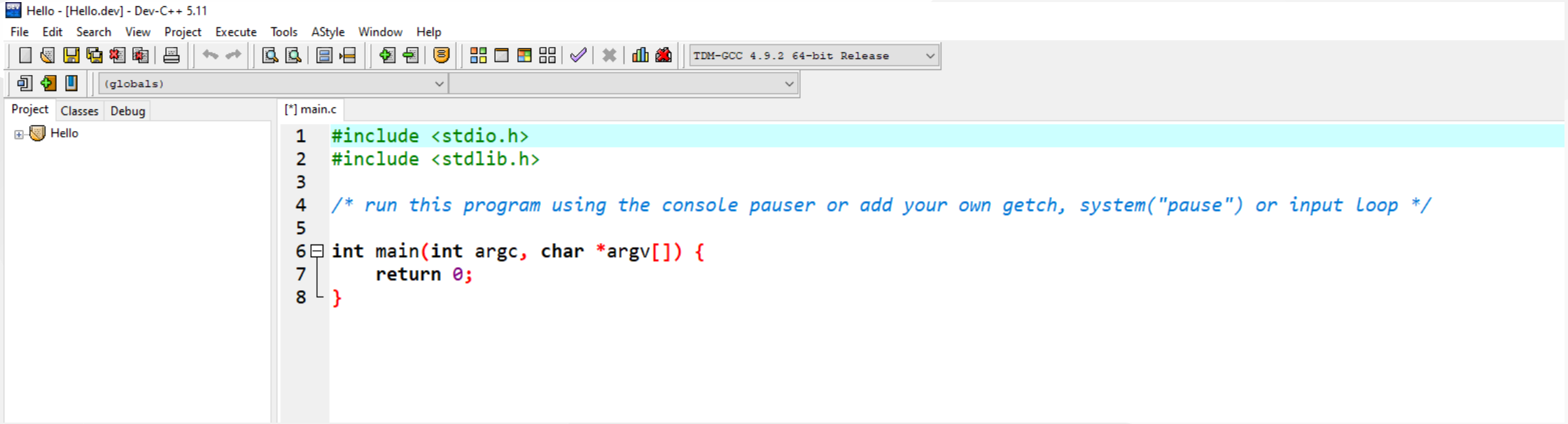
DevCpp (Install / Compile / Run / Debug) (3)

Select **Console Application** from **Basic** tab and with **C Project** Option and write a project name such as "**Hello**" then press OK

Select a folder and save **Hello.dev** project file.

DevCpp (Install / Compile / Run / Debug) (4)

- You will see a sample main with an empty body



DevCpp (Install / Compile / Run / Debug) (5)

```c
#include <stdio.h>
#include <stdlib.h>

/* run this program using the console pauser or add your own getch, s,ystem("pause") or input loop */
int main(int argc, char *argv[]) {
    retAdd 0;
}
```

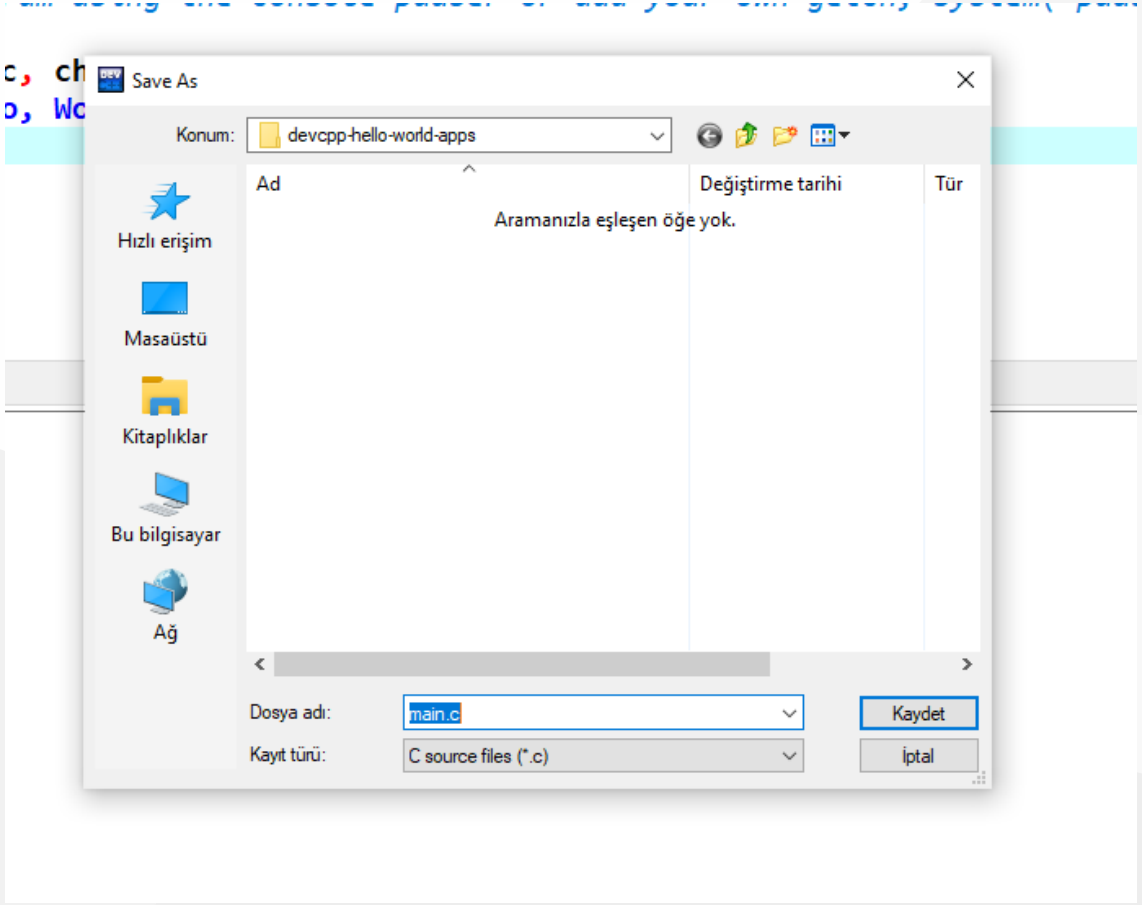
DevCpp (Install / Compile / Run / Debug) (6)

- Add the following line in the main function. This will write "Hello, World!" on the screen and then wait for a keypress to exit from the application

```c
#include <stdio.h>
#include <stdlib.h>

/* run this program using the console pauser or add your own getch, system("pause") or input loop */

int main(int argc, char *argv[]) {
    printf("Hello, World!");
    getchar();
    return 0;
}
```

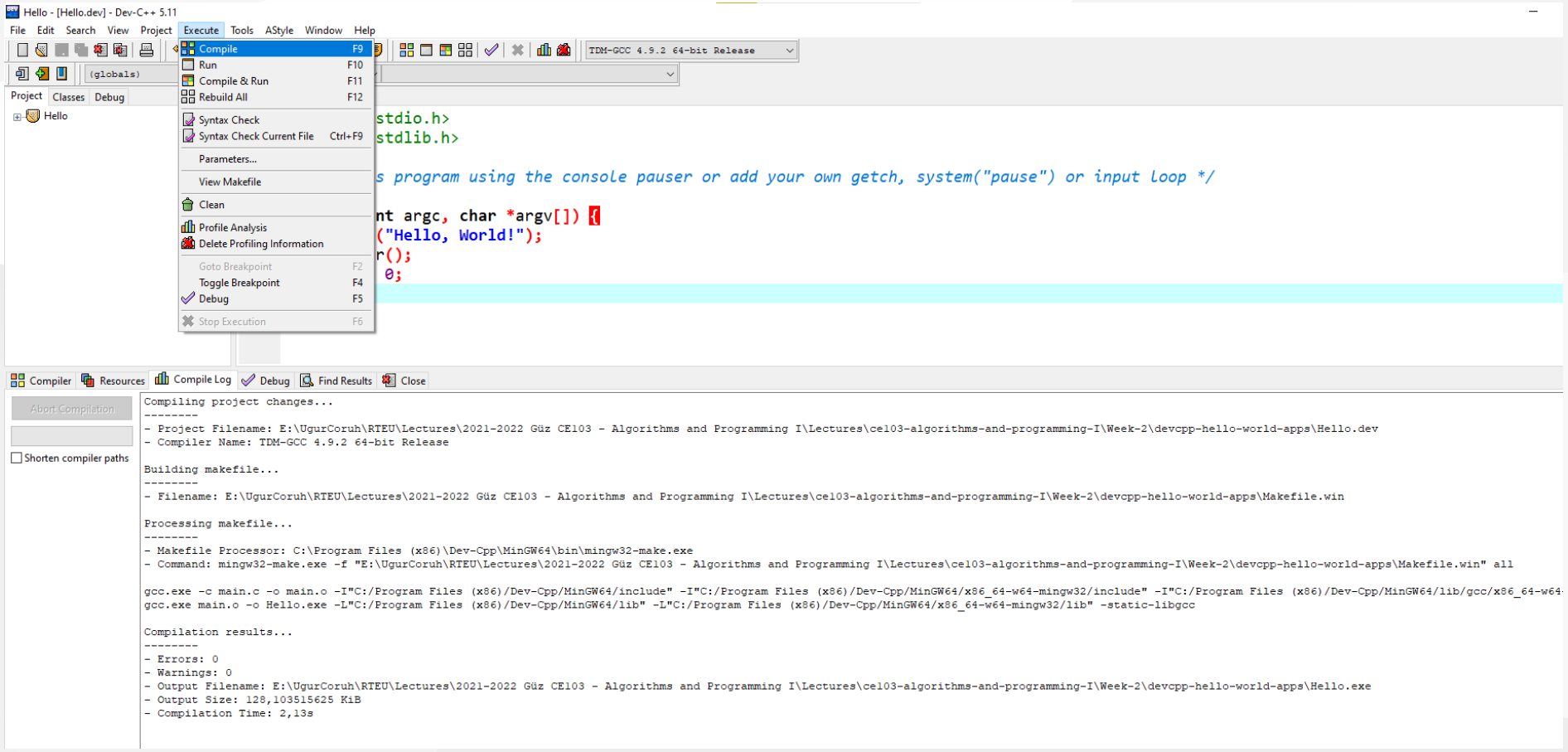
DevCpp (Install / Compile / Run / Debug) (7)

- Then save the file



DevCpp (Install / Compile / Run / Debug) (8)

- Use from menu `Execute->Compile F5` to generate `Hello.exe`



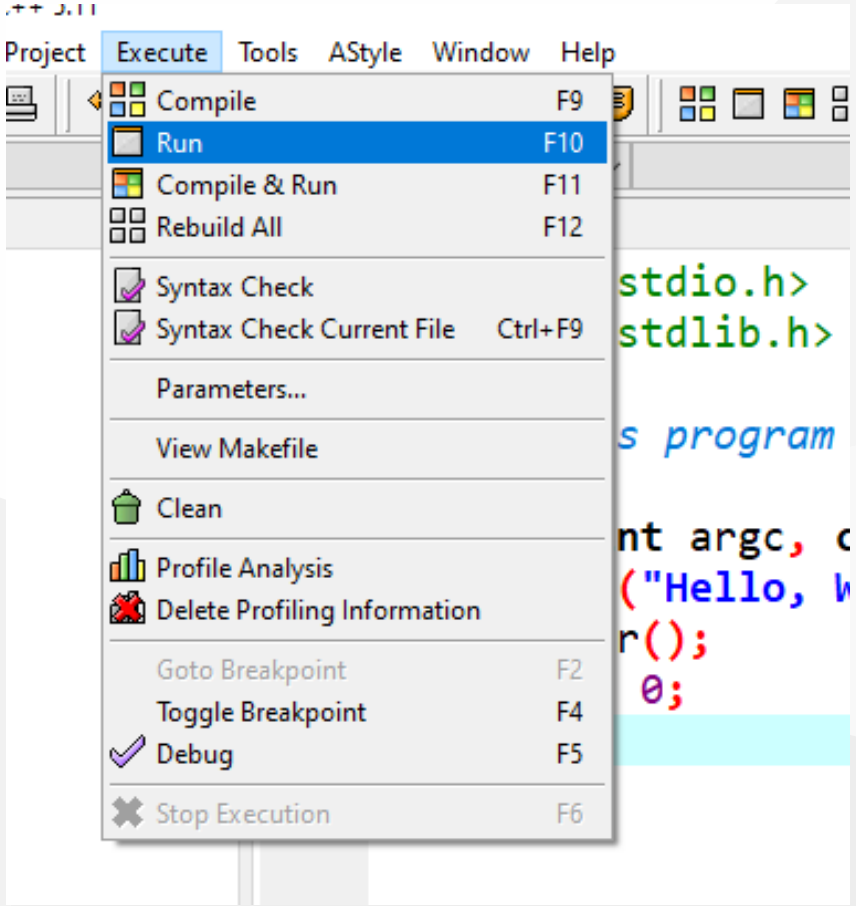
DevCpp (Install / Compile / Run / Debug) (9)

- You can find the generated `Hello.exe` path from Compile.log as follow. Check the Output Filename

```
Compiling project changes...
--------
- Project Filename: E:\UgurCoruh\RTEU\Lectures\2021-2022 Güz CE103 - Algorithms and Programming I\Lectures\ce103-algorithms-and-programming-I\Week-2\devcpp-hello-world-apps\Hello.dev
- Compiler Name: TDM-GCC 4.9.2 64-bit Release

Building makefile...
--------
- Filename: E:\UgurCoruh\RTEU\Lectures\2021-2022 Güz CE103 - Algorithms and Programming I\Lectures\ce103-algorithms-and-programming-I\Week-2\devcpp-hello-world-apps\Makefile.win

Processing makefile...
--------
- Makefile Processor: C:\Program Files (x86)\Dev-Cpp\MinGW64\bin\mingw32-make.exe
- Command: mingw32-make.exe -f "E:\UgurCoruh\RTEU\Lectures\2021-2022 Güz CE103 - Algorithms and Programming I\Lectures\ce103-algorithms-and-programming-I\Week-2\devcpp-hello-world-apps\Makefile.win" all

gcc.exe -c main.c -o main.o -I"C:/Program Files (x86)/Dev-Cpp/MinGW64/include" -I"C:/Program Files (x86)/Dev-Cpp/MinGW64/x86_64-w64-mingw32/include" -I"C:/Program Files (x86)/Dev-Cpp/MinGW64/lib/gcc/x86_64-w64-mingw32/4.9.2/include"

gcc.exe main.o -o Hello.exe -L"C:/Program Files (x86)/Dev-Cpp/MinGW64/lib" -L"C:/Program Files (x86)/Dev-Cpp/MinGW64/x86_64-w64-mingw32/lib" -static-libgcc


Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: E:\UgurCoruh\RTEU\Lectures\2021-2022 Güz CE103 - Algorithms and Programming I\Lectures\ce103-algorithms-and-programming-I\Week-2\devcpp-hello-world-apps\Hello.exe
- Output Size: 128,103515625 KiB
- Compilation Time: 2,13s
```

DevCpp (Install / Compile / Run / Debug) (10)

- Then you can run with `Execute->Run F10` or Directly `Compile&Run F11`



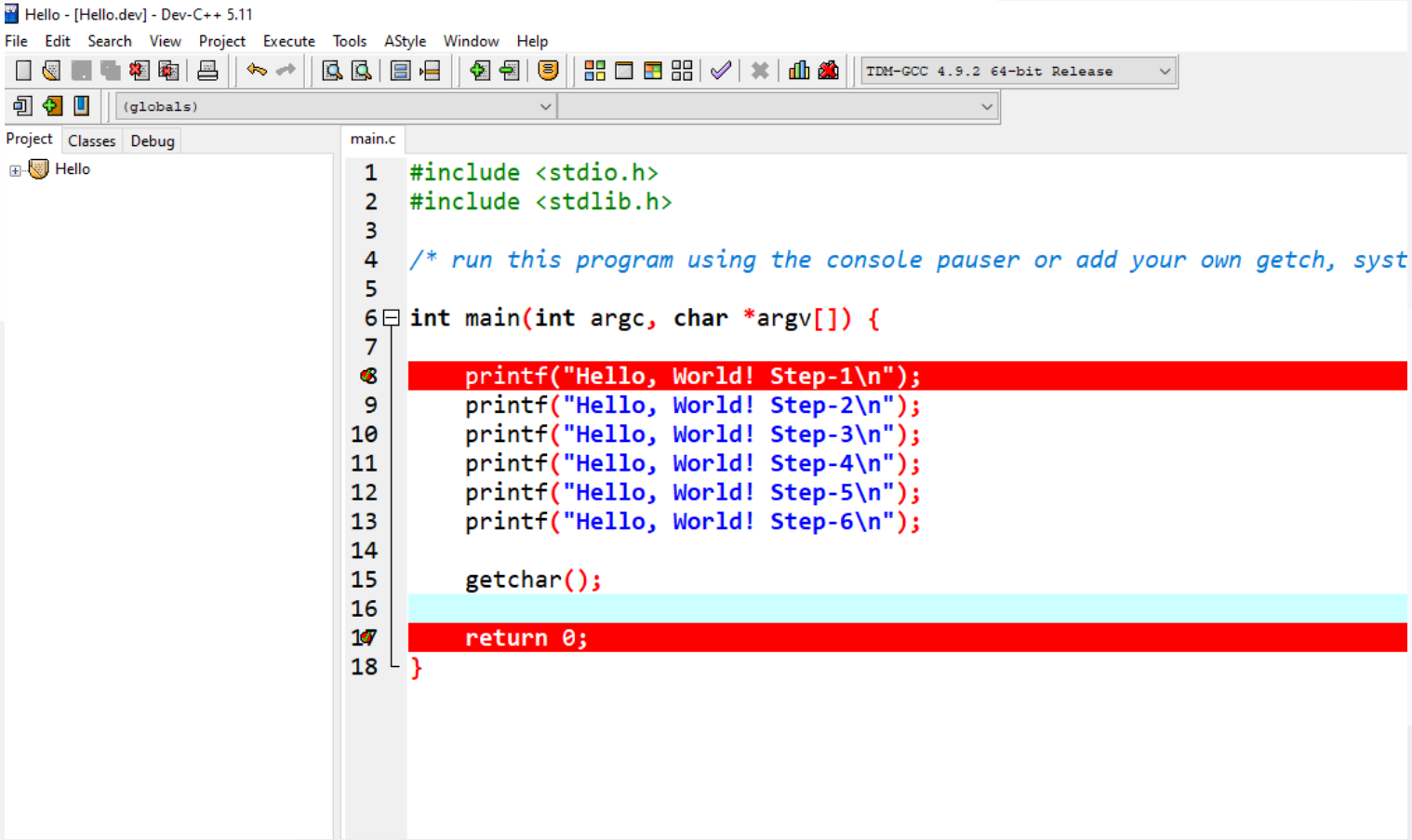
DevCpp (Install / Compile / Run / Debug) (11)

for debugging operations, just change the code and add more statements as follow

```c
#include <stdio.h>
#include <stdlib.h>

/* run this program using the console pauser or add your getch, system(",pause") or input loop */

int main(int argc, char *argv[]) {

    printf("Hello, World! Step-1\n");
    printf("Hello, World! Step-2\n");
    printf("Hello, World! Step-3\n");
    printf("Hello, World! Step-4\n");
    printf("Hello, World! Step-5\n");
    printf("Hello, World! Step-6\n");

    getchar();

    return 0;
}
```

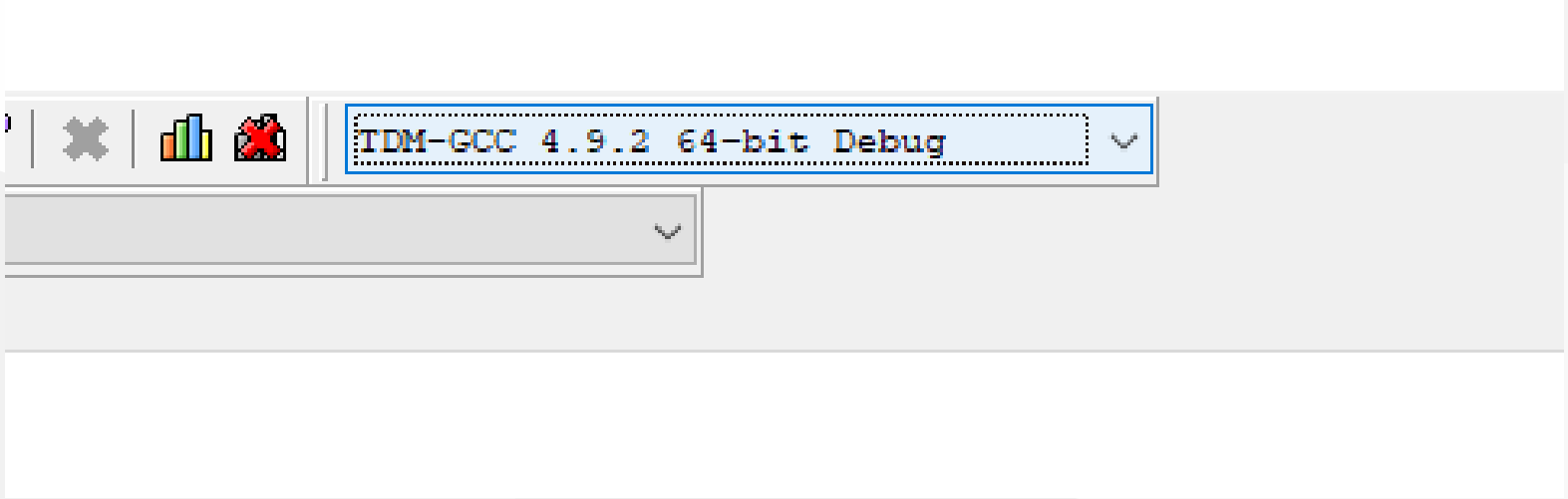
DevCpp (Install / Compile / Run / Debug) (12)

Click on line numbers and add breakpoints for the debugger. This red point will be debugger stop points



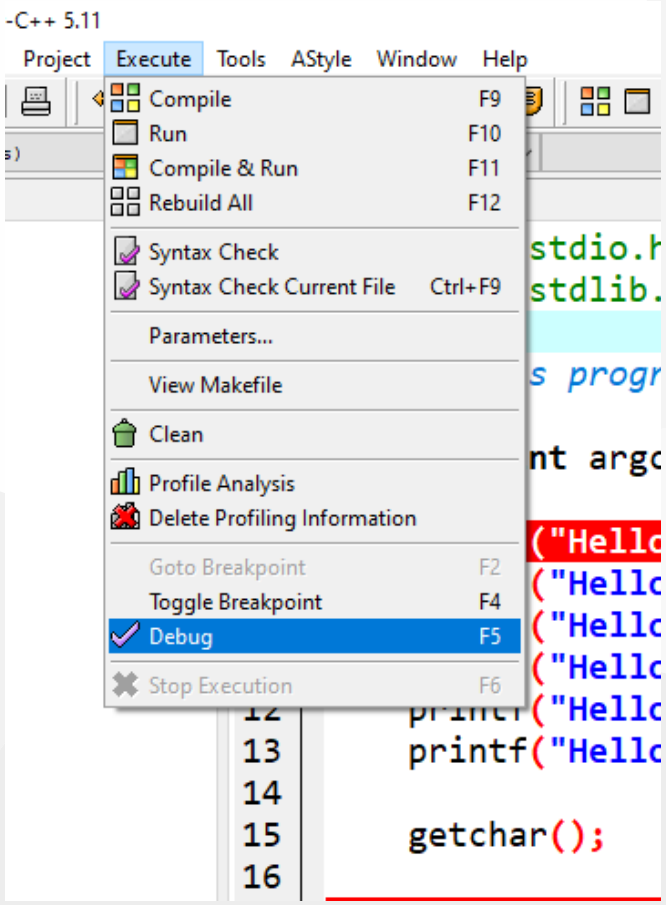
DevCpp (Install / Compile / Run / Debug) (13)

- In the menu section, select the compiler with debug option



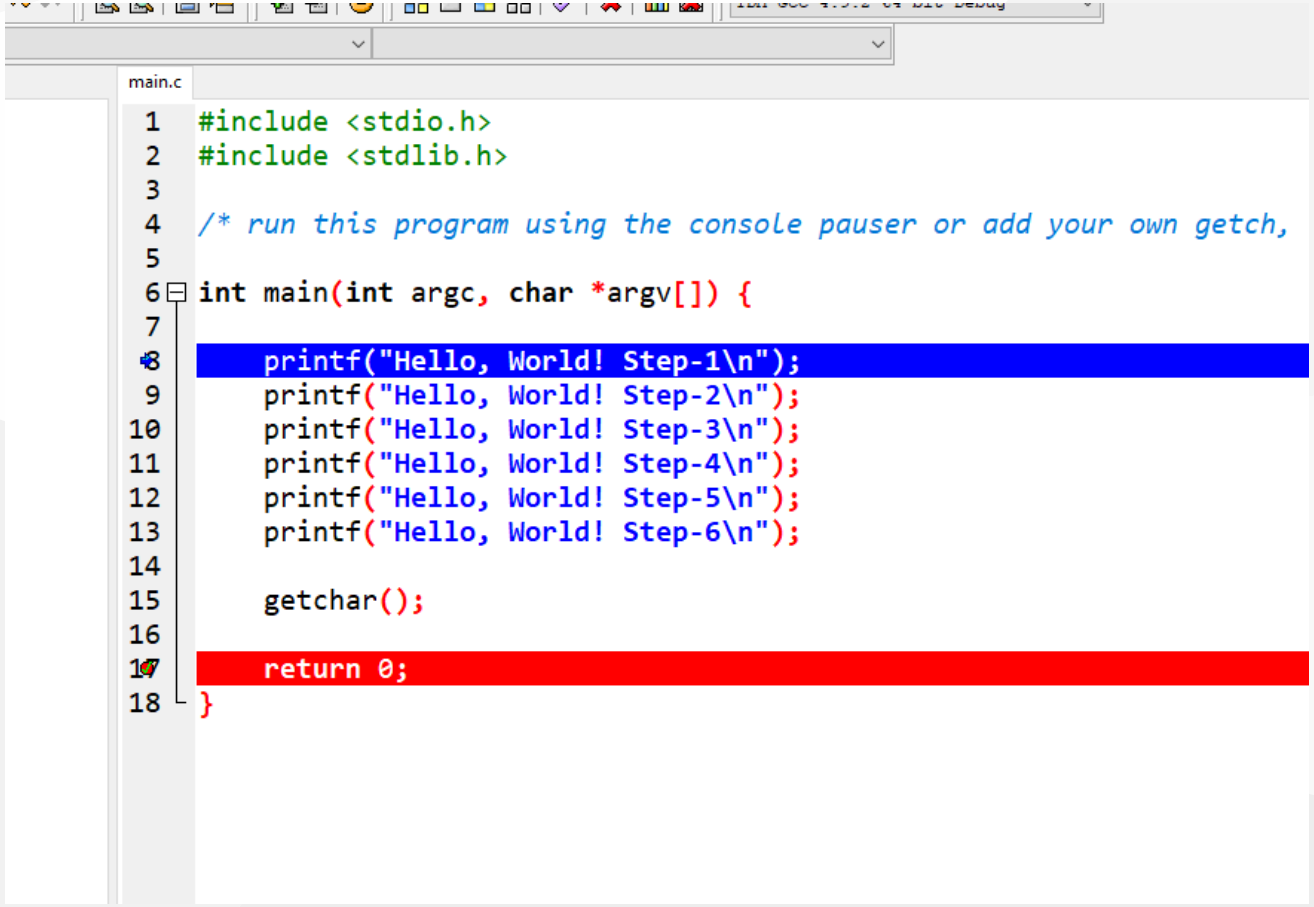
DevCpp (Install / Compile / Run / Debug) (14)

- Compile application with debugging setting and in Execute Section use Debug F5 to start debugging



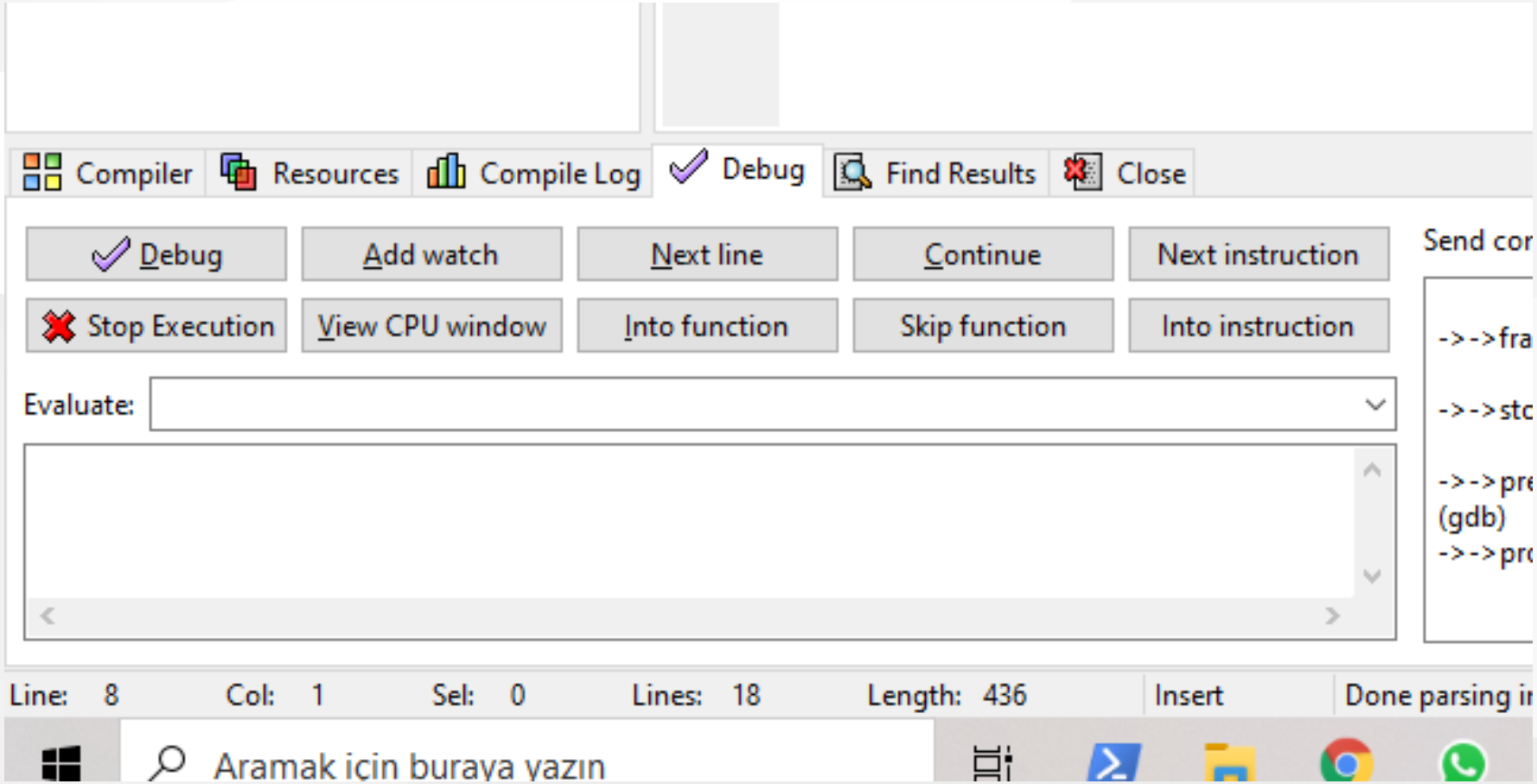
DevCpp (Install / Compile / Run / Debug) (15)

- The debugger will stop at the breakpoint at the debug point (blue line)



DevCpp (Install / Compile / Run / Debug) (16)

- Moving to the next statement can be done via control buttons or shortcuts



DevCpp (Install / Compile / Run / Debug) (17)

-Press `F8` to step-by-step continue

- Then go to `Project Options -> Compiler -> Linker` and set Generate debugging information to "yes", and make sure you are not using any optimization options (they're not good for debug mode). Also, check the Parameters tab, and make sure you don't have any optimization options (like `-O2` or `-O3`, but `-O0` is ok because it means no optimization) or strip option (`-s`).

DevCpp (Install / Compile / Run / Debug) (18)

- After that, do a full rebuild (`Ctrl-F11`), then set a breakpoint(s) where you want the debugger to stop (otherwise it will just run the program). To set a breakpoint on a line, just click on the gutter (the gray band on the left), or press `Ctrl-F5` .

DevCpp (Install / Compile / Run / Debug) (19)

- Now you are ready to launch the debugger, by pressing F8 or clicking the debug button. If everything goes well, the program will start, and then stop at the first breakpoint. Then you can step through the code, entering function calls, by pressing `Shift-F7` or the "step into" button, or stepping over the function calls, by pressing `F7` or the "next step" button. You can press `Ctrl-F7` or the "`continue`" button to continue execution till the next breakpoint. At any time, you can add or remove breakpoints.

DevCpp (Install / Compile / Run / Debug) (20)

When the program stopped at a breakpoint and you are stepping through the code, you can display the values of various variables in your program by putting your mouse over them, or you can display variables and expressions by pressing `F4` or the "add watch" button and typing the expression.

DevCpp (Install / Compile / Run / Debug) (21)

How do I debug using Dev-C++

Code Blocks (Install / Compile / Run / Debug) (1)

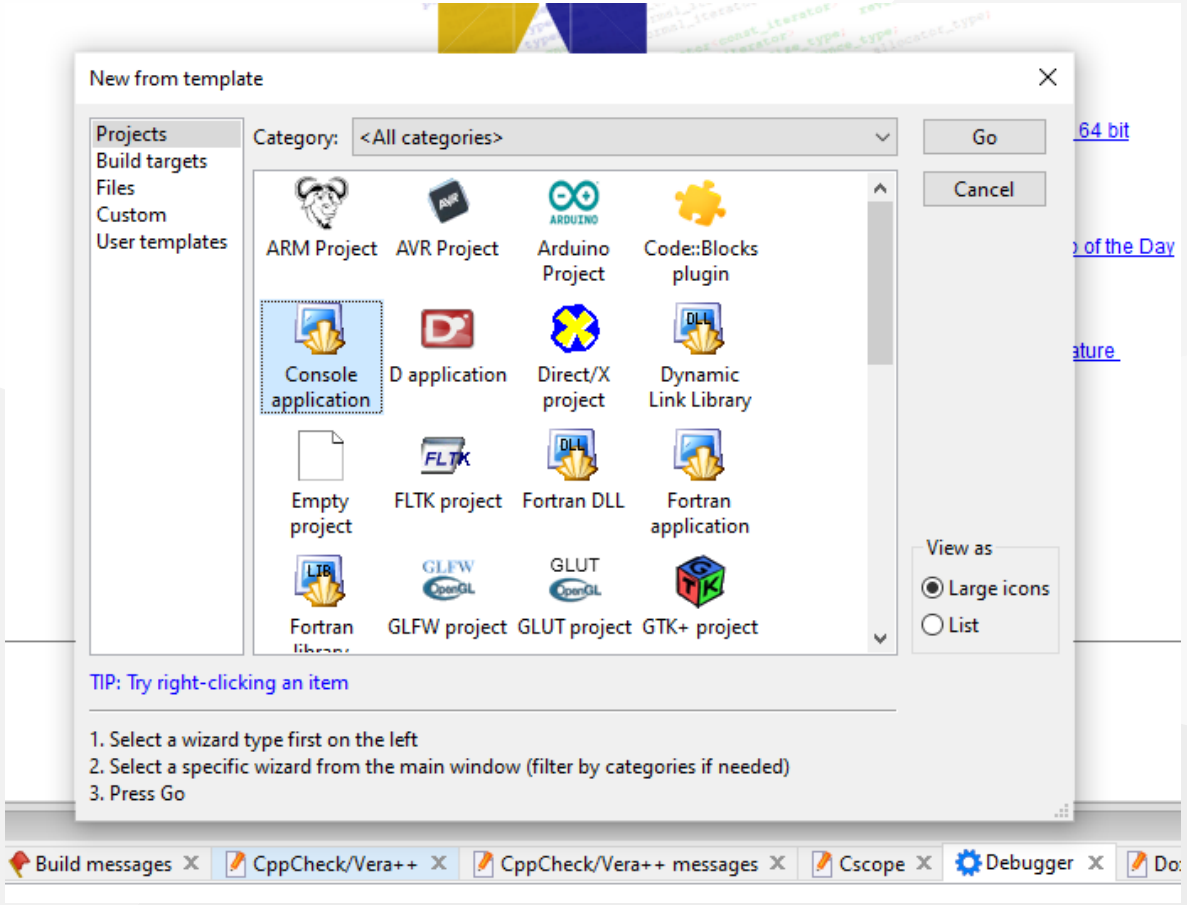
Download Code Blocks from the following link

Binary releases - Code::Blocks

Code Blocks (Install / Compile / Run / Debug) (2)

Open Code Blocks and

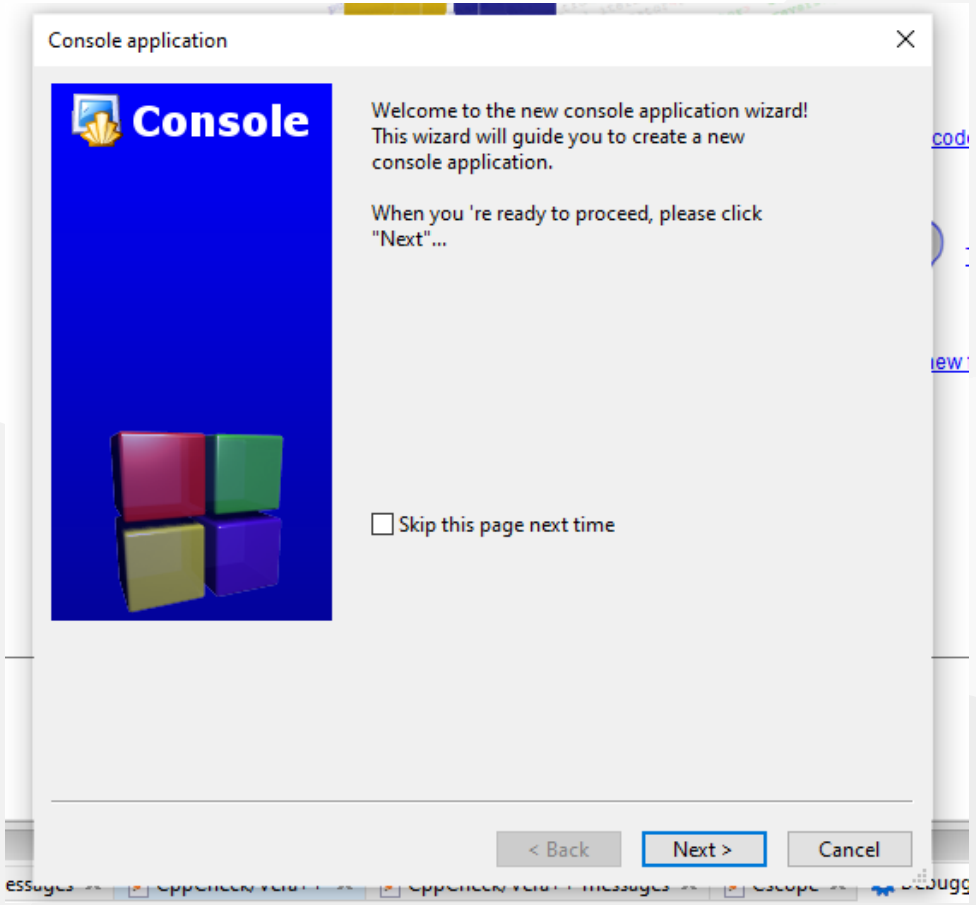
Select `File->New->Project`



Code Blocks (Install / Compile / Run / Debug) (3)

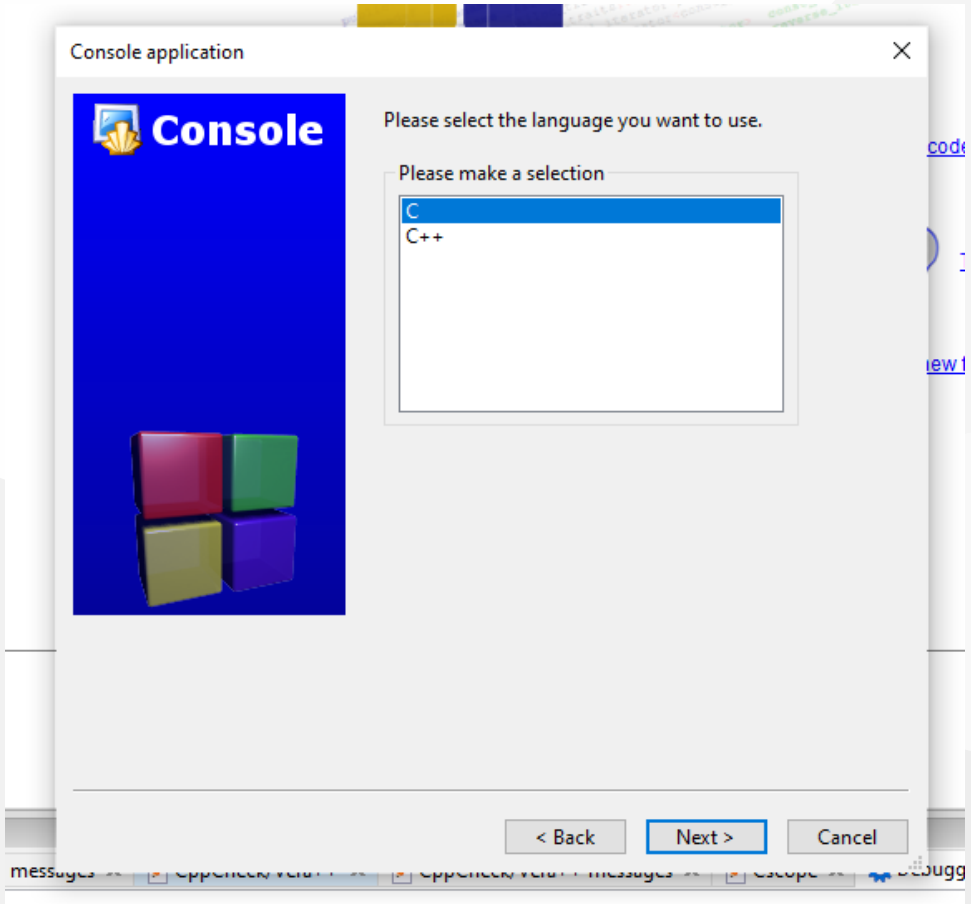
Select `Console Application`

Click `Next` from Opening Window



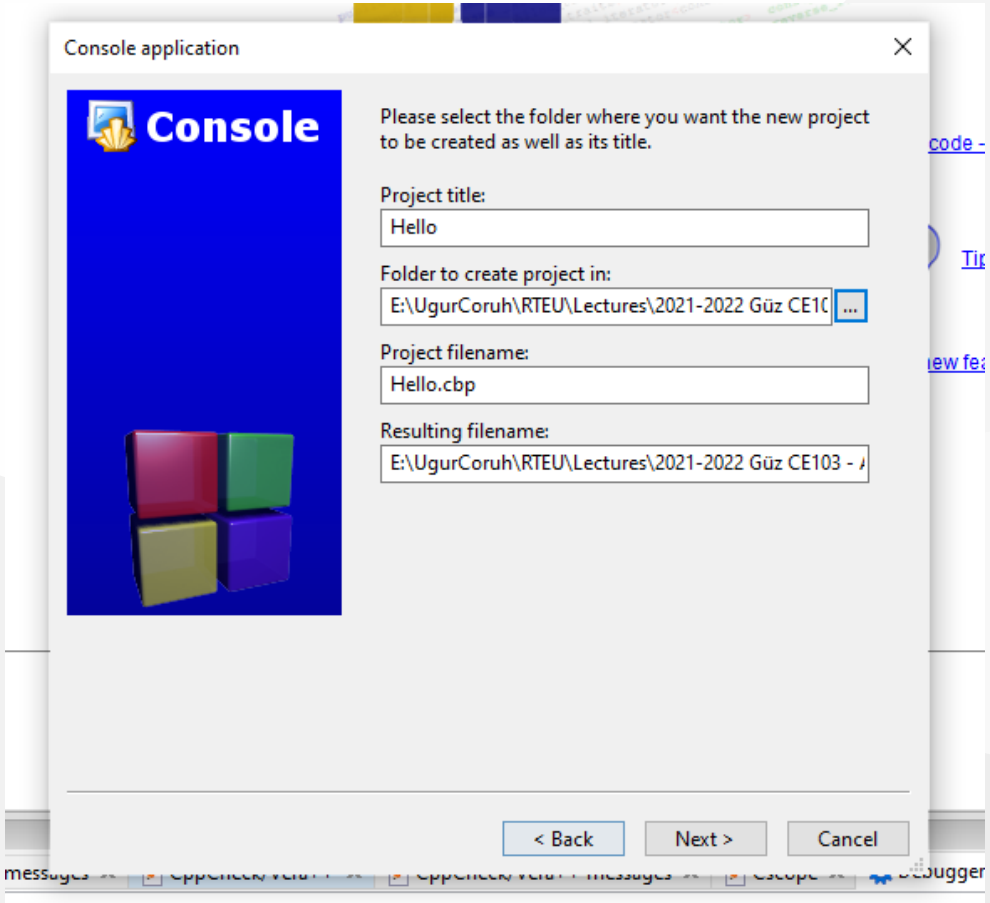
Code Blocks (Install / Compile / Run / Debug) (4)

Select `c` for Sample Project



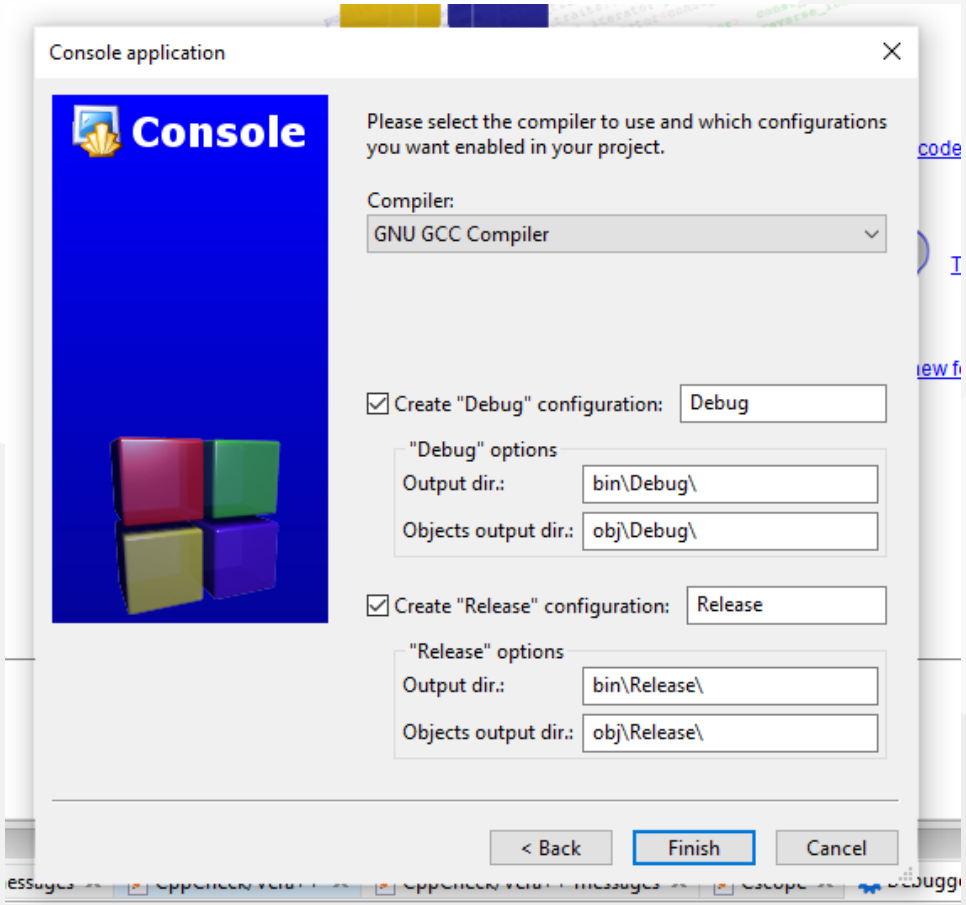
Code Blocks (Install / Compile / Run / Debug) (5)

Write a project name and title also set a project folder



Code Blocks (Install / Compile / Run / Debug) (6)

Select a compiler for this project we selected `GCC` but you can select C compilers from the list. Set Debug and Release executable output folders.



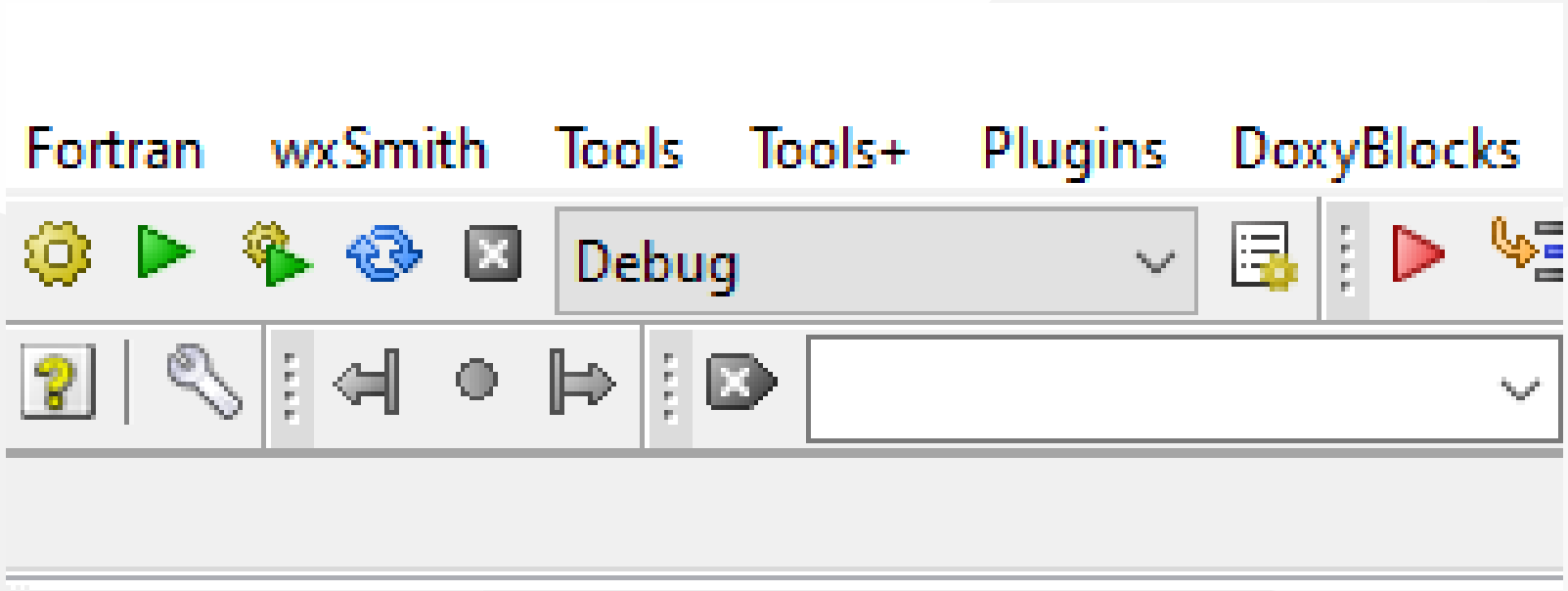
Code Blocks (Install / Compile / Run / Debug) (7)

- After this wizard, you will have the following code

```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    printf("Hello world!\n");
    return 0;
}
```

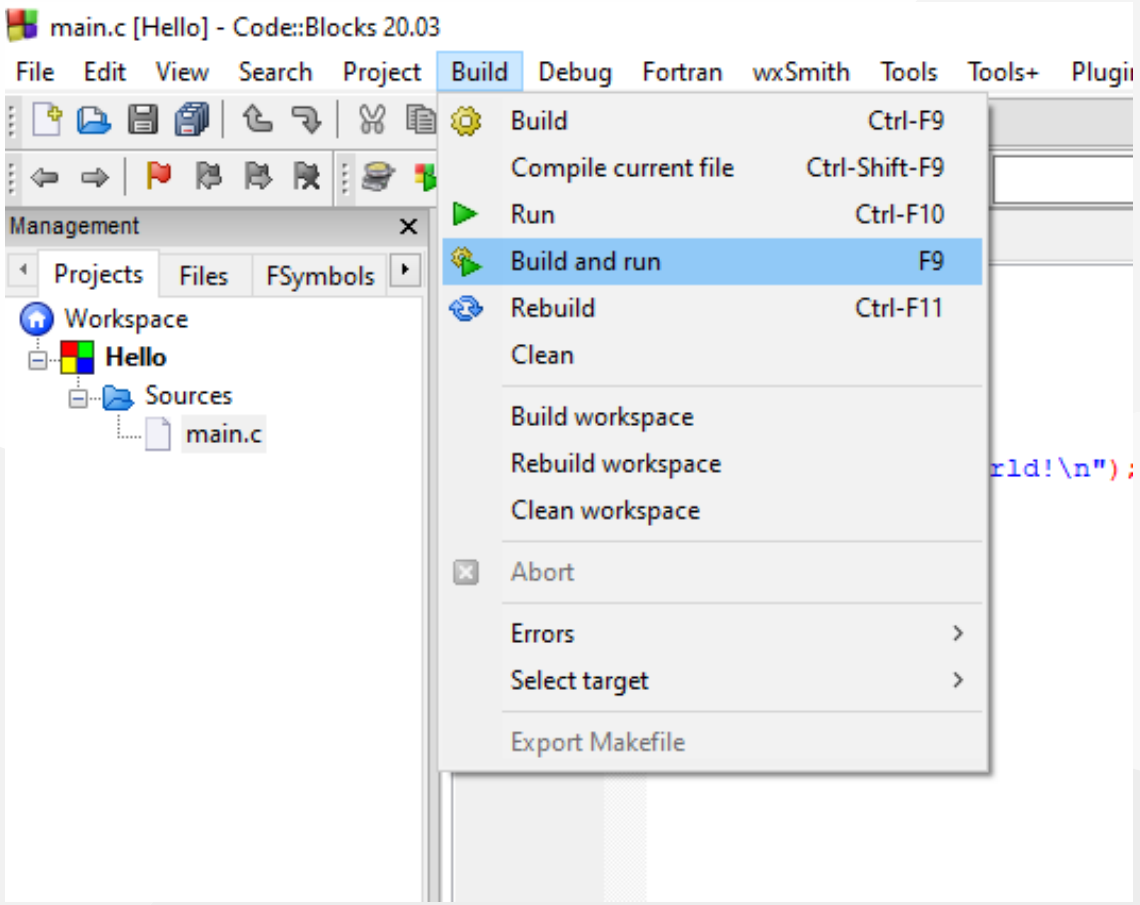
Code Blocks (Install / Compile / Run / Debug) (8)

Select `Debug` Build from the menu



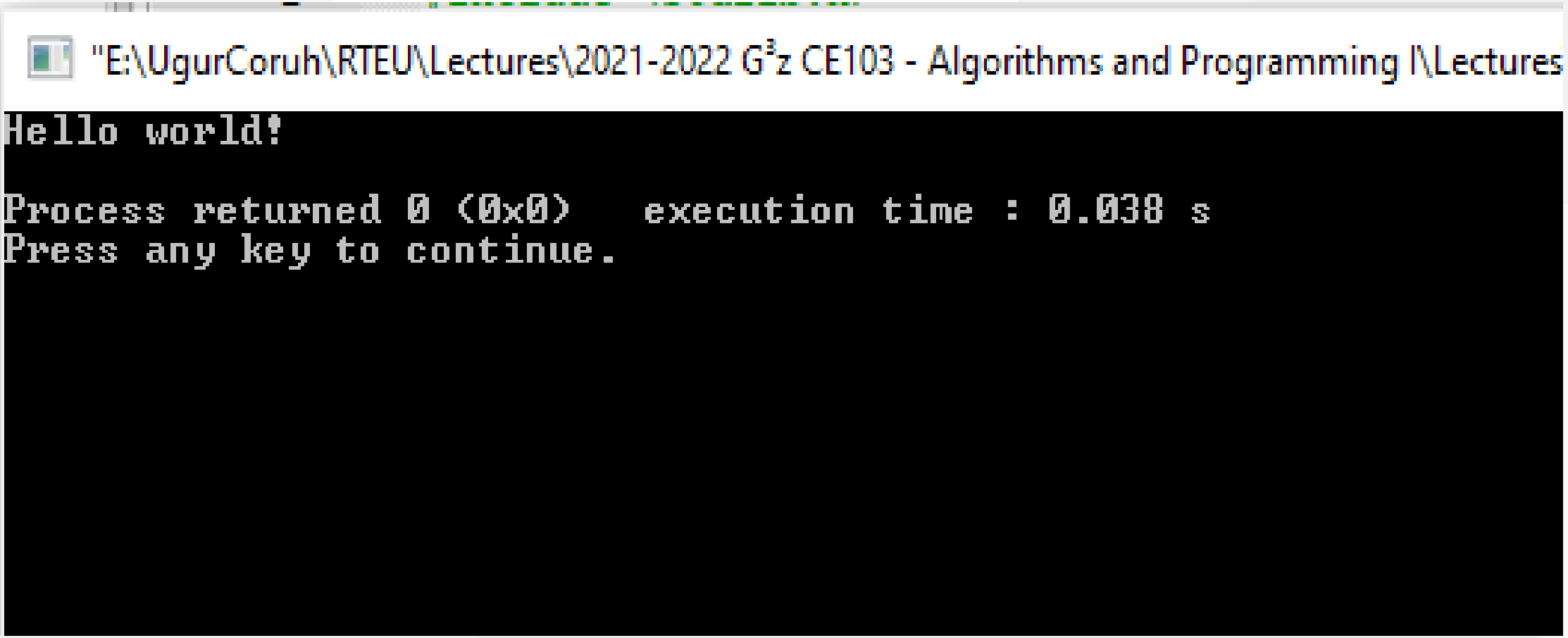
Code Blocks (Install / Compile / Run / Debug) (9)

Run with Build and Run `F9`



Code Blocks (Install / Compile / Run / Debug) (10)

- You should see the following output



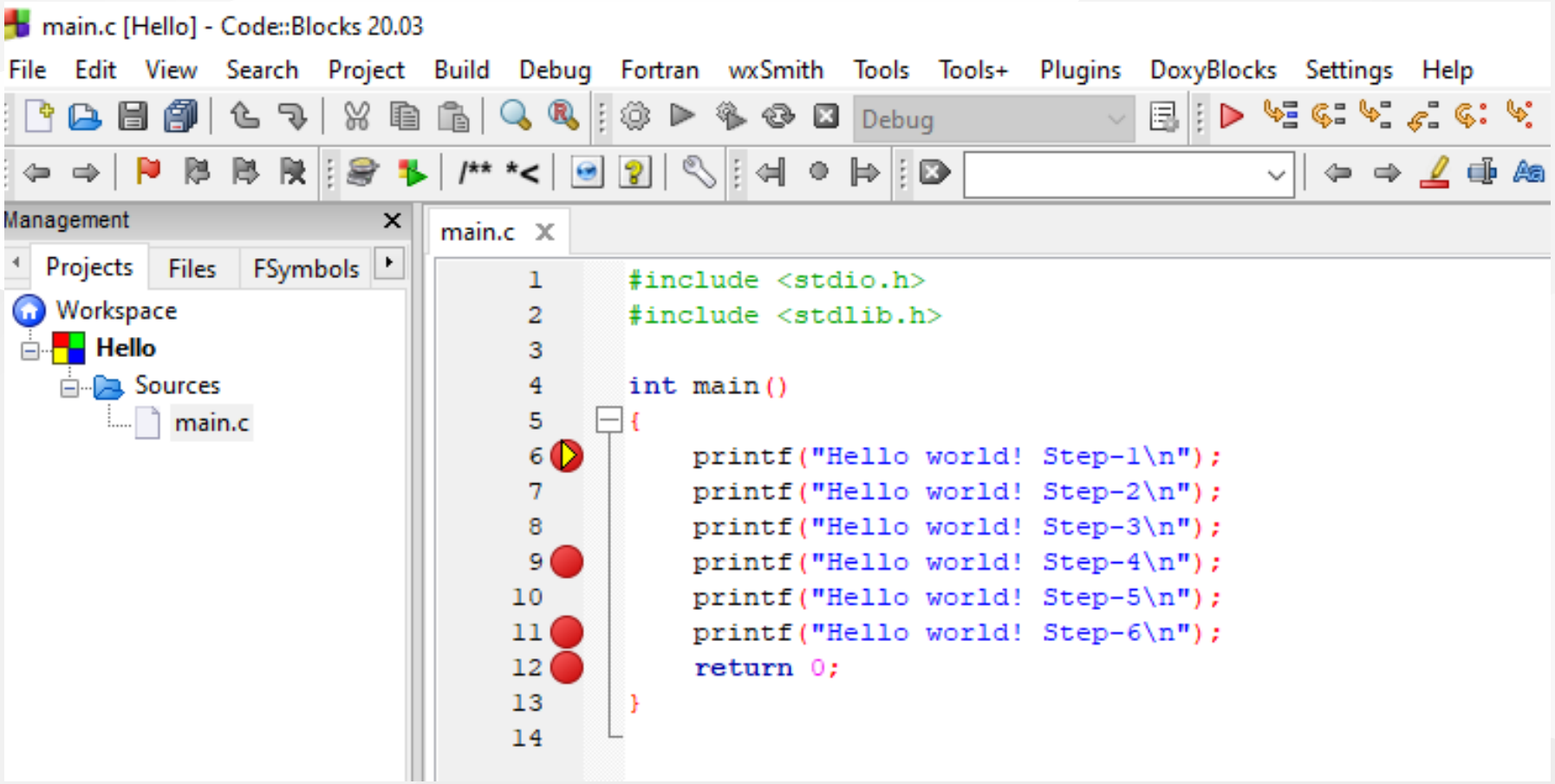
Code Blocks (Install / Compile / Run / Debug) (11)

- Add the following lines to your source code for debugging

```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    printf("Hello world! Step-1\n");
    printf("Hello world! Step-2\n");
    printf("Hello world! Step-3\n");
    printf("Hello world! Step-4\n");
    printf("Hello world! Step-5\n");
    printf("Hello world! Step-6\n");
    return 0;
}
```

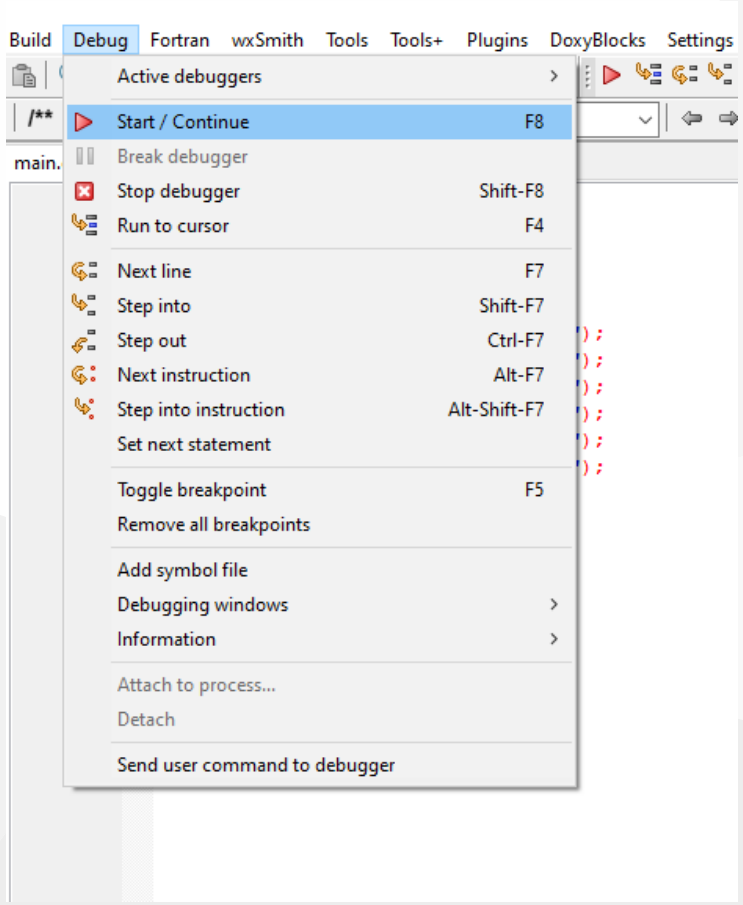
Code Blocks (Install / Compile / Run / Debug) (12)

- and add breakpoints with `F5` or mouse click



Code Blocks (Install / Compile / Run / Debug) (13)

- select `Debug->Start/Continue` to start debugger



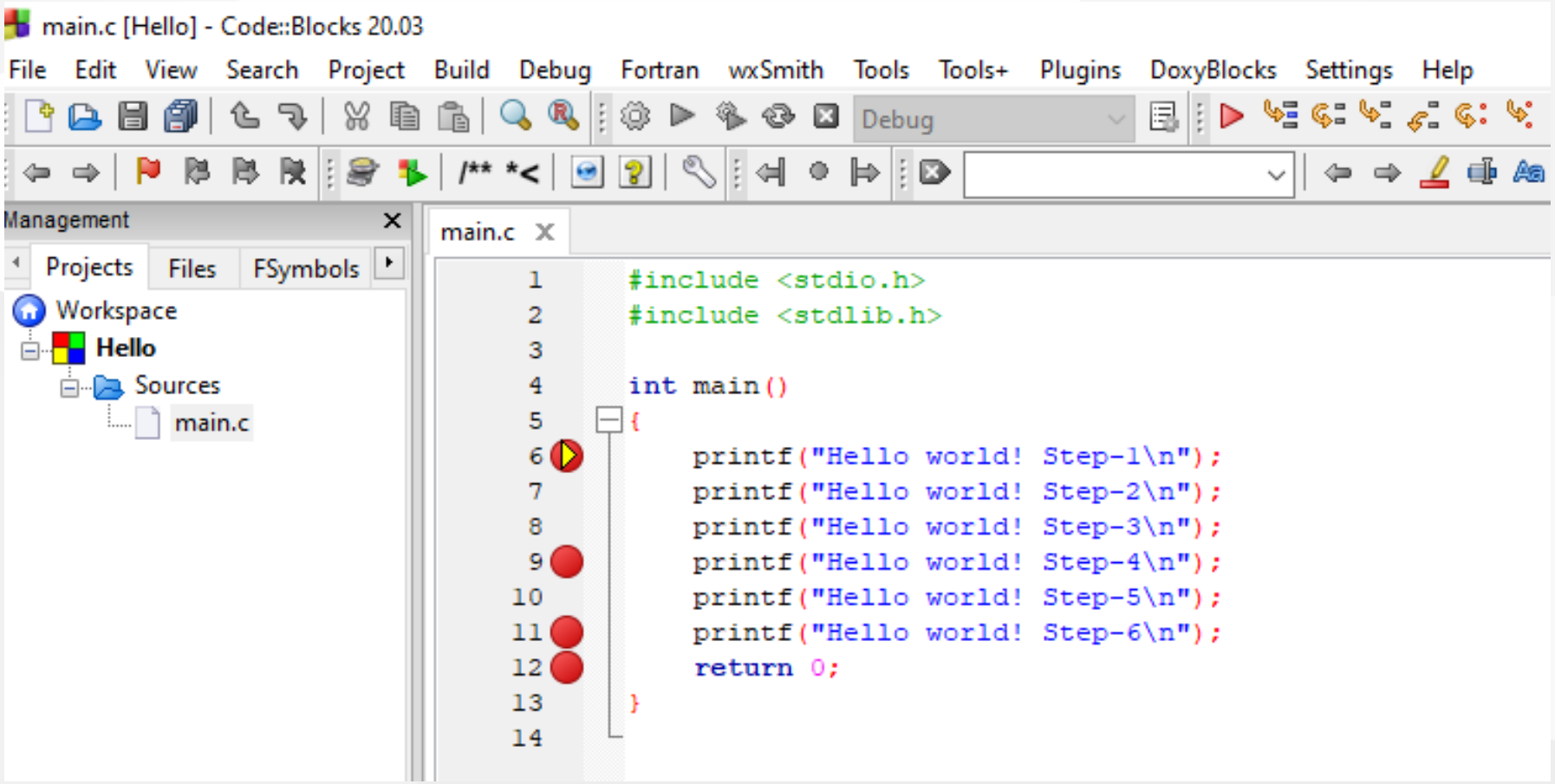
Code Blocks (Install / Compile / Run / Debug) (14)

- If you see the following error this is related to long or turkish characters including the path. Just move the project to a shorter path and try again

```
Setting breakpoints
Debugger name and version: GNU gdb (GDB) 8.1
Starting the debuggee failed: No executable specified, use `target exec'.
Debugger finished with status 0
```

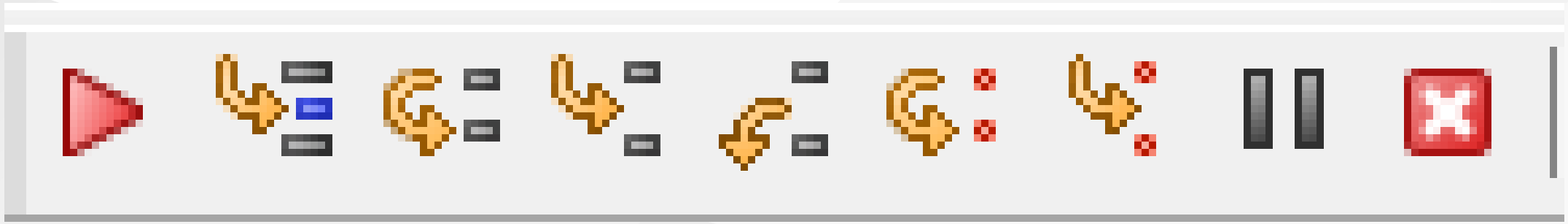
Code Blocks (Install / Compile / Run / Debug) (15)

You will see the following yellow pointer for the debugger



Code Blocks (Install / Compile / Run / Debug) (16)

You can use the following menu or shortcuts for step-by-step debugging.



GCC/G++ Complier (MinGW) / Clang-cl (LLVM) (1)

Download and install `MinGW` or `LLVM` compiler (if you downloaded then skip this step)

- MinGW installer (clang)
  - Download MinGW-w64 - for 32 and 64-bit Windows from SourceForge.net
- If you have a problem try `Github`` builds
  - https://github.com/niXman/mingw-builds-binaries/releases
  - https://github.com/niXman/mingw-builds-binaries/releases/download/12.2.0-rt_v10-rev0/x86_64-12.2.0-release-win32-seh-rt_v10-rev0.7z
- LLVM installer (gcc/g++)
- Download LLVM releases
  - Also use the following notes
    - https://llvm.org/devmtg/2014-04/PDFs/Talks/clang-cl.pdf

GCC/G++ Complier (MinGW) / Clang-cl (LLVM) (2)

Open a console with " `cmd` " and test the following commands if commands are not recognized then set the system environment variable to add `gcc` and `g++` executable paths to the path variable (add to both system and user path variable)

```
gcc --version

g++ --version
```

```
C:\Users\ugur.coruh>gcc --version
gcc (x86_64-win32-seh-rev0, Built by MinGW-W64 project) 8.1.0
Copyright (C) 2018 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

```
clang --version
```

GCC/G++ Complier (MinGW) / Clang-cl (LLVM) (3)

- for `gcc.exe`, `g++.exe` and `gdb.exe`

```
C:\Program Files\mingw-w64\x86_64-8.1.0-win32-seh-rt_v6-rev0\mingw64\bin
```

- for `clang.exe`, `lldb.exe`

```
C:\Program Files\LLVM\bin
```

This folder path changes according to your setup

VSCode (Install / Compile / Run / Debug) (1)

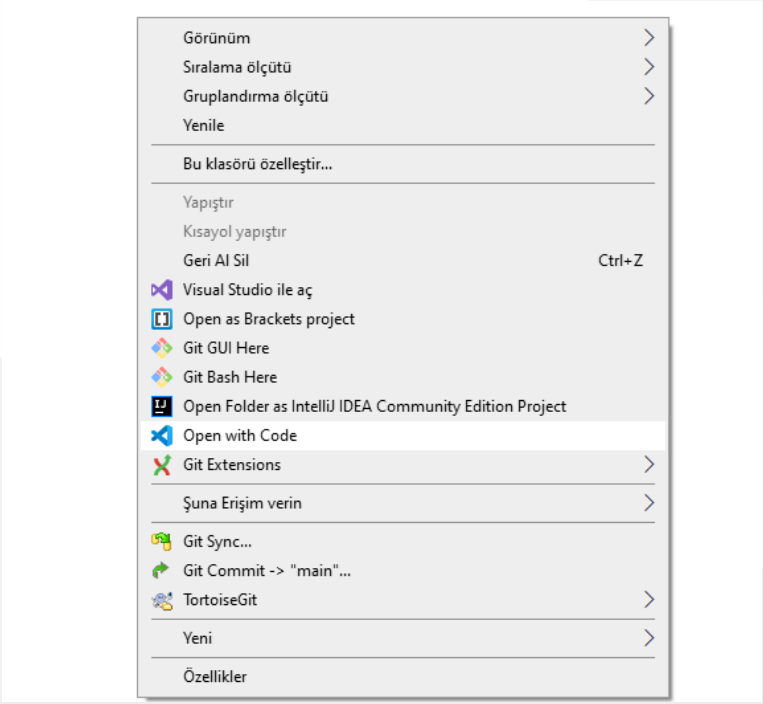
Download Visual Studio Code from the following link

Download Visual Studio Code - Mac, Linux, Windows

VSCode (Install / Compile / Run / Debug) (2)

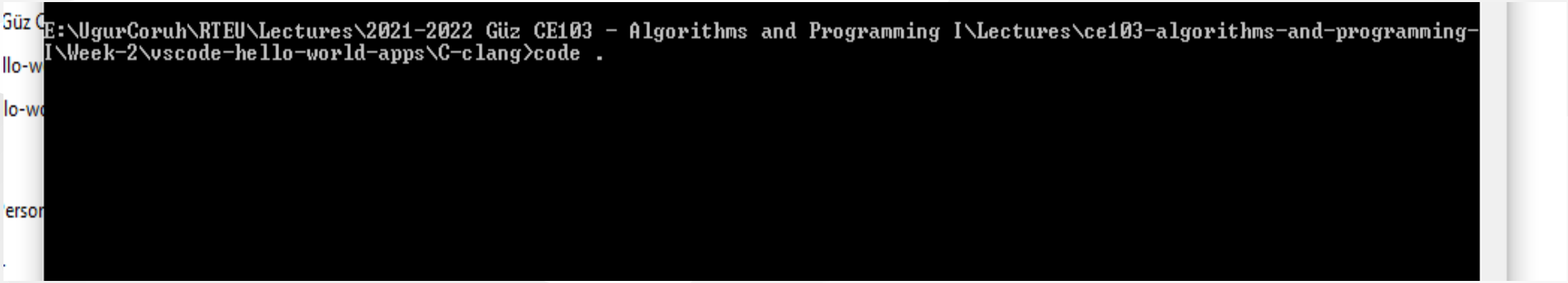
In this sample, you will find MinGW and LLVM compiler combinations for C and C++

Create a folder and enter this folder then open this folder with vscode by right click



VSCode (Install / Compile / Run / Debug) (3)

or enter the folder via console

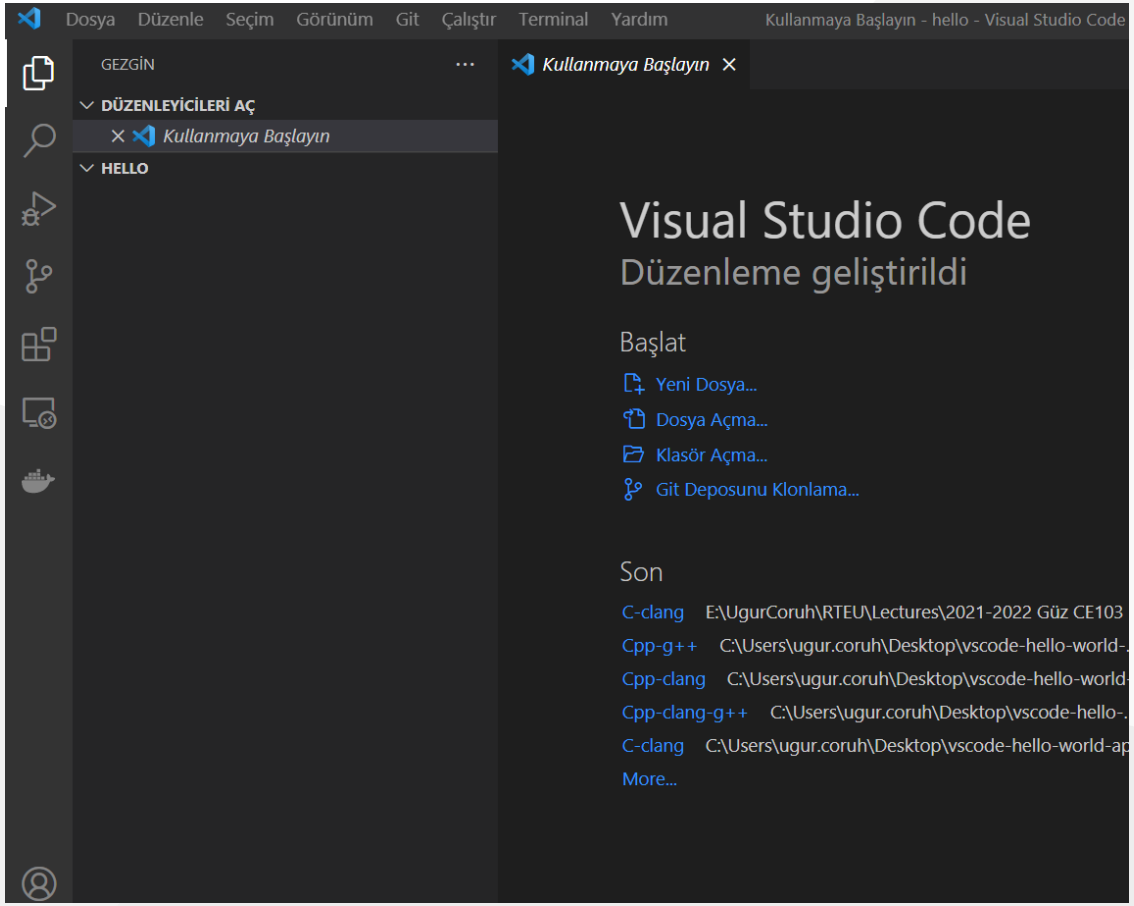


write

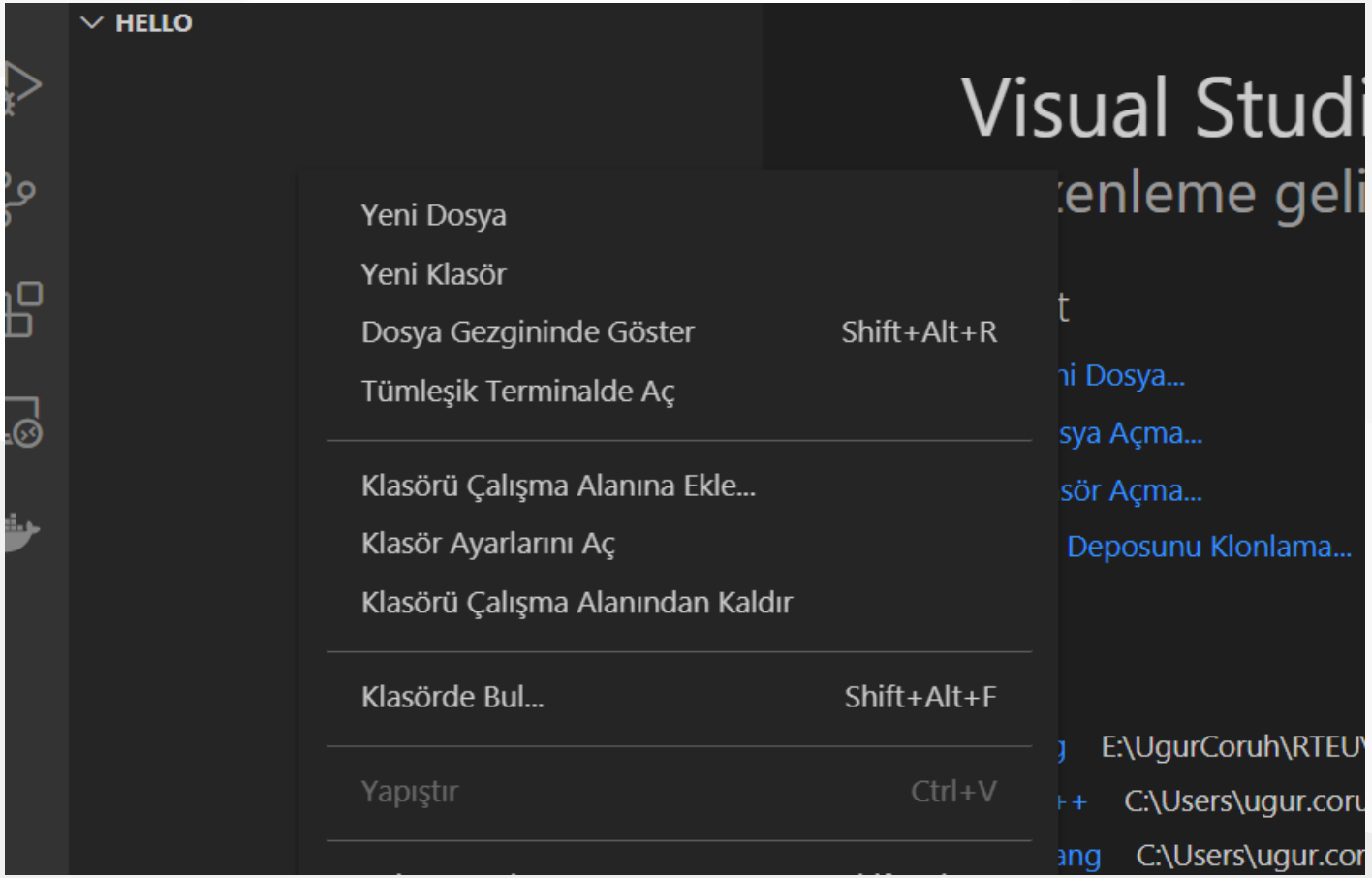
```
code .
```

VSCode (Install / Compile / Run / Debug) (4)

- This will open vscode for the current folder, (.) dot present current folder.
- You will see an empty folder in the right window



VSCode (Install / Compile / Run / Debug) (5)



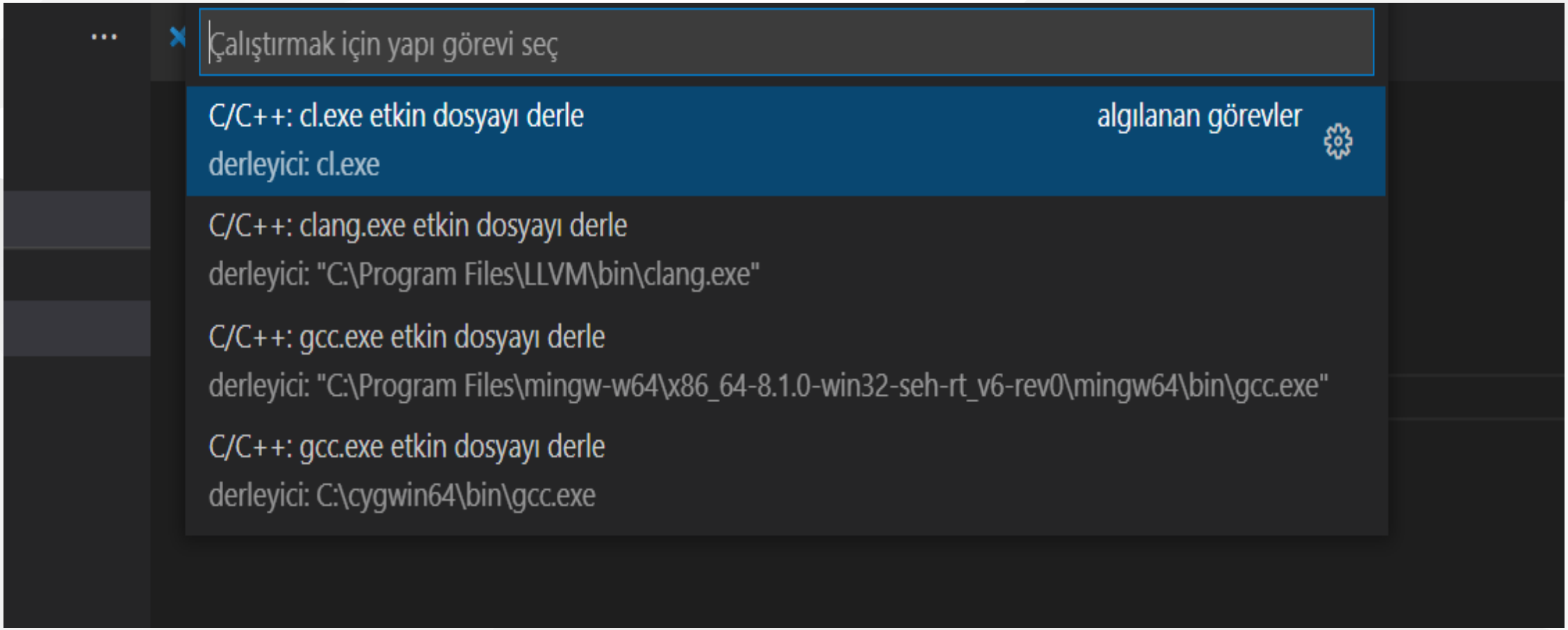
VSCode (Install / Compile / Run / Debug) (6)

- Create a `hello.c` file and write the following content

```c
#include <stdio.h>
int main() {
   // printf() displays the string inside quotation
   printf("Hello, World!");
   return 0;
}
```

VSCode (Install / Compile / Run / Debug) (7)

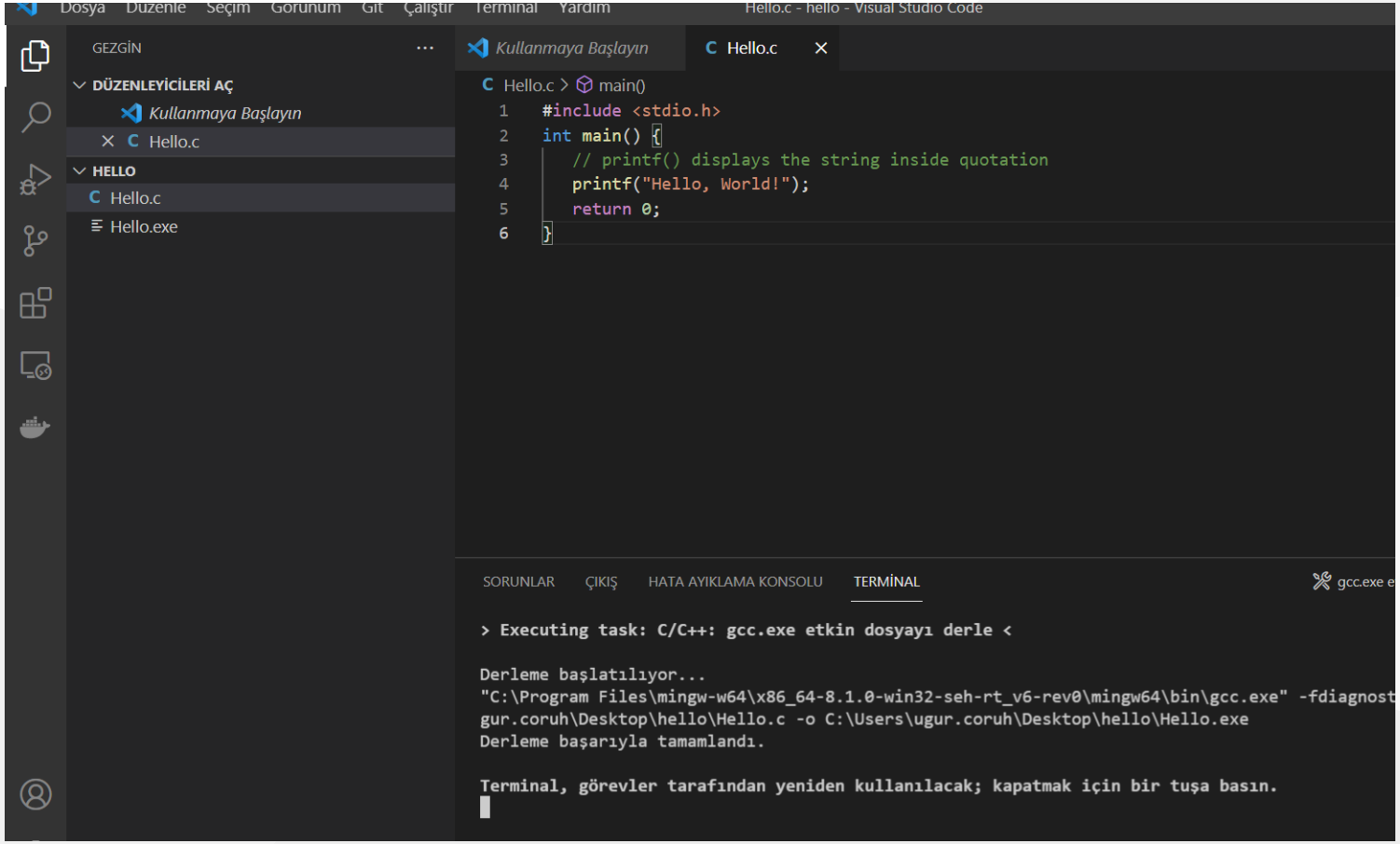
use `CTRL+SHIFT+B` (you should be on the source code section) to build a file



VSCode (Install / Compile / Run / Debug) (8)

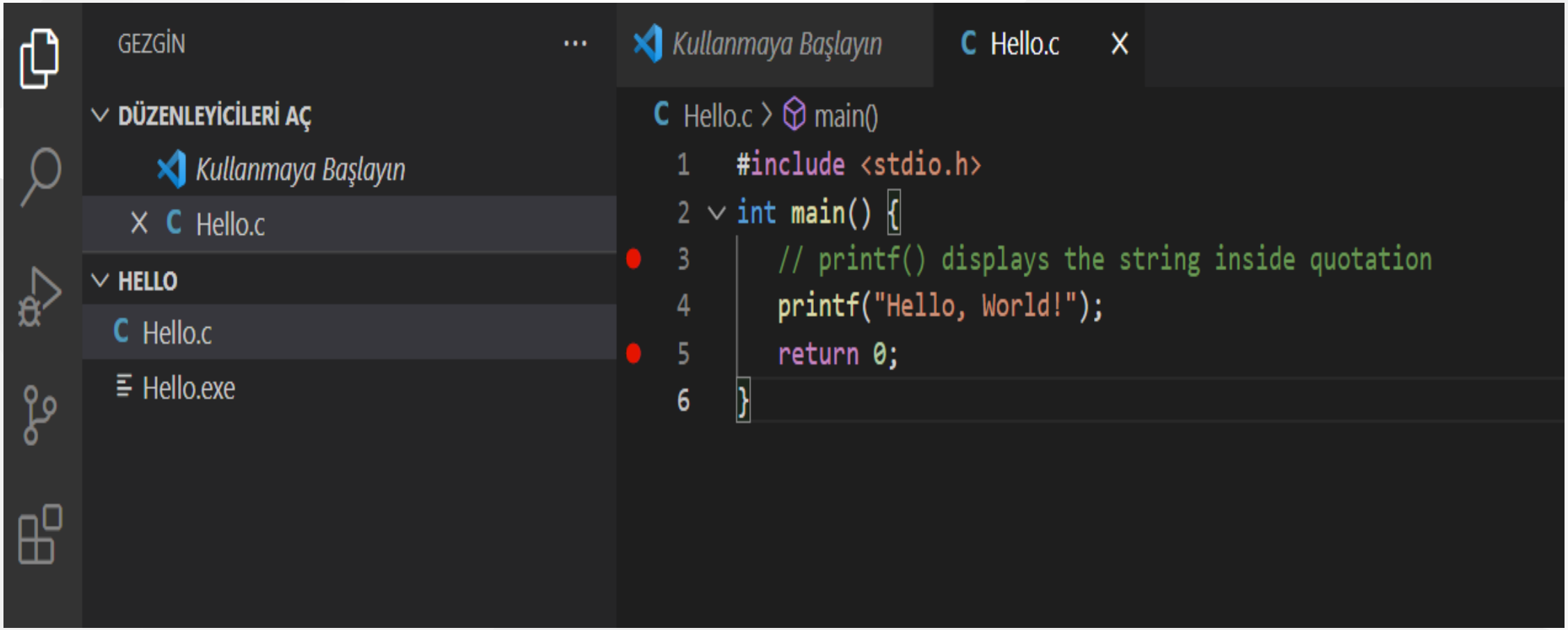
Select `GCC` or `CLANG` for this sample we can use `GCC`

You will see the output generated `Hello.exe``



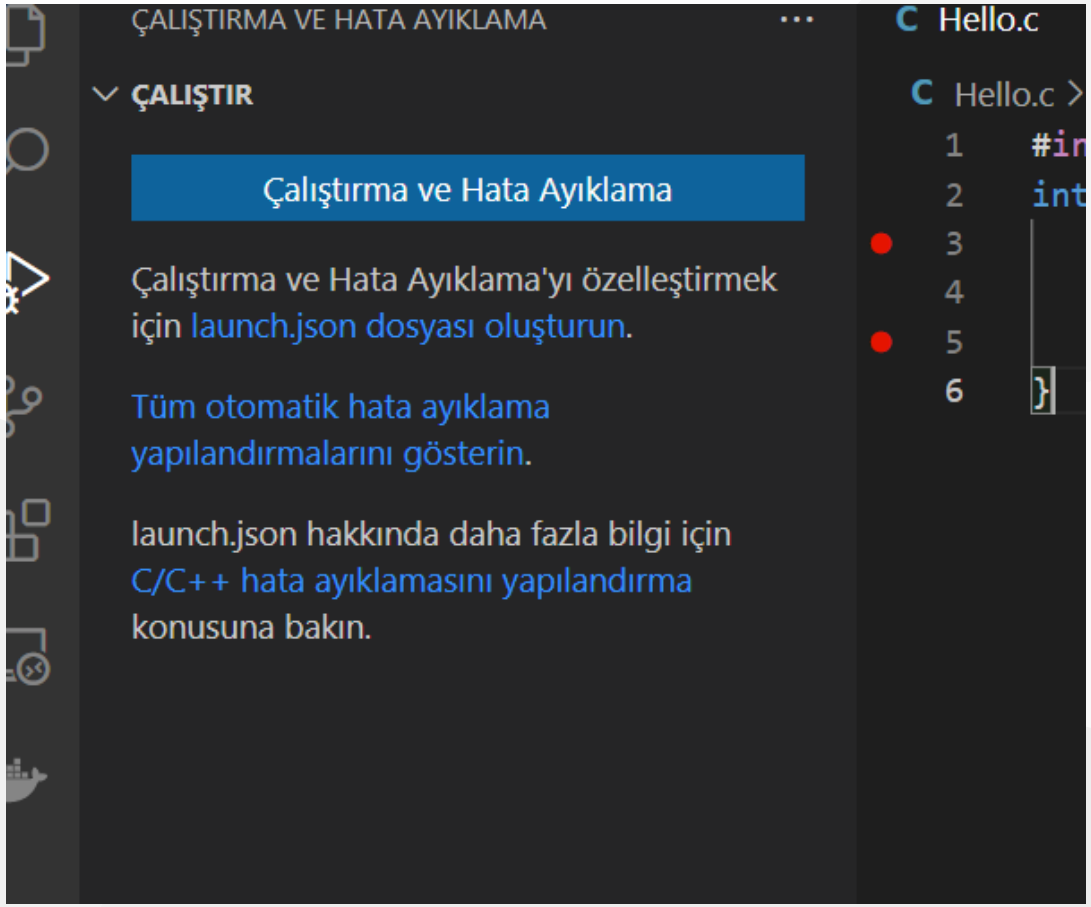
VSCode (Install / Compile / Run / Debug) (9)

for debugging just put a breakpoint and build again



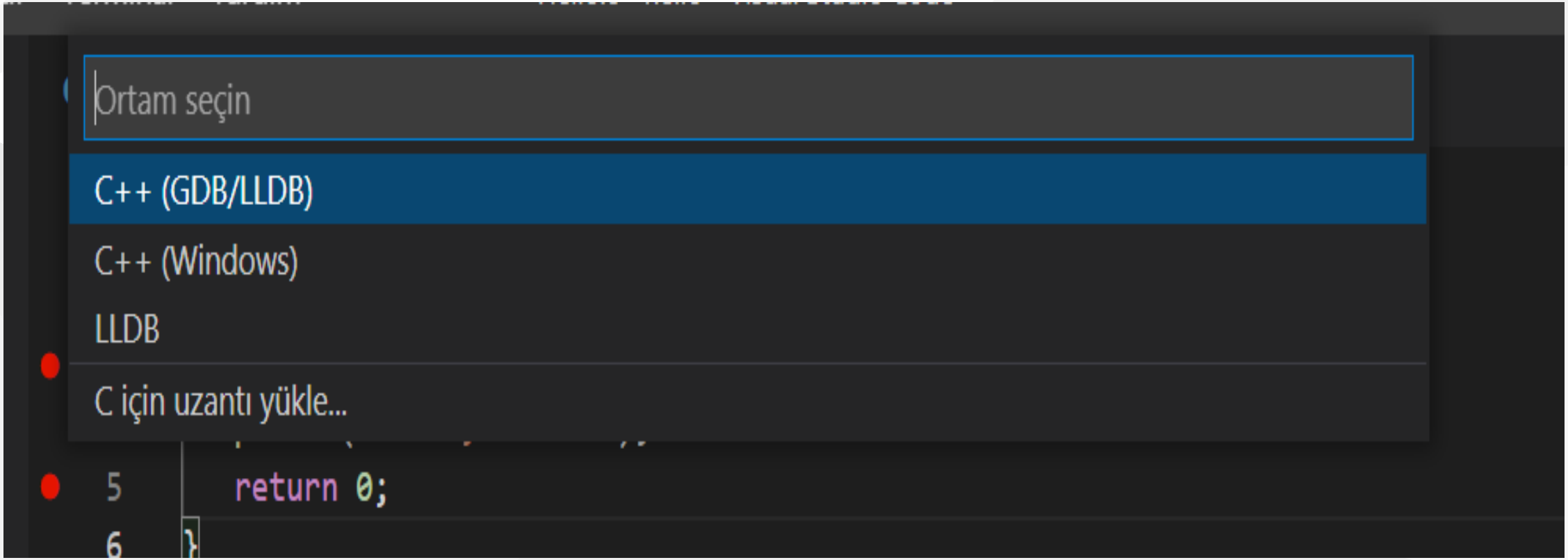
VSCode (Install / Compile / Run / Debug) (10)

- after building for debug press `CTRL+SHIFT+D` (you should be in the source code section)and in the right window select create `launch.json`



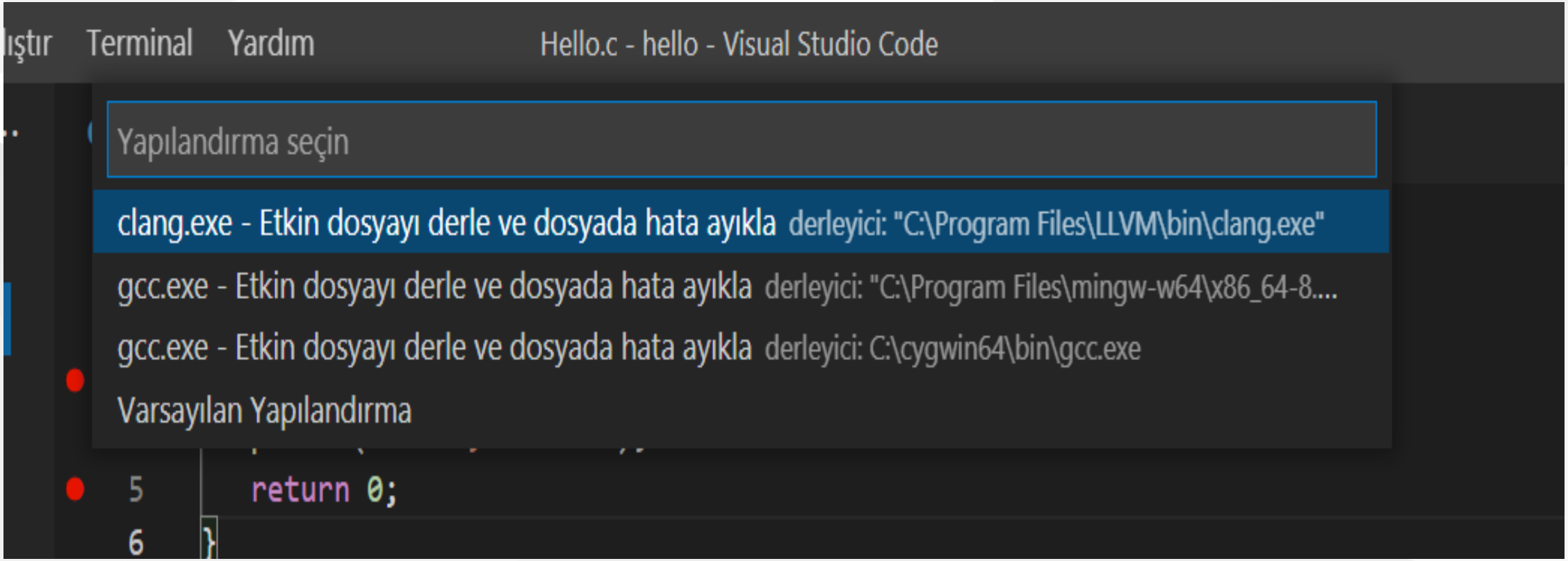
VSCode (Install / Compile / Run / Debug) (11)

- from opening, window select `C++ GDB/LLDB`



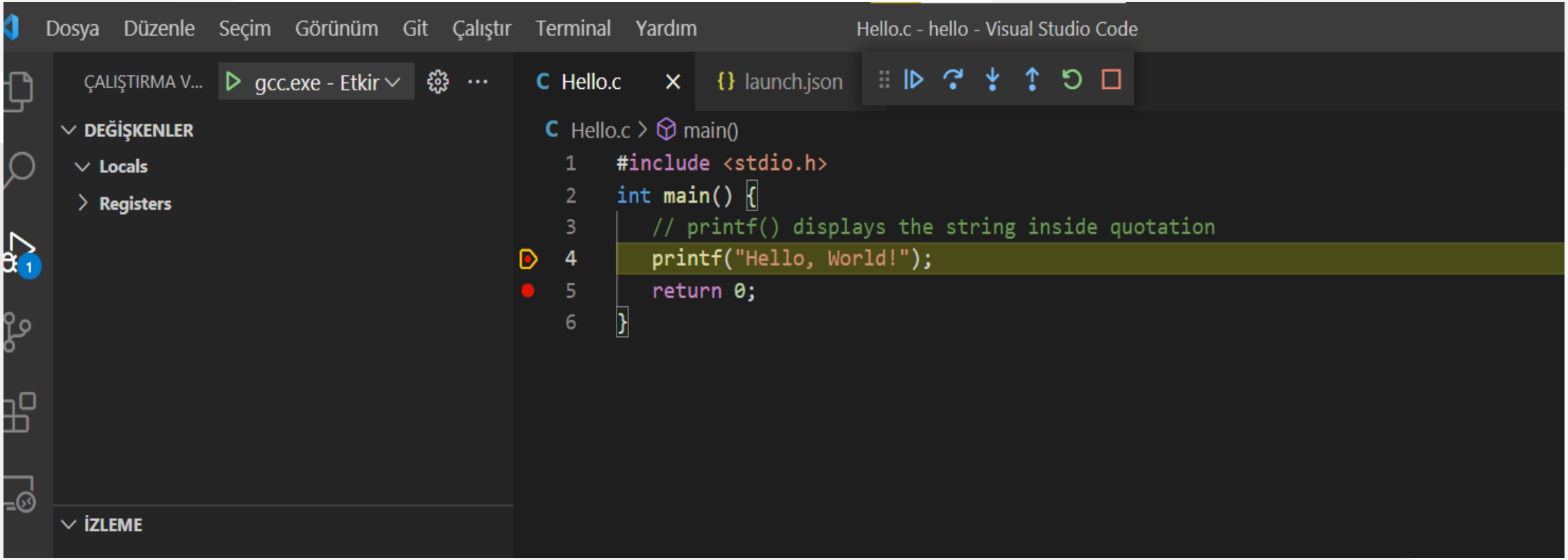
VSCode (Install / Compile / Run / Debug) (12)

- from the next opening, menu select `mingw-w64 gcc.exe`



VSCode (Install / Compile / Run / Debug) (13)

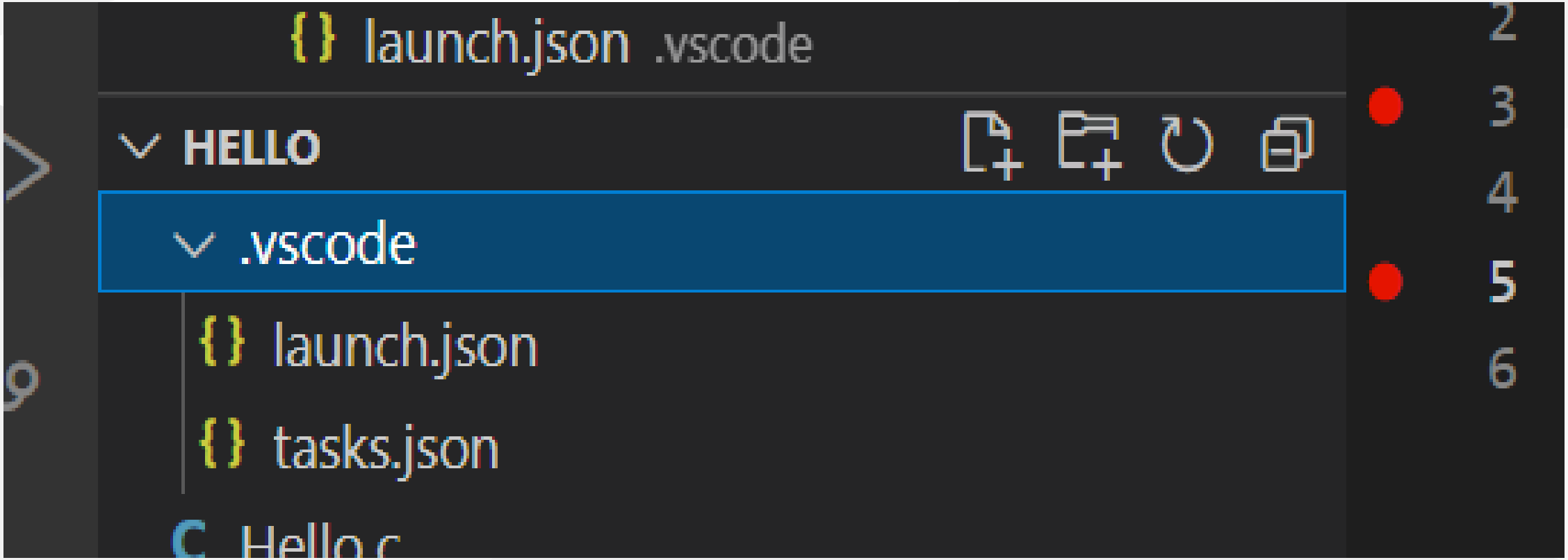
this will run the debugger and you will see debug points activated



VSCode (Install / Compile / Run / Debug) (14)

then you can step-by-step debug your code.

the following `task.json` and `launch.json` automatically generated with your selections



VSCode (Install / Compile / Run / Debug) (15)

launch.json

```
{
  // Olası öznitelikler hakkında bilgi edinmek için IntelliSense kullanın.
  // Mevcut özniteliklerin açıklamalarını görüntülemek için üzerine gelin.
  // Daha fazla bilgi için şu adresi ziyaret edin: https://go.microsoft.com/fwlink/?linkid=830387
  "version": "0.2.0",
  "configurations": [
    {
      "name": "gcc.exe - Etkin dosyayı derle ve dosyada hata ayıkla",
      "type": "cppdbg",
      "request": "launch",
      "program": "${fileDirname}\\${fileBasenameNoExtension}.exe",
      "args": [],
      "stopAtEntry": false,
      "cwd": "${fileDirname}",
      "environment": [],
      "externalConsole": false,
      "MIMode": "gdb",
      "miDebuggerPath": "C:\\Program Files\\mingw-w64\\x86_64-8.1.0-win32-seh-rt_v6-rev0\\mingw64\\bin\\gdb.exe",
      "setupCommands": [
        {
          "description": "gdb için düzgün yazdırmayı etkinleştir",
          "text": "-enable-pretty-printing",
          "ignoreFailures": true
        }
      ],
      "preLaunchTask": "C/C++: gcc.exe etkin dosyayı derle"
    }
  ]
}
```

VSCode (Install / Compile / Run / Debug) (16)

task.json

```
{
  "tasks": [
    {
      "type": "cppbuild",
      "label": "C/C++: gcc.exe etkin dosyayı derle",
      "command": "C:\\Program Files\\mingw-w64\\x86_64-8.1.0-win32-seh-rt_v6-rev0\\mingw64\\bin\\gcc.exe",
      "args": [
        "-fdiagnostics-color=always",
        "-g",
        "${file}",
        "-o",
        "${fileDirname}\\${fileBasenameNoExtension}.exe"
      ],
      "options": {
        "cwd": "${fileDirname}"
      },
      "problemMatcher": ["$gcc"],
      "group": {
        "kind": "build",
        "isDefault": true
      },
      "detail": "Hata Ayıklayıcısı tarafından oluşturulan görev."
    }
  ],
  "version": "2.0.0"
}
```

VSCode (Install / Compile / Run / Debug) (17)

- You can do the same thing for other compilers and C++ source codes. LLVM does not support debugging on vscode now.

for C++ VsCode you can check the following links

- for Windows
  - https://code.visualstudio.com/docs/cpp/config-mingw
- for Linux
  - https://code.visualstudio.com/docs/cpp/config-linux
- for WSL
  - https://code.visualstudio.com/docs/cpp/config-wsl

VSCode (Install / Compile / Run / Debug) (18)

in the launch file if you start debugging with `F5`

(you can select debugger with `CTRL+SHIFT+P` and then write Debug and Selecting Configure Debugger Option)

VSCode (Install / Compile / Run / Debug) (19)

- the following line will be your debugging application path
- if you start debugging with `F5` in `Hello.c` file this will set `<Hello.c base path>/Hello.exe`

VSCode (Install / Compile / Run / Debug) (20)

You should set this correct for both `LLVM` and `GCC` configuration in launch.json

```
 "program": "${fileDirname}\\${fileBasenameNoExtension}.exe",
```

Also you should set your installed debugger paths

for GCC

```
"miDebuggerPath": "C:\\Program Files\\mingw-w64\\x86_64-8.1.0-win32-seh-rt_v6-rev0\\mingw64\\bin\\gdb.exe",
```

for LLVM

```
"miDebuggerPath": "C:\\Program Files\\LLVM\\bin\\lldb.exe",
```

for more details please check the sample source codes.

Visual Studio Code Extension List (1)

> My Extension List

- Listing Installed Extensions

```
PS C:\Users\ugur.coruh\Desktop> code --list-extensions | % { "code --install-extension $_" }
```

Following topic can help you

How can you export the Visual Studio Code extension list? - Stack Overflow

Visual Studio Code Extension List (2)

```
code --install-extension 2gua.rainbow-brackets
code --install-extension aaron-bond.better-comments
code --install-extension abusaidm.html-snippets
code --install-extension ACharLuk.easy-cpp-projects
code --install-extension chris-noring.node-snippets
code --install-extension cschlosser.doxdocgen
code --install-extension csholmq.excel-to-markdown-table
code --install-extension DaChuiOpenSource.FreeMind
code --install-extension dannysteenman.cloudformation-yaml-snippets
code --install-extension Dart-Code.dart-code
code --install-extension Dart-Code.flutter
code --install-extension digized.umple
code --install-extension DotJoshJohnson.xml
code --install-extension DougFinke.vscode-pandoc
code --install-extension dzhavat.bracket-pair-toggler
code --install-extension esbenp.prettier-vscode
code --install-extension formulahendry.dotnet
code --install-extension franneck94.c-cpp-runner
code --install-extension gcc.
```

Visual Studio Code Extension List (3)

```
vscode-plugin-billionbottle
code --install-extension geeklearningio.graphviz-markdown-preview
code --install-extension geyao.html-snippets
code --install-extension GitHub.copilot-nightly
code --install-extension GrapeCity.gc-excelviewer
code --install-extension Ionide.Ionide-fsharp
code --install-extension ionut-botizan.vscode-cypher-ql
code --install-extension ipedrazas.kubernetes-snippets
code --install-extension JakeWilson.vscode-picture
code --install-extension James-Yu.latex-workshop
code --install-extension JasonMejane.base64viewer
code --install-extension jasonnutter.search-node-modules
code --install-extension jebbs.plantuml
code --install-extension jeff-hykin.better-cpp-syntax
code --install-extension Katacoda.vscode
code --install-extension KenDomino.Antlrvsix-vscode
code --install-extension l7ssha.tag-inserter
code --install-extension lolkush.quickstart
code --install-extension marp-team.marp-vscode
code --install-extension mindaro-dev.file-downloader
code --install-extension mindaro.mindaro
code --install-extension ms-azuretools.vscode-docker
code --install-extension MS-CEINTL.vscode-language-pack-tr
```

Visual Studio Code Extension List (4)

```
code --install-extension ms-dotnettools.csharp
code --install-extension ms-dotnettools.dotnet-interactive-vscode
code --install-extension ms-dotnettools.vscode-dotnet-pack
code --install-extension ms-dotnettools.vscode-dotnet-runtime
code --install-extension ms-kubernetes-tools.vscode-aks-tools
code --install-extension ms-kubernetes-tools.vscode-kubernetes-tools
code --install-extension ms-python.python
code --install-extension ms-python.vscode-pylance
code --install-extension ms-toolsai.jupyter
code --install-extension ms-toolsai.jupyter-keymap
code --install-extension ms-toolsai.jupyter-renderers
code --install-extension ms-vscode-remote.remote-containers
code --install-extension ms-vscode-remote.remote-ssh
code --install-extension ms-vscode-remote.remote-ssh-edit
code --install-extension ms-vscode-remote.remote-wsl
```

Visual Studio Code Extension List (5)

```
code --install-extension ms-vscode.azure-account
code --install-extension ms-vscode.brackets-keybindings
code --install-extension ms-vscode.brackets-pack
code --install-extension ms-vscode.cmake-tools
code --install-extension ms-vscode.cpptools
code --install-extension ms-vscode.cpptools-extension-pack
code --install-extension ms-vscode.cpptools-themes
code --install-extension ms-vscode.live-server
code --install-extension ms-vsliveshare.vsliveshare
code --install-extension oleg-shilo.cs-script
code --install-extension PascalReitermann93.vscode-yaml-sort
```

Visual Studio Code Extension List (6)

```
code --install-extension Pivotal.vscode-boot-dev-pack
code --install-extension Pivotal.vscode-concourse
code --install-extension Pivotal.vscode-manifest-yaml
code --install-extension Pivotal.vscode-spring-boot
code --install-extension PKief.material-icon-theme
code --install-extension platformio.platformio-ide
code --install-extension pranaygp.vscode-css-peek
code --install-extension redhat.fabric8-analytics
code --install-extension redhat.java
code --install-extension redhat.vscode-commons
code --install-extension redhat.vscode-xml
code --install-extension redhat.vscode-yaml
code --install-extension ritwickdey.LiveServer
code --install-extension sidthesloth.html5-boilerplate
code --install-extension TaodongWu.ejs-snippets
code --install-extension tht13.python
code --install-extension tomoki1207.pdf
code --install-extension twxs.cmake
code --install-extension vadimcn.vscode-lldb
```

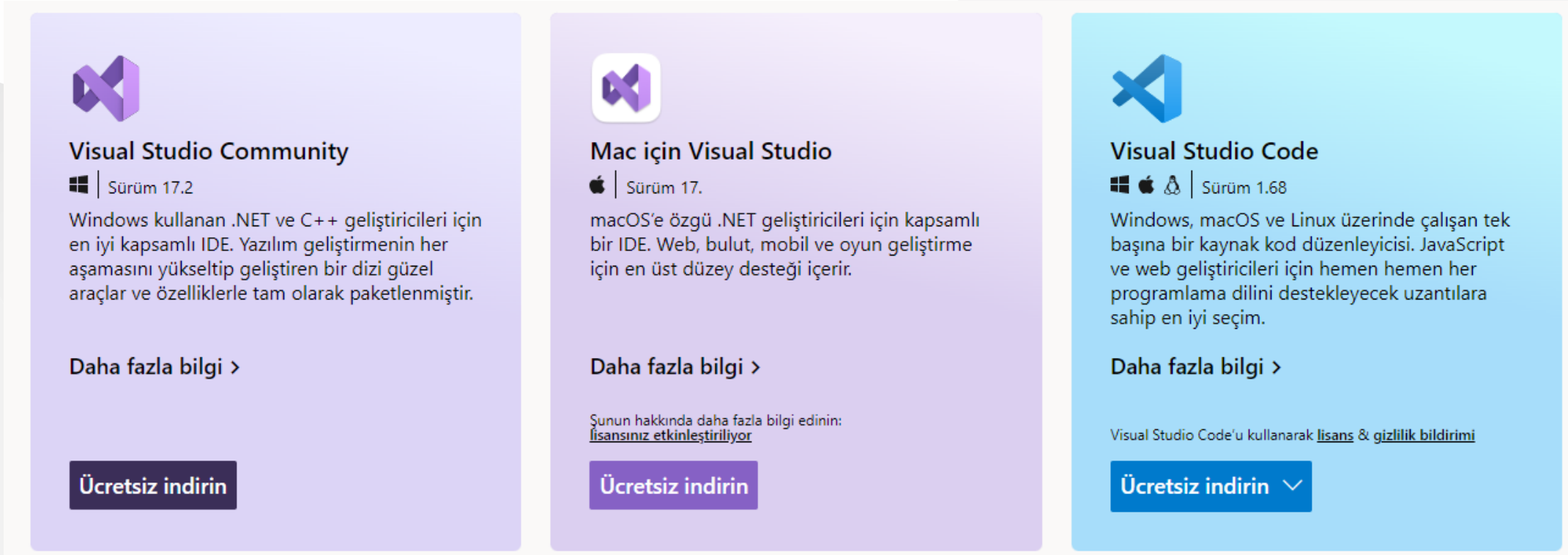
Visual Studio Code Extension List (7)

```
code --install-extension VisualStudioExptTeam.intellicode-api-usage-examples
code --install-extension VisualStudioExptTeam.vscodeintellicode
code --install-extension vscjava.vscode-java-debug
code --install-extension vscjava.vscode-java-dependency
code --install-extension vscjava.vscode-java-pack
code --install-extension vscjava.vscode-java-test
code --install-extension vscjava.vscode-maven
code --install-extension vscjava.vscode-spring-boot-dashboard
code --install-extension vscjava.vscode-spring-initializr
code --install-extension walkme.HTML5-extension-pack
code --install-extension webfreak.debug
code --install-extension well-ar.plantuml
code --install-extension wildboar.asn1
code --install-extension Zignd.html-css-class-completion
```

Visual Studio Community Edition (Install / Compile / Run / Debug) (1)

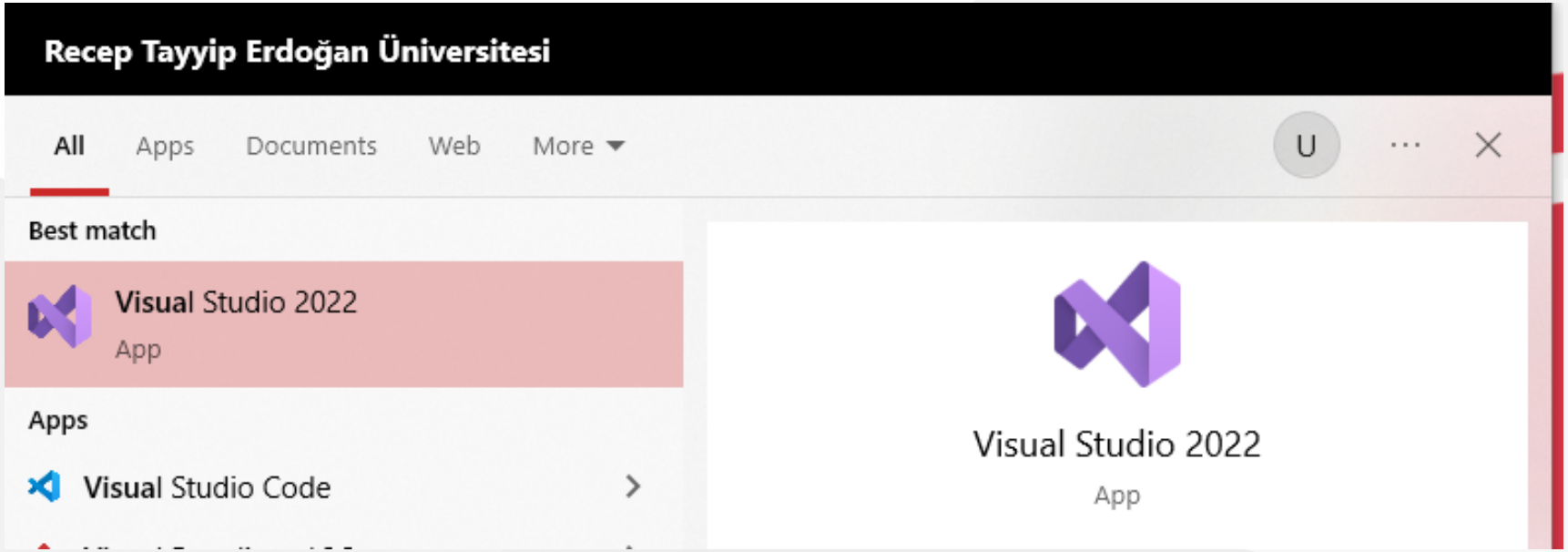
- Download and install `Visual Studio Community Edition`
- Select All Development Environments from Installer.

Ücretsiz Geliştirici Yazılımları ve Hizmetleri - Visual Studio



Visual Studio Community Edition (Install / Compile / Run / Debug) (2)

- After installation open `Visual Studio` 2022` from the menu.

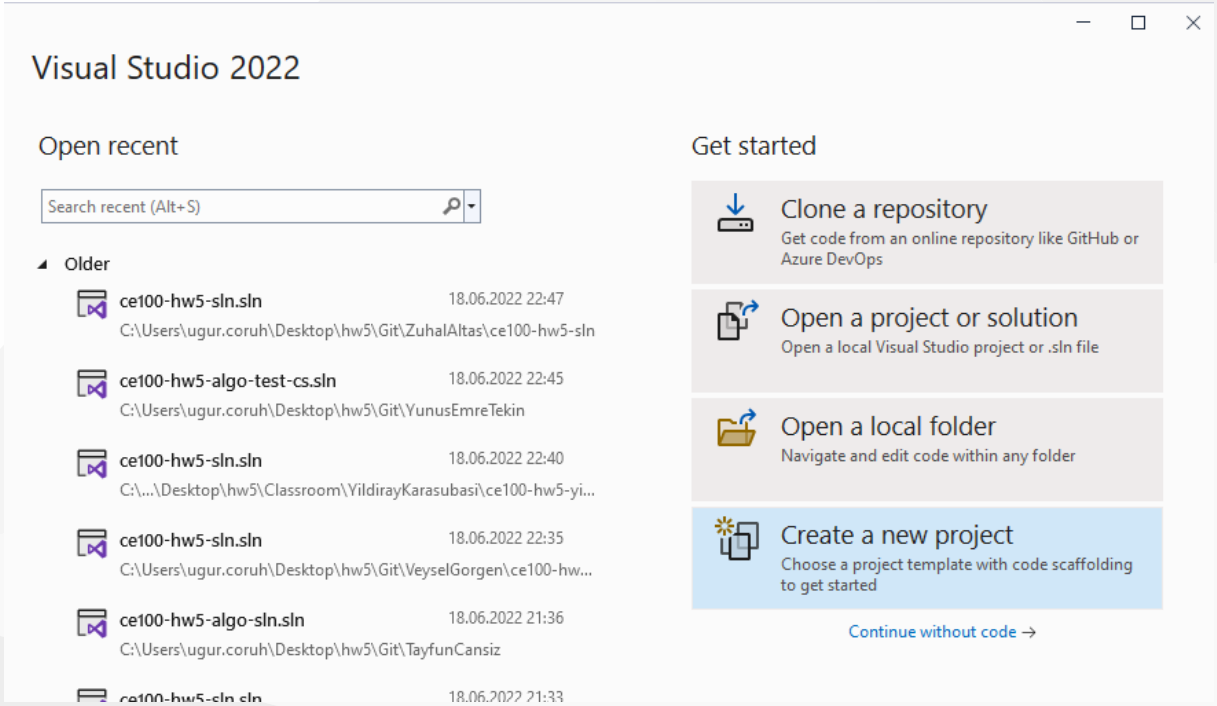


Visual Studio Community Edition (Install / Compile / Run / Debug) (3)

- The application will start...

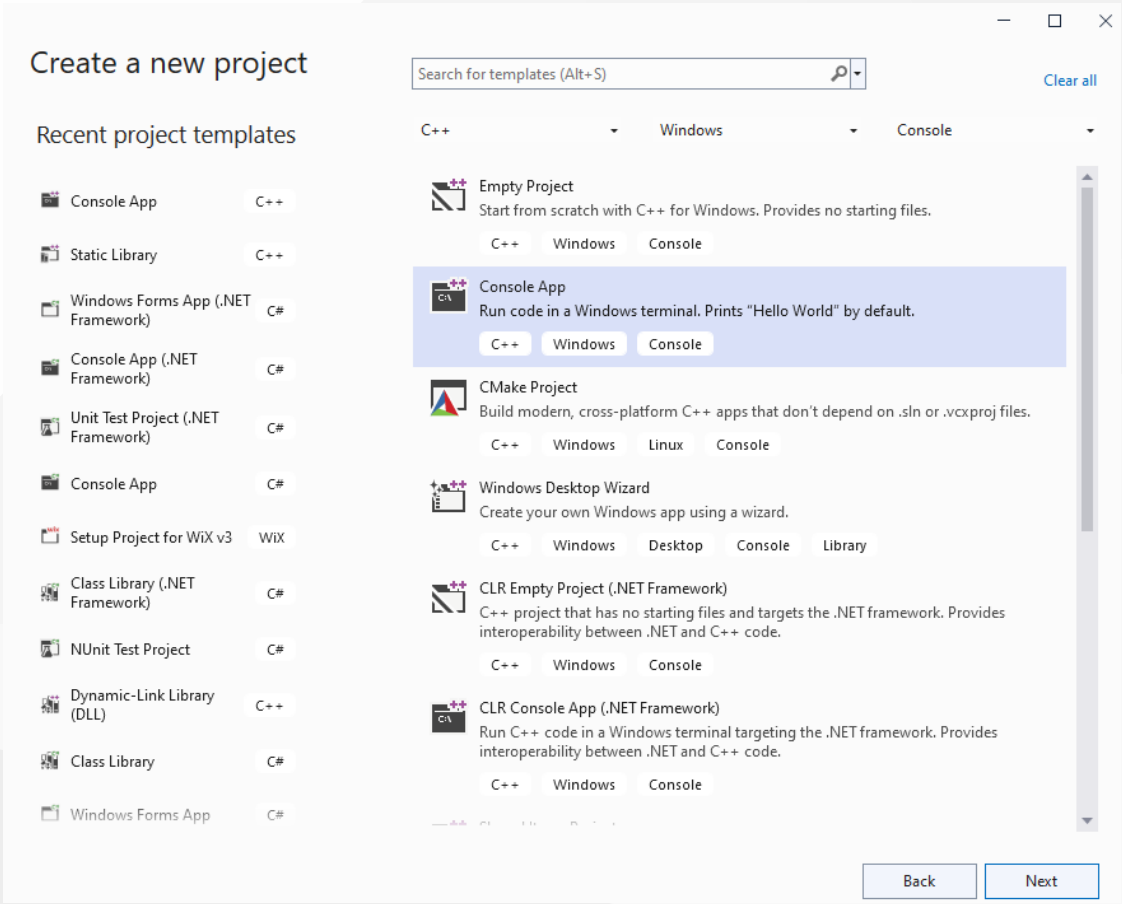
Visual Studio Community Edition (Install / Compile / Run / Debug) (4)

- From Opening Window Select `Create a new project`



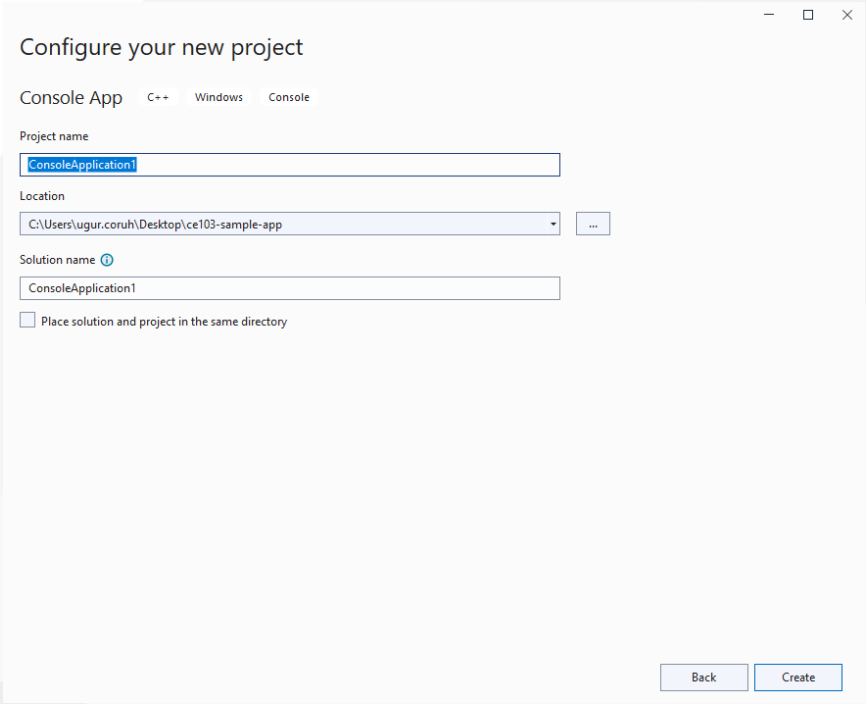
Visual Studio Community Edition (Install / Compile / Run / Debug) (5)

- There will be several options, you can review them.
- Select `Windows` , `C++` , `Console Application` from Combobox.
- Select `Console Application`



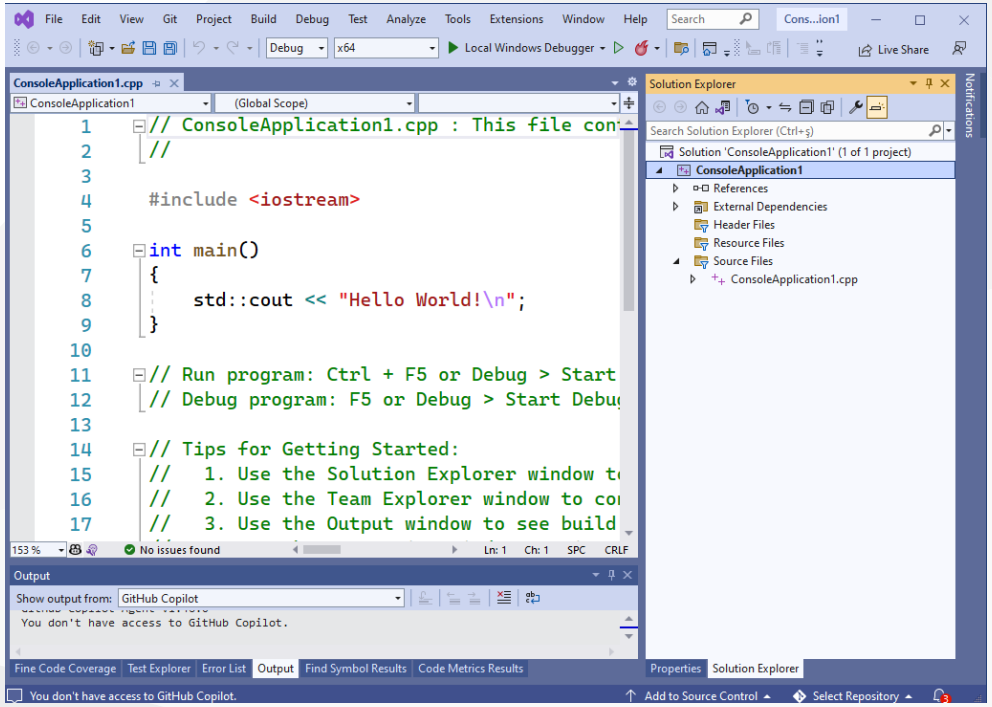
Visual Studio Community Edition (Install / Compile / Run / Debug) (6)

- Give a solution and project name.
- Select save location



Visual Studio Community Edition (Install / Compile / Run / Debug) (7)

- You will have C++ basic Hello World application.



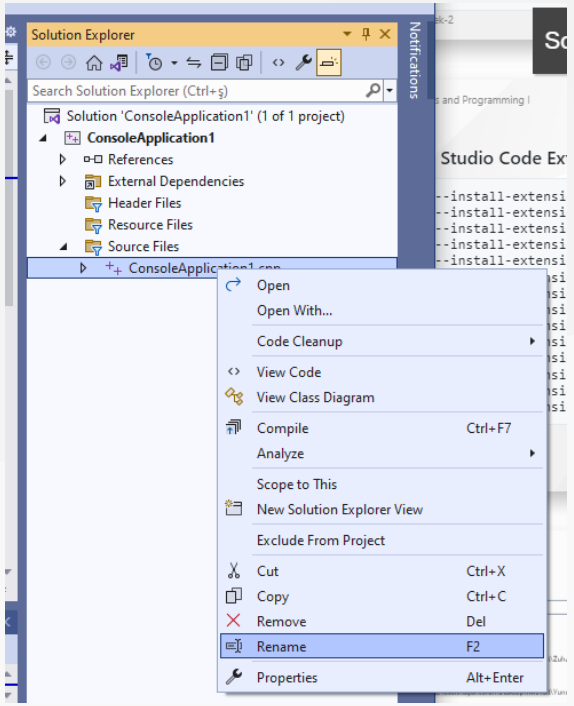
Visual Studio Community Edition (Install / Compile / Run / Debug) (8)

- You will have C++ basic Hello World application.

```
// ConsoleApplication1.cpp : This file contains the 'main' function. Program execution begins and ends there.
//

#include <iostream>

int main()
{
    std::cout << "Hello World!\n";
}

// Run program: Ctrl + F5 or Debug > Start Without Debugging menu
// Debug program: F5 or Debug > Start Debugging menu

// Tips for Getting Started:
//   1. Use the Solution Explorer window to add/manage files
//   2. Use the Team Explorer window to connect to source control
//   3. Use the Output window to see build output and other messages
//   4. Use the Error List window to view errors
//   5. Go to Project > Add New Item to create new code files, or Project > Add Existing Item to add existing code files to the project
//   6. In the future, to open this project again, go to File > Open > Project and select the .sln file
```

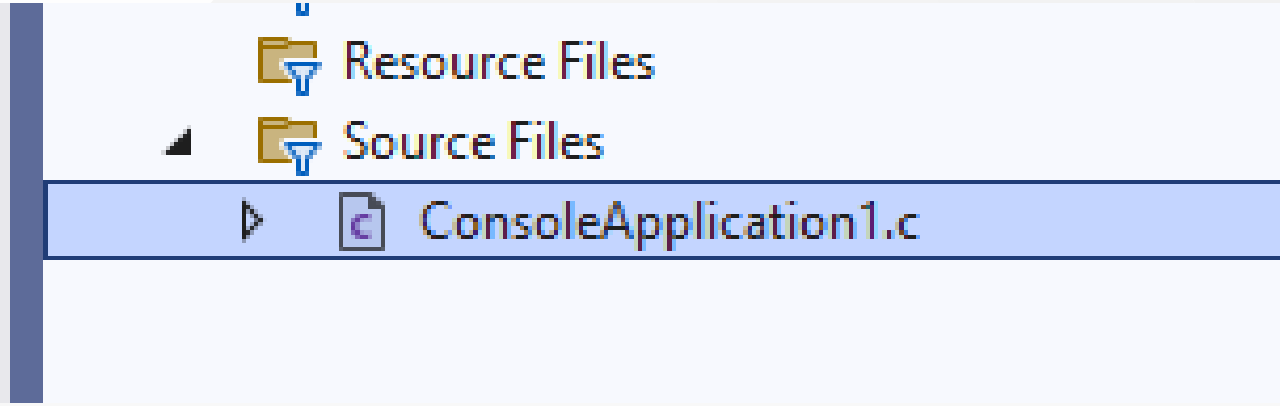
Visual Studio Community Edition (Install / Compile / Run / Debug) (9)

- We need to rename the file extension to `c` from `cpp`



Visual Studio Community Edition (Install / Compile / Run / Debug) (10)

- If you compile the source C compiler will be used.



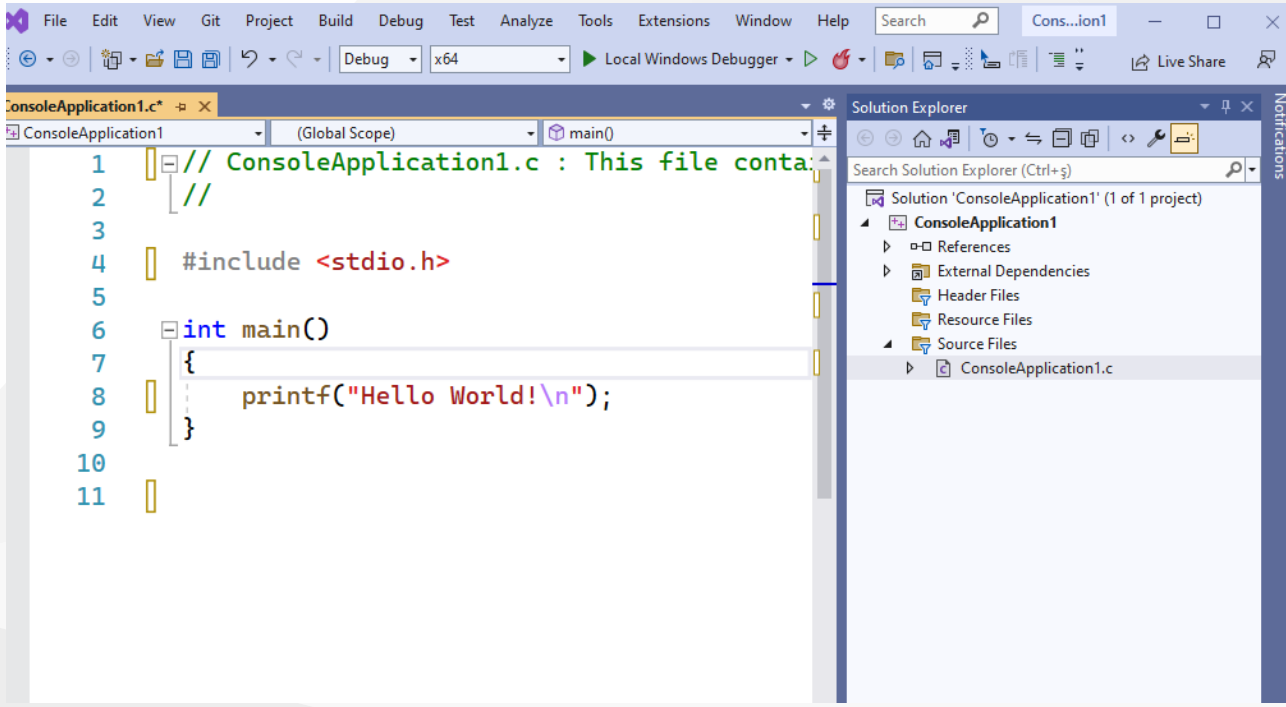
Visual Studio Community Edition (Install / Compile / Run / Debug) (11)

- We need to update our source for `c` as follows

```c
// ConsoleApplication1.c : This file contains the 'main' function. Program execution begins and ends there.
//

#include <stdio.h>

int main(){
    printf("Hello World!\n");
}
```

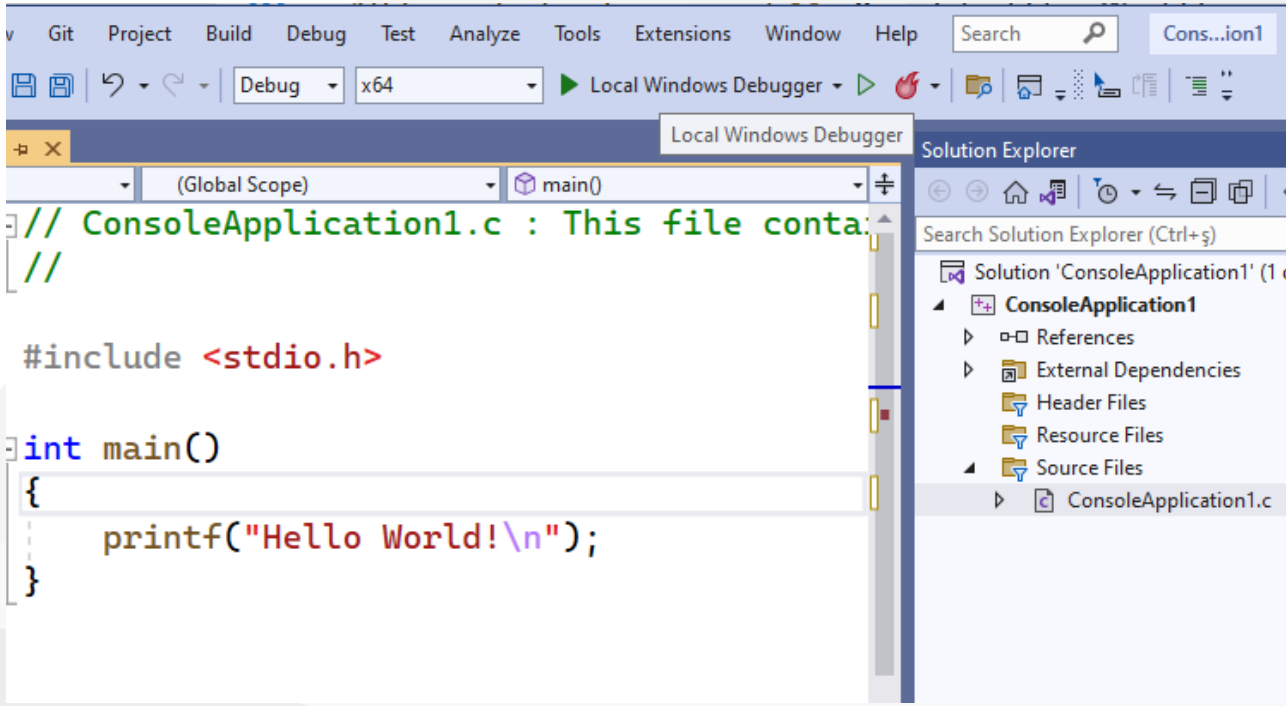
Visual Studio Community Edition (Install / Compile / Run / Debug) (12)

- We need to update our source for `c` as follows



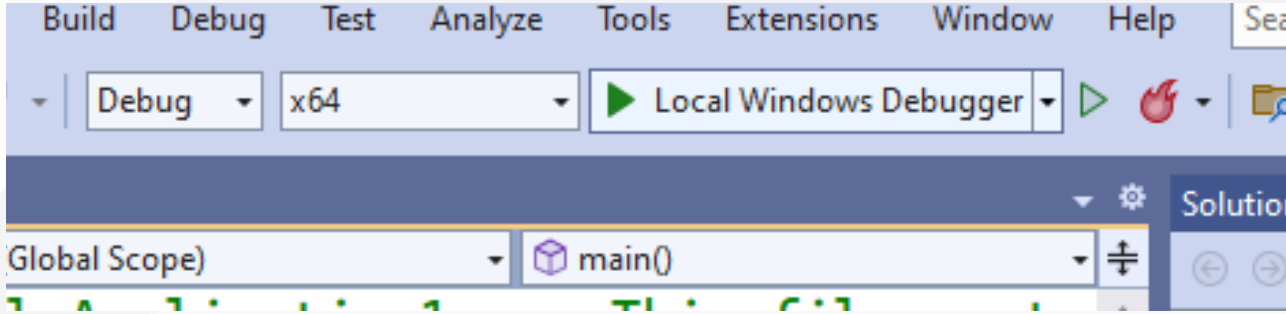
Visual Studio Community Edition (Install / Compile / Run / Debug) (13)

- Put a breakpoint by clicking the following location. Breakpoints will be stop points for our debugging operations.



Visual Studio Community Edition (Install / Compile / Run / Debug) (14)

- Then select Debug configuration and according to your operating system select x64 or x86 configuration and click `Local Windows Debugger`



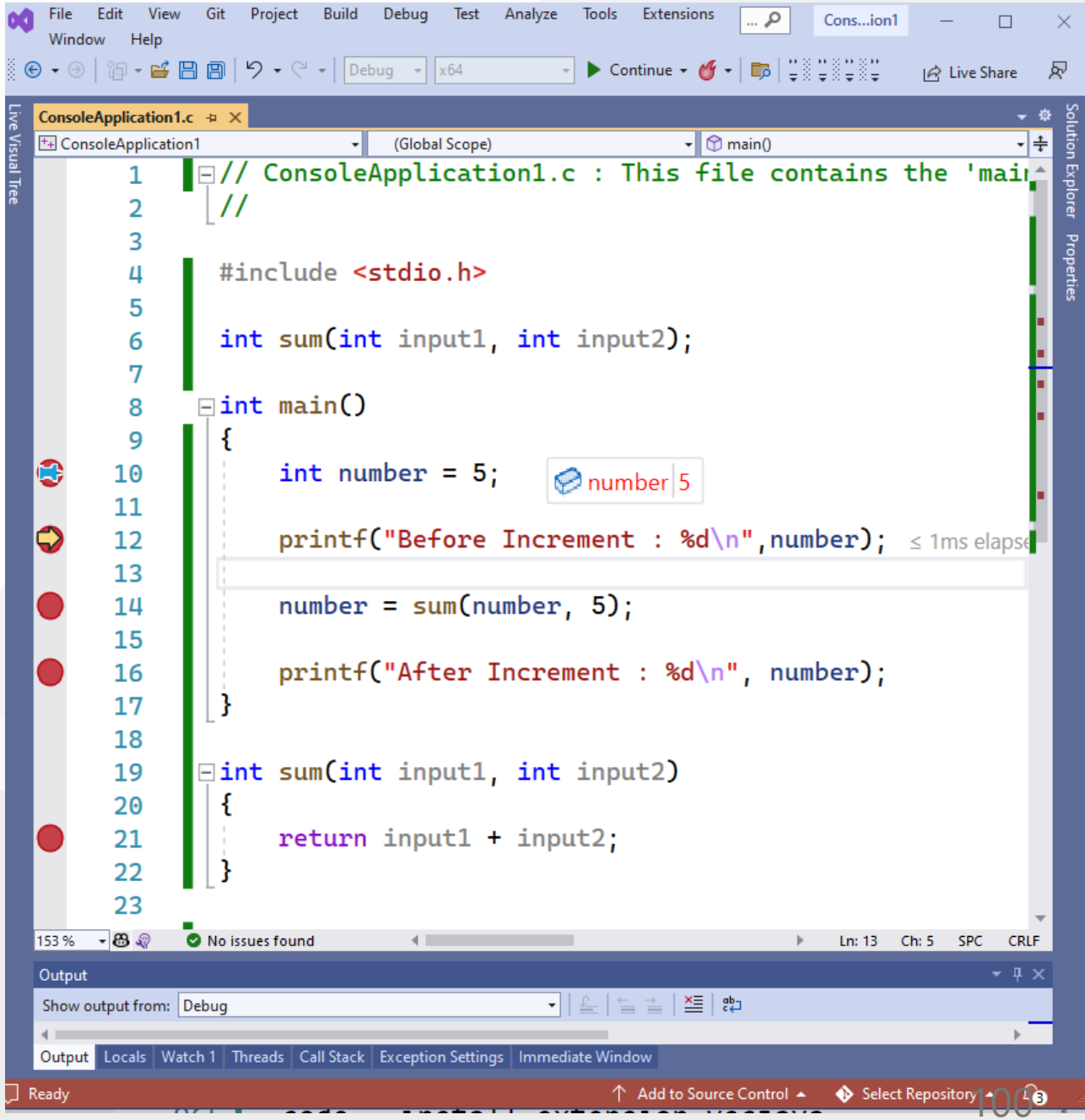
Visual Studio Community Edition (Install / Compile / Run / Debug) (15)

- Update your source code as follow

```
// ConsoleApplication1.c : This file contains the 'main' function. Program execution begins and ends there.
//

#include <stdio.h>

int sum(int input1, int input2);

int main(){
    int number = 5;
    printf("Before Increment : %d\n",number);
    number = sum(number, 5);
    printf("After Increment : %d\n", number);
}

int sum(int input1, int input2){
    return input1 + input2;
}
```

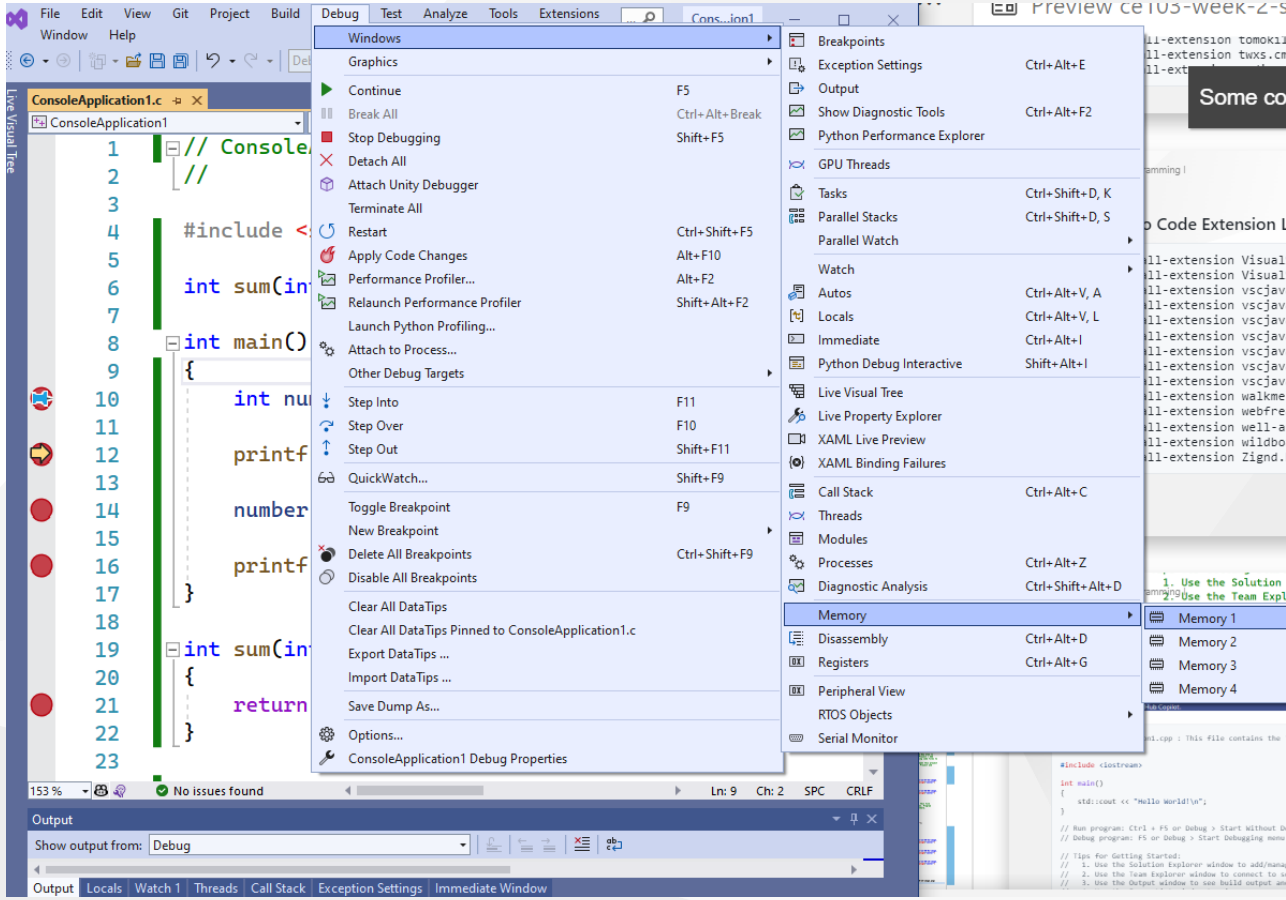
Visual Studio Community Edition (Install / Compile / Run / Debug) (16)

- Put the following breakpoints and run the debugger. On number, the variable pins the variable to see its value in real-time.



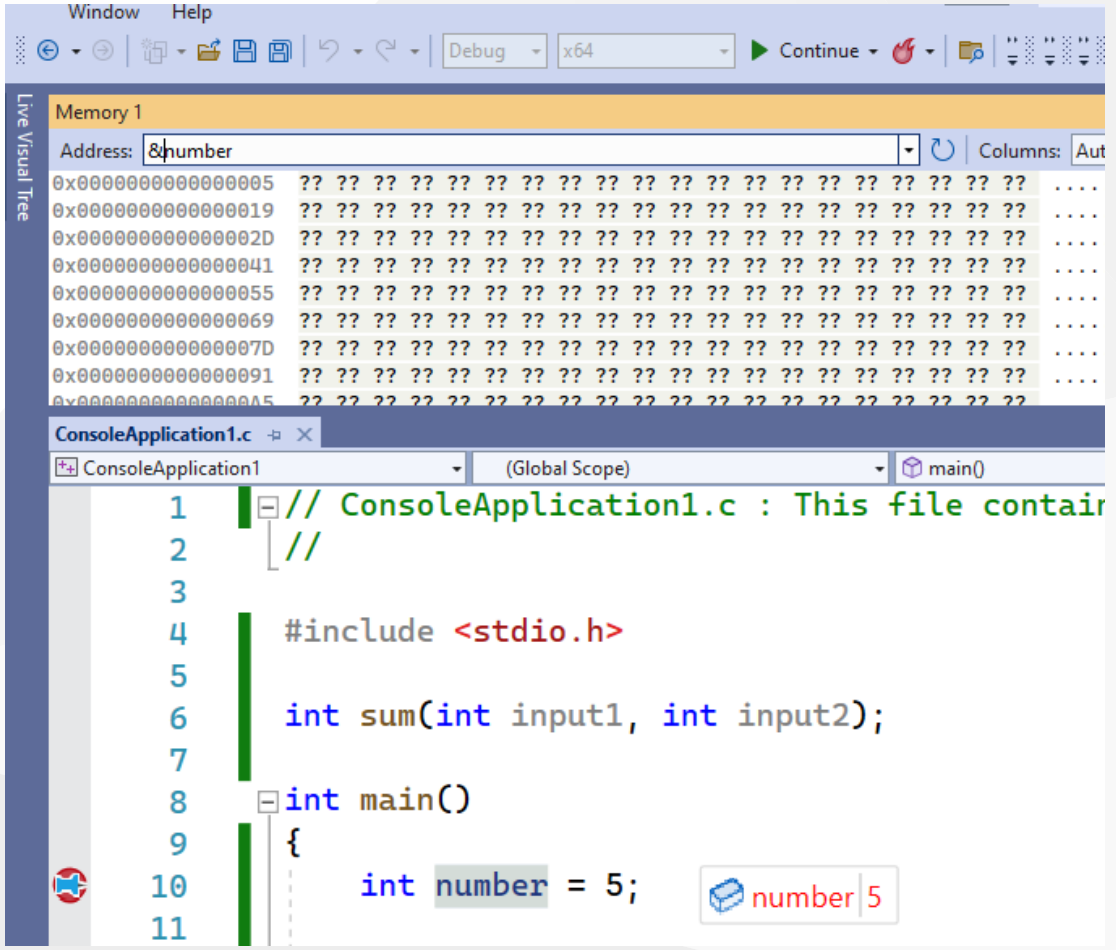
Visual Studio Community Edition (Install / Compile / Run / Debug) (17)

- Open Debug->Windows->Memory->Memory1 to see value in memory



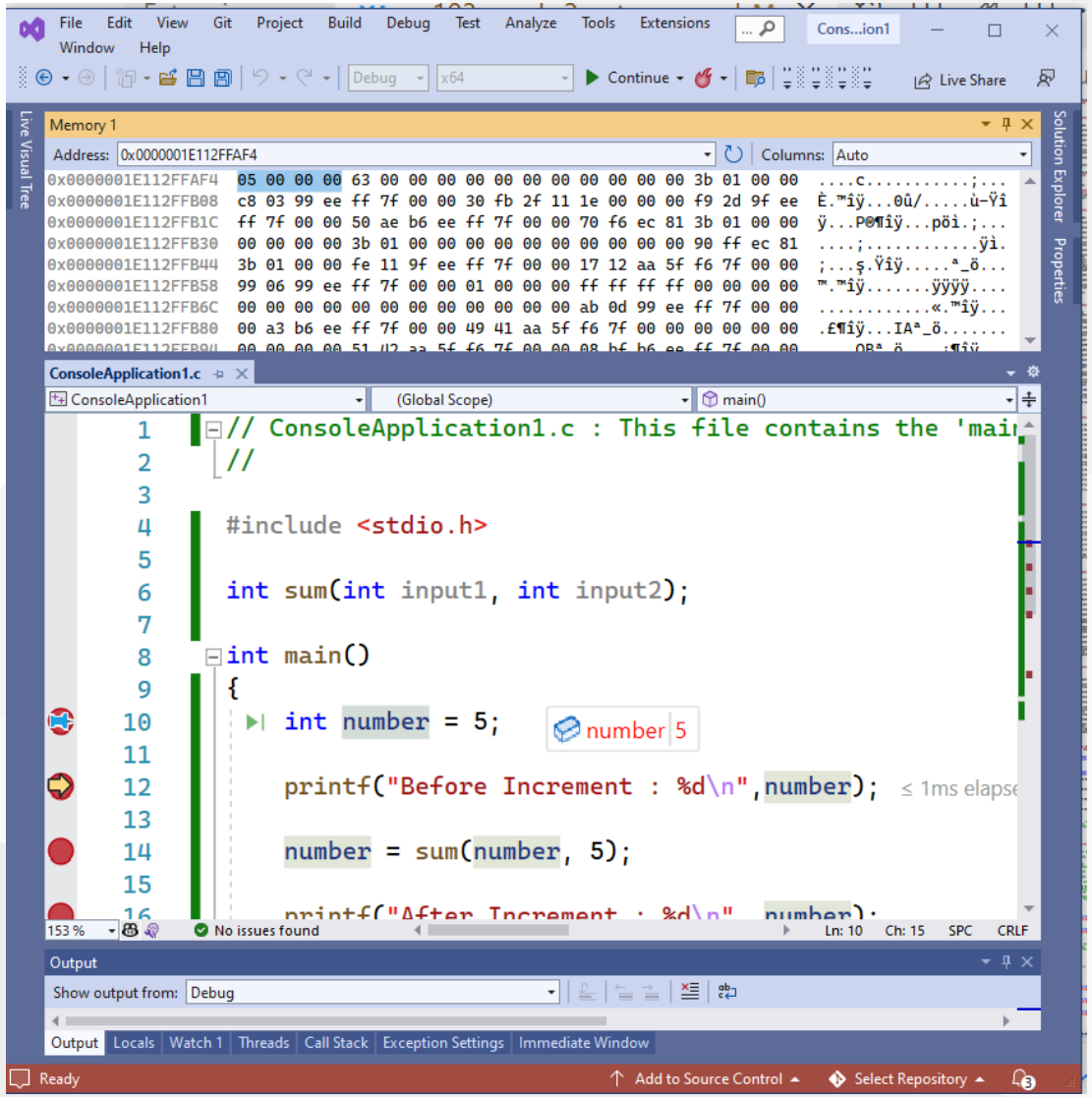
Visual Studio Community Edition (Install / Compile / Run / Debug) (18)

- In the memory window copy variable name (number) with address operator (&) and then (&number) press enter.



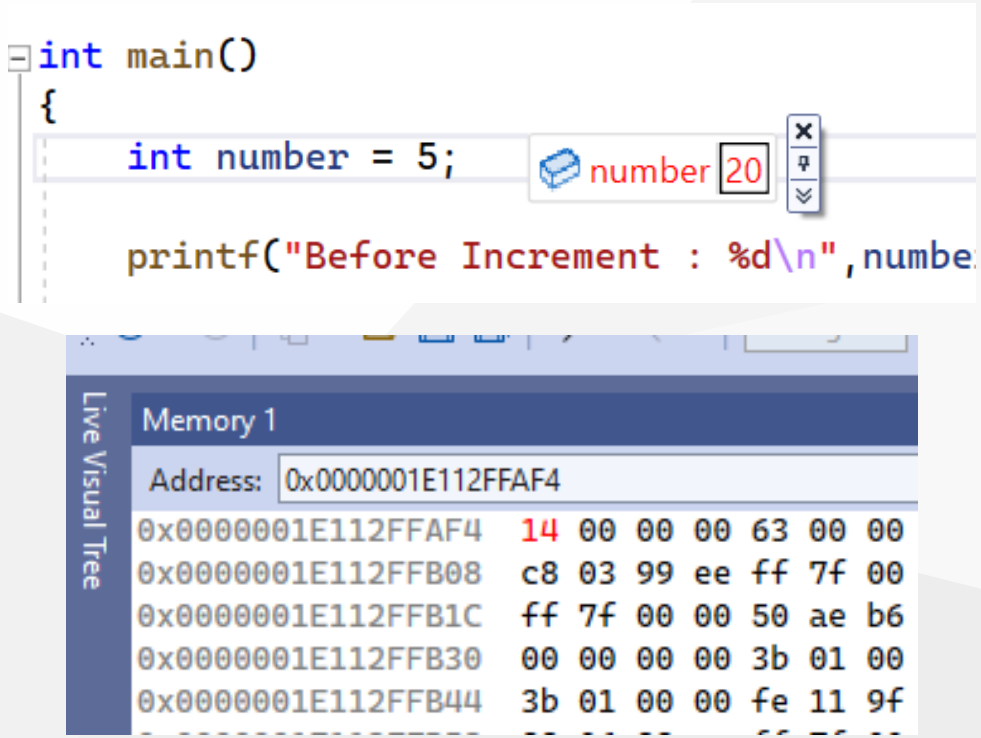
Visual Studio Community Edition (Install / Compile / Run / Debug) (19)

- You can see its value in memory with hexadecimal form (`05 00 00 00`)



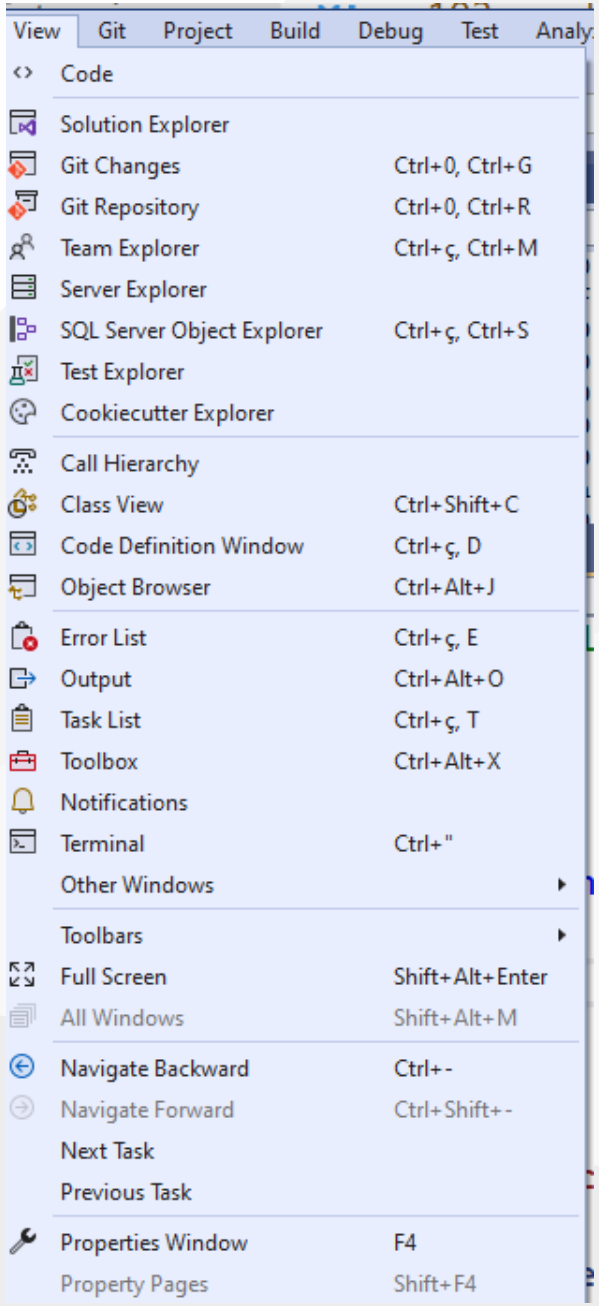
Visual Studio Community Edition (Install / Compile / Run / Debug) (20)

- If you change value with pinned control your memory value and your current value will be updated. 20 in hexadecimal 0x14 (integer is 4 bytes length for this reason memory shows `14 00 00 00`)



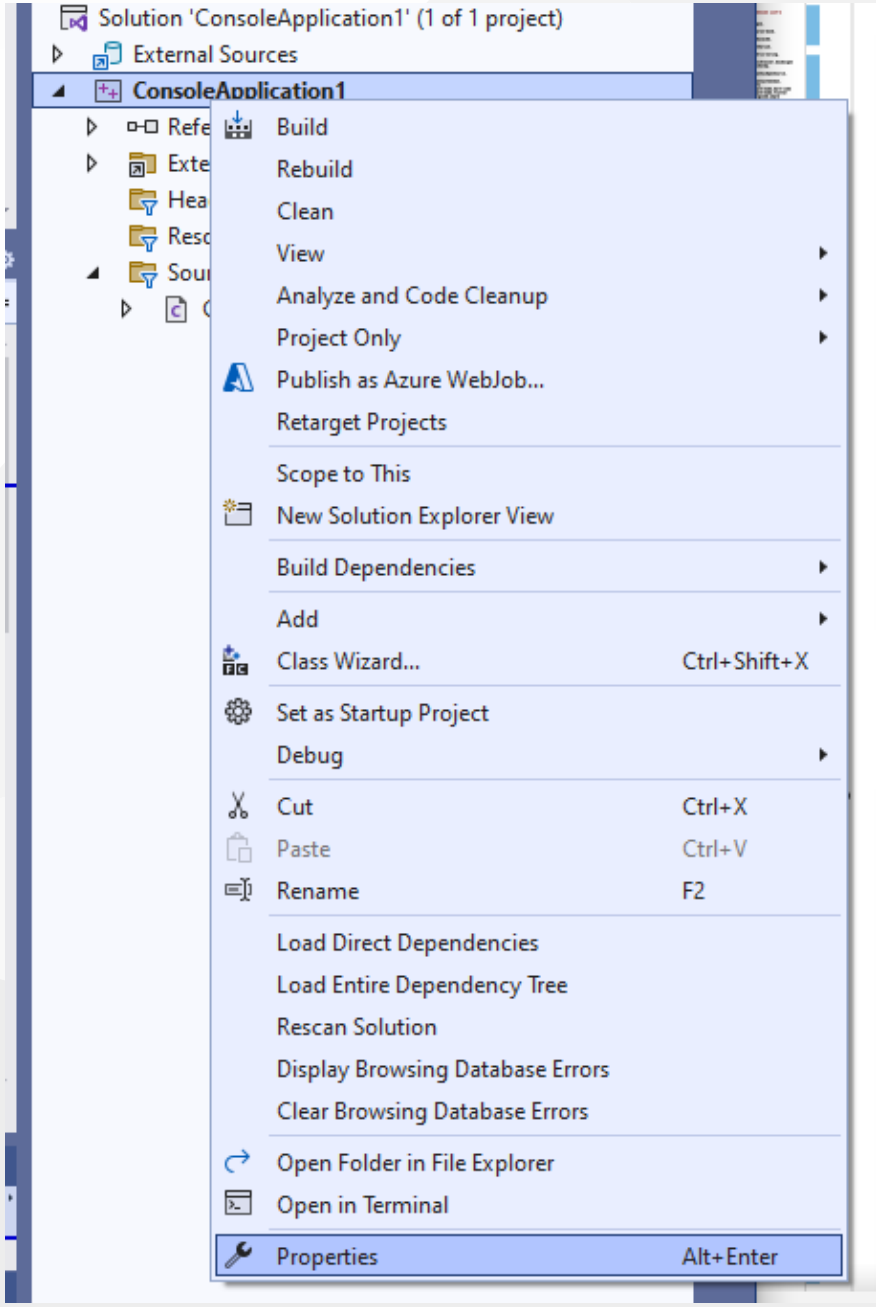
Visual Studio Community Edition (Install / Compile / Run / Debug) (21)

- If you close some windows such as solution explorer, and properties windows you can open them from the View menu.



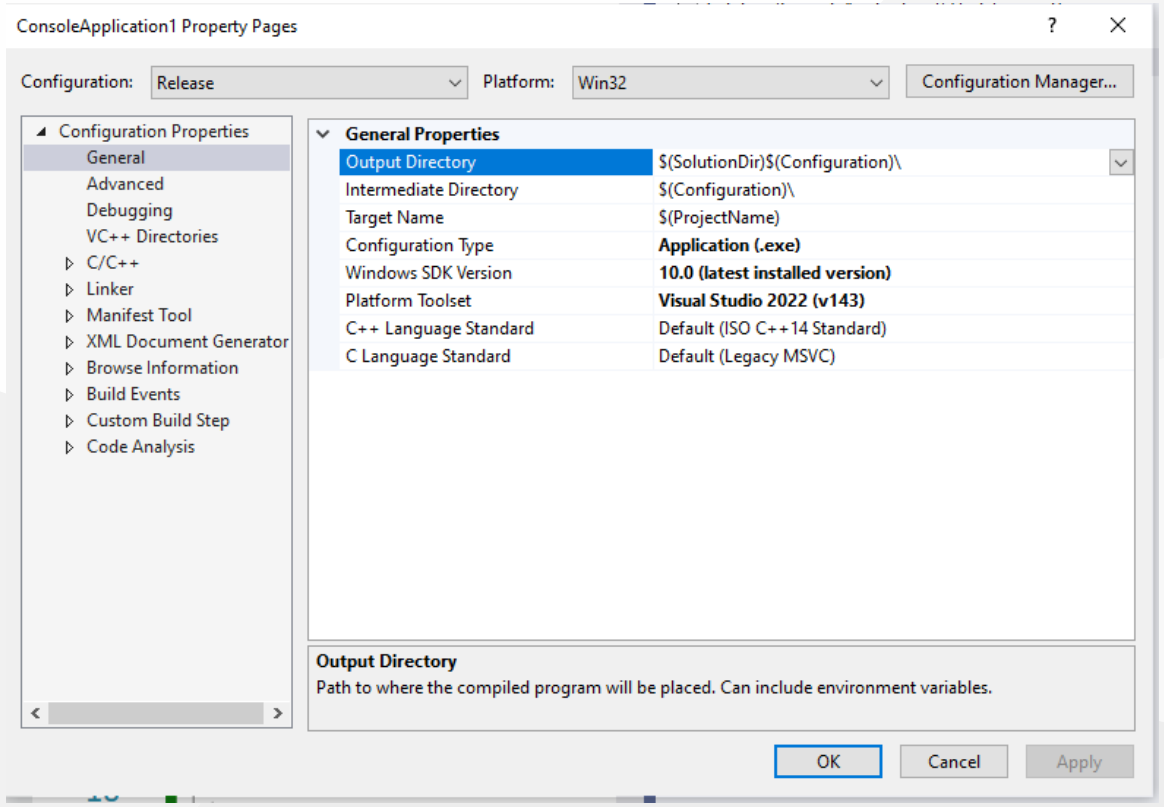
Visual Studio Community Edition (Install / Compile / Run / Debug) (22)

- Solution and Projects have several configurations for each setup such as Release - x86, Release-x64, Debug-x86, and Debug-x64 you need to configure all of them for your requirements. You can access configurations by right-clicking to project and then selecting properties.

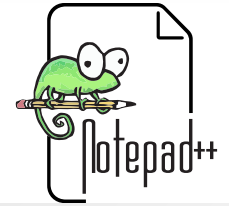


Visual Studio Community Edition (Install / Compile / Run / Debug) (23)

- Project properties has several settings



Notepad++ (Install / Compile) (1)



- Please download Notepad++ from the following link
  - Downloads | Notepad++

Notepad++ (Install / Compile) (2)

Download and install MinGW or LLVM compiler (if you downloded then skip this step)

MinGW installer (gcc / g++)

- A complete runtime environment for gcc
  - https://sourceforge.net/projects/mingw-w64/
  - https://sourceforge.net/projects/mingw-w64/files/latest/download
- w64devkit is a portable C and C++ development kit for x64 (and x86) Windows.
  - https://www.mingw-w64.org/downloads/#w64devkit
- Also, see the following notes
  - https://www.hanshq.net/building-gcc.html

Notepad++ (Install / Compile) (3)

LLVM installer (clang)

- Download
  - https://releases.llvm.org/
- Also, use the following notes
  - https://llvm.org/devmtg/2014-04/PDFs/Talks/clang-cl.pdf
  - https://www.hanshq.net/clang-plugin-example.html

Notepad++ (Install / Compile) (4)

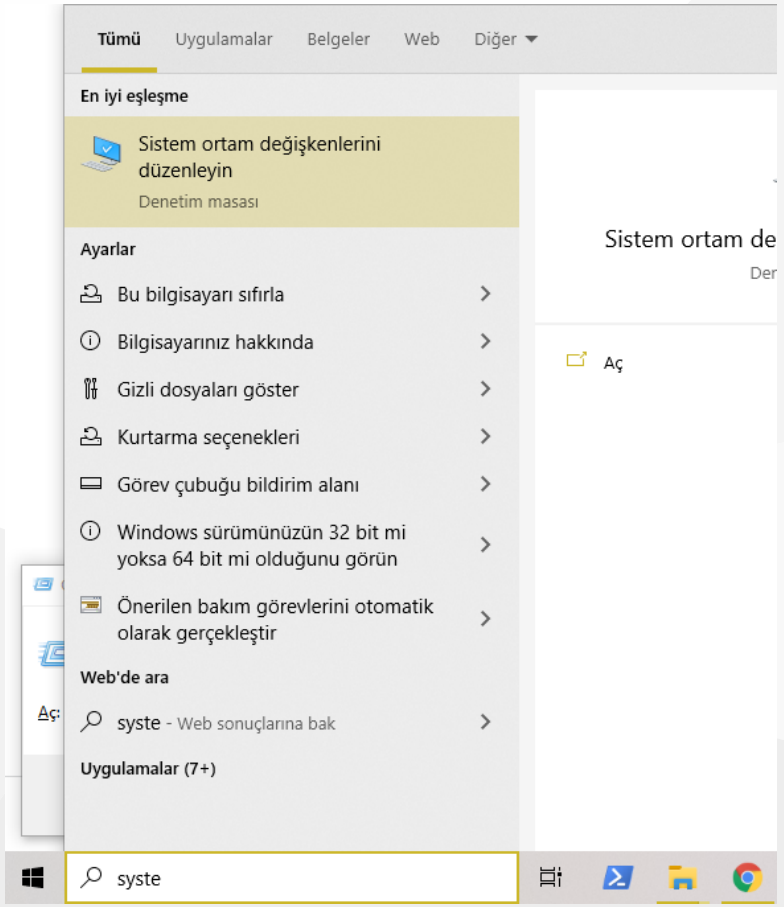
Open a console with " `cmd` " and test the following commands if commands are not recognized then set the system environment variable to add `gcc` and `g++` executable paths to the path variable (add to both system and user path variable)

```
gcc --version

g++ --version
```

```
C:\Users\ugur.coruh>gcc --version
gcc (x86_64-win32-seh-rev0, Built by MinGW-W64 project) 8.1.0
Copyright (C) 2018 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

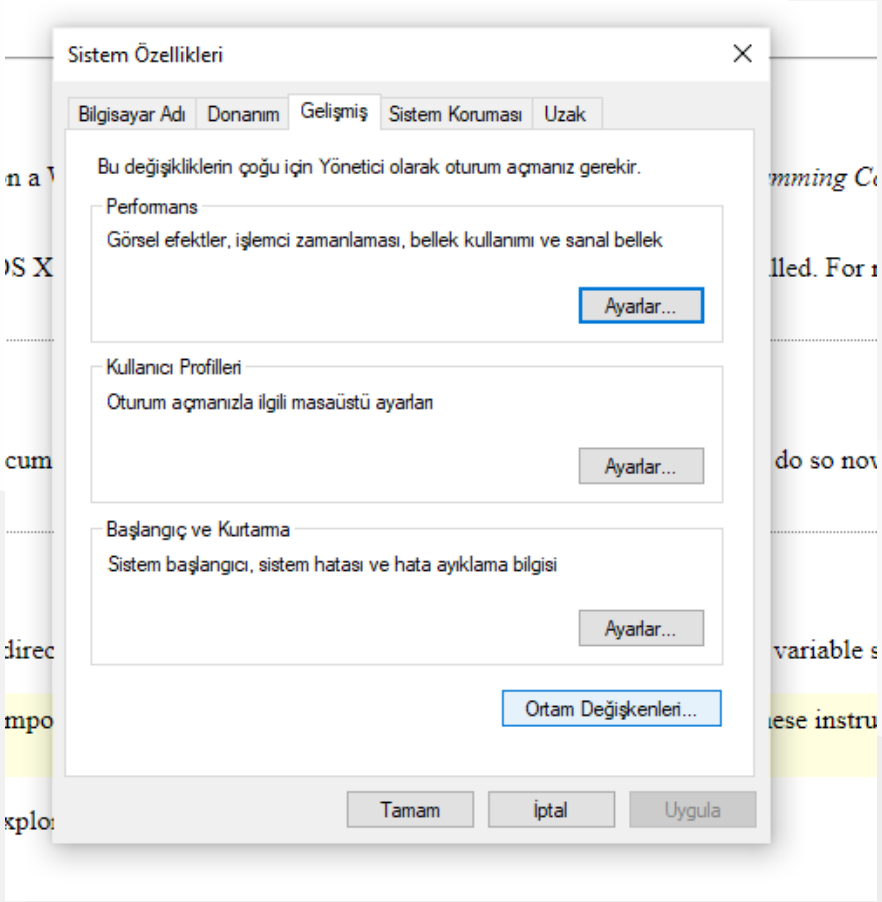
Notepad++ (Install / Compile) (5)

- Open system environments to update path variable for gcc/g++ and clang



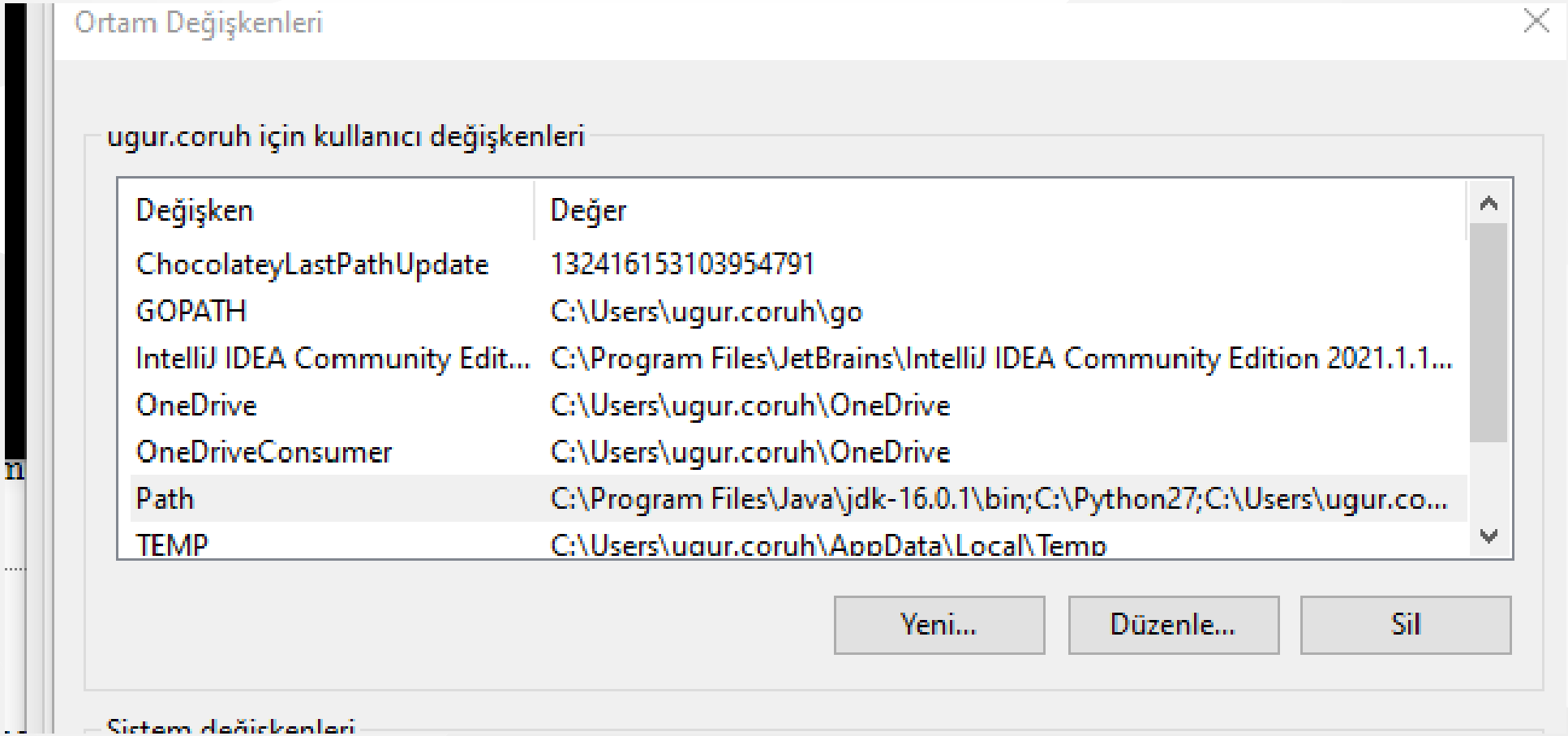
Notepad++ (Install / Compile) (6)

- Open "Environment Variables"



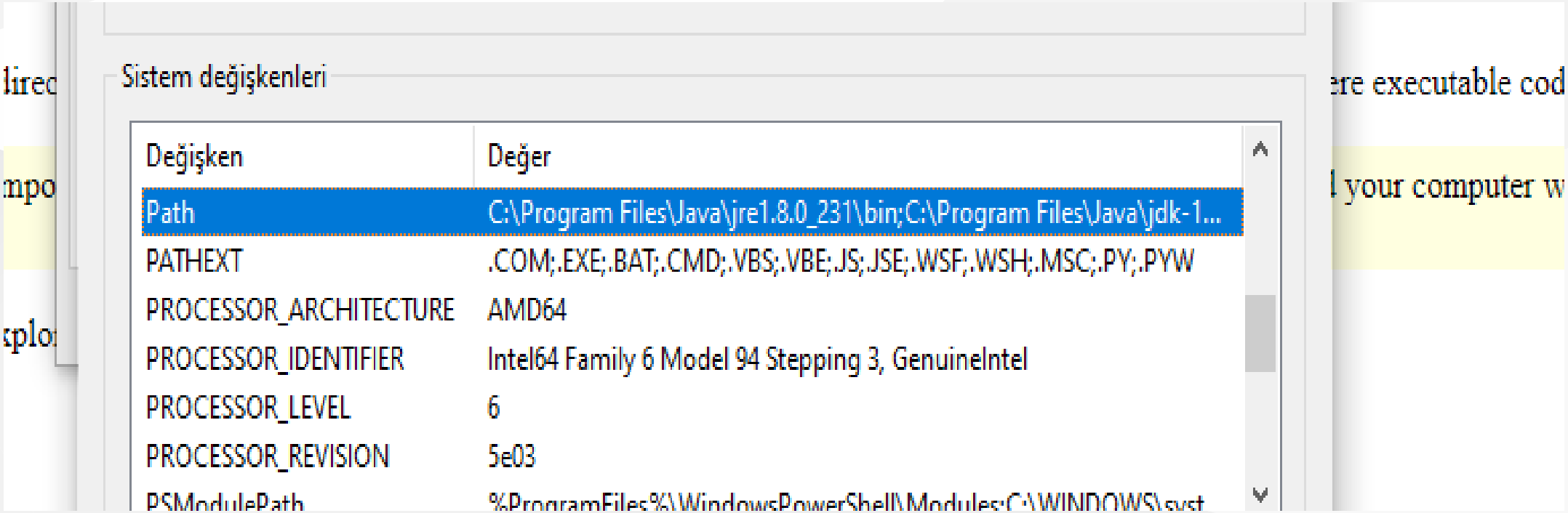
Notepad++ (Install / Compile) (7)

- Select path variable from user section.



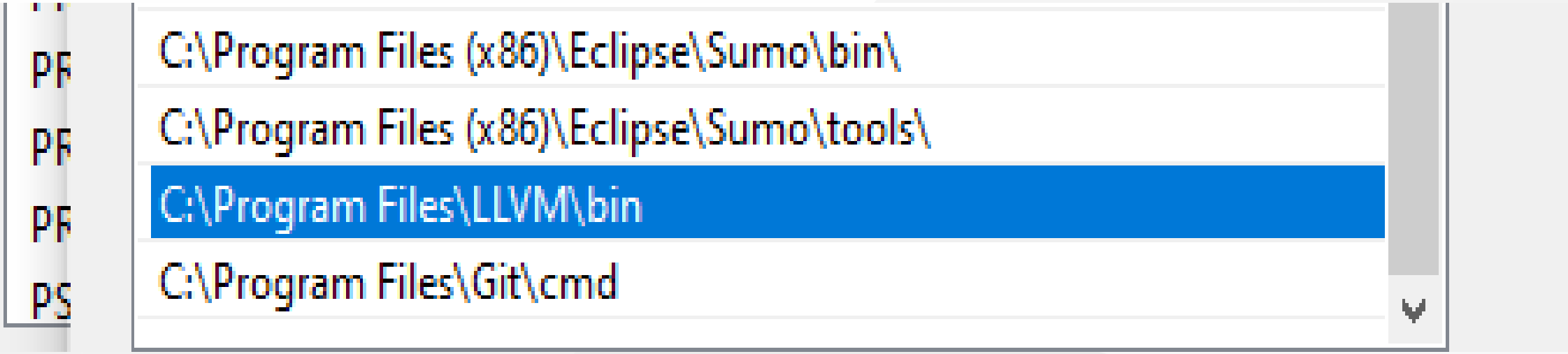
Notepad++ (Install / Compile) (8)

- Select path variable from system section.



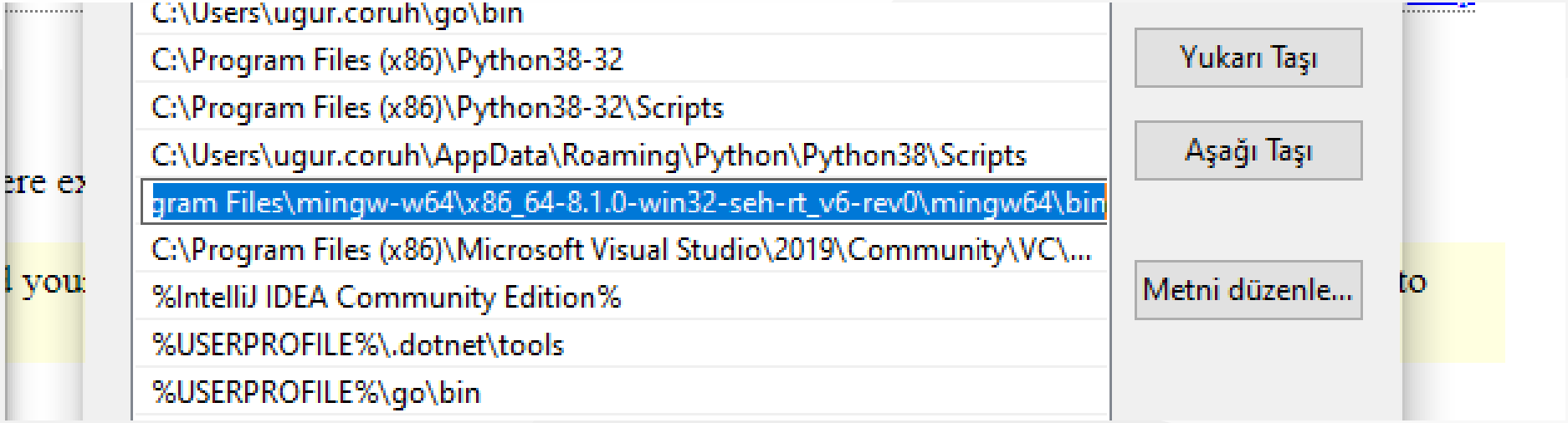
Notepad++ (Install / Compile) (9)

- Update variables add `MinGW` and `LLVM` to path `gcc.exe` `g++.exe` `clang.exe` will be in bin folders. Then we can run this commands from command line.



Notepad++ (Install / Compile) (9)

- Update variables add `MinGW` and `LLVM` to path `gcc.exe` `g++.exe` `clang.exe` will be in bin folders. Then we can run this commands from command line.



Notepad++ (Install / Compile) (10)

- for `gcc.exe` , `g++.exe` and `gdb.exe`

```
C:\Program Files\mingw-w64\x86_64-8.1.0-win32-seh-rt_v6-rev0\mingw64\bin
```

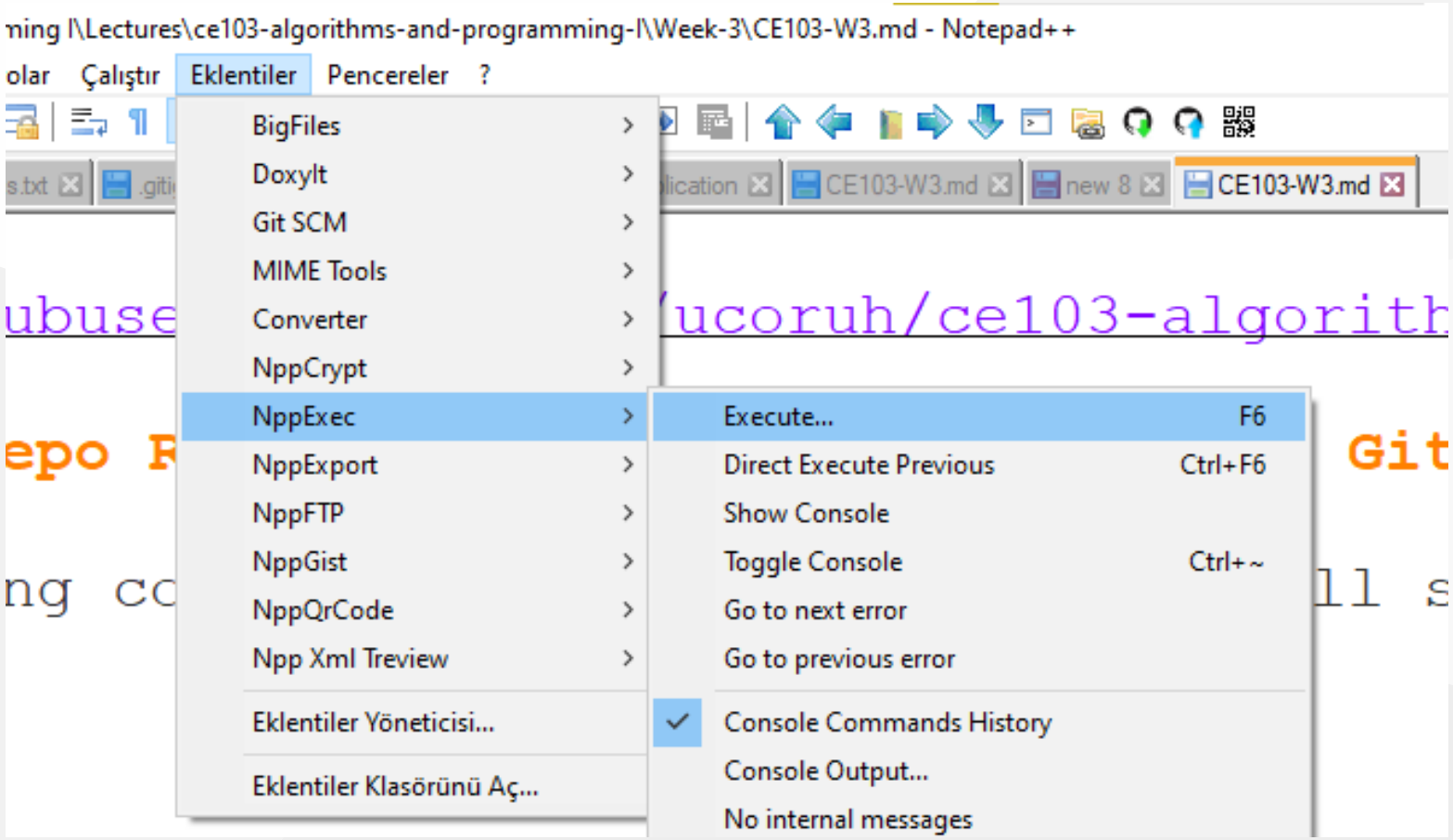
Notepad++ (Install / Compile) (11)

- for `clang.exe` , `lldb.exe` we will use the following path

```
C:\Program Files\LLVM\bin
```

Notepad++ (Install / Compile) (12)

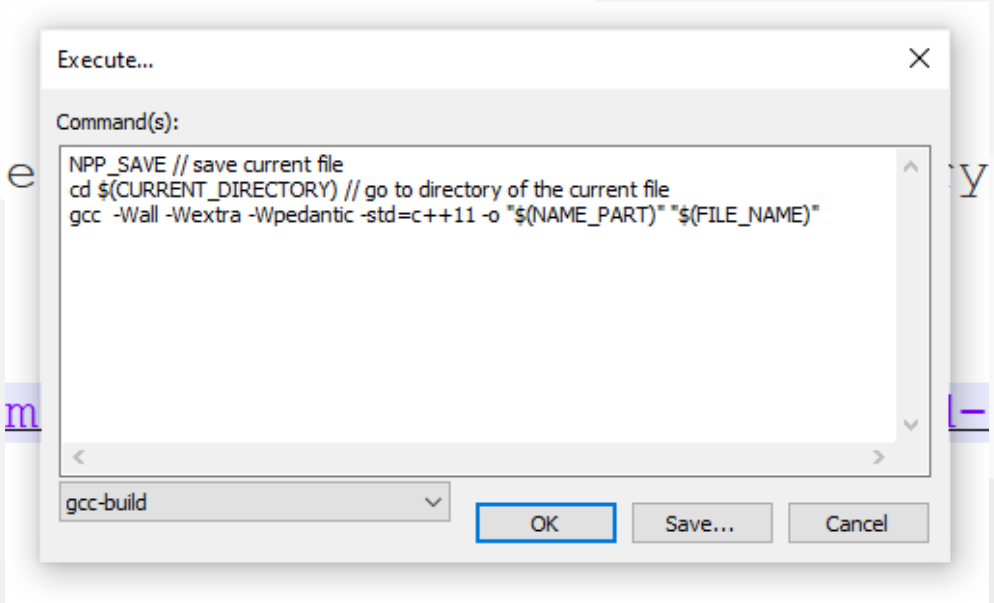
- This folder paths changes according to your setup
- Open `NppExec` extension (install from extension manager if not exist)



Notepad++ (Install / Compile) (13)

- Write the following commands in the box

```
NPP_SAVE // save current file
cd $(CURRENT_DIRECTORY) // go to directory of the current file
gcc  -Wall -Wextra -Wpedantic -std=c++11 -o "$(NAME_PART)" "$(FILE_NAME)"
```



Notepad++ (Install / Compile) (14)

- Save the script as `gcc-build` and for more information check the following link
- You can modify or add multiple scripts for another task.

MSYS2

- Software Distribution and Building Platform for Windows

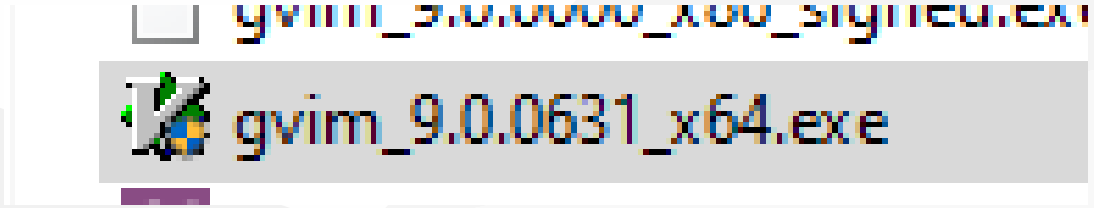
https://www.msys2.org/

Vi/Vim (C/C++) for Windows (1)

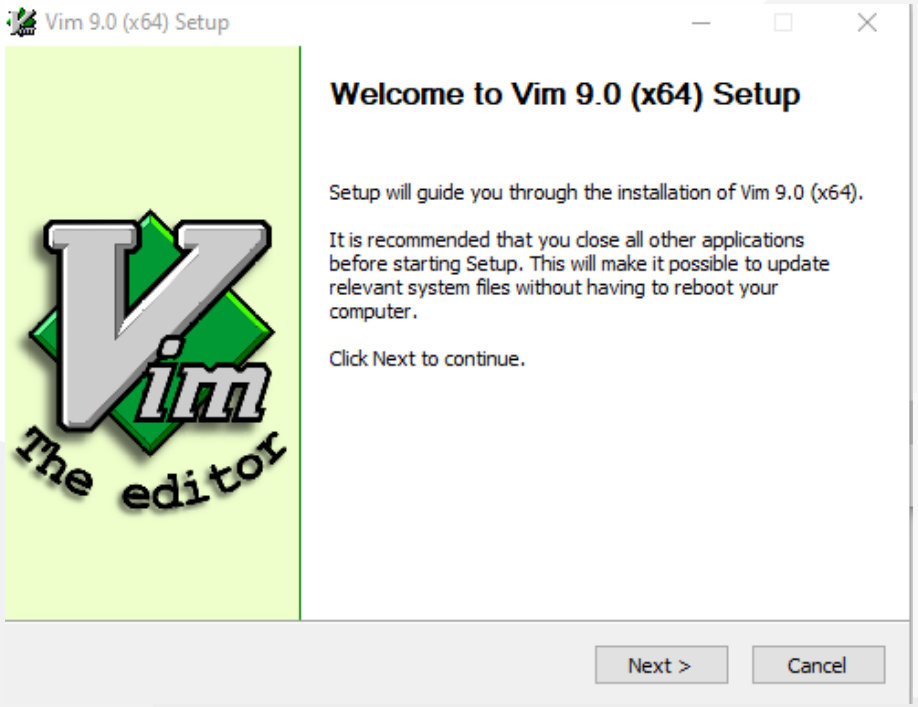
- Vim is a command-line editor for programming
- Use the following links to download Vim for Windows
  - https://github.com/vim/vim-win32-installer/releases
  - download : vim online

Vi/Vim (C/C++) for Windows (2)

- Run setup to install the application on your computer.

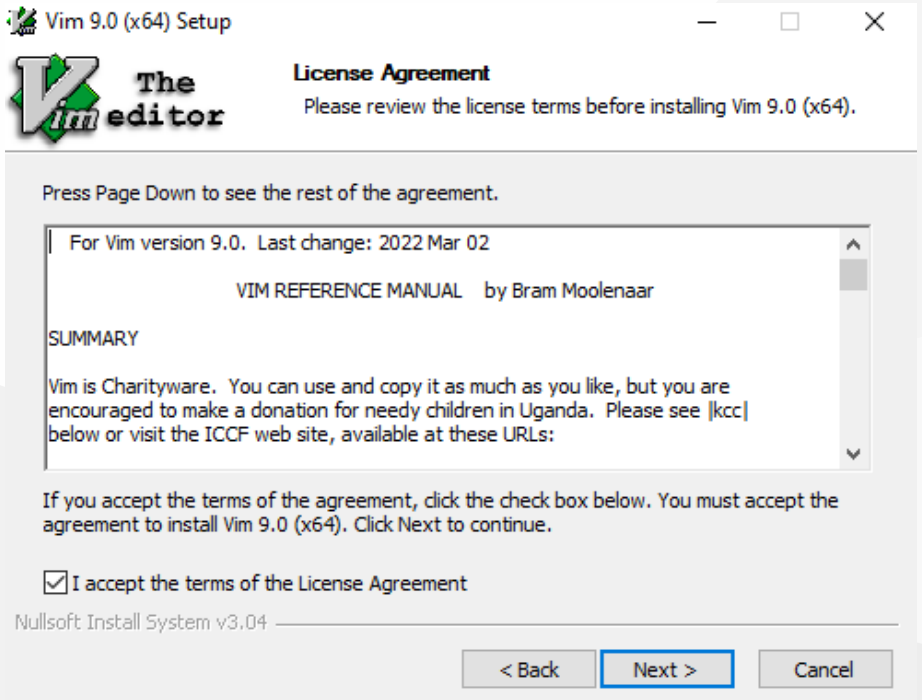


Vi/Vim (C/C++) for Windows (3)



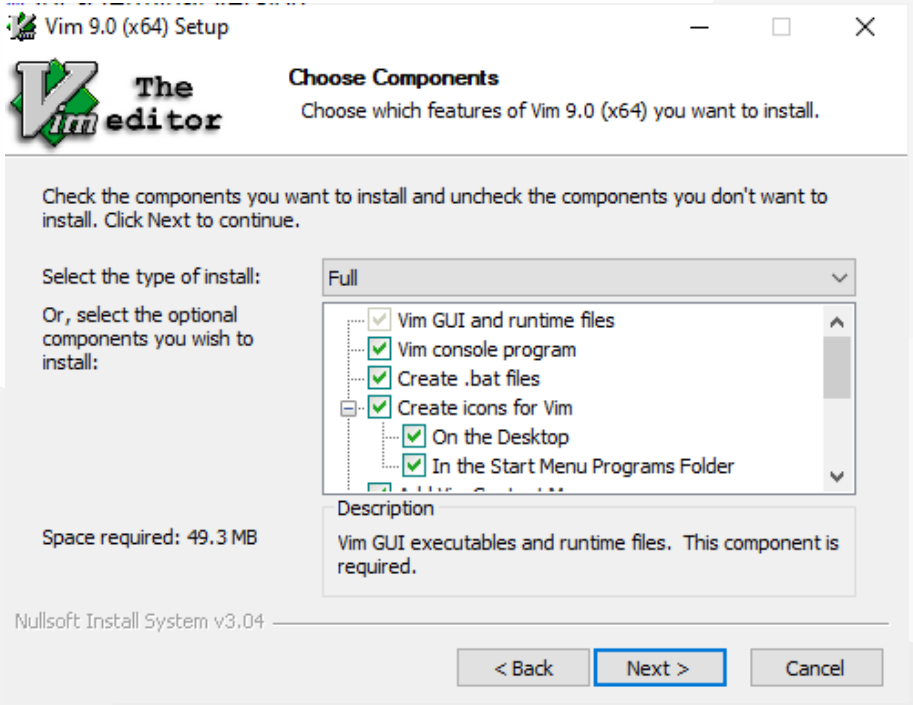
Vi/Vim (C/C++) for Windows (4)

- Installation steps.



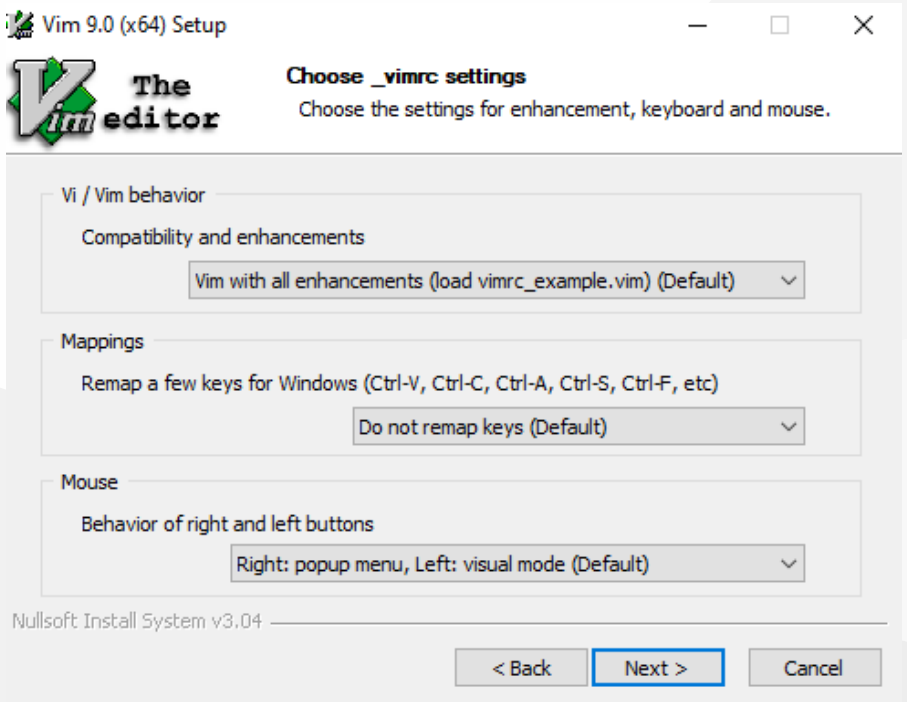
Vi/Vim (C/C++) for Windows (5)

- Installation steps.



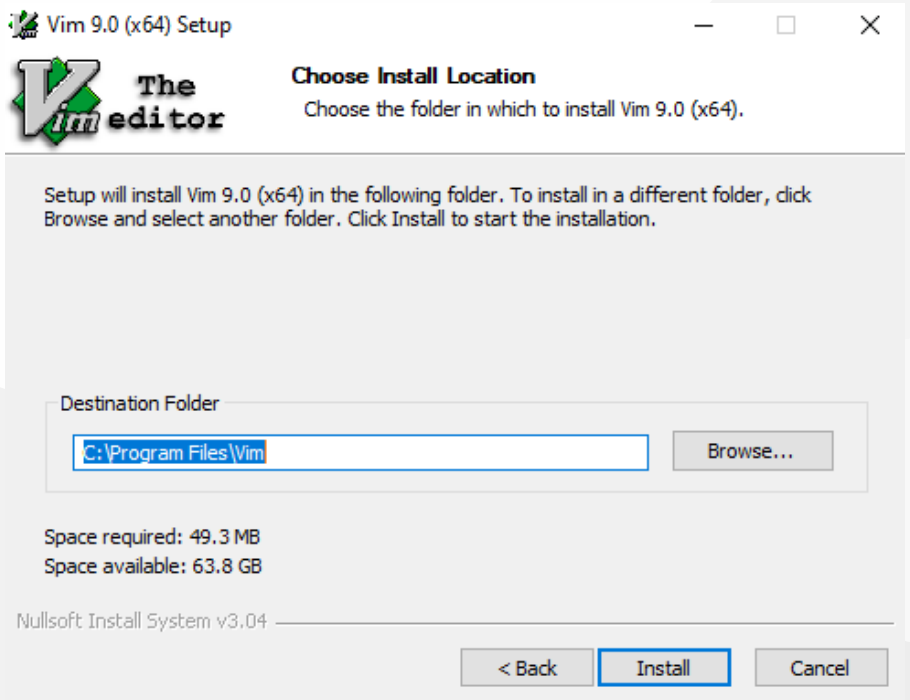
Vi/Vim (C/C++) for Windows (6)

- Installation steps.



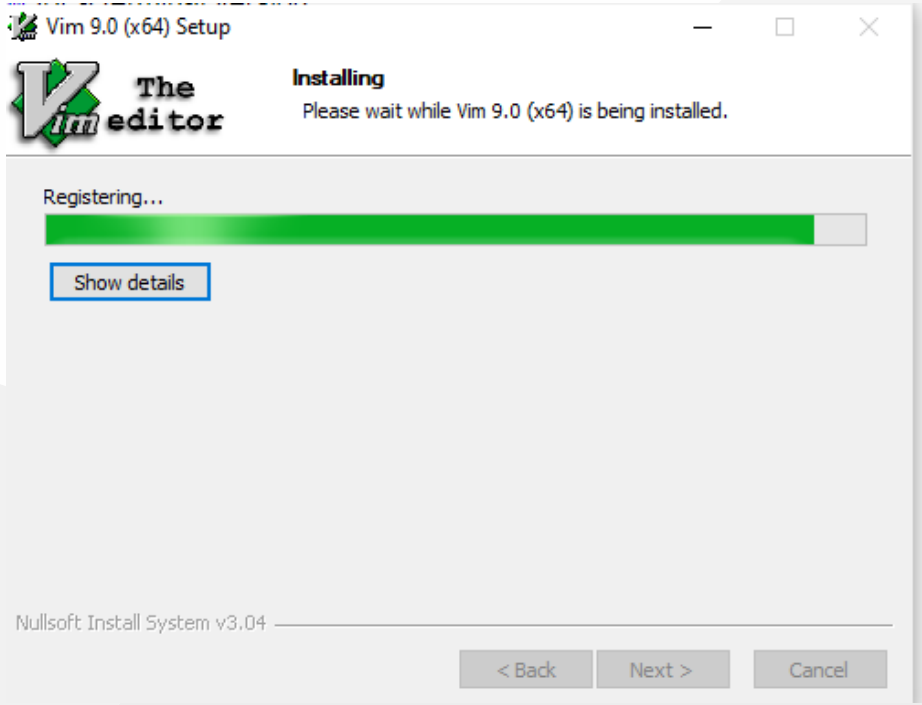
Vi/Vim (C/C++) for Windows (7)

- Installation steps.



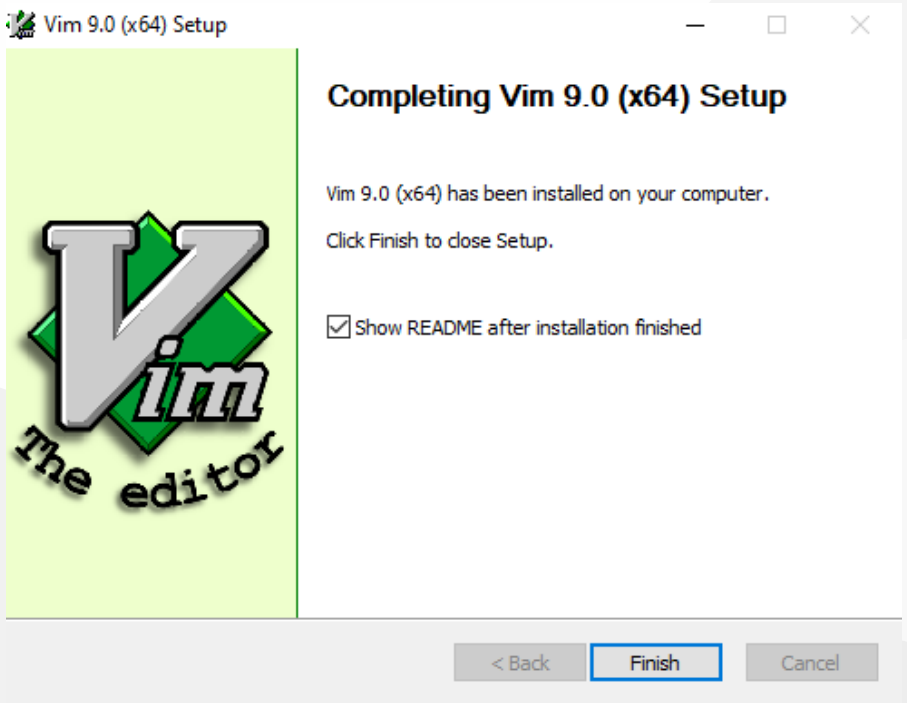
Vi/Vim (C/C++) for Windows (8)

- Installation steps.



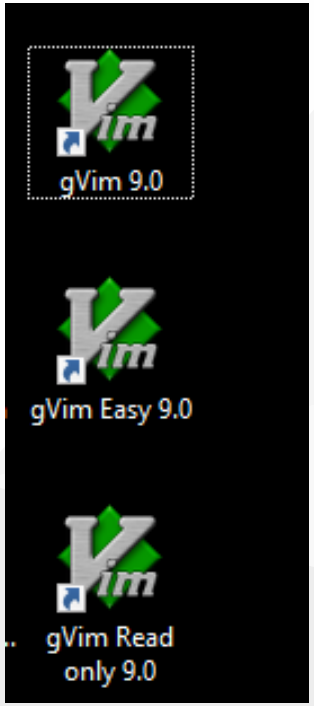
Vi/Vim (C/C++) for Windows (9)

- Installation steps.



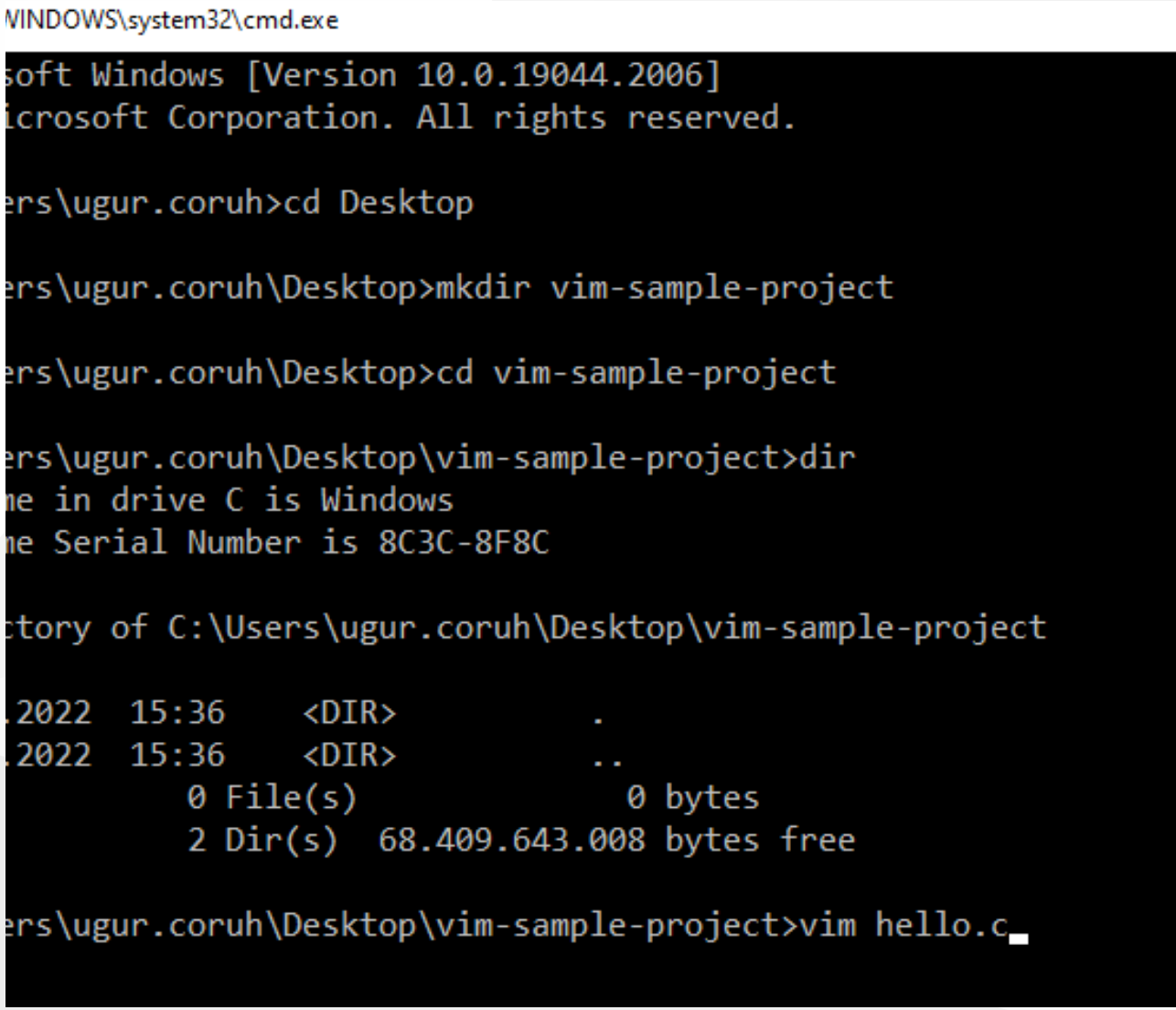
Vi/Vim (C/C++) for Windows (10)

- Generated shortcuts on your desktop



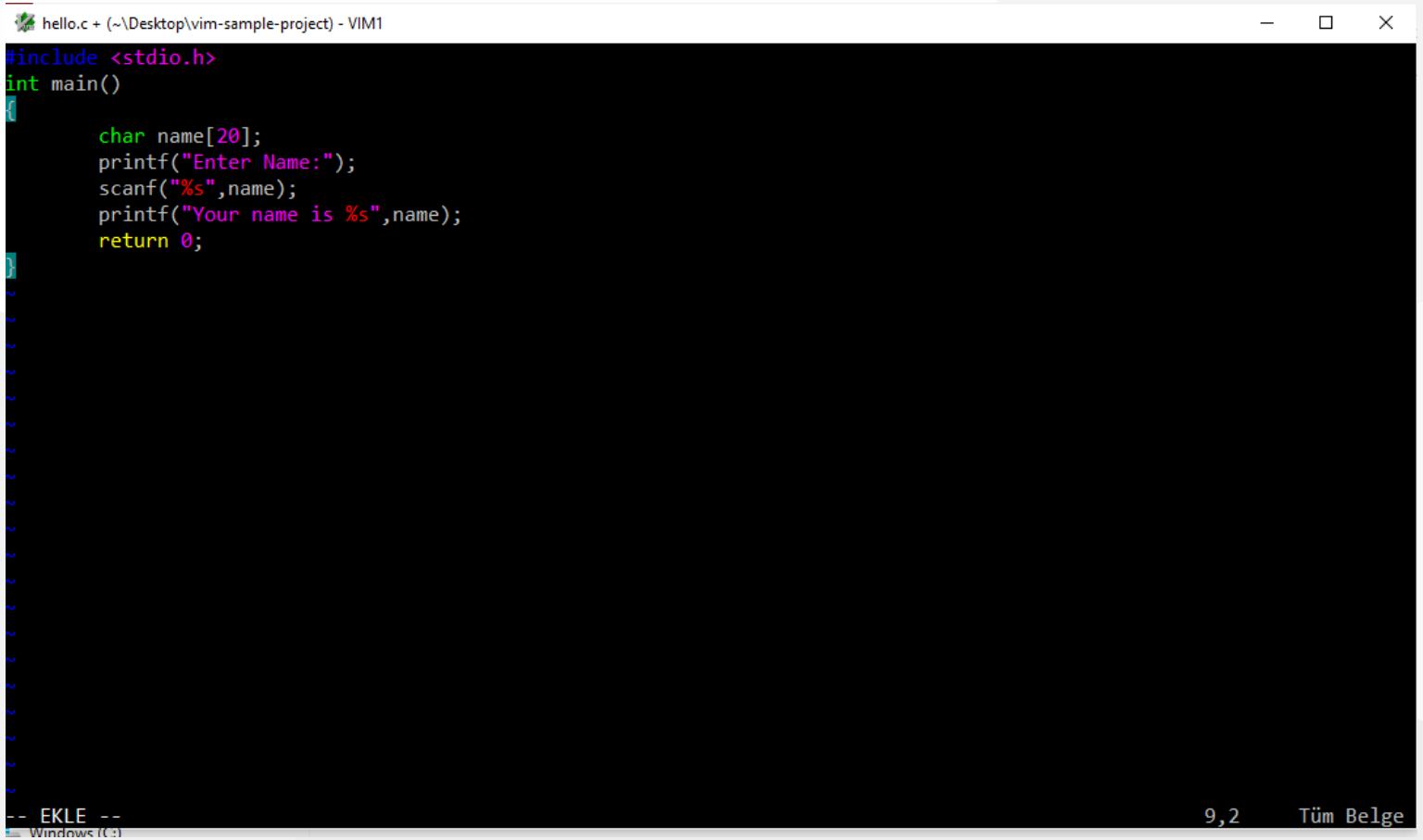
Vi/Vim (C/C++) for Windows (11)

- Run `vim hello.c` on your command-line to open a c file with vim editor.



Vi/Vim (C/C++) for Windows (12)

- You will have the following editor.
- Use INSERT to change edit options.



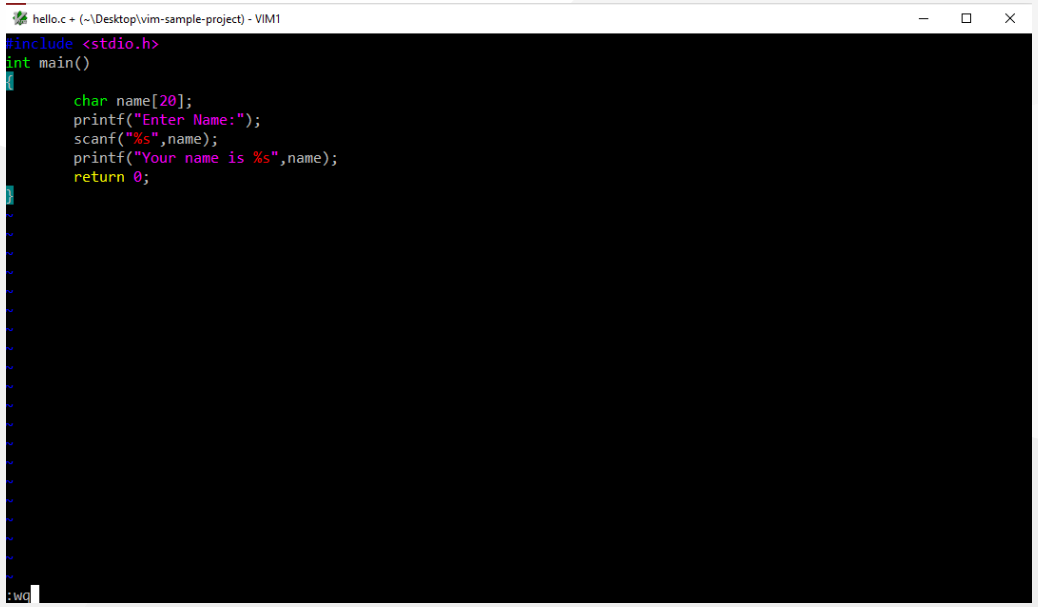
Vi/Vim (C/C++) for Windows (13)

- Sample source code

```c
#include <stdio.h>
int main()
{
    char name[20];
    printf("Enter Name:");
    scanf("%s",name);
    printf("Your name is %s",name);
    return 0;
}
```

Vi/Vim (C/C++) for Windows (14)

- Write source code
- Press the `Esc` button to enter command mode
- Then type `:wq`. It will save the file and exit from Vim
  - w: write
  - q: quit



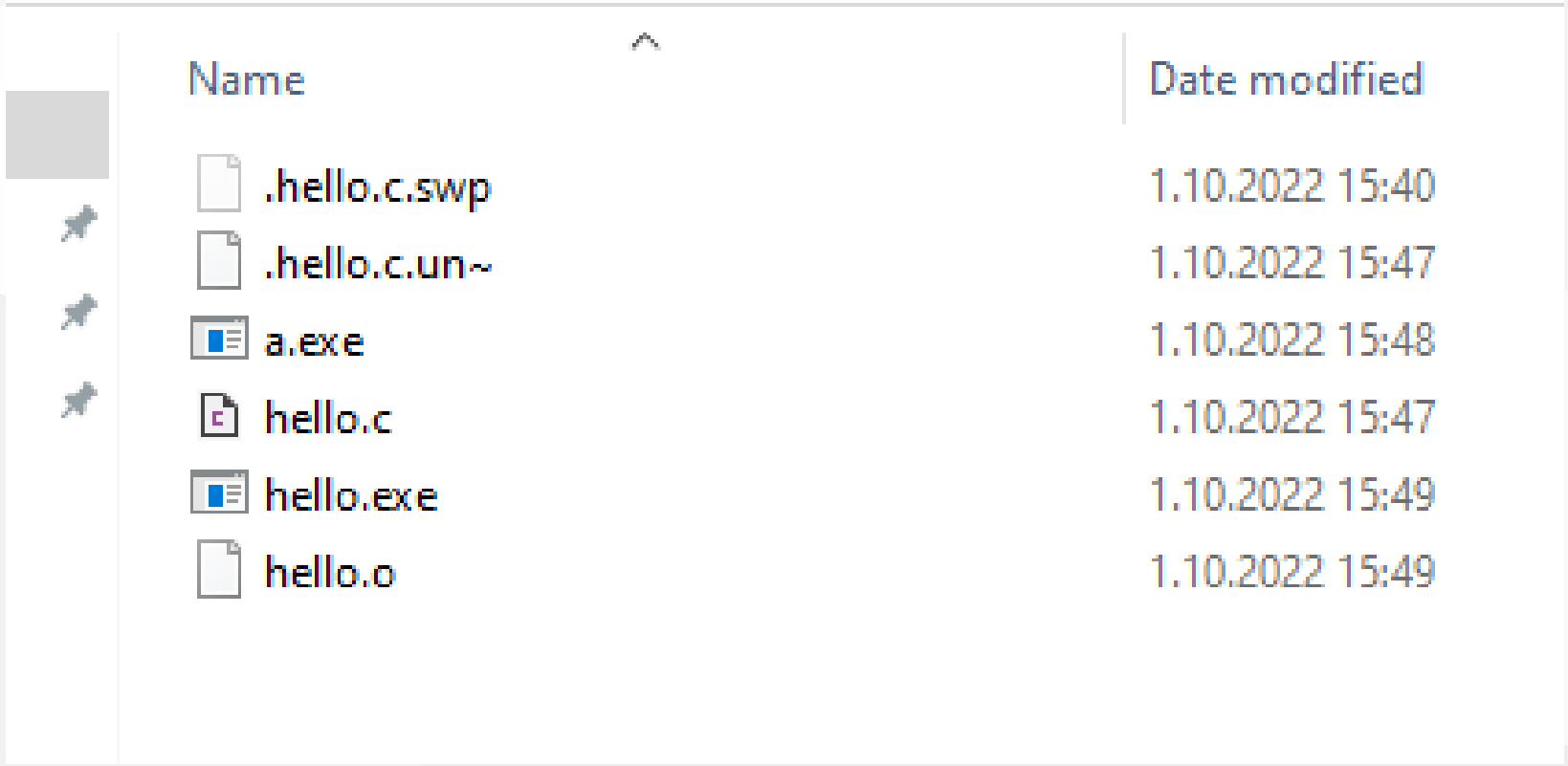
Vi/Vim (C/C++) for Windows (15)

- compile source code with `gcc`
- link the objects and
- run executable

```
C:\Users\ugur.coruh\Desktop\vim-sample-project>gcc -c hello.c -o hello.o

C:\Users\ugur.coruh\Desktop\vim-sample-project>gcc hello.o -o hello.exe

C:\Users\ugur.coruh\Desktop\vim-sample-project>hello.exe
Enter Name:Ugur Coruh
Your name is Ugur
C:\Users\ugur.coruh\Desktop\vim-sample-project>
```

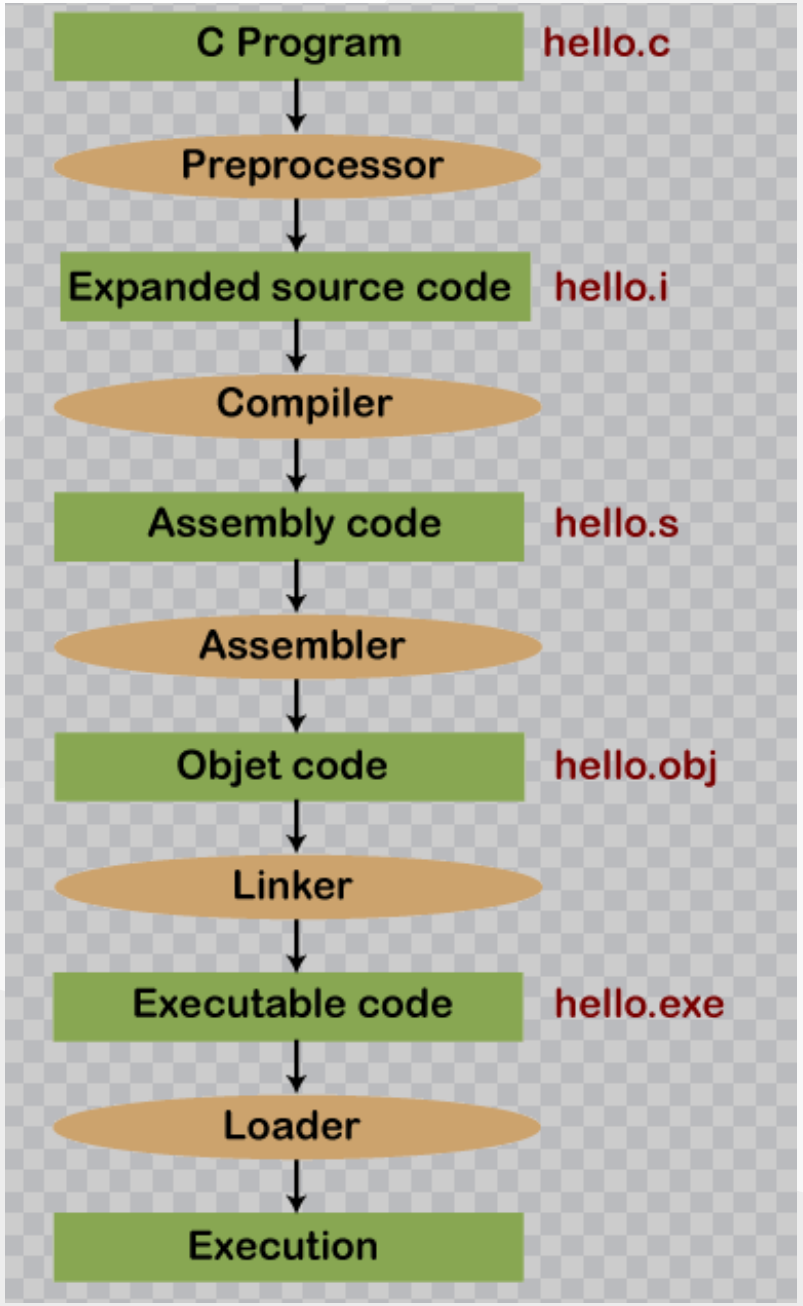
Vi/Vim (C/C++) for Windows (17)

- In the folder, you can find your executable. `hello.exe`



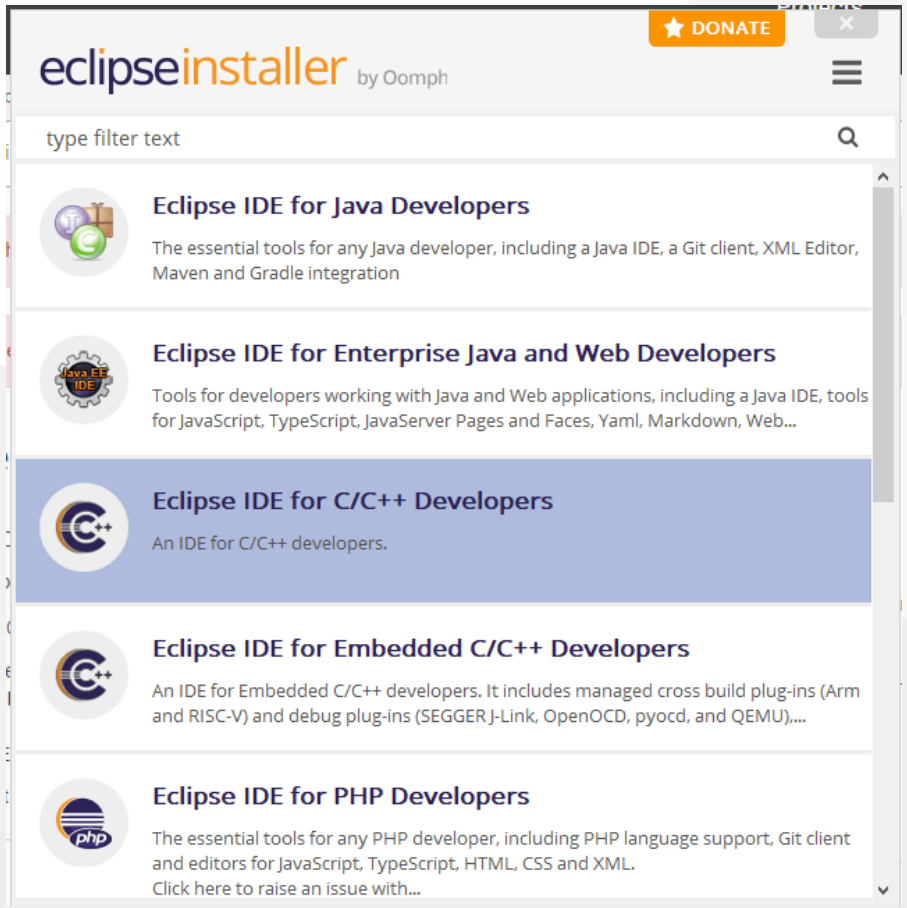
Vi/Vim (C/C++) for Windows (16)

- compile, link and execute flow will be as follow;



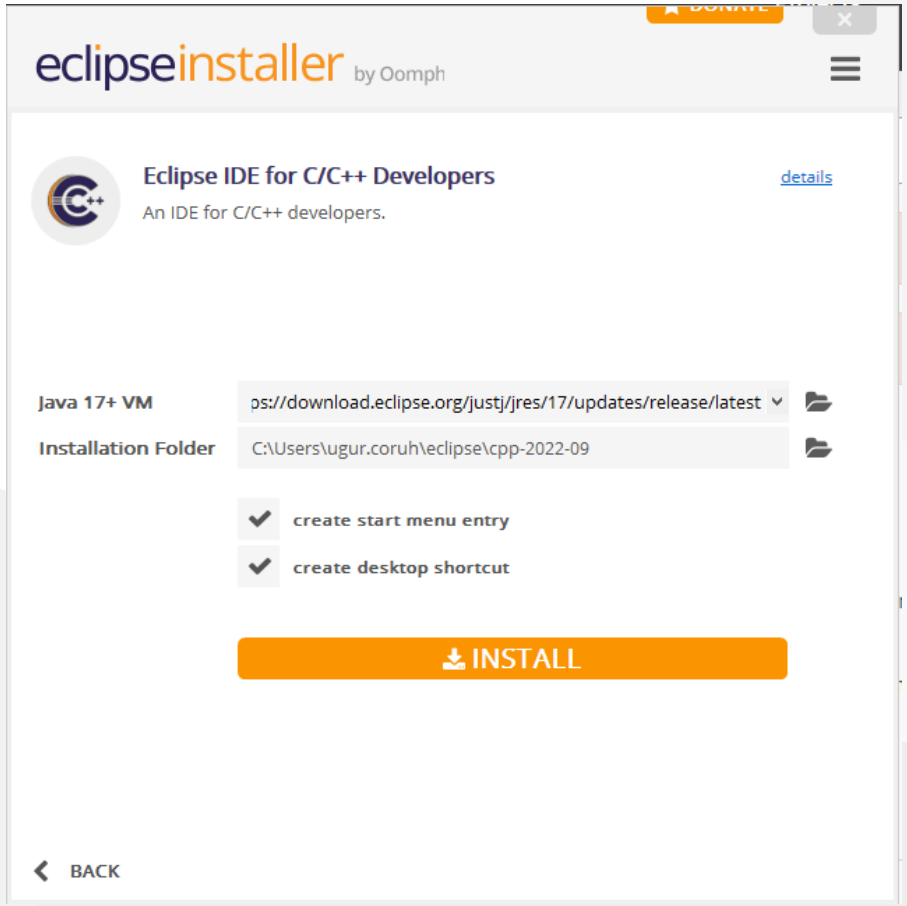
Eclipse (C/C++) - Compile Only / Debugging Has Problem (1)

- Download and install Eclipse IDE from the following link
  - Eclipse IDE for C/C++ Developers | Eclipse Packages
- Run Installer
- Select `Eclipse IDE for C/C++ Developers`



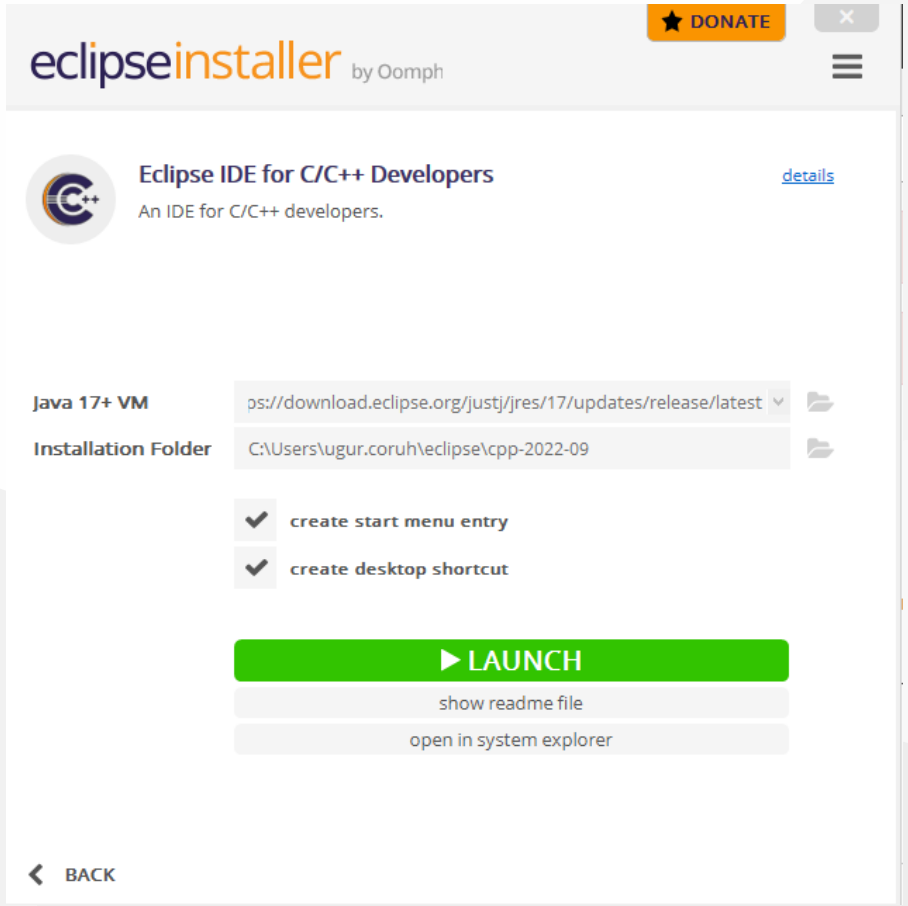
Eclipse (C/C++) - Compile Only / Debugging Has Problem (2)

- Select Java Version and Installation Path



Eclipse (C/C++) - Compile Only / Debugging Has Problem (3)

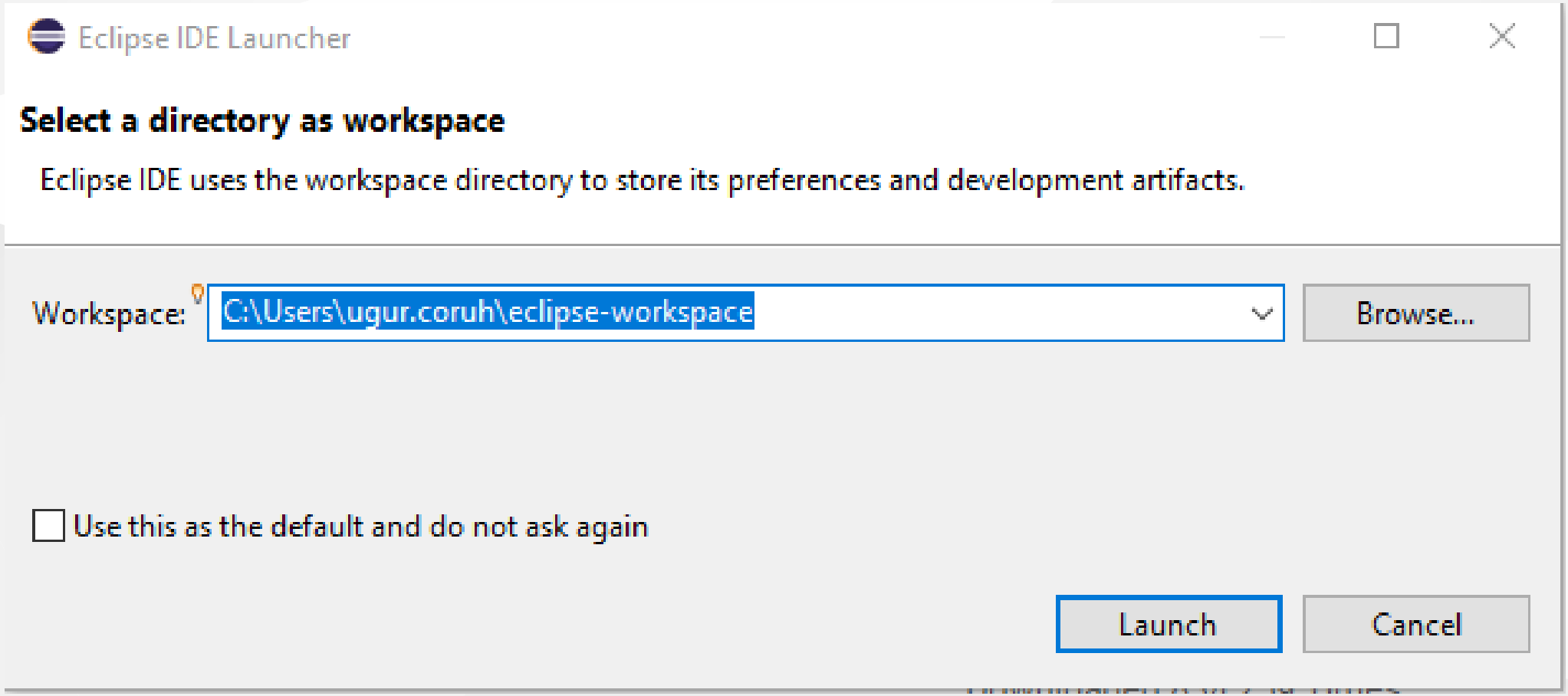
- After installation you can LAUNCH eclipse IDE



Eclipse (C/C++) - Compile Only / Debugging Has Problem (4)

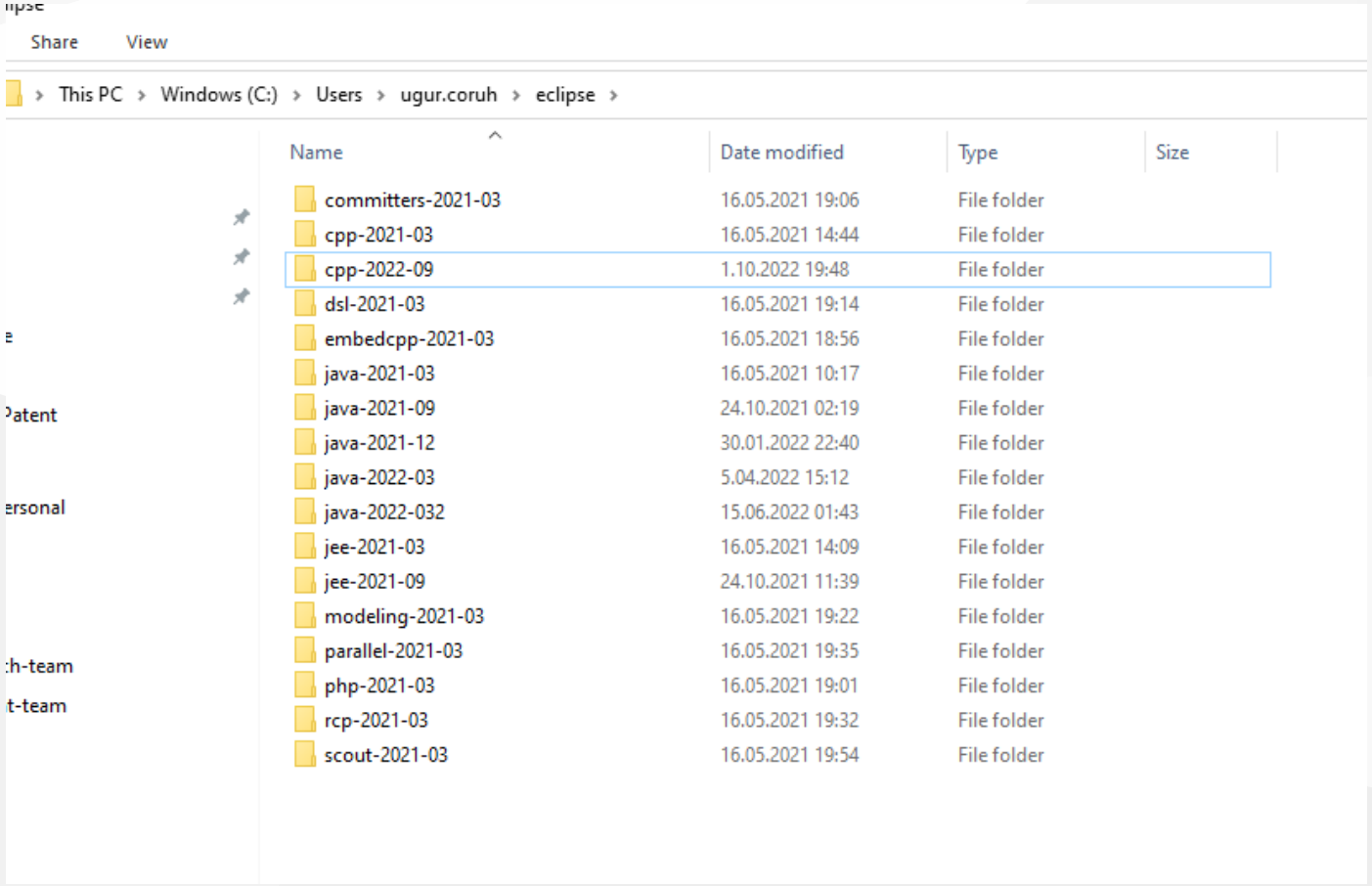
Eclipse (C/C++) - Compile Only / Debugging Has Problem (5)

- Select a workspace that your project will be saved



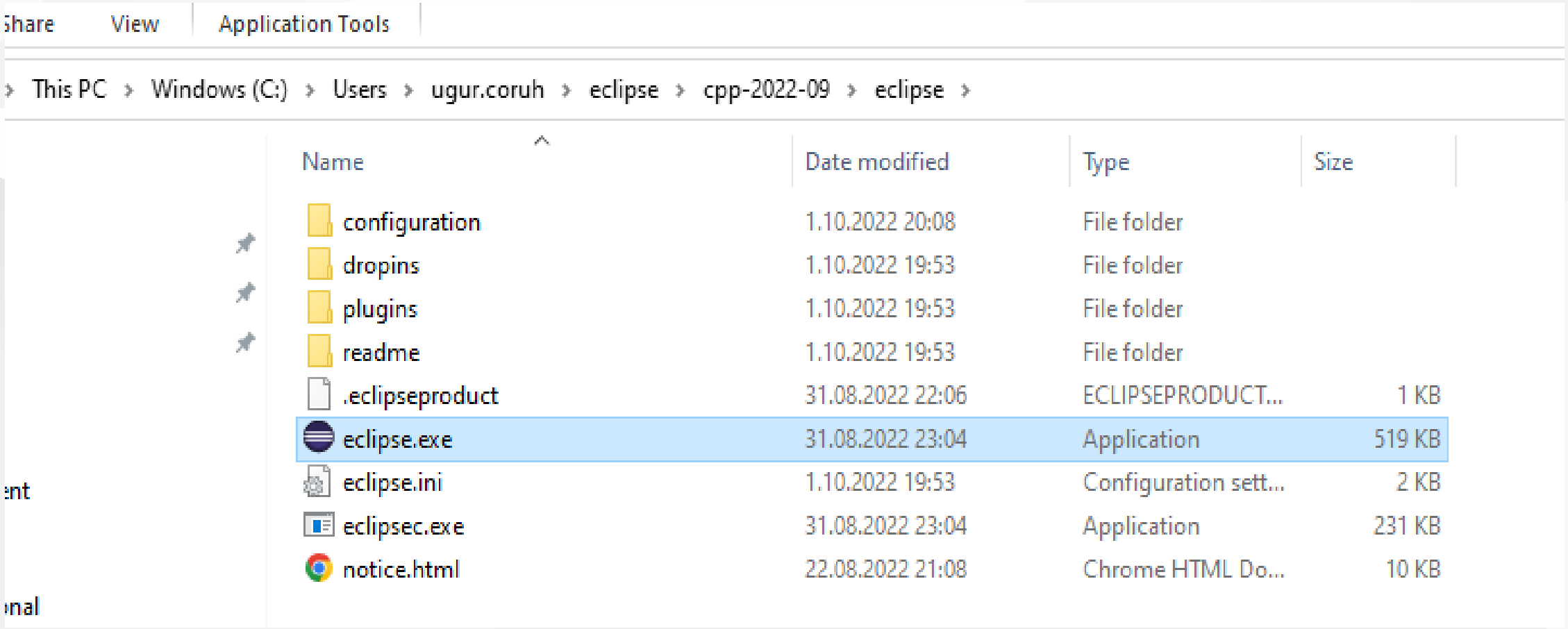
Eclipse (C/C++) - Compile Only / Debugging Has Problem (6)

- You can find your installation under your user folder



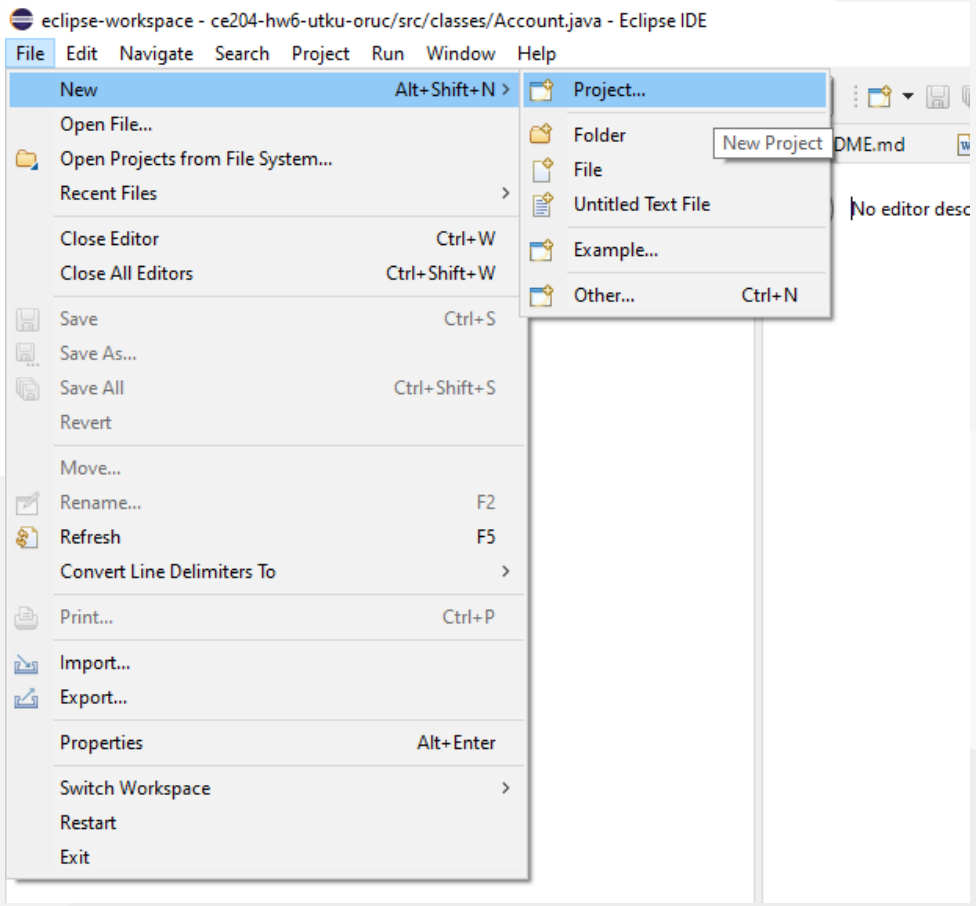
Eclipse (C/C++) - Compile Only / Debugging Has Problem (7)

- You can create shortcut to desktop for your working eclipse version.



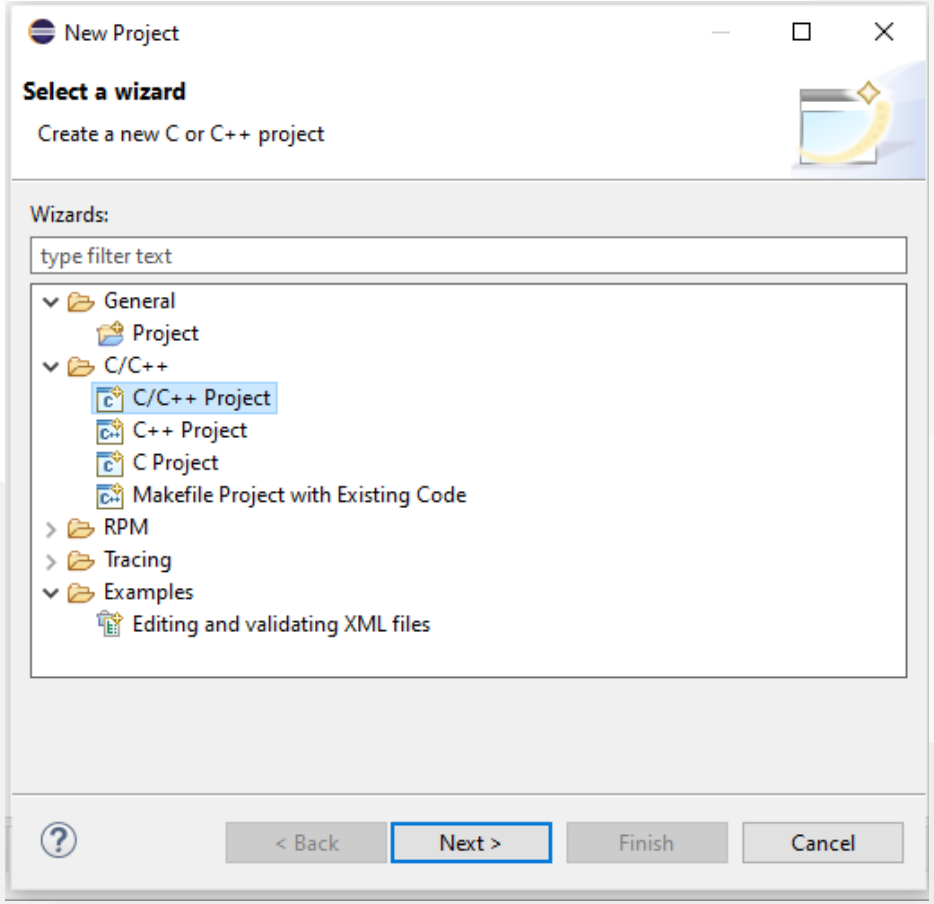
Eclipse (C/C++) - Compile Only / Debugging Has Problem (8)

- File -> New -> Project



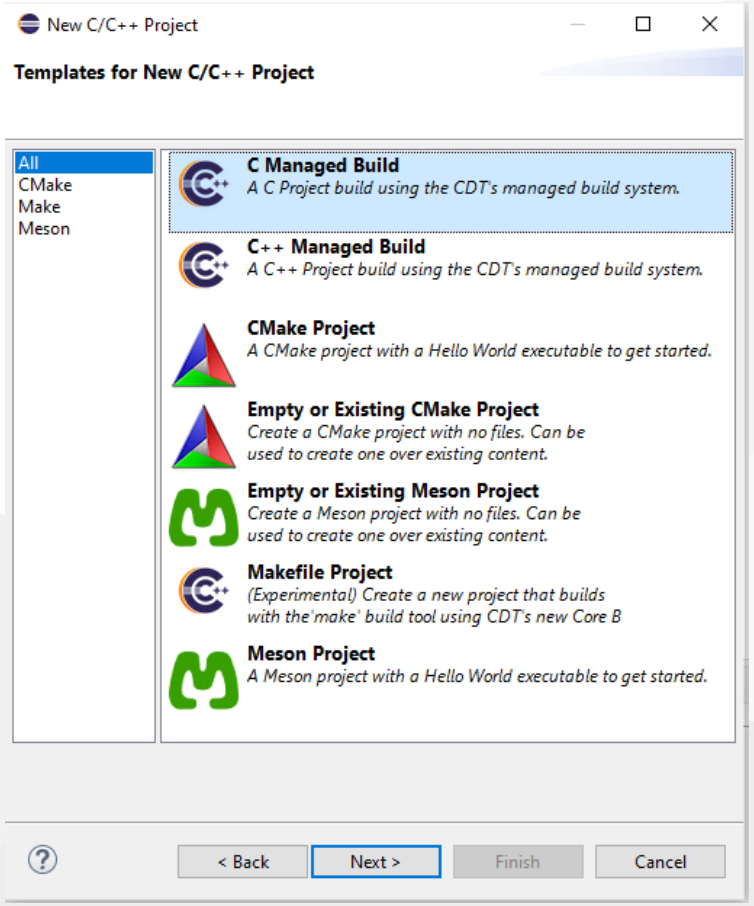
Eclipse (C/C++) - Compile Only / Debugging Has Problem (9)

- Select C/C++ Project



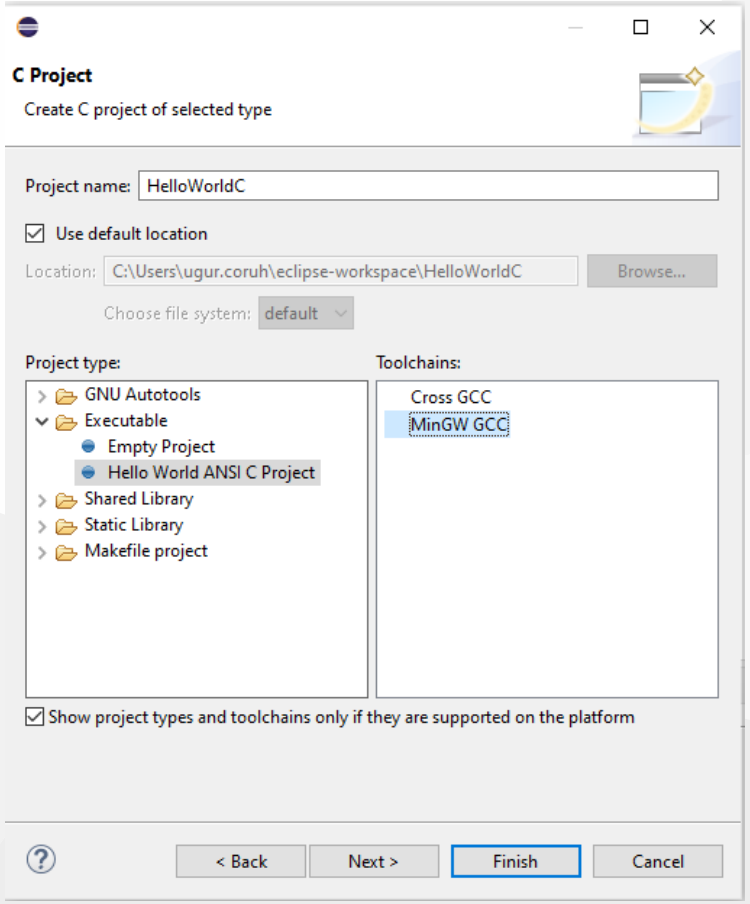
Eclipse (C/C++) - Compile Only / Debugging Has Problem (10)

- Select C Managed Build, Eclipse CDT will do job for us.



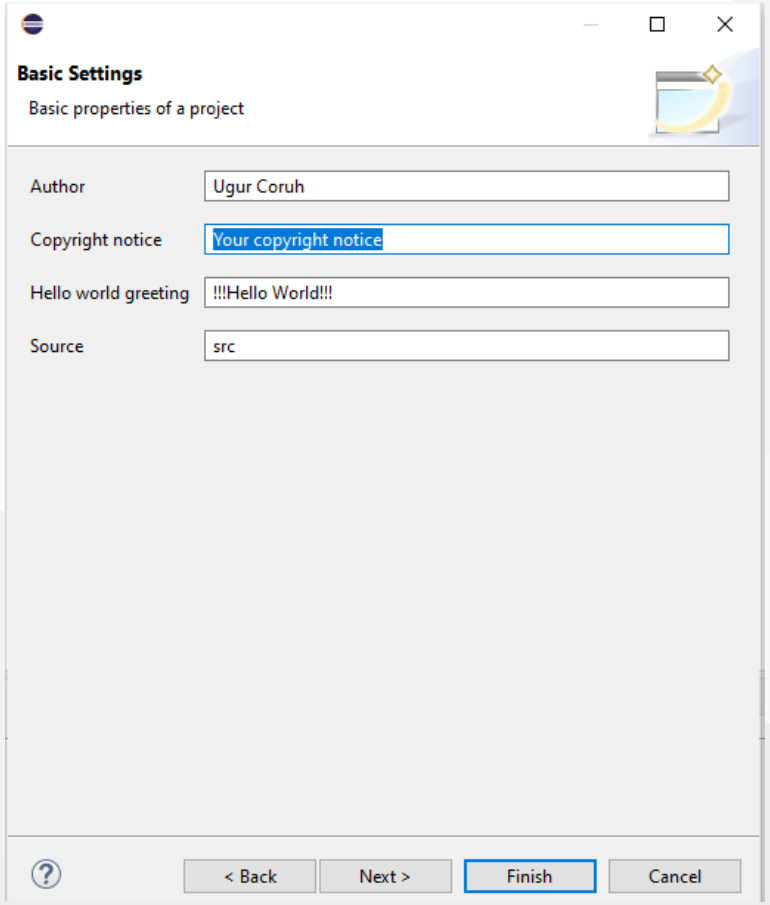
Eclipse (C/C++) - Compile Only / Debugging Has Problem (11)

- Give project name and select a basic template executable with MinGW GCC.



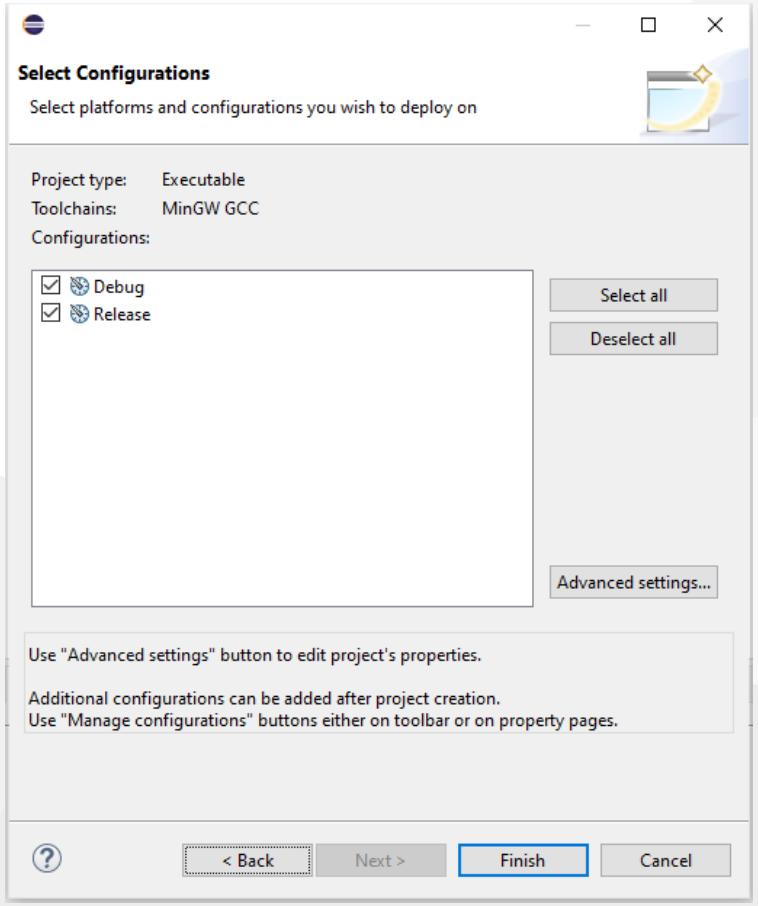
Eclipse (C/C++) - Compile Only / Debugging Has Problem (12)

- Configura Basic Settings



Eclipse (C/C++) - Compile Only / Debugging Has Problem (13)

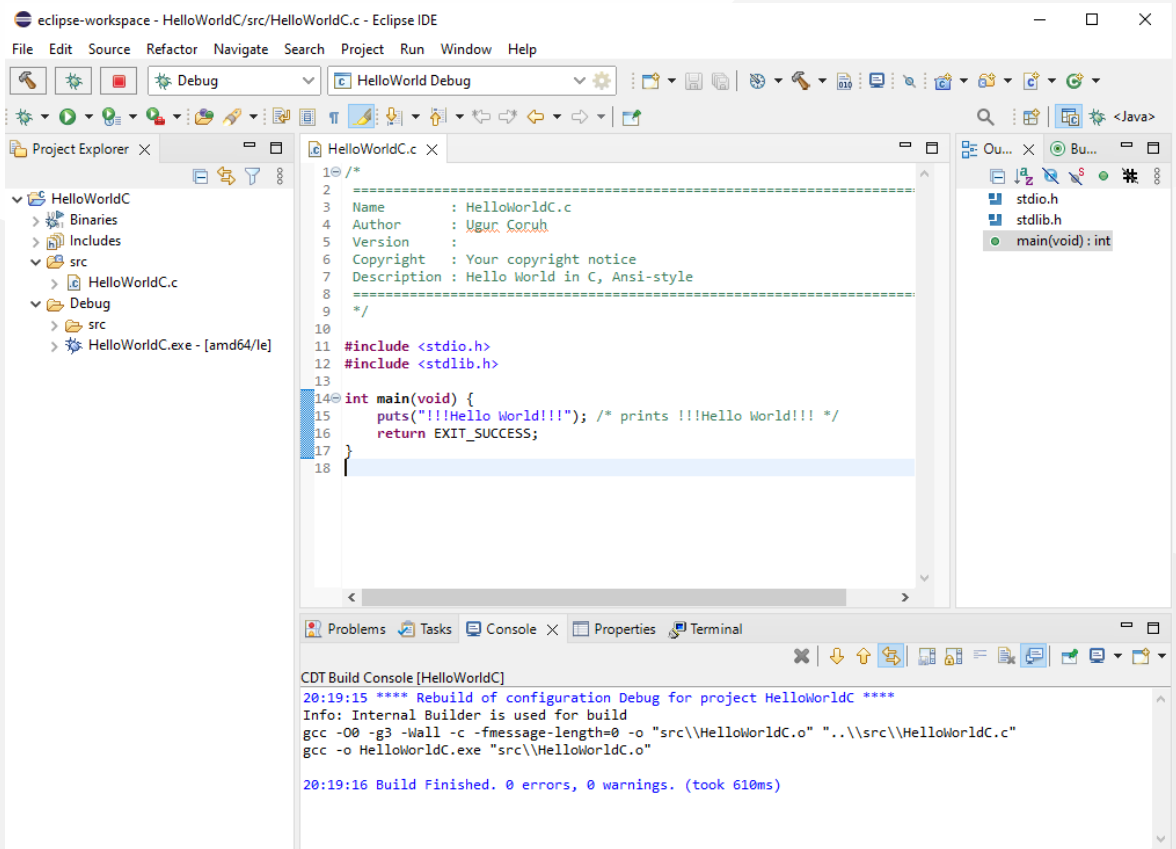
- There are default Debug and Release configurations you can add your customized configurations from Advanced Settings.



- Project settings will be C Select Debug/Release configuration and then Build Application Project->Build All (Ctrl+B)

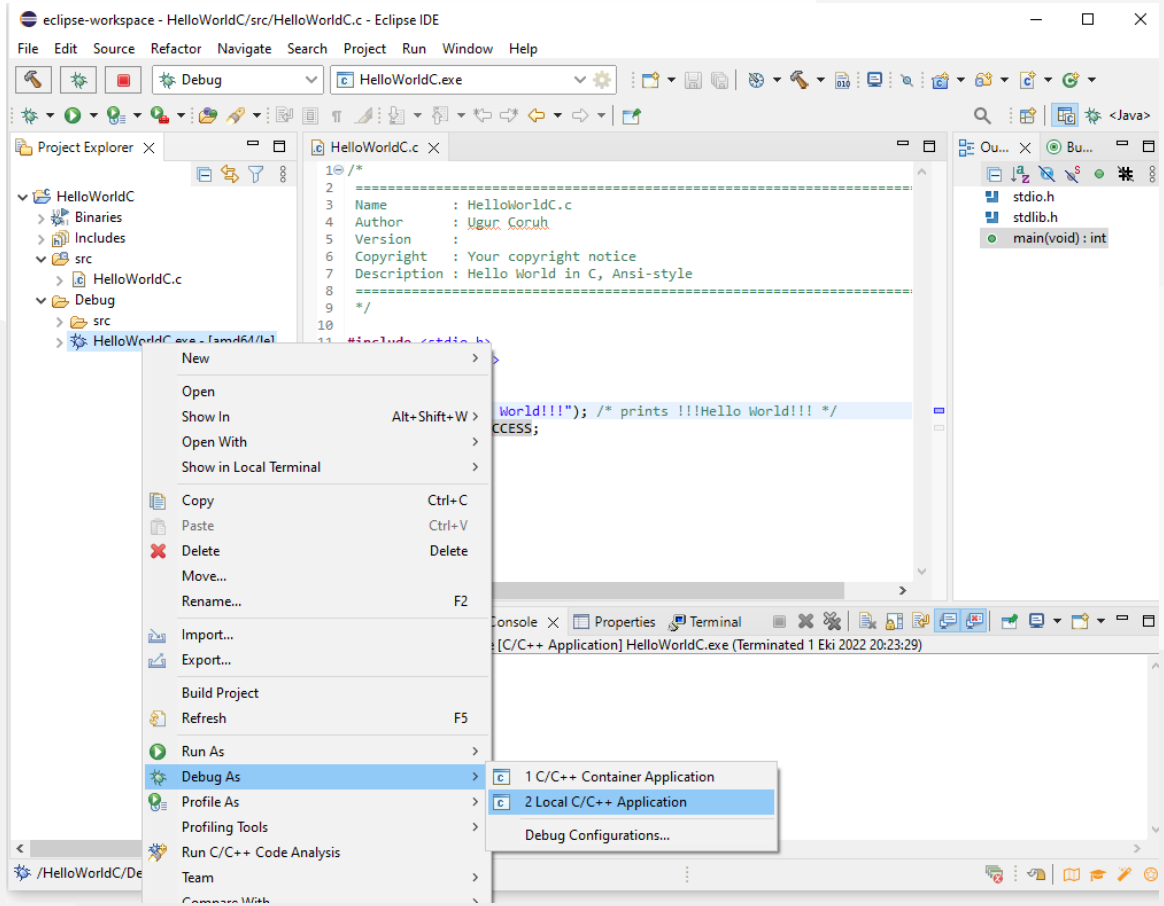
- HelloWorldC.exe will be generated

```
gcc -O0 -g3 -Wall -c -fmessage-length=0 -o "src\\HelloWorldC.o" "..\\src\\HelloWorldC.c"
gcc -o HelloWorldC.exe "src\\HelloWorldC.o"
```



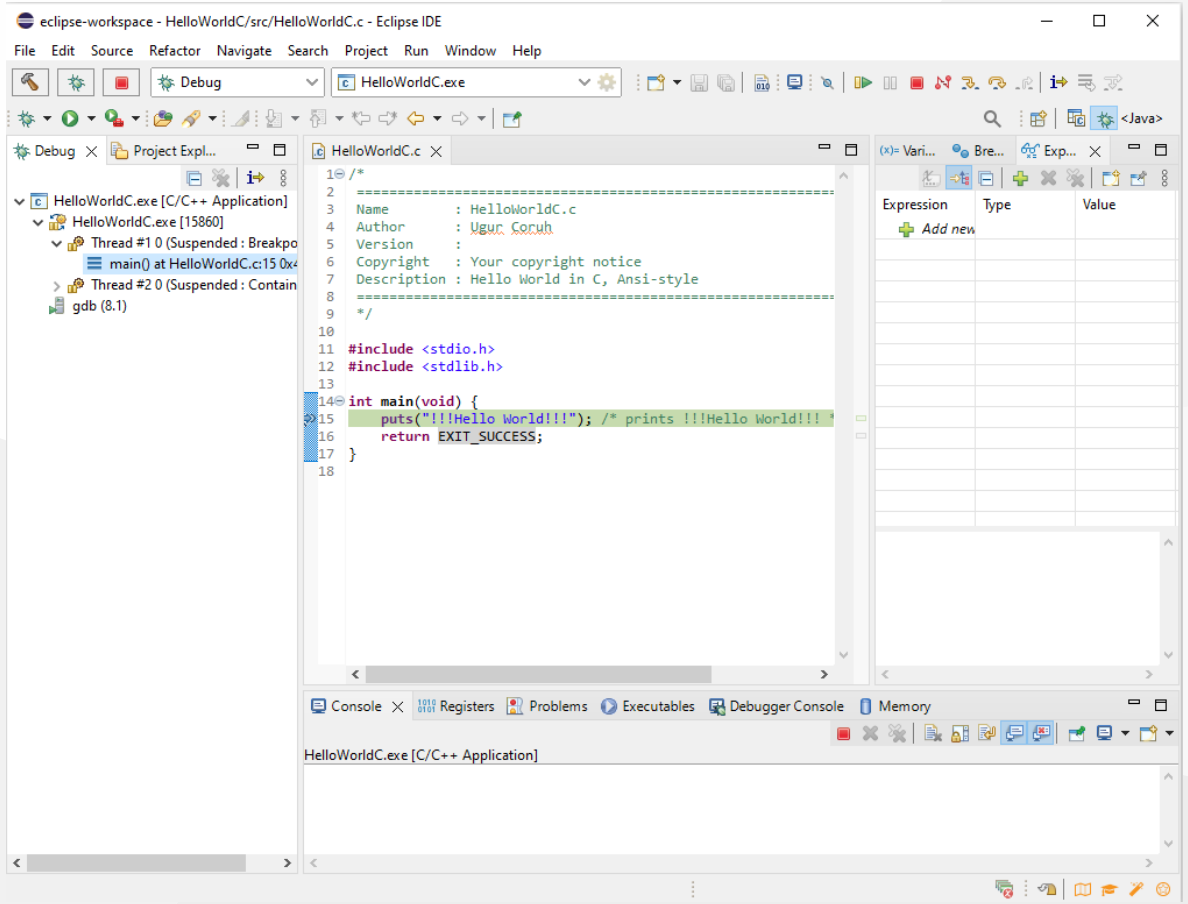
Eclipse (C/C++) - Compile Only / Debugging Has Problem (15)

- Before build if you want to debug application select debug configuration, put your breakpoints and then Build application again.
- Right click the generated executable Debug As -> Local C/C++ Application



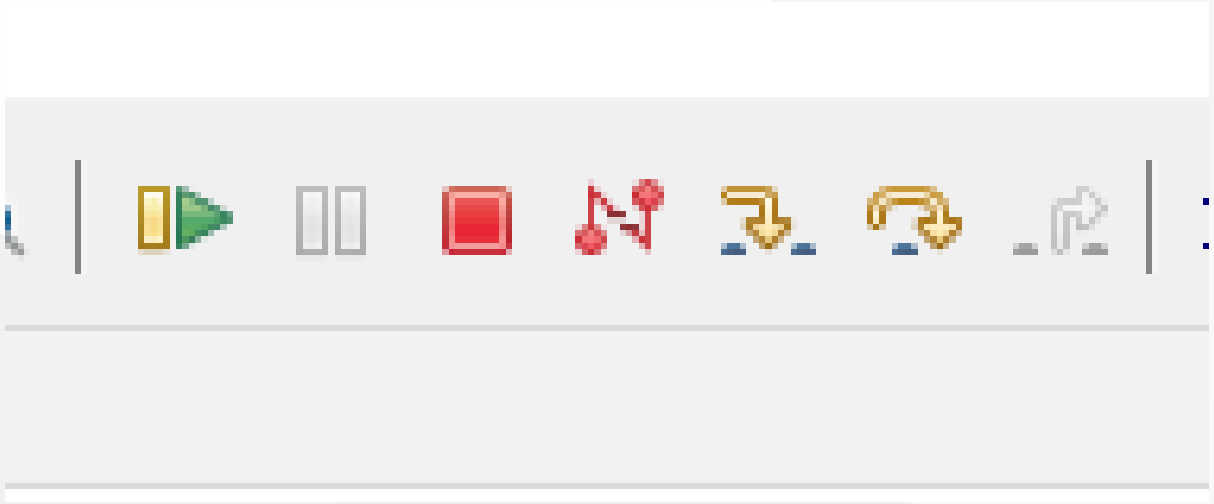
Eclipse (C/C++) - Compile Only / Debugging Has Problem (16)

- Debugger will start and stop at breakpoint as follow.



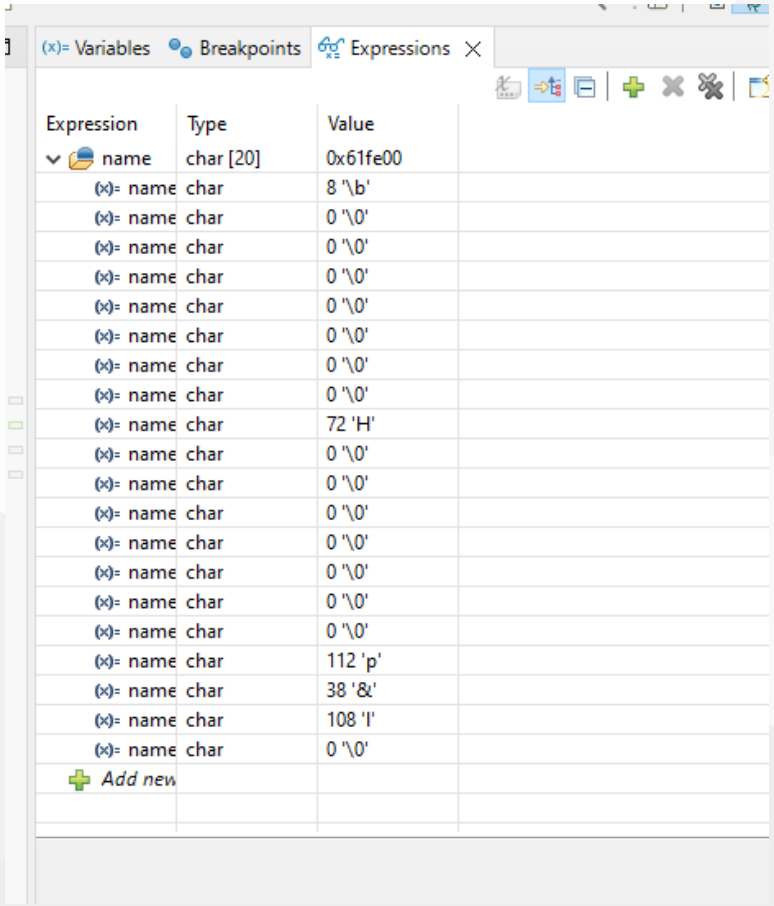
Eclipse (C/C++) - Compile Only / Debugging Has Problem (16)

- Check debug control shortcuts and use them

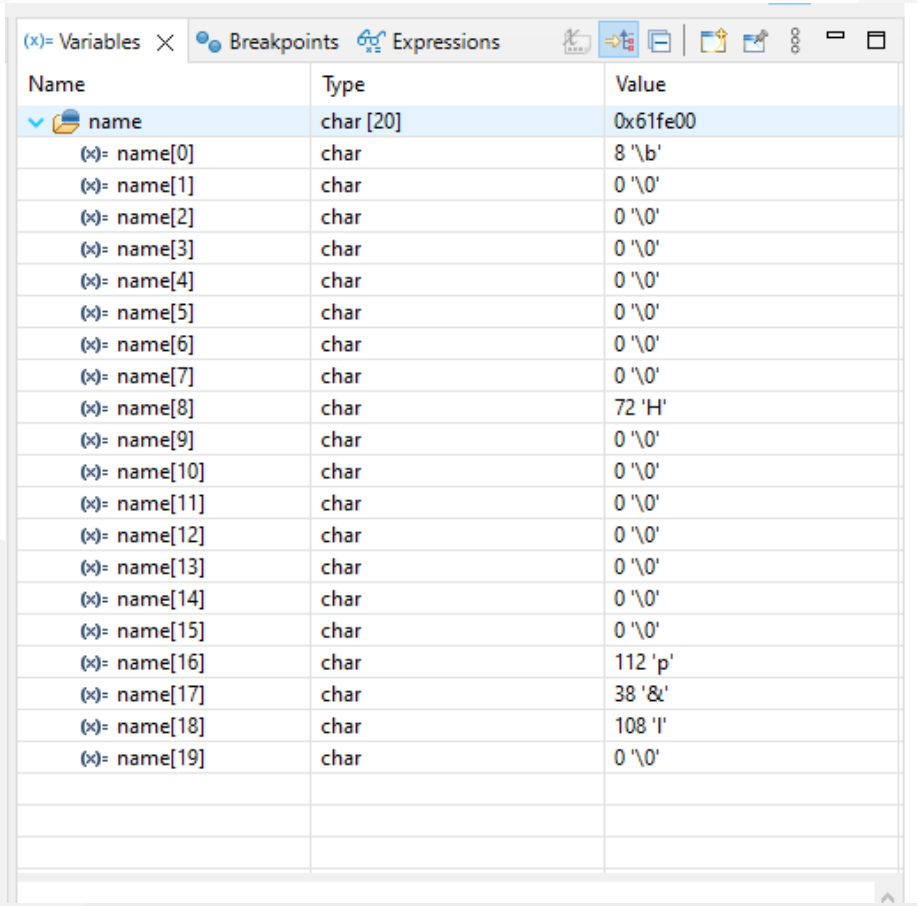


Eclipse (C/C++) - Compile Only / Debugging Has Problem (17)

- To watch variables use Expressions and Variables



Eclipse (C/C++) - Compile Only / Debugging Has Problem (18)



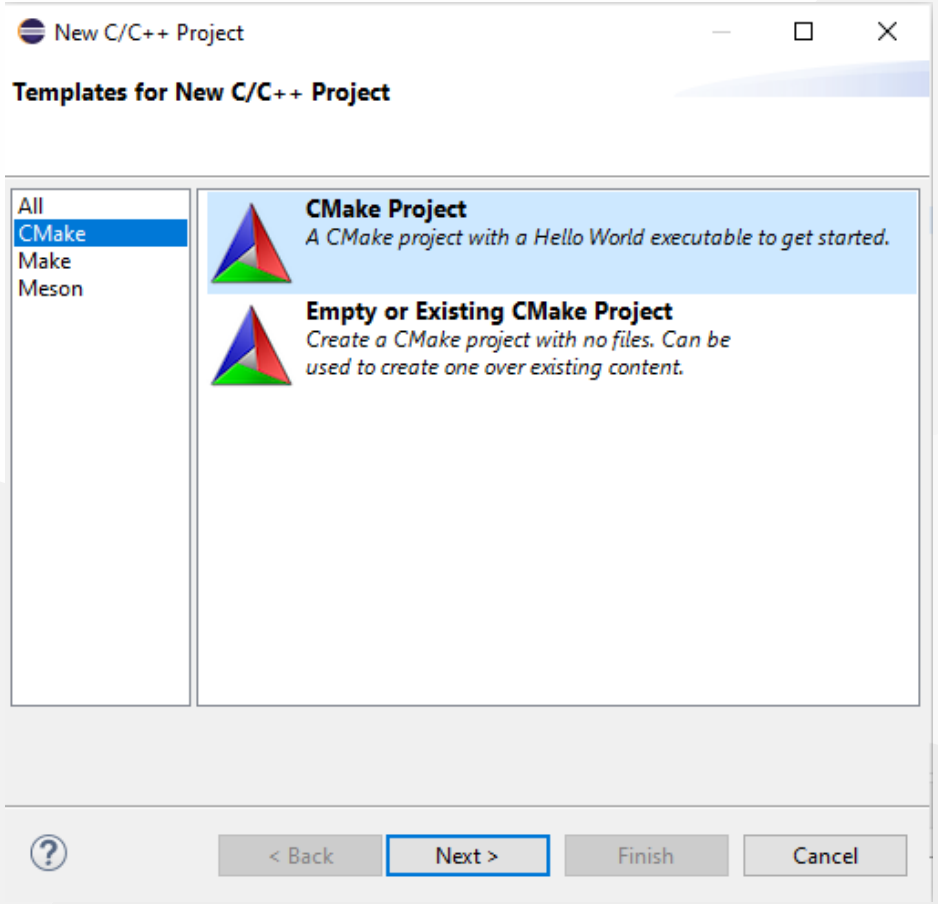
Name	Type	Value
name	char [20]	0x61fe00
name[0]	char	8 '\b'
name[1]	char	0 '\0'
name[2]	char	0 '\0'
name[3]	char	0 '\0'
name[4]	char	0 '\0'
name[5]	char	0 '\0'
name[6]	char	0 '\0'
name[7]	char	0 '\0'
name[8]	char	72 'H'
name[9]	char	0 '\0'
name[10]	char	0 '\0'
name[11]	char	0 '\0'
name[12]	char	0 '\0'
name[13]	char	0 '\0'
name[14]	char	0 '\0'
name[15]	char	0 '\0'
name[16]	char	112 'p'
name[17]	char	38 '&'
name[18]	char	108 'l'
name[19]	char	0 '\0'

Eclipse (C/C++) - Compile Only / Debugging Has Problem (19)

- for more visit eclipse webpage
  - Effective Techniques for Debugging C & C++ | The Eclipse Foundation
  - Help - Eclipse IDE

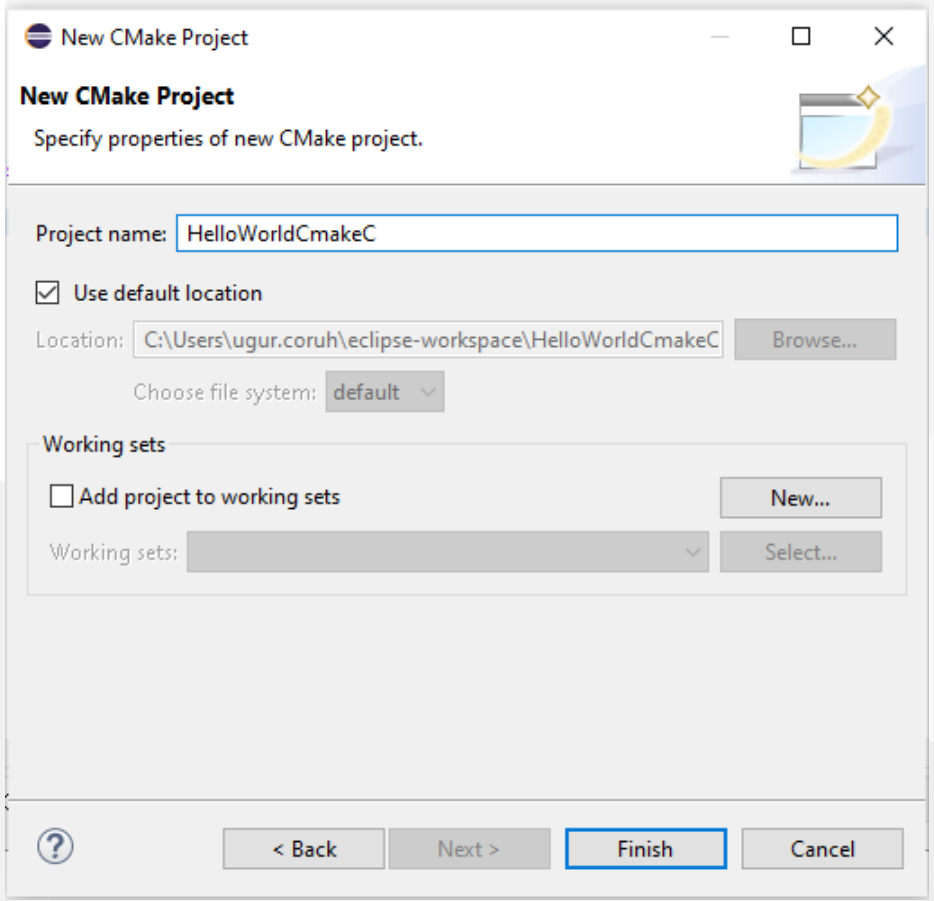
Eclipse (C/C++) - Compile Only / Debugging Has Problem (20)

- Generate CMAKE project from new Project and Select CMake Project Template



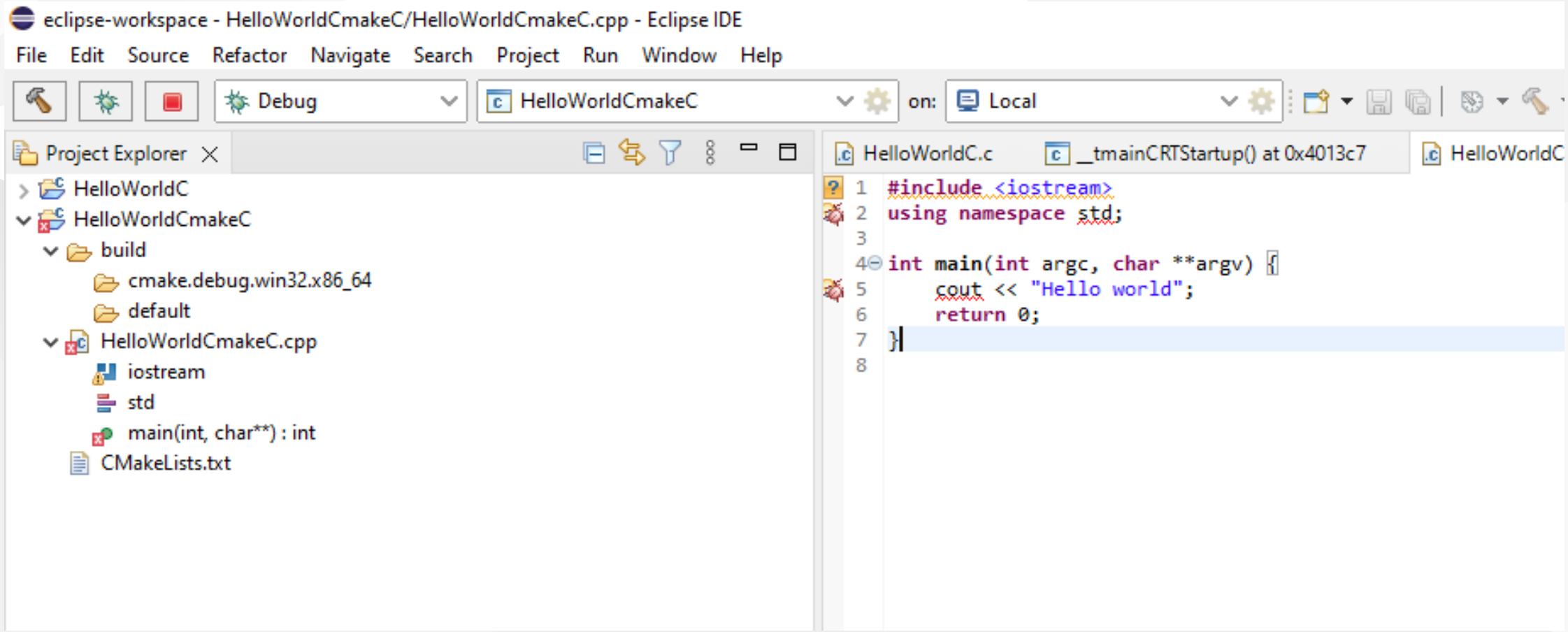
Eclipse (C/C++) - Compile Only / Debugging Has Problem (21)

- Give project name



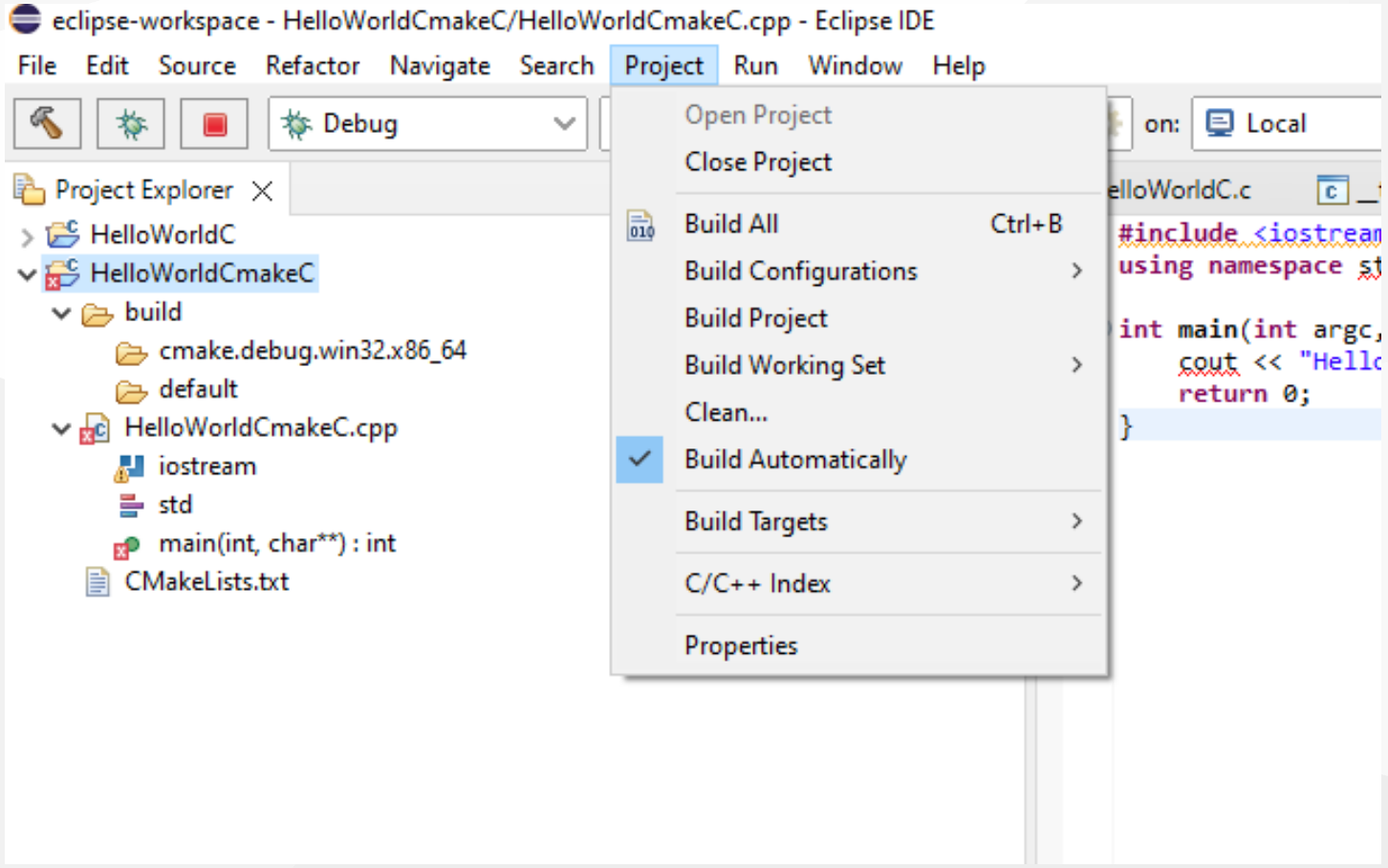
Eclipse (C/C++) - Compile Only / Debugging Has Problem (22)

- This will generate default C++ Hello World project



Eclipse (C/C++) - Compile Only / Debugging Has Problem (23)

- Build Project

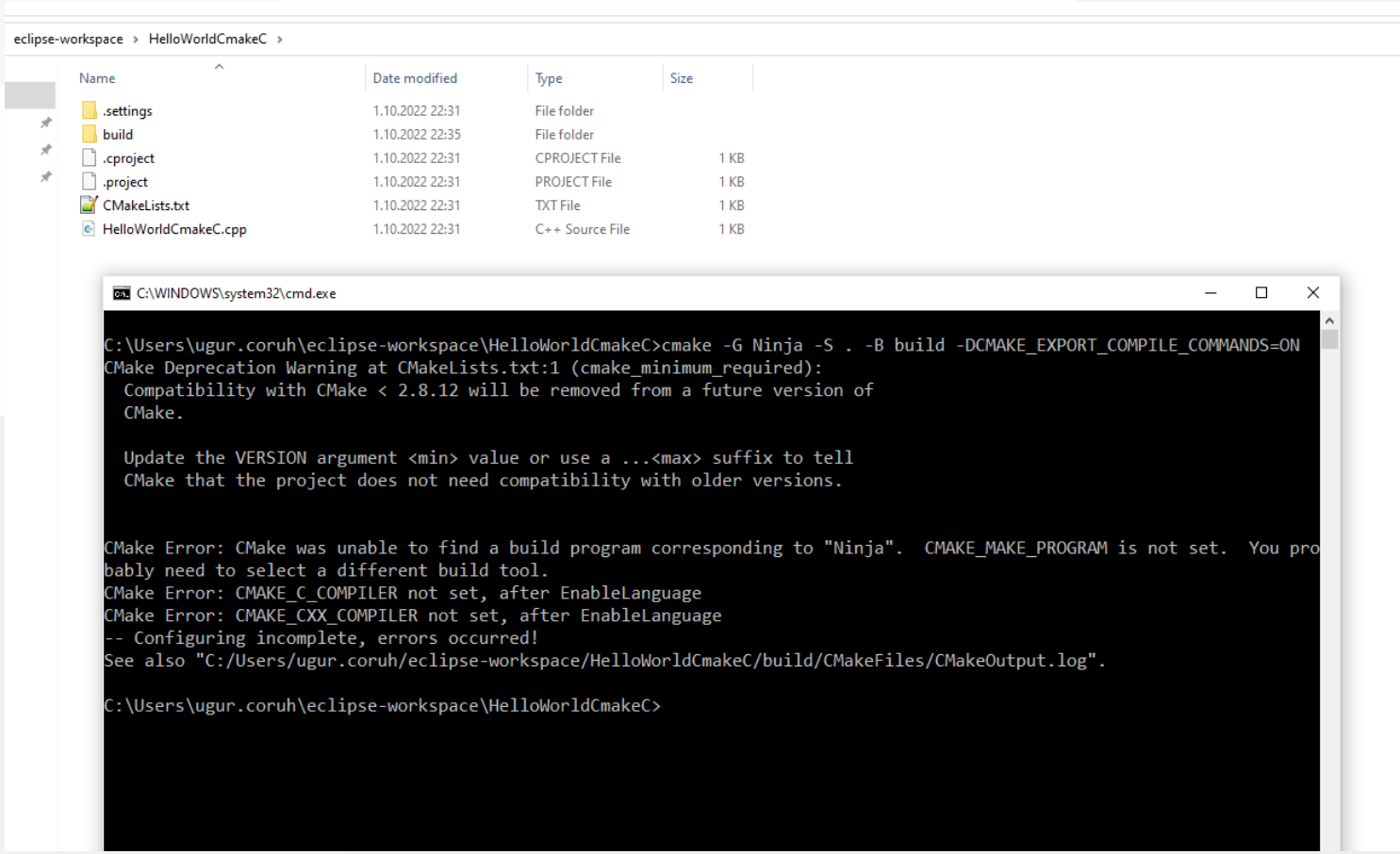


Eclipse (C/C++) - Compile Only / Debugging Has Problem (24)

- It will give following errors, for missing configurations. This errors are generated by CMAKE
- Then clean and rebuild again.

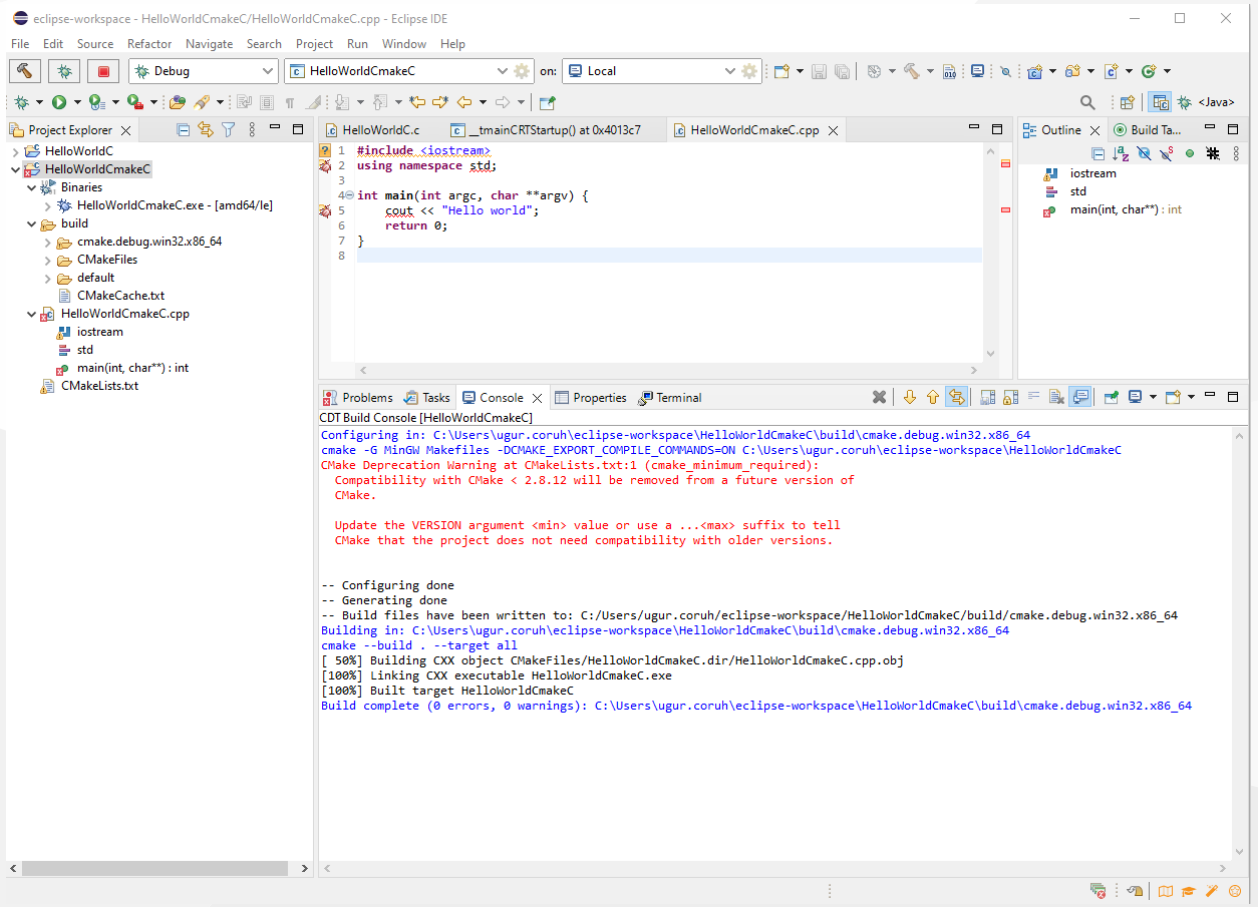
```
Errors occurred during the build.
Errors running builder 'CDT Core Builder' on project 'HelloWorldCmakeC'.
Resource '/HelloWorldCmakeC/build/cmake.debug.win32.x86_64/compile_commands.json' does not exist.
Resource '/HelloWorldCmakeC/build/cmake.debug.win32.x86_64/compile_commands.json' does not exist.
Resource '/HelloWorldCmakeC/build/cmake.debug.win32.x86_64/compile_commands.json' does not exist.
Resource '/HelloWorldCmakeC/build/cmake.debug.win32.x86_64/compile_commands.json' does not exist.
```

Eclipse (C/C++) - Compile Only / Debugging Has Problem (25)



Eclipse (C/C++) - Compile Only / Debugging Has Problem (26)

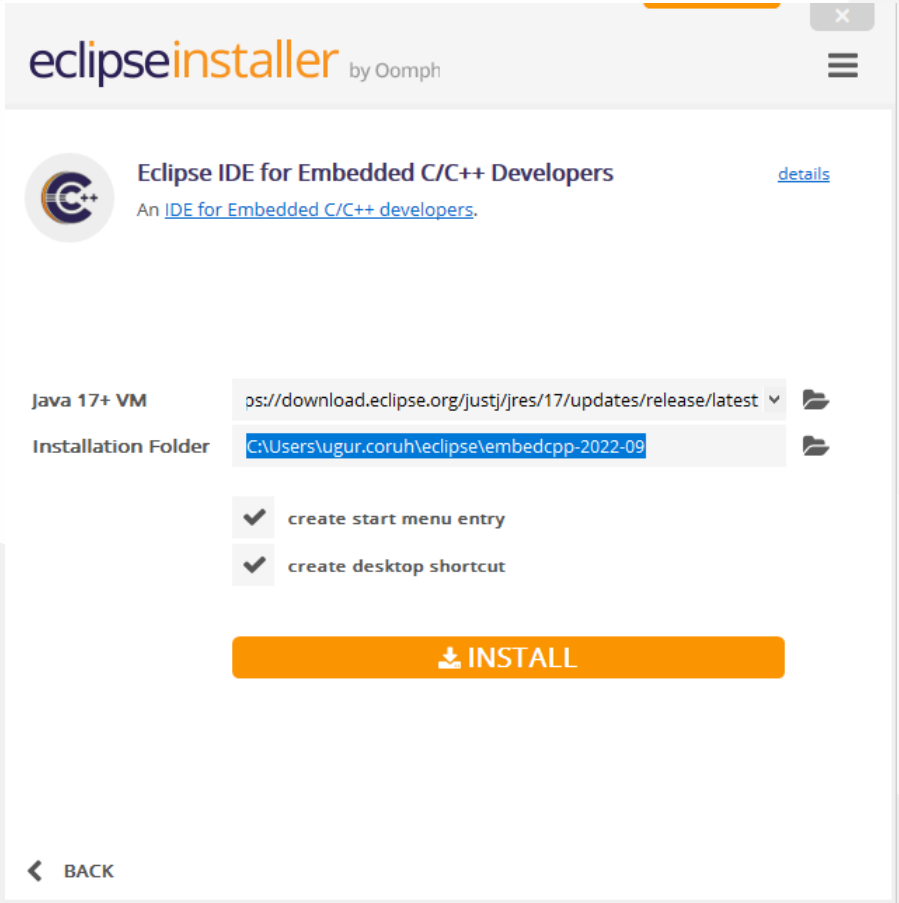
- After this operation first Clean project from Project menu and then Build All again



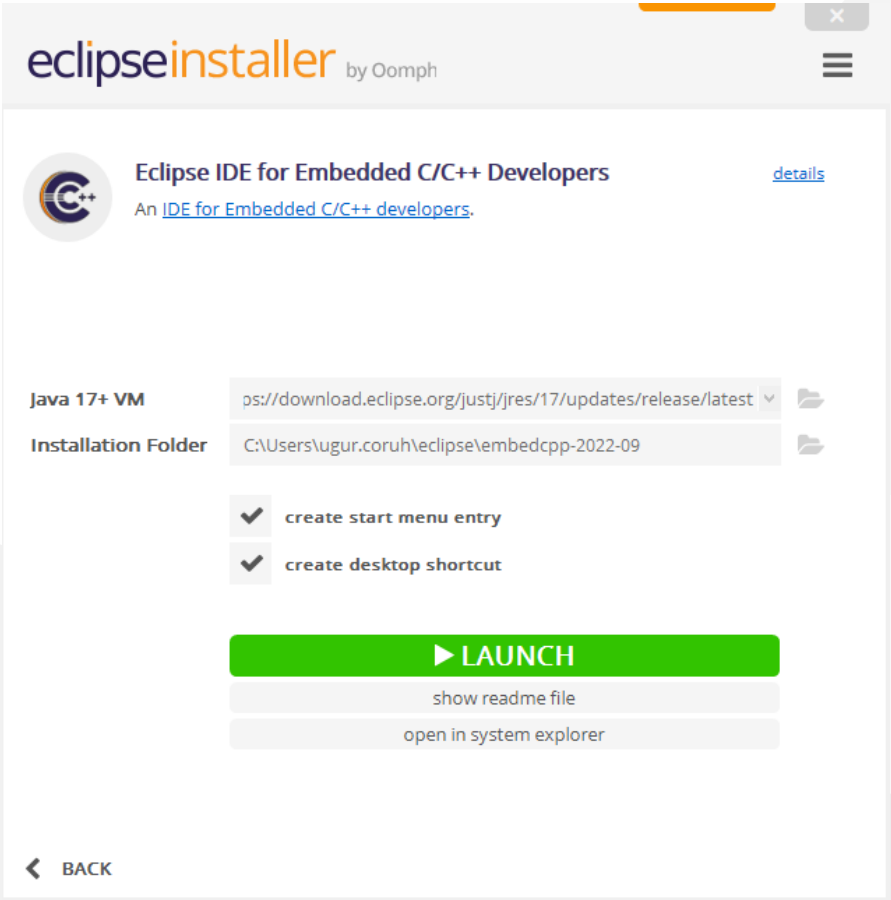
Eclipse (C/C++) - Compile Only / Debugging Has Problem (27)

- Eclipse with CMake project on windows
- JV - Science and stuff.

Eclipse (C/C++) - Compile Only / Debugging Has Problem (28)

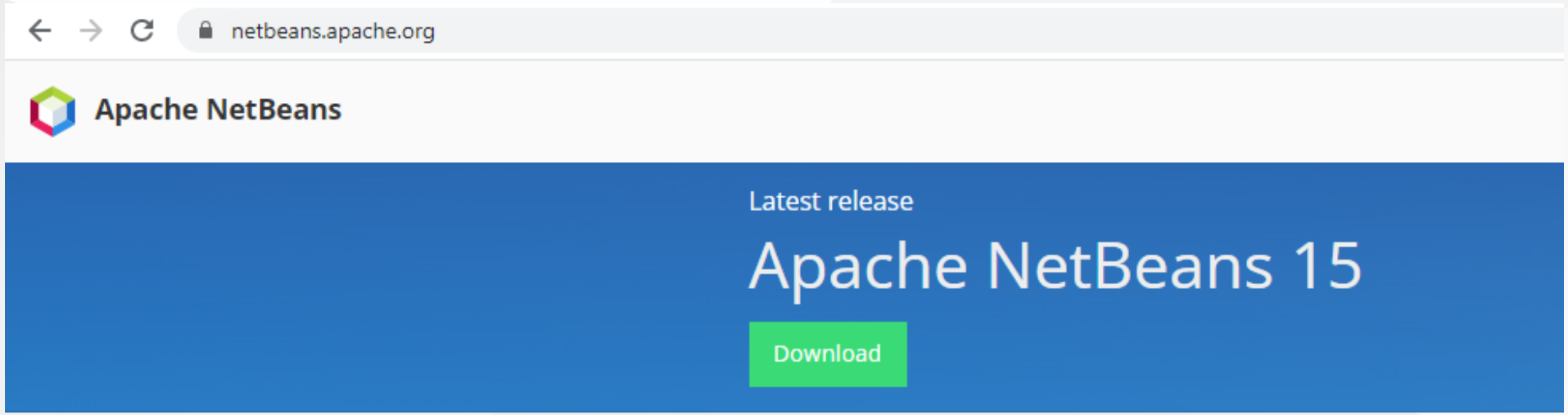


Eclipse (C/C++) - Compile Only / Debugging Has Problem (29)

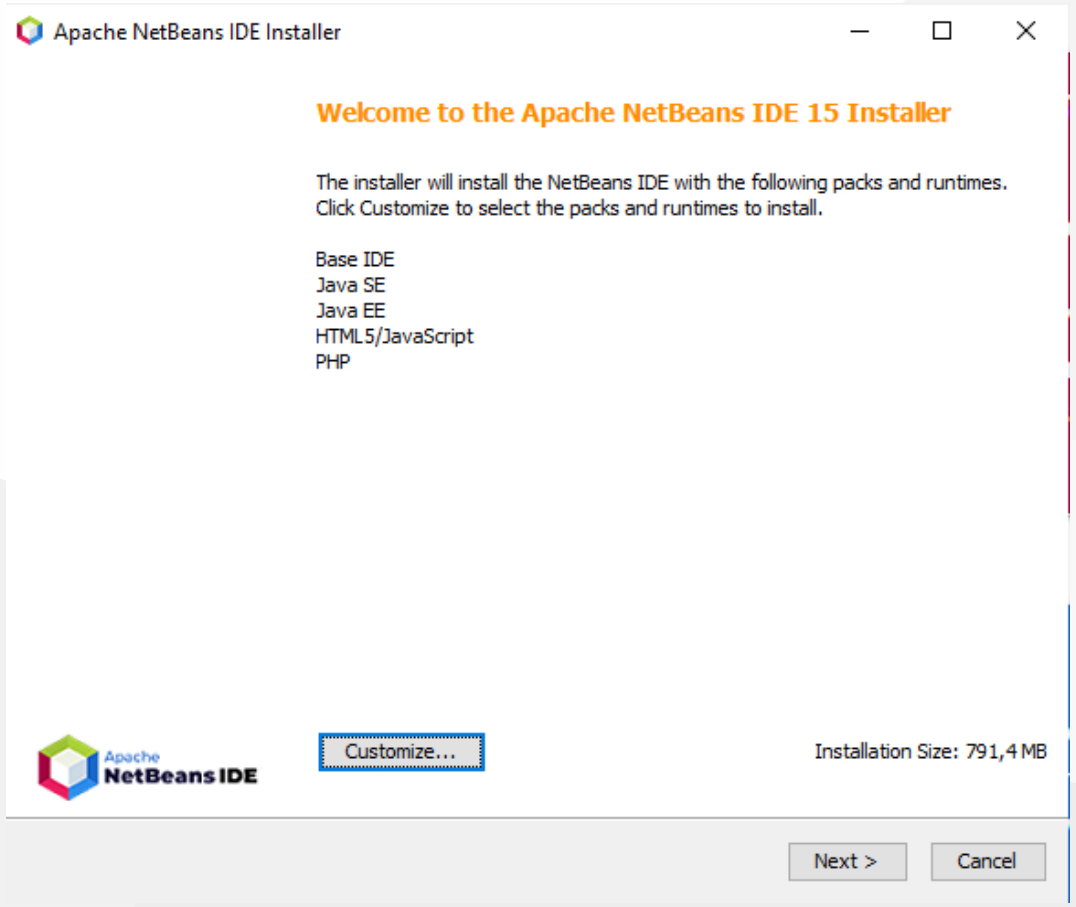


Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (1)

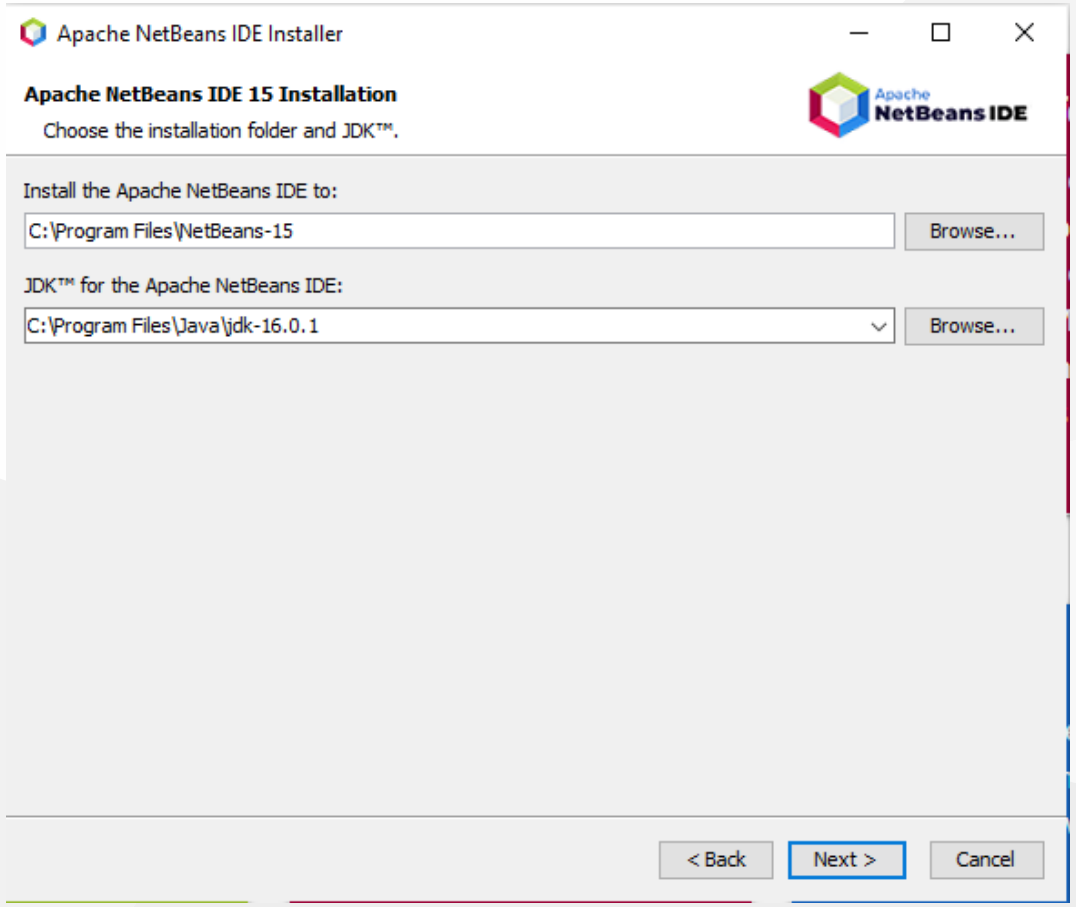
- https://netbeans.apache.org/
- C and C++ Tutorials



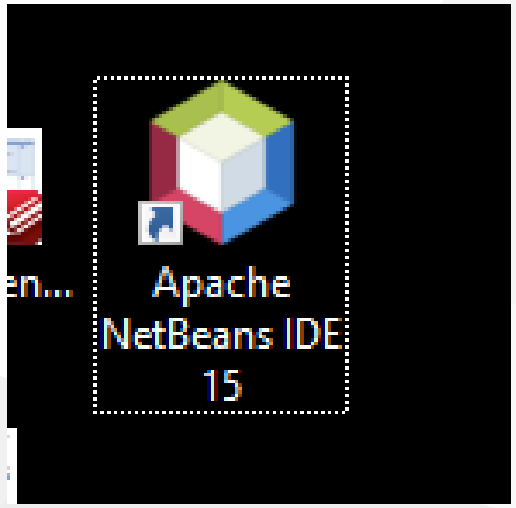
Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (2)



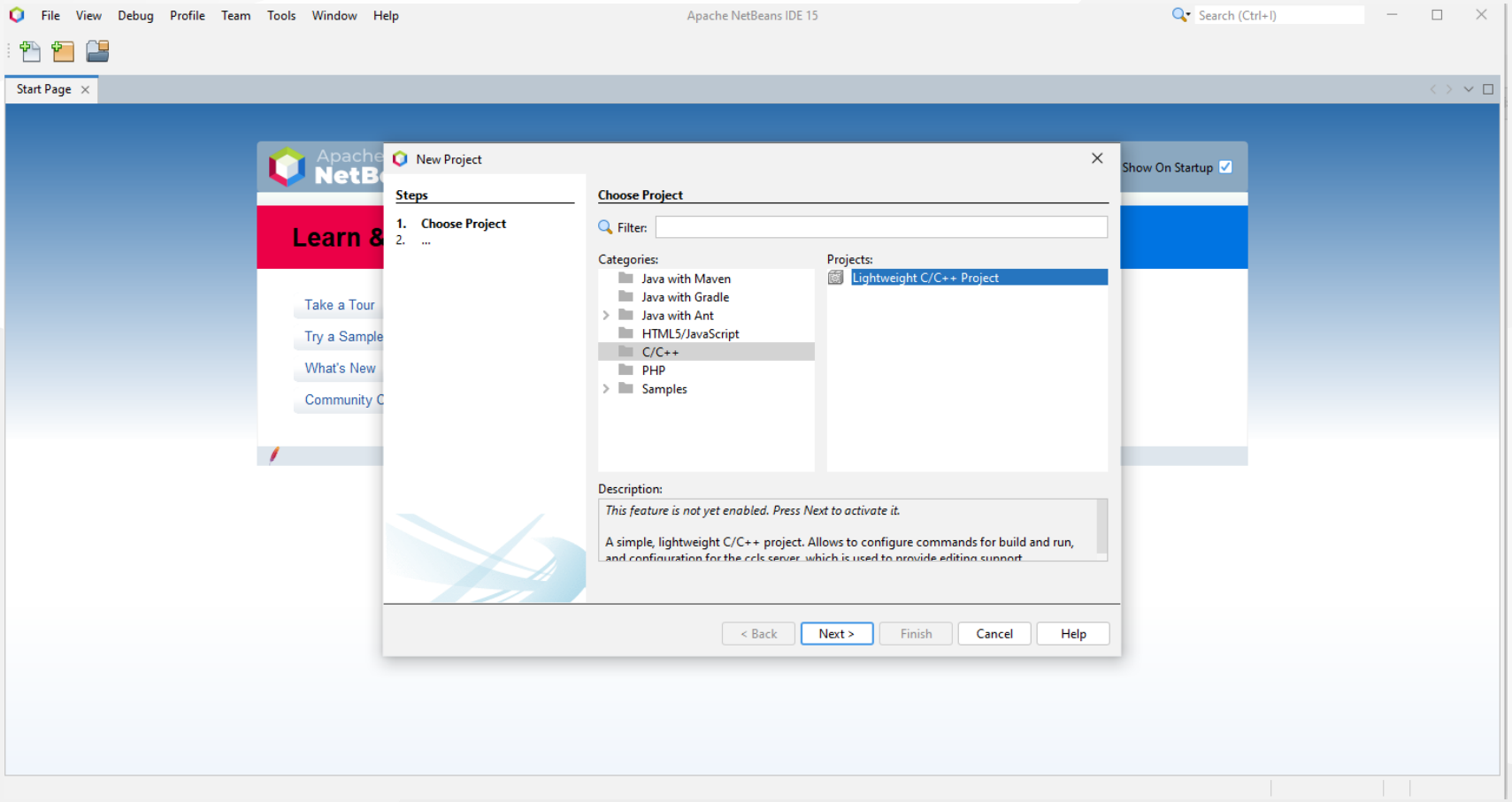
Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (3)



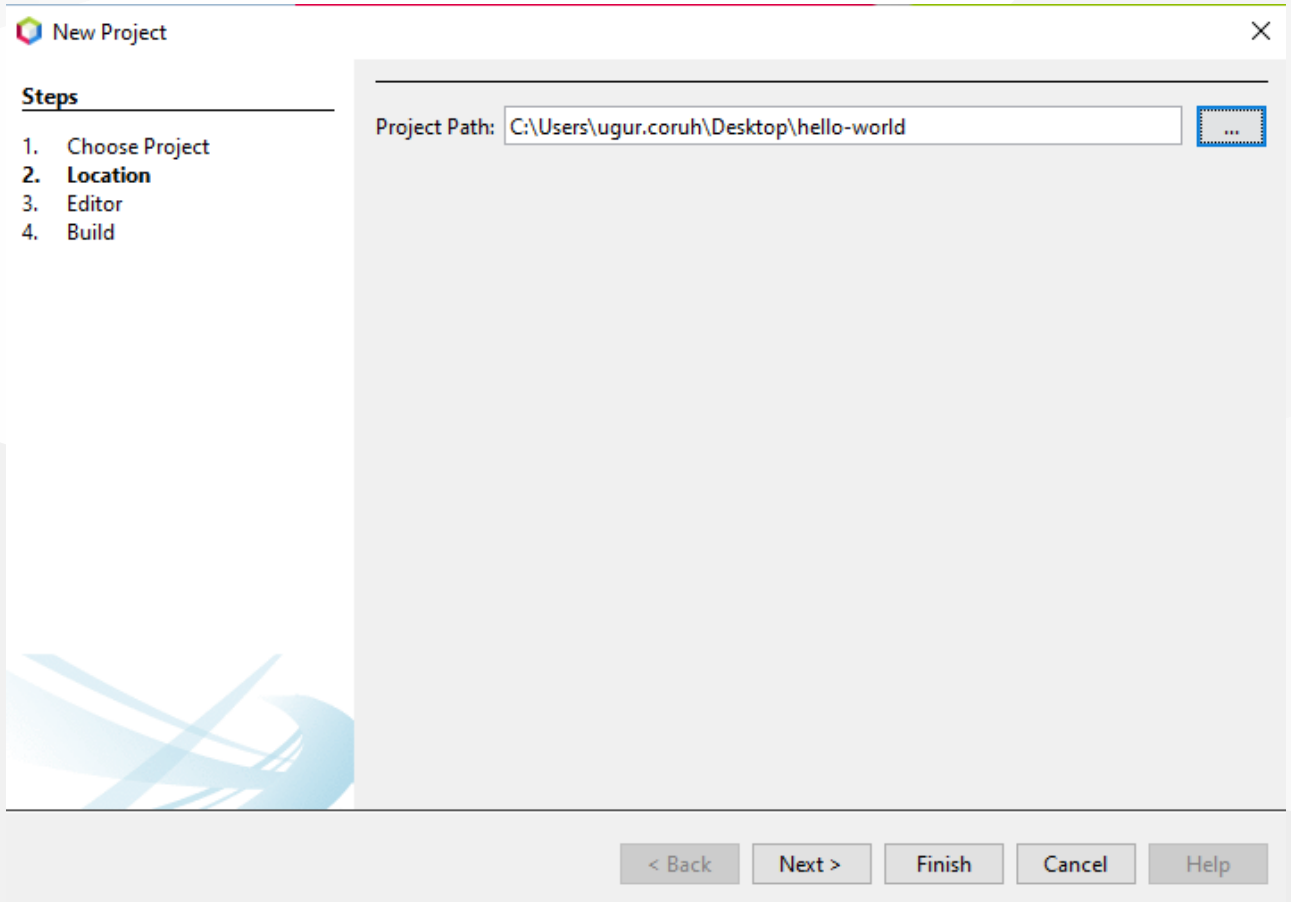
Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (4)



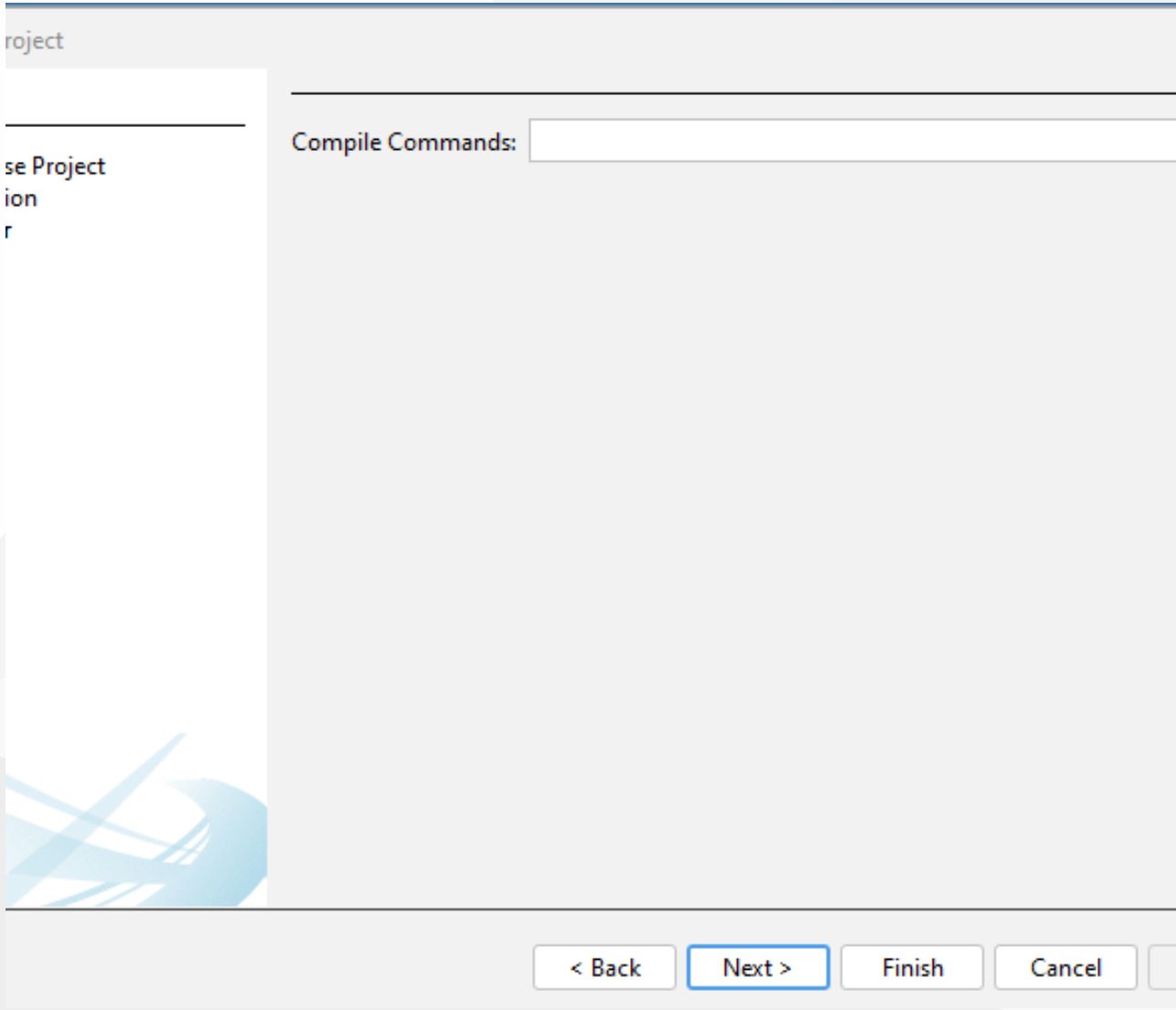
Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (5)



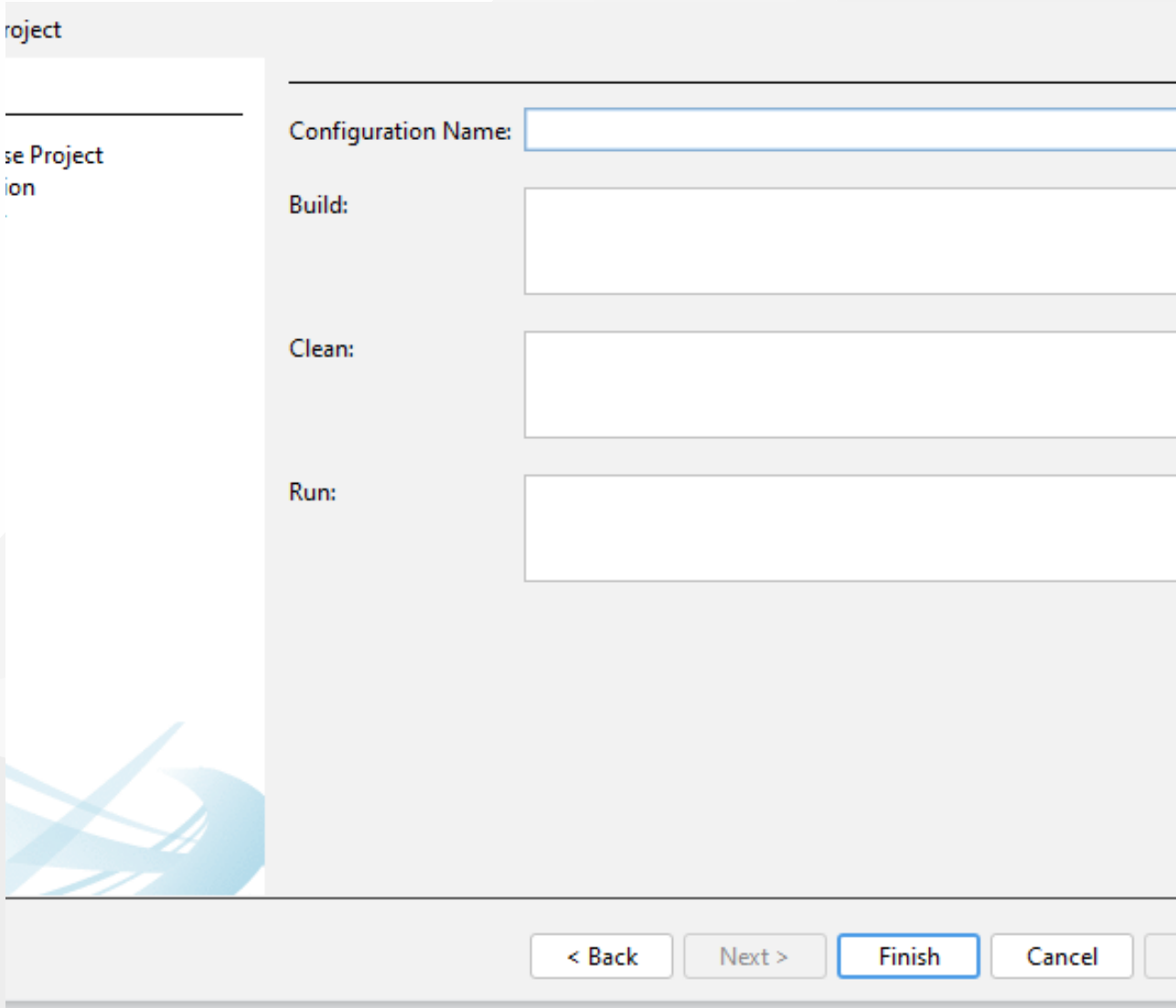
Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (6)



Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (7)



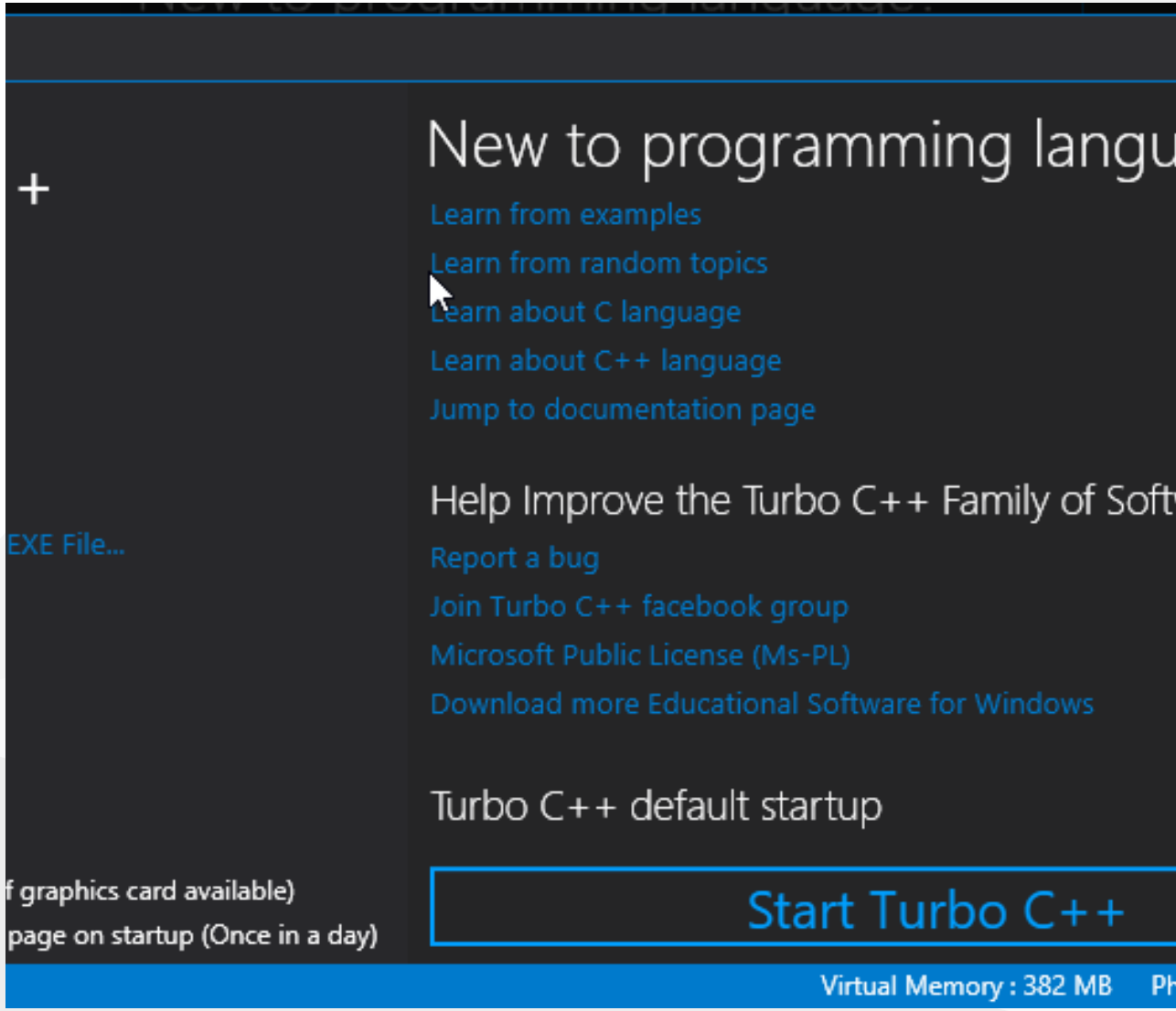
Netbeans (C/C++) - Manuel Build/Clean/Run Command Setting Not Good Option for C/C++ Development (8)



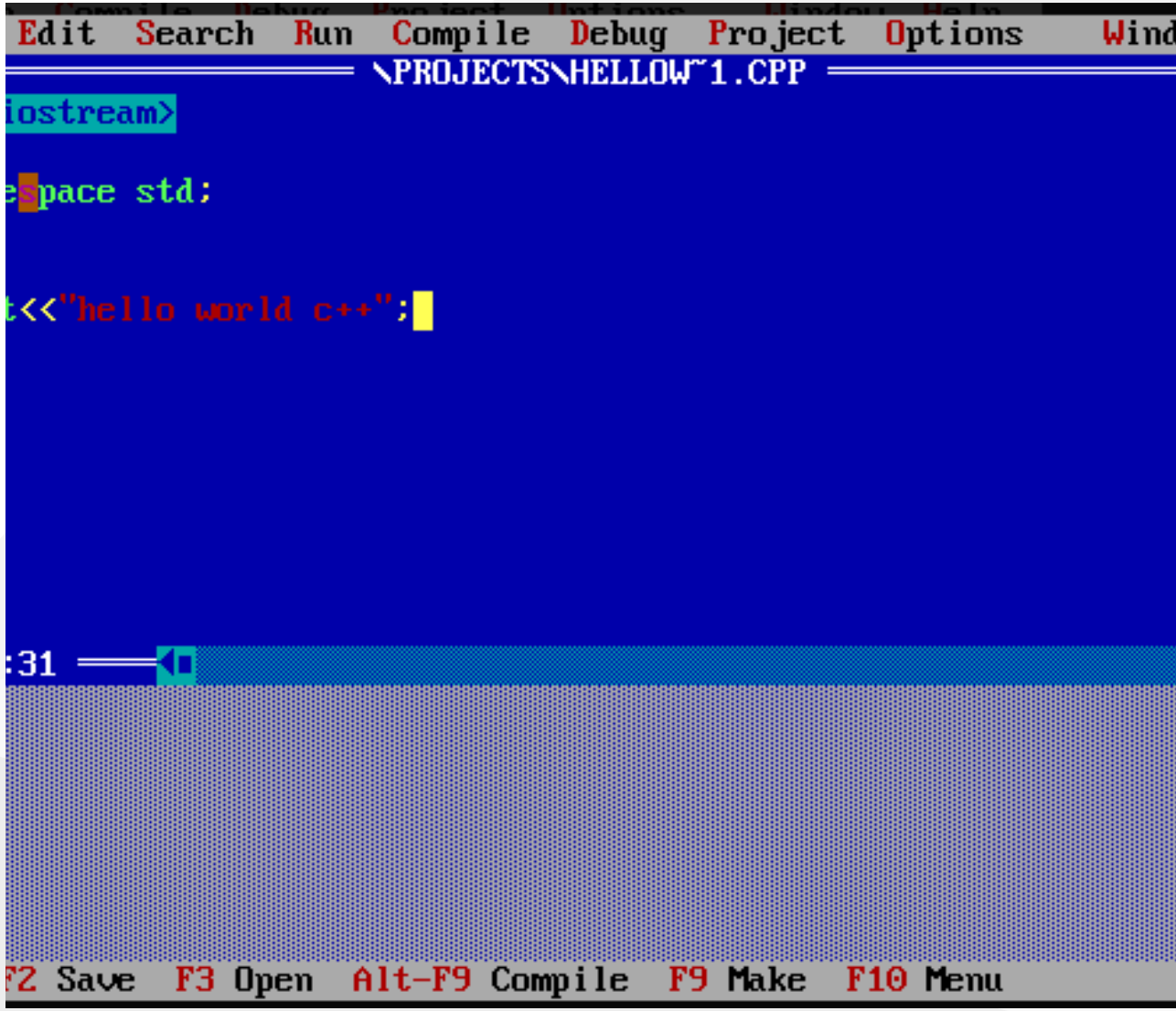
Turbo C/C++ (1)

Download Turbo.C.3.2.zip

- Download Turbo C++ for Windows 7, 8, 8.1, 10 and Windows 11 (32-64 bit) with full/window screen mode and many more extra features
- Turbo C++ Shortcuts - C Programming Language Tutorials



Turbo C/C++ (2)


Edit Search Run Compile Debug Project Options Wind
\PROJECTS\HELLOW~1.CPP
iostream>
space std;
t<<"hello world c++";
:31
F2 Save F3 Open Alt-F9 Compile F9 Make F10 Menu

Cmake (C++/C) (1)

CMake (http://www.cmake.org/) is a program which generates the **Makefiles** used by **Make**.

Cmake (C++/C) (2)

Why use **CMake** ?

- Eases **Make** use
  - but the same way of thinking
  - generate the **Makefile**
- Separate the compilation from the sources
- Multi-platfoms
- Very flexible

Cmake (C++/C) (3)

- Check if the libraries/programs are available on your system
- File generator (**configure_file**)
- Calling programs or scripts (**doxygen**)
- One of the new standards

Cmake (C++/C) (4) (Download and Install)

use the following link for download

Download | CMake

Cmake (C++/C) (5) (WSL and Linux Environment)

Hello world with CMake

Cmake (C++/C) (6) (Windows Environment)

main.c

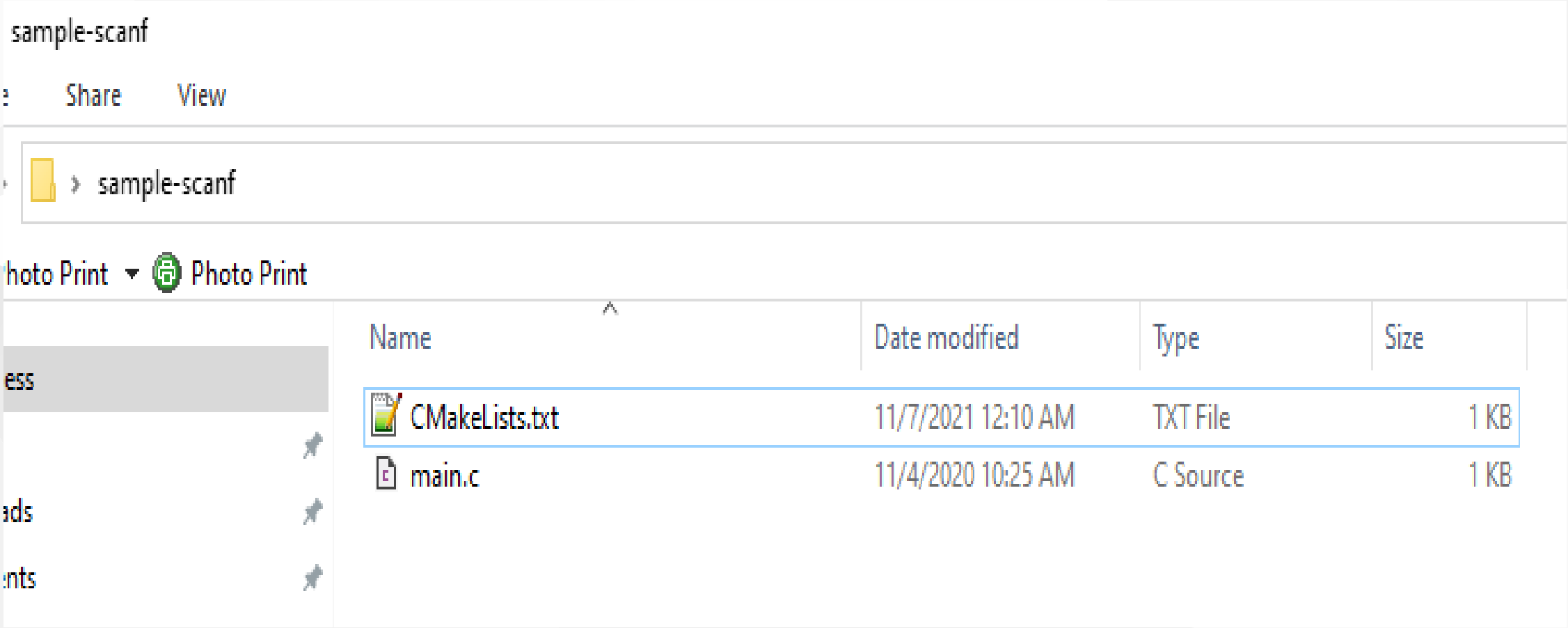
```c
#include <stdio.h>
int main()
{
    char name[20];
    printf("Enter name: ");
    scanf("%s", name);
    printf("Your name is %s.", name);
    return 0;
}
```

CMakeLists.txt

```
cmake_minimum_required(VERSION 3.7.2)
project(scanf-sample)
add_executable(scanf-sample main.c)
```

Cmake (C++/C) (7) (Windows Environment)

put main.c and CMakeLists.txt file in sample-scanf folder and from command line



run the following cmake command with dot (.) to create solution file for c project

```
C:\Users\ugur.coruh\Desktop\sample-scanf>cmake .
```

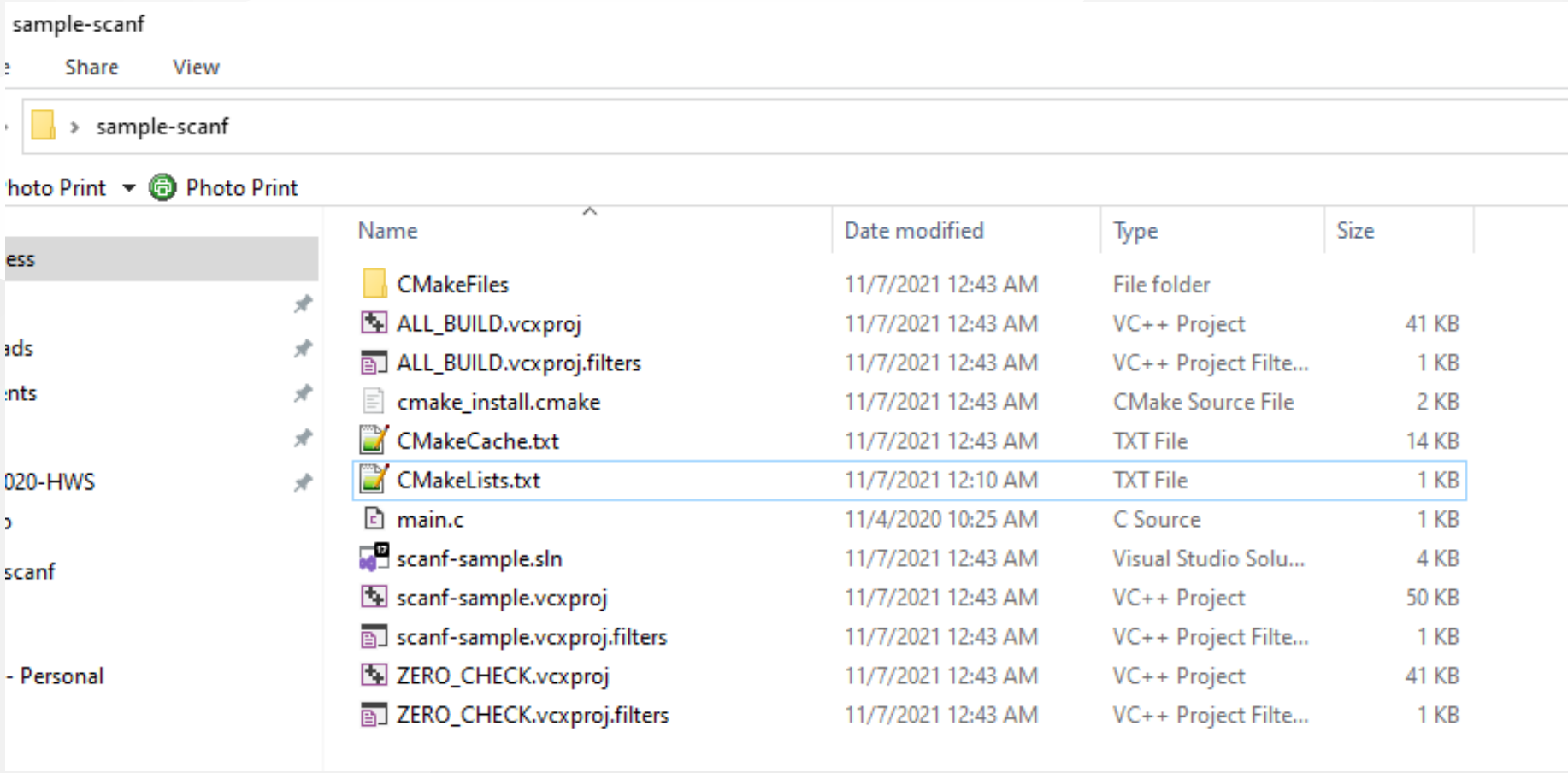
Cmake (C++/C) (8) (Windows Environment)

I have Visual Studio 2022 Community Edition Installed on My Computer, for these reason build tools are selected for visual studio environment and the following outputs are generated

```
C:\Users\ugur.coruh\Desktop\sample-scanf>cmake .
-- Building for: Visual Studio 17 2022
-- Selecting Windows SDK version 10.0.22000.0 to target Windows 10.0.19043.
-- The C compiler identification is MSVC 19.30.30704.0
-- The CXX compiler identification is MSVC 19.30.30704.0
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working C compiler: C:/Program Files/Microsoft Visual Studio/2022/Community/VC/Tools/MSVC/14.30.30704/bin/Hostx64/x64/cl.exe - skipped
-- Detecting C compile features
-- Detecting C compile features - done
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Check for working CXX compiler: C:/Program Files/Microsoft Visual Studio/2022/Community/VC/Tools/MSVC/14.30.30704/bin/Hostx64/x64/cl.exe - skipped
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Configuring done
-- Generating done
-- Build files have been written to: C:/Users/ugur.coruh/Desktop/sample-scanf

C:\Users\ugur.coruh\Desktop\sample-scanf>
```

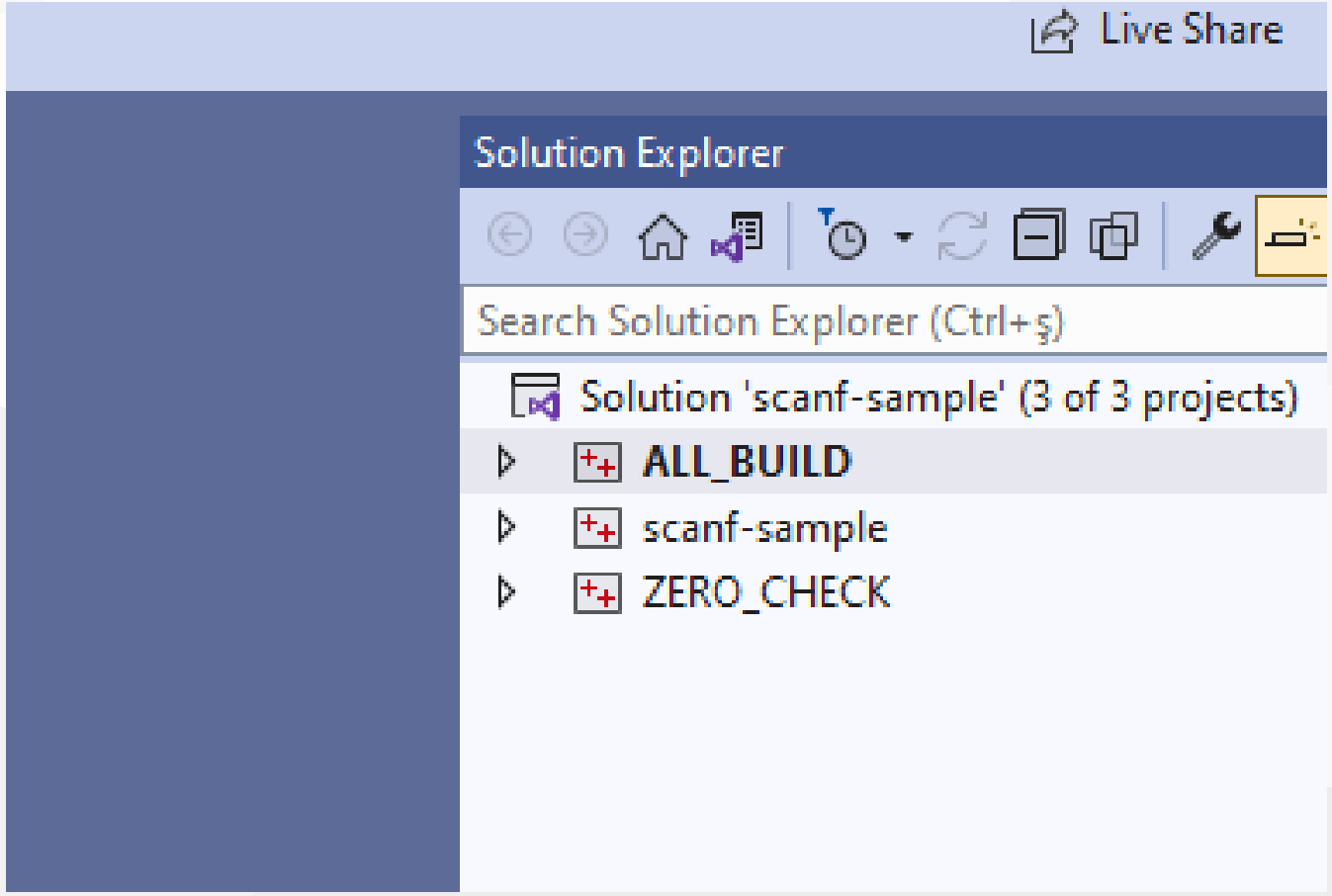
Cmake (C++/C) (9) (Windows Environment)

also following files are generated



Cmake (C++/C) (10) (Windows Environment)

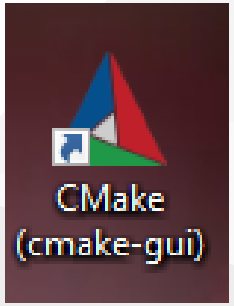
if we open scanf-sample.sln file we will have automated generated project files



Cmake (C++/C) (11) (Windows Environment)

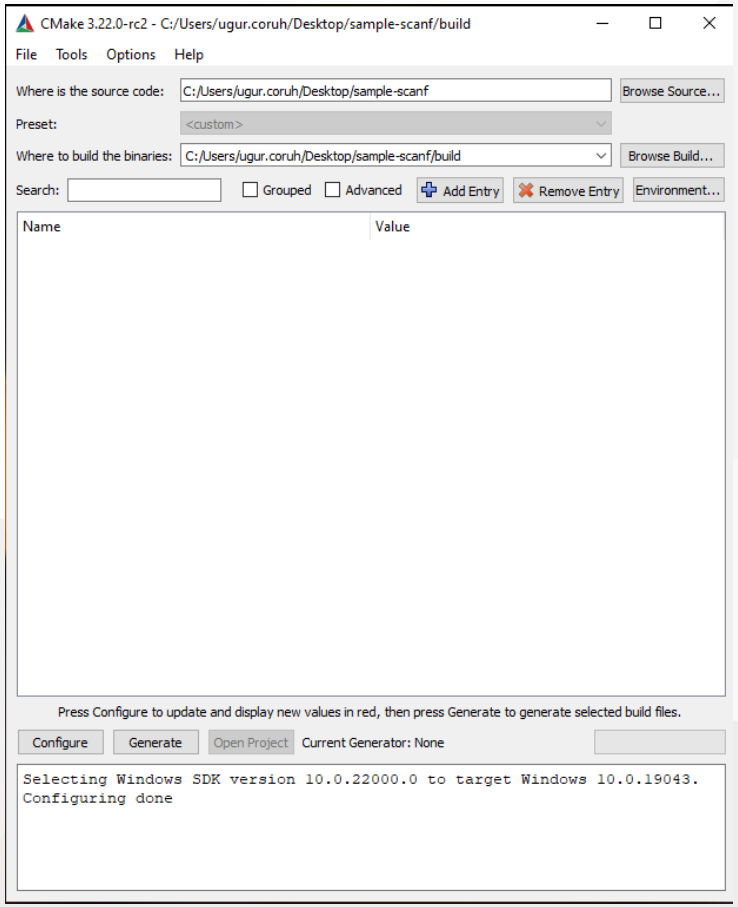
you can make scanf-sample with startup project with right click and then run on visual studio.

if you want to configure for another build tool you can use Cmake-GUI installed with setup on your computer



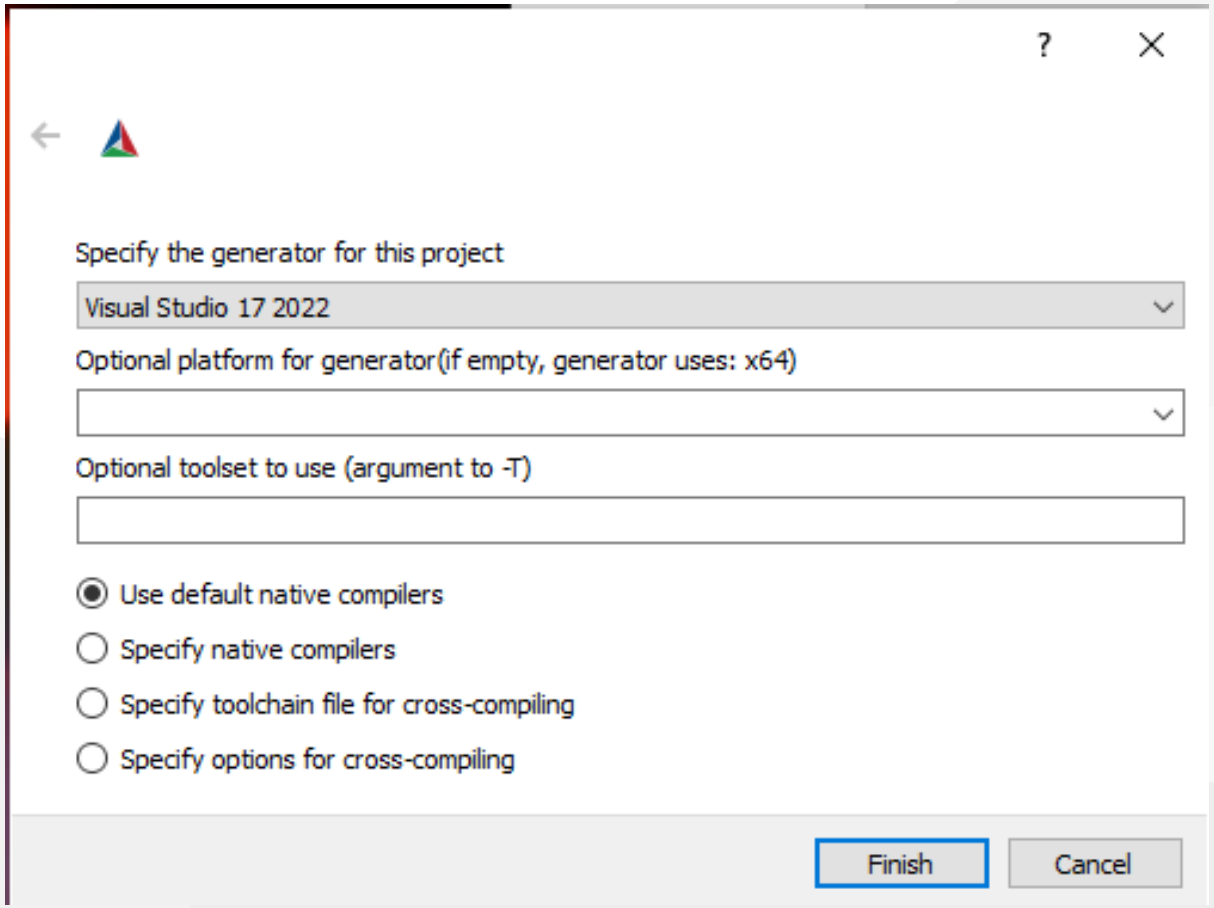
Cmake (C++/C) (12) (Windows Environment)

Open GUI and Select *File-> Delete Cache*

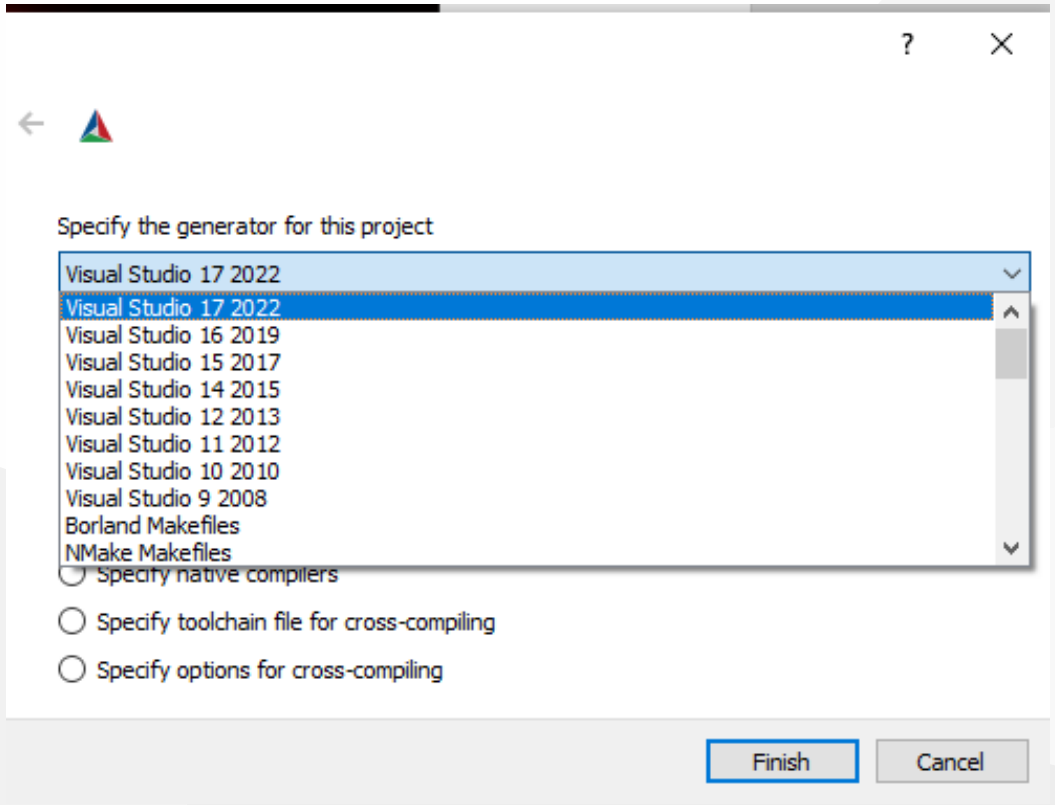


Cmake (C++/C) (13) (Windows Environment)

then you can click "Configure" to select build tool



Cmake (C++/C) (14) (Windows Environment)



Cmake (C++/C) (15) (Windows Environment)

if you click "Configure" twice it will generate the visual studio solution in build folder

for more detailed examples that include also docker and travis-ci sample you can check the following repo

GitHub - ttroy50/cmake-examples: Useful CMake Examples

Make (1)

Sample

hello.c

```c
#include <stdio.h>

int main(void)
{
    printf("hello, world\n");
}
```

Make (2)

Makefile

```
# This is the default target, which will be built when
# you invoke make
.PHONY: all
all: hello

# This rule tells make how to build hello from hello.cpp
hello: hello.c
    g++ -o hello hello.c

# This rule tells make to copy hello to the binaries subdirectory,
# creating it if necessary
.PHONY: install
install:
    mkdir -p binaries
    cp -p hello binaries

# This rule tells make to delete hello and hello.o
.PHONY: clean
clean:
    rm -f hello
```

Make (3)

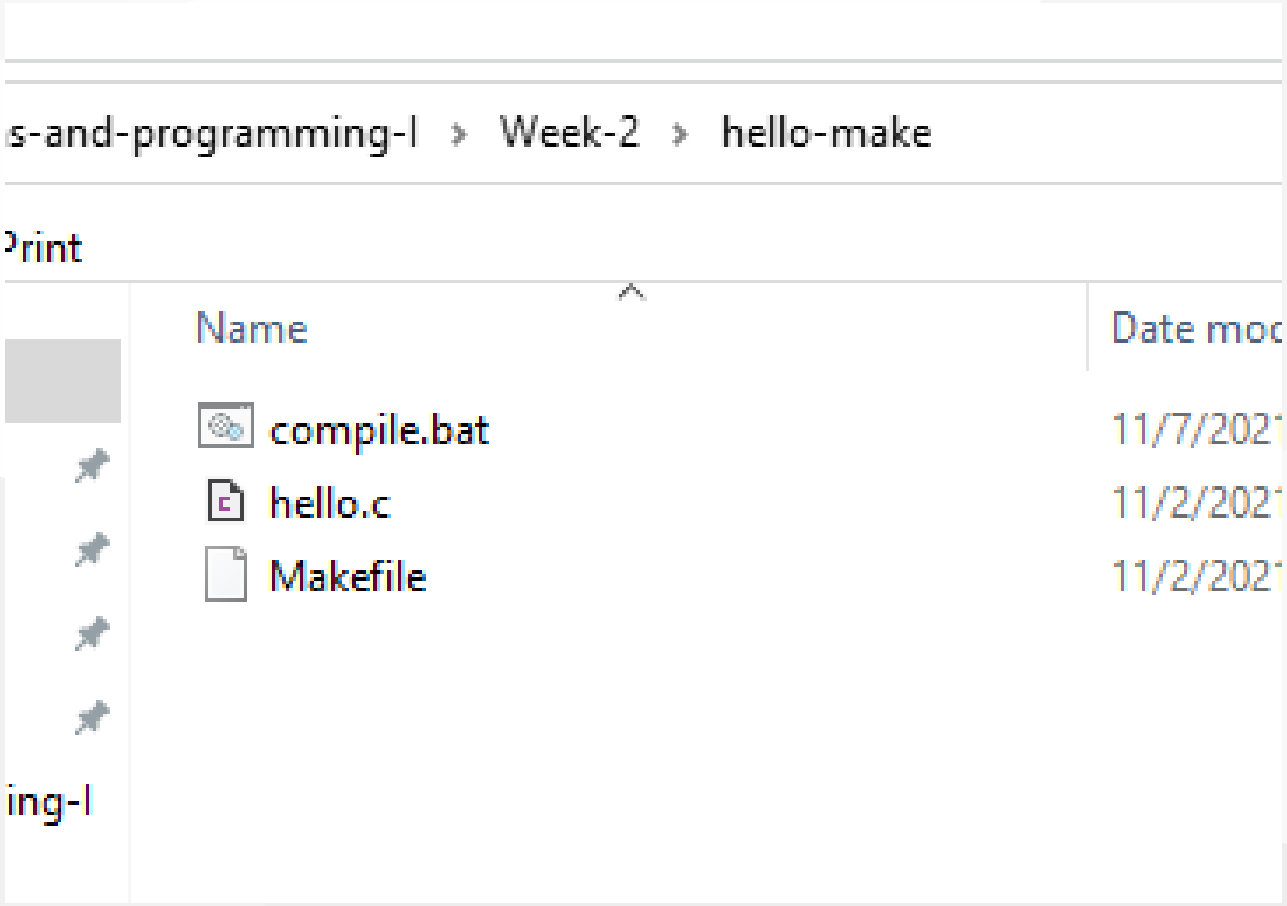
compile.bat

```
make all .
```

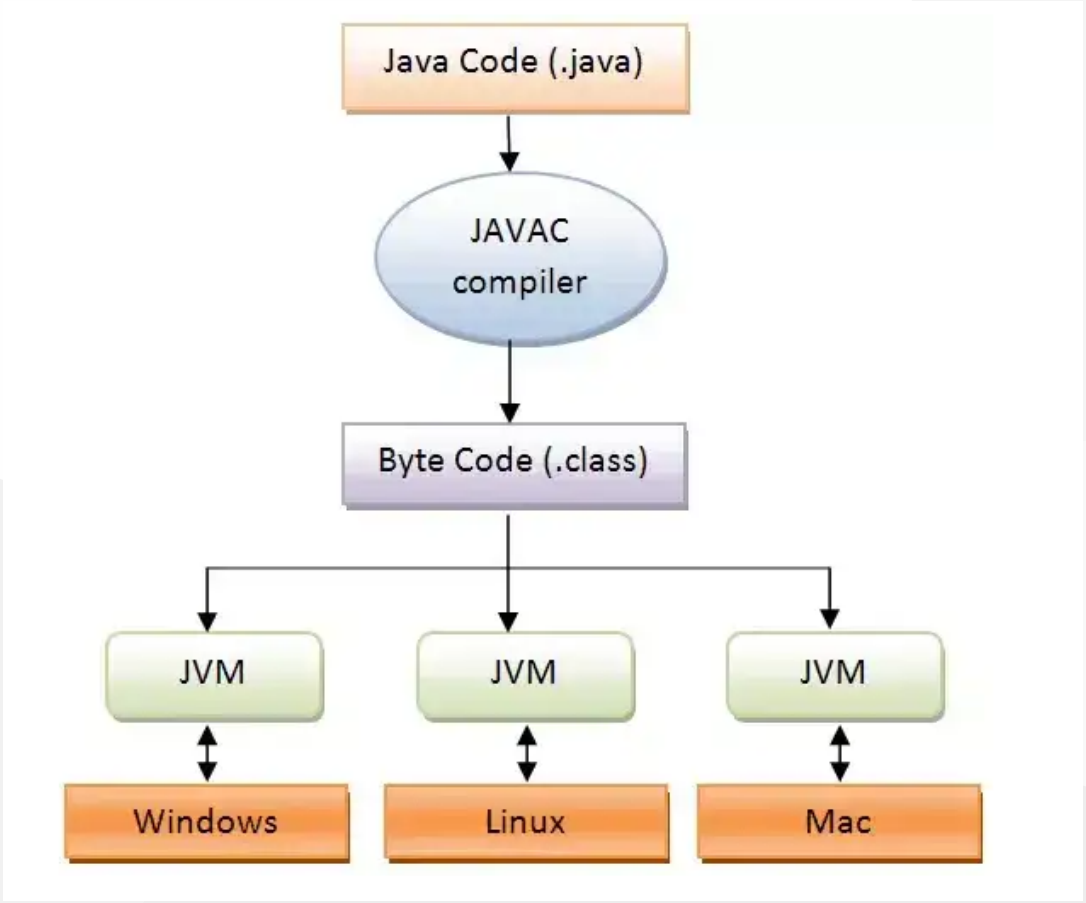
will create hello.exe

check hello-make sample

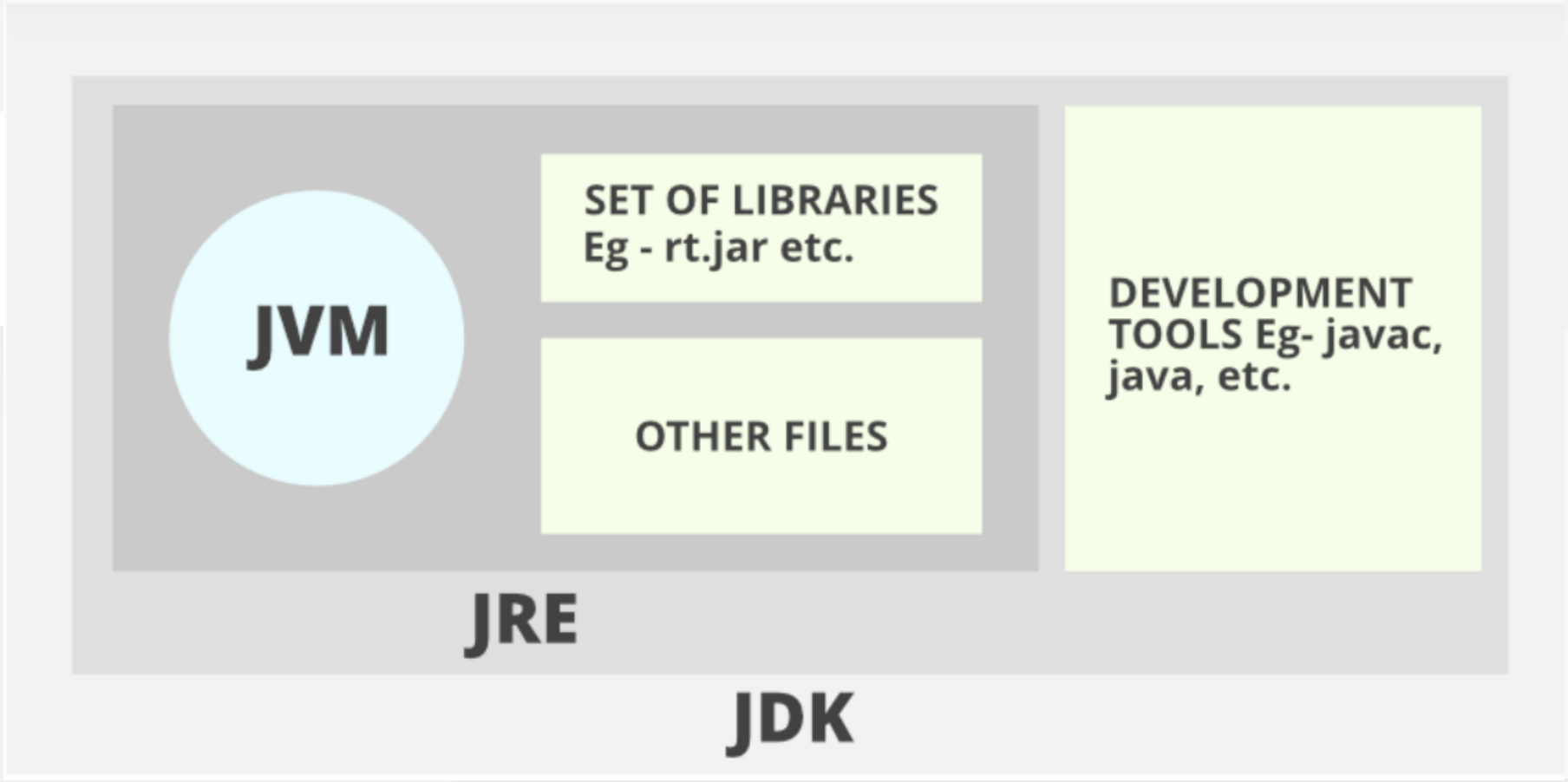
Make (4)


s-and-programming-I › Week-2 › hello-make
Print
Name
Date mod
compile.bat
11/7/2021
hello.c
11/2/2021
Makefile
11/2/2021
ing-I

JAVA Environment and Development



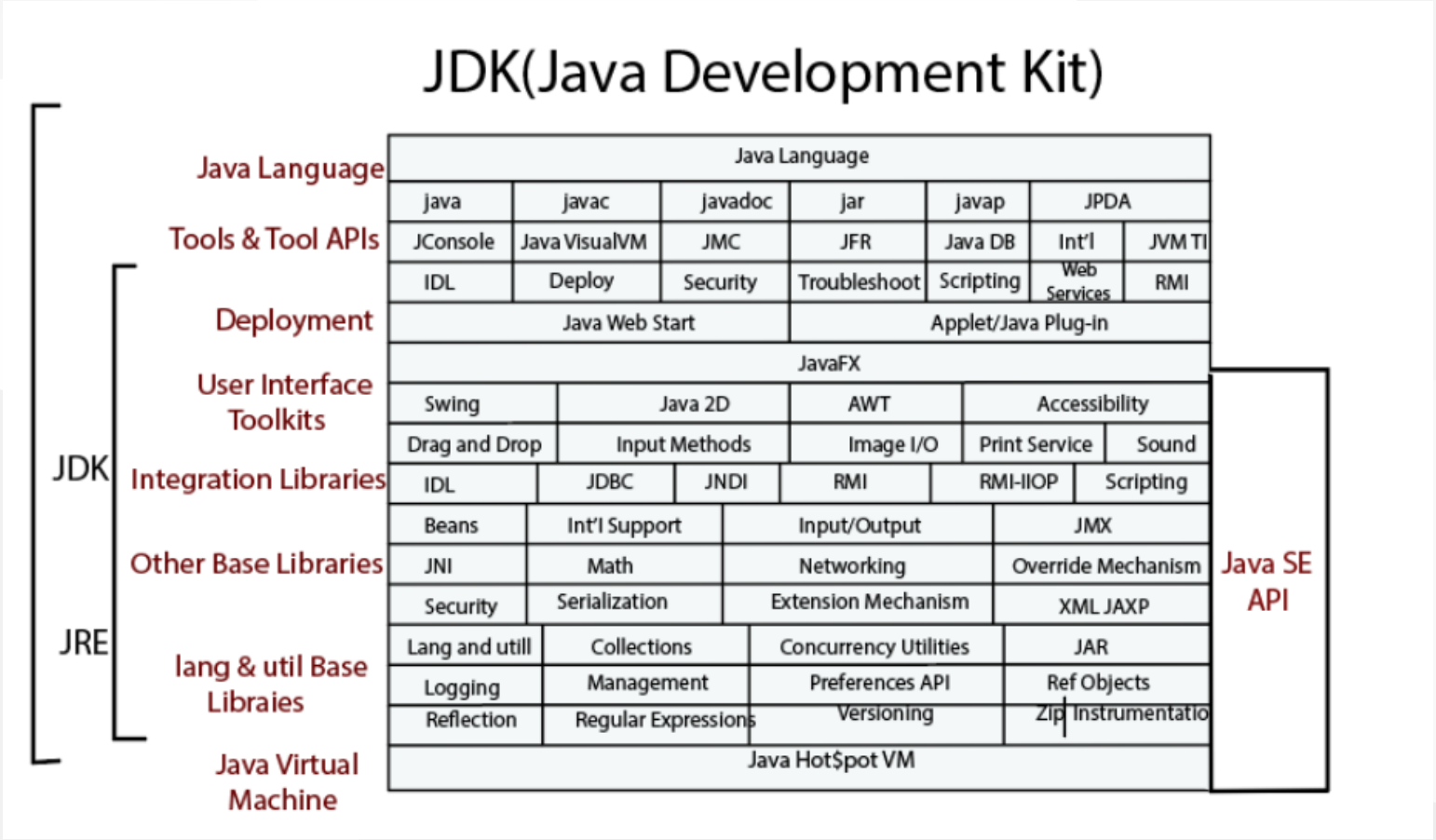
JDK and JRE Setup (1)



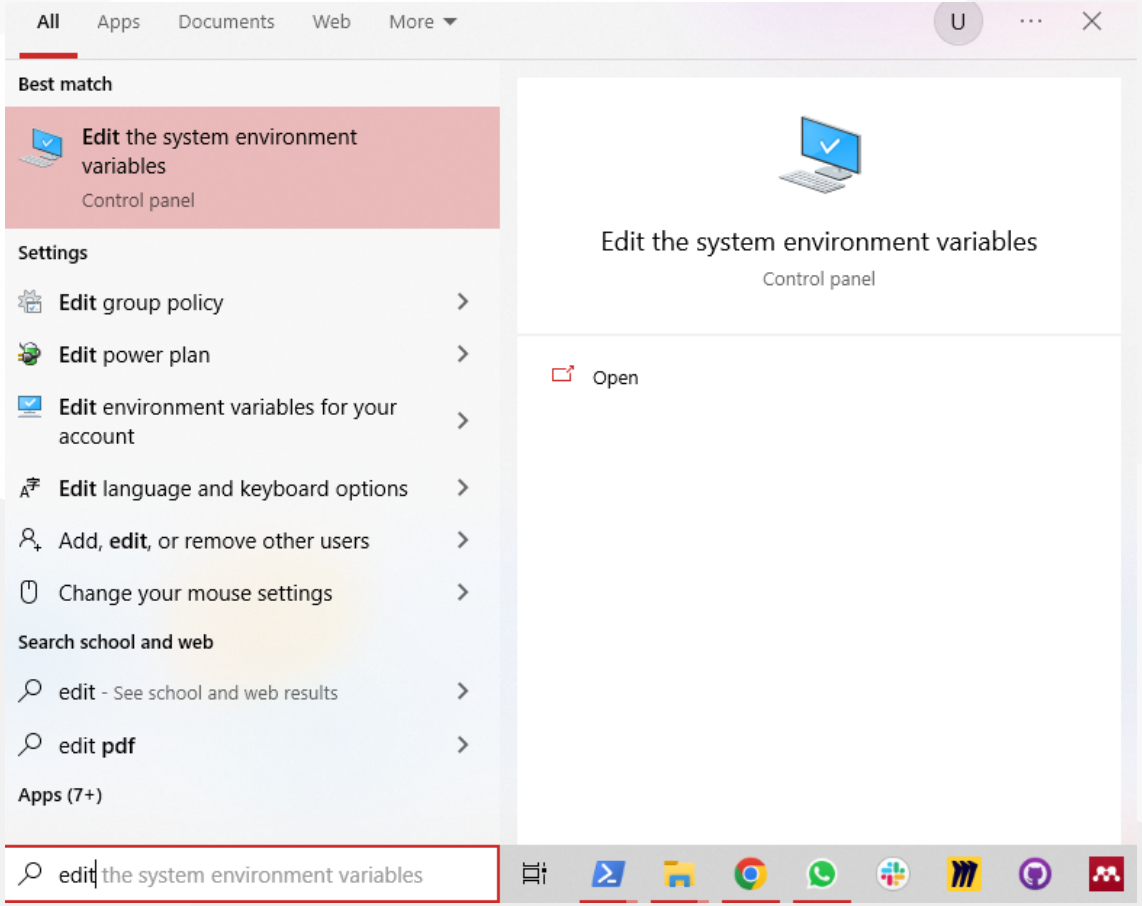
JDK and JRE Setup (2)

- **JDK** (Java Development Kit) is a Kit that provides the environment to **develop and execute(run)** the Java program. JDK is a kit(or package) that includes two things
  - Development Tools(to provide an environment to develop your java programs)
  - JRE (to execute your java program).
- **JRE** (Java Runtime Environment) is an installation package that provides an environment to **only run(not develop)** the java program(or application)onto your machine. JRE is only used by those who only want to run Java programs that are end-users of your system.
- **JVM (Java Virtual Machine)** is a very important part of both JDK and JRE because it is contained or inbuilt in both. Whatever Java program you run using JRE or JDK goes into JVM and JVM is responsible for executing the java program line by line, hence it is also known as an **i*****nterpreter***.

- Difference between JDK, JRE, JVM - TutorialAndExample

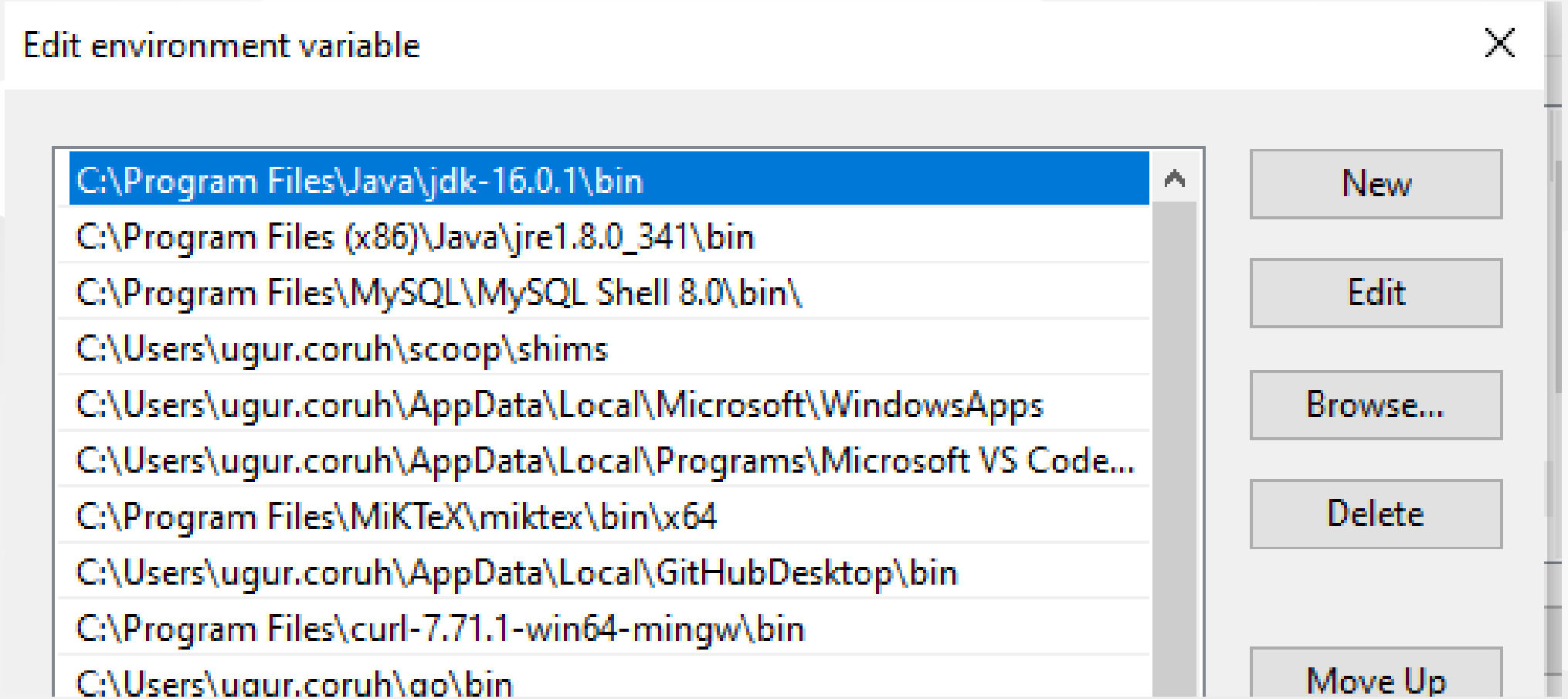


System Environments and Paths for Java (1)



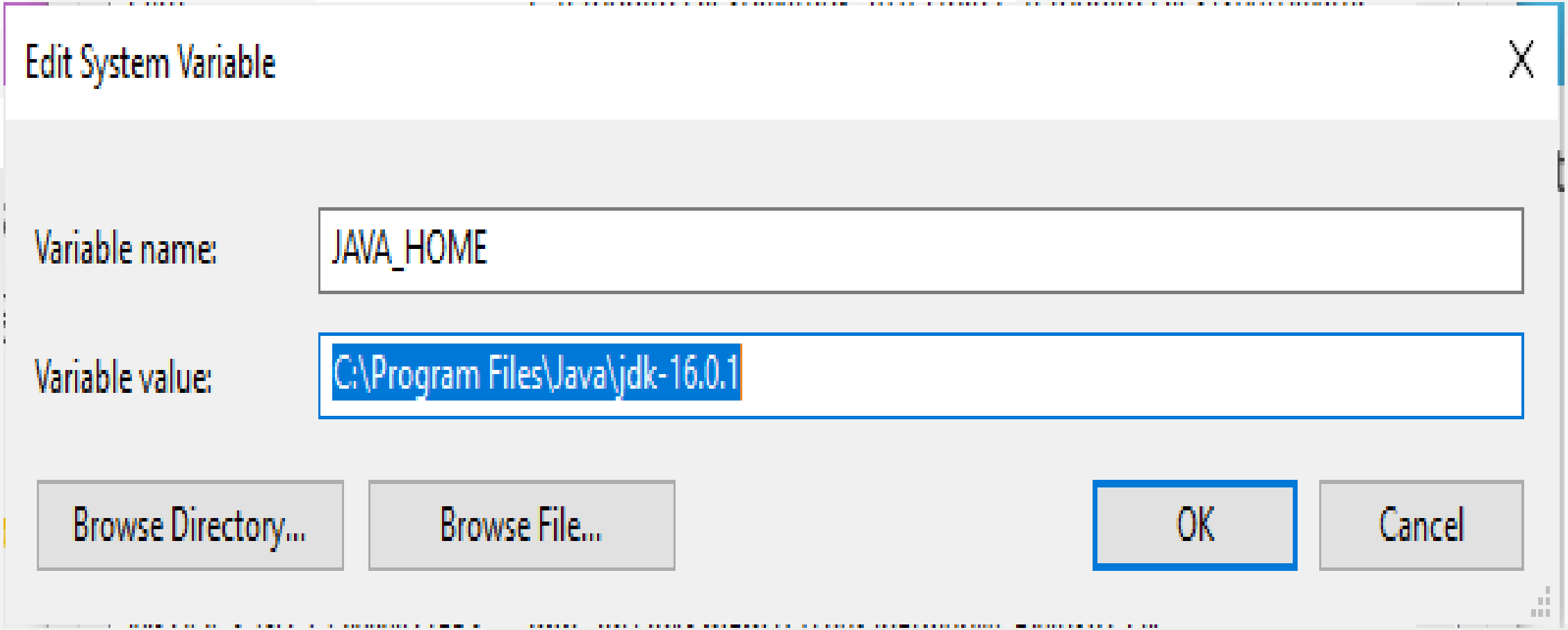
System Environments and Paths for Java (2)

- Select path variable (JDK should be set there)



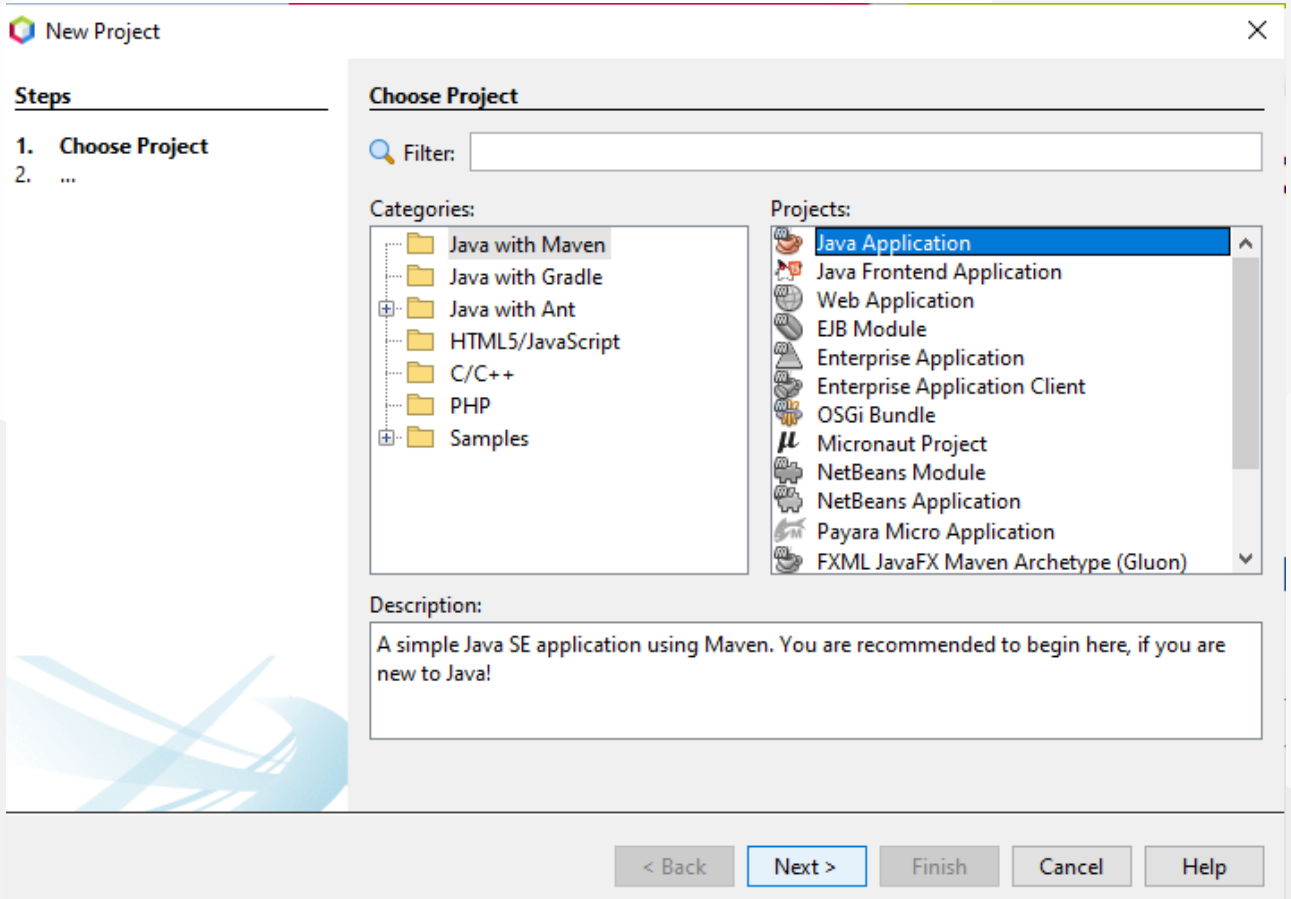
System Environments and Paths for Java (3)

- JAVA_HOME also should be set

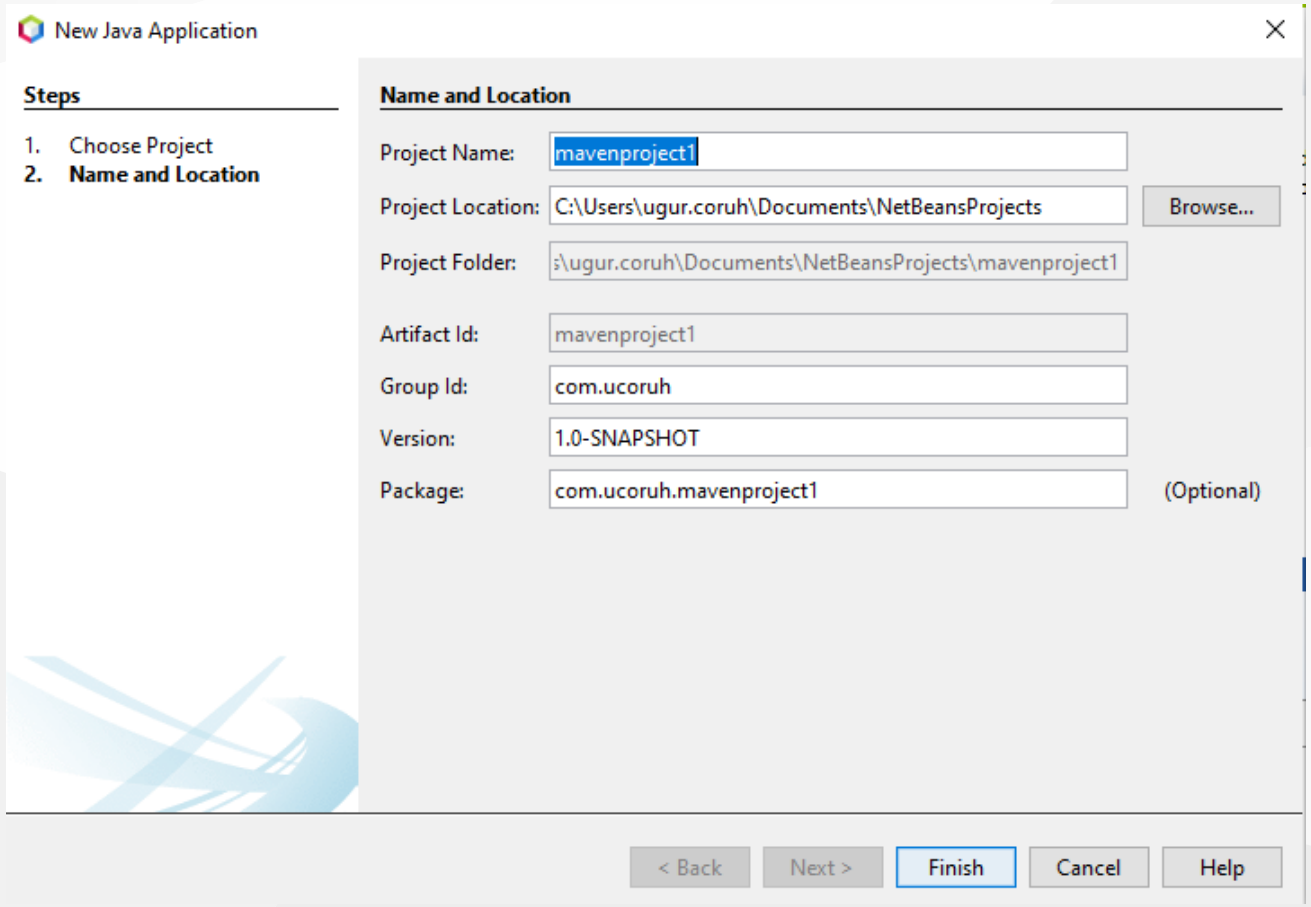


Netbeans (Java) (1)

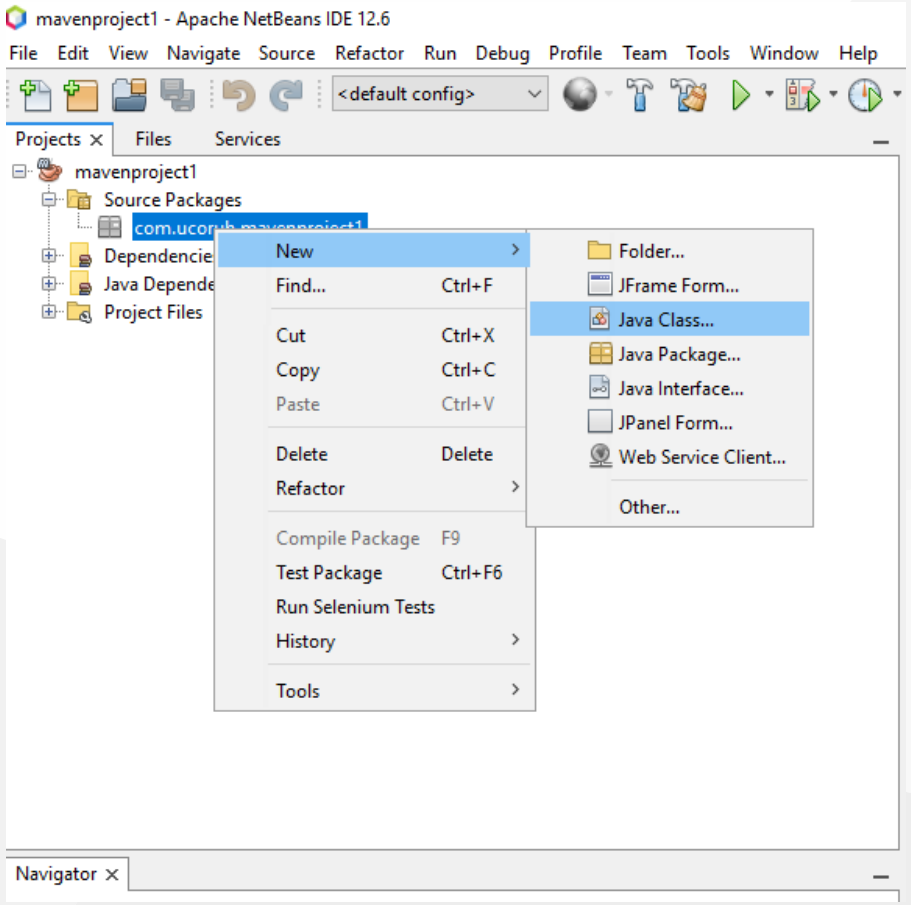
- Open New Project -> Java Project



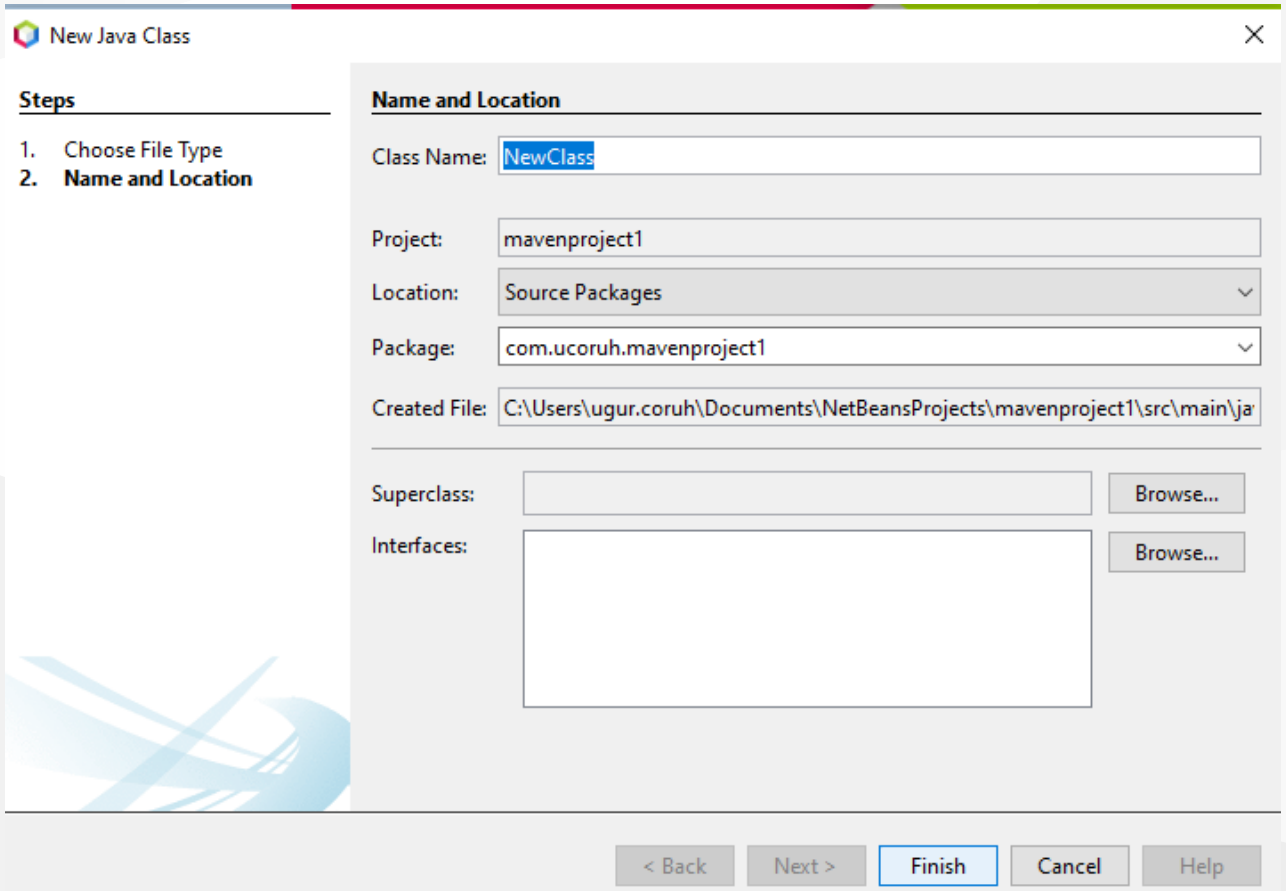
Netbeans (Java) (2)



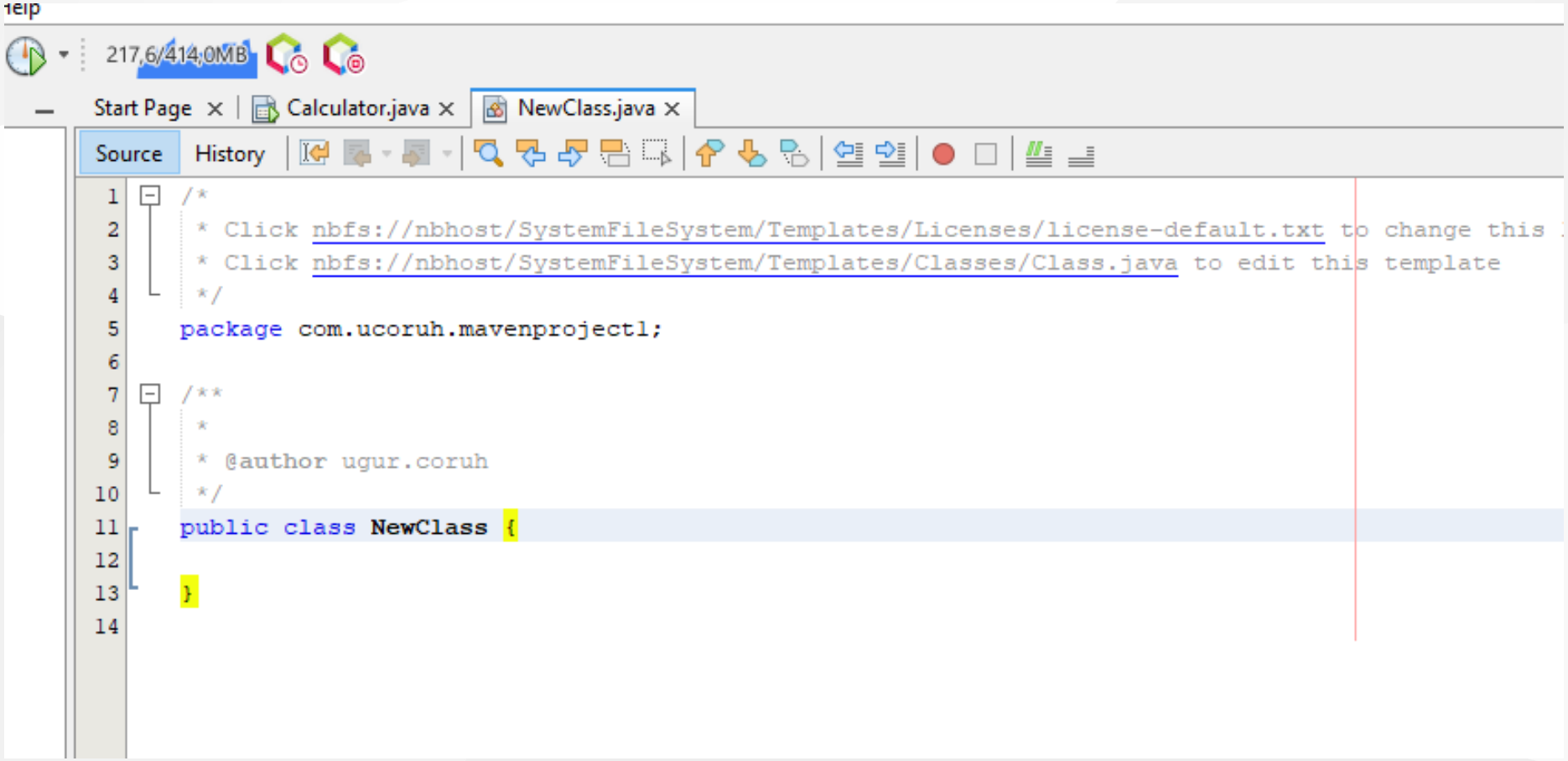
Netbeans (Java) (3)



Netbeans (Java) (4)



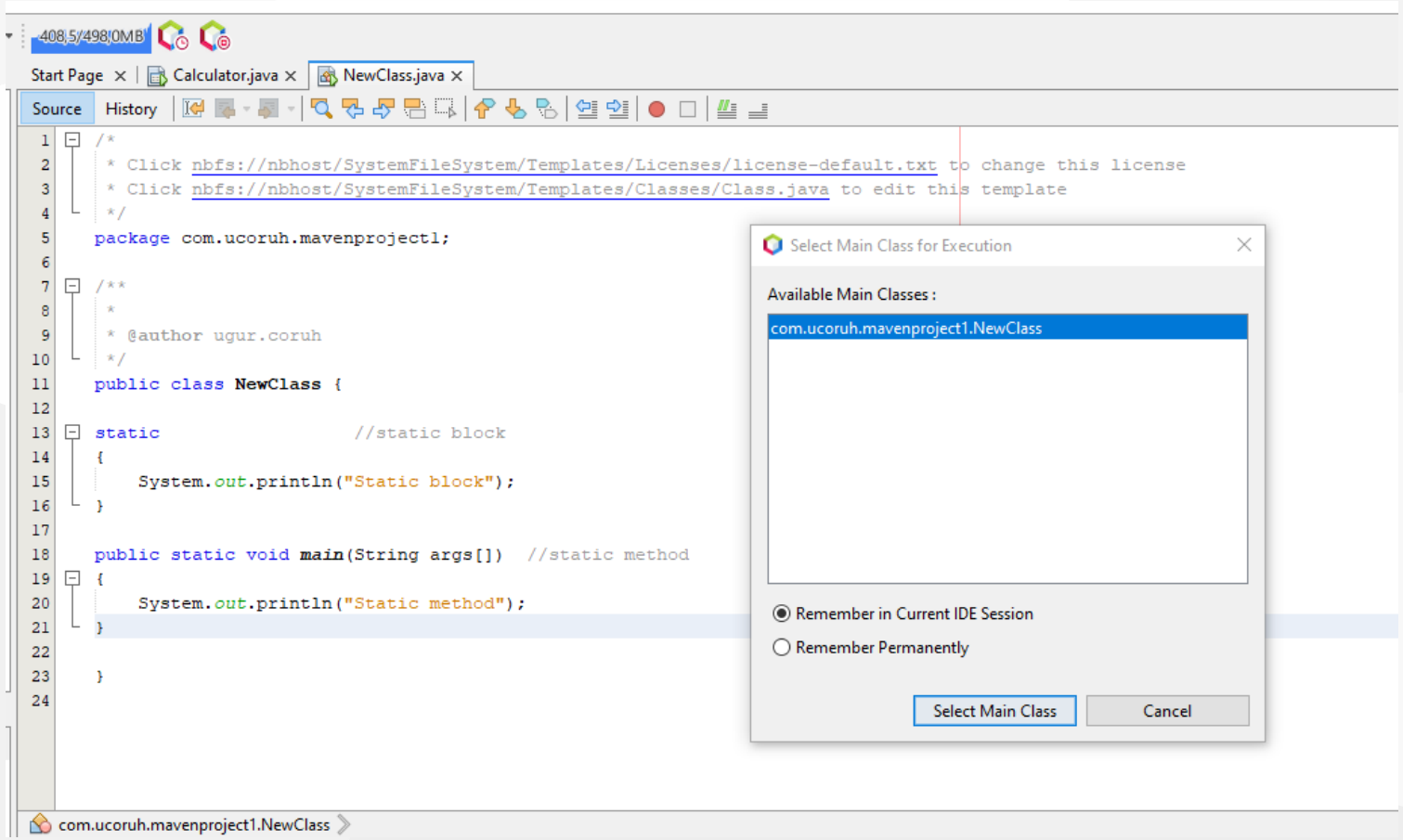
Netbeans (Java) (5)



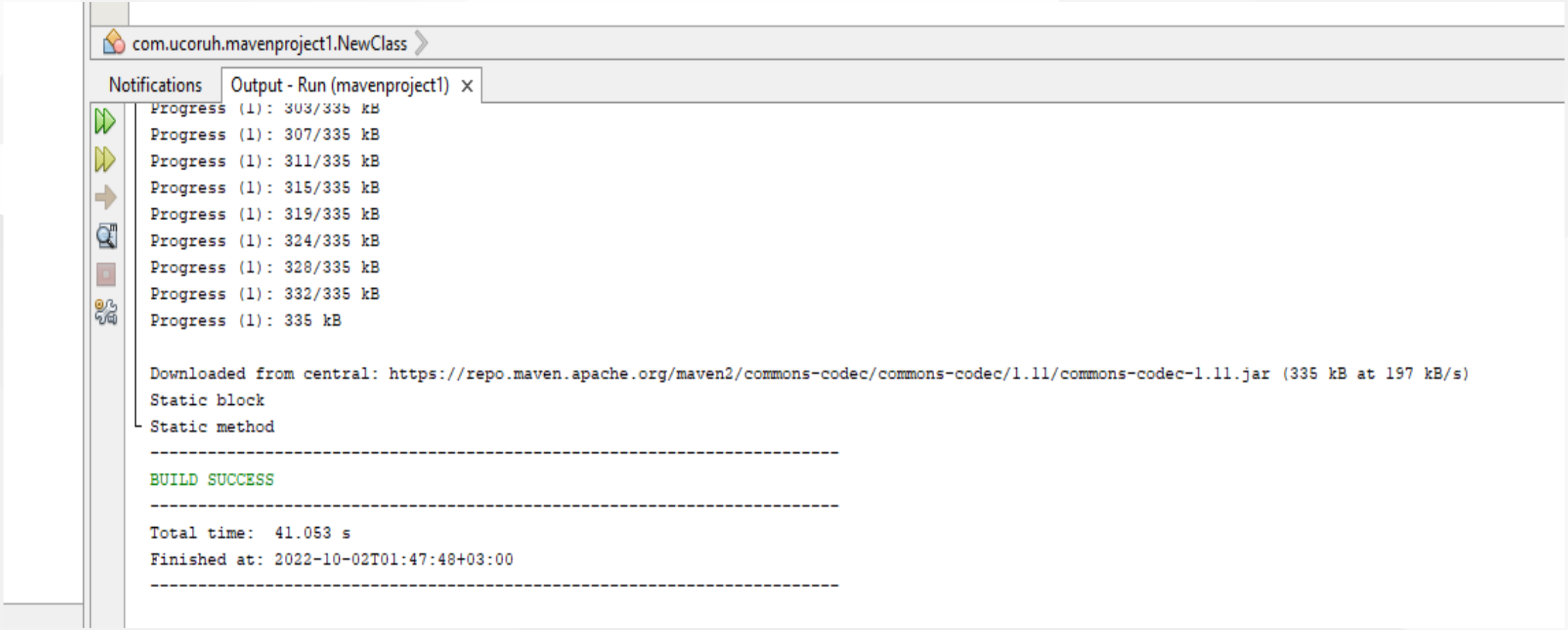
Update code and run


```
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
 */
package com.ucoruh.mavenproject1;

/**
 *
 * @author ugur.coruh
 */
public class NewClass {

static                  //static block
{
    System.out.println("Static block");
}

public static void main(String args[])  //static method
{
    System.out.println("Static method");
}
}
```

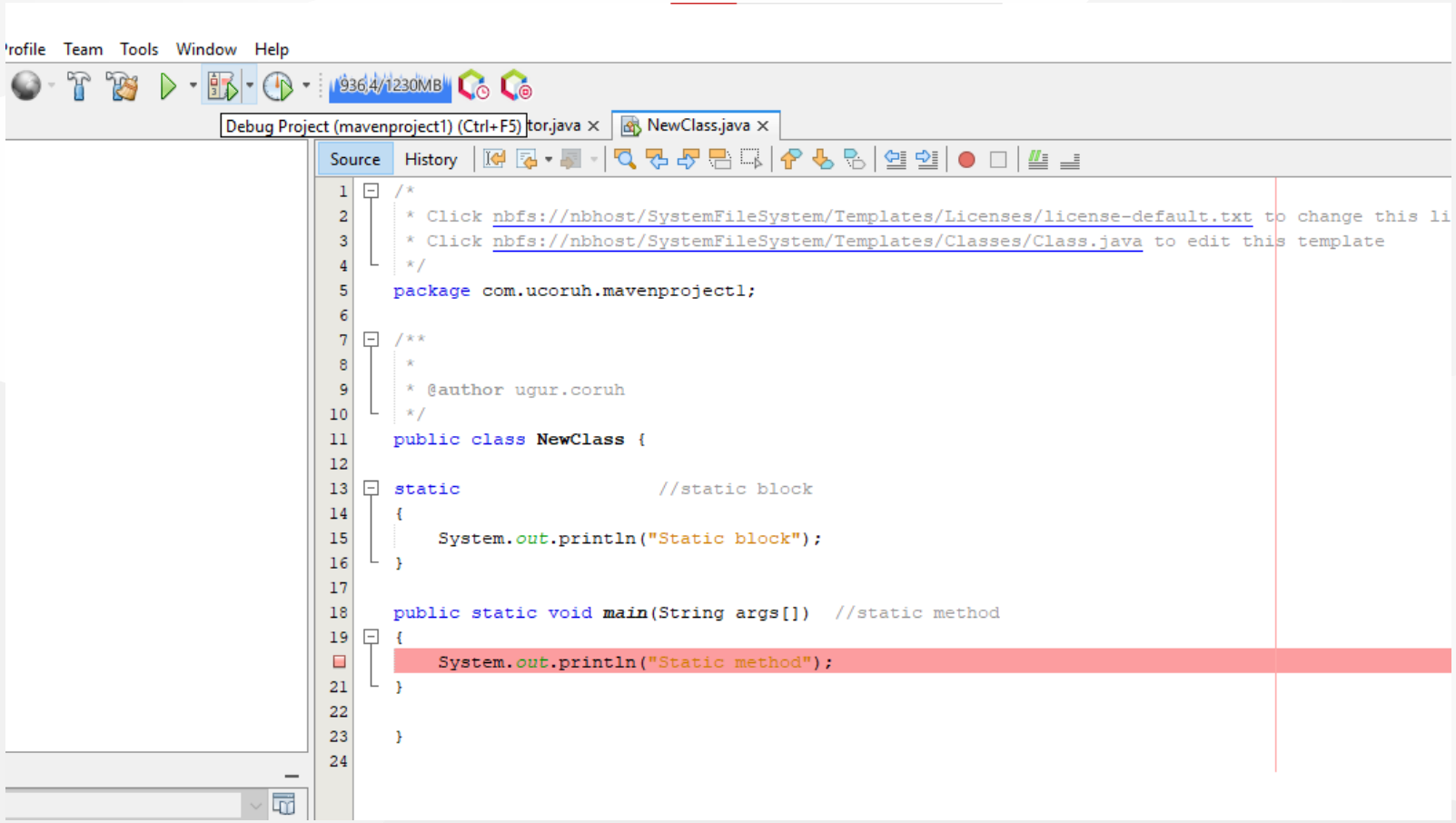
Netbeans (Java) (7)



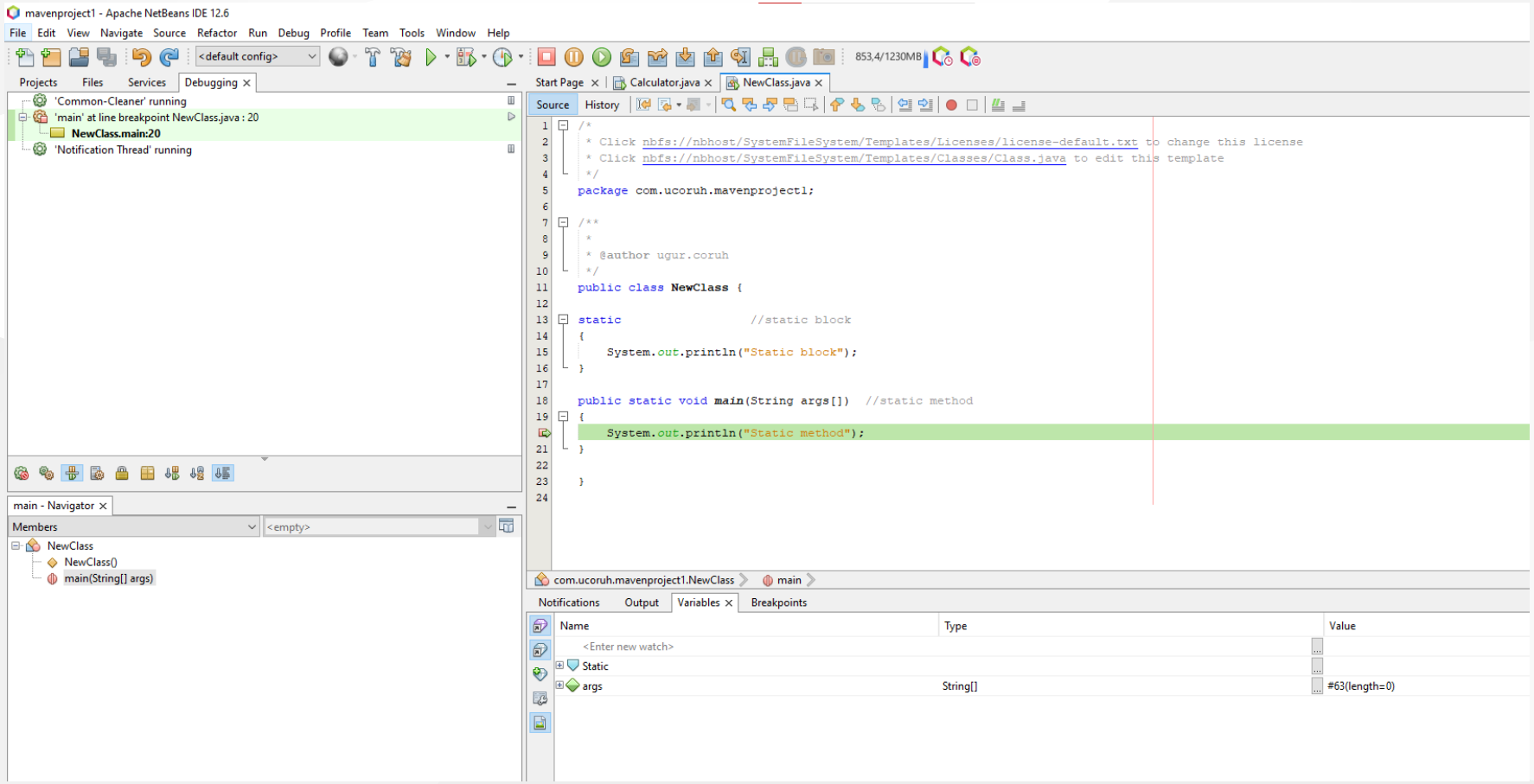
Netbeans (Java) (8)



Netbeans (Java) (9)

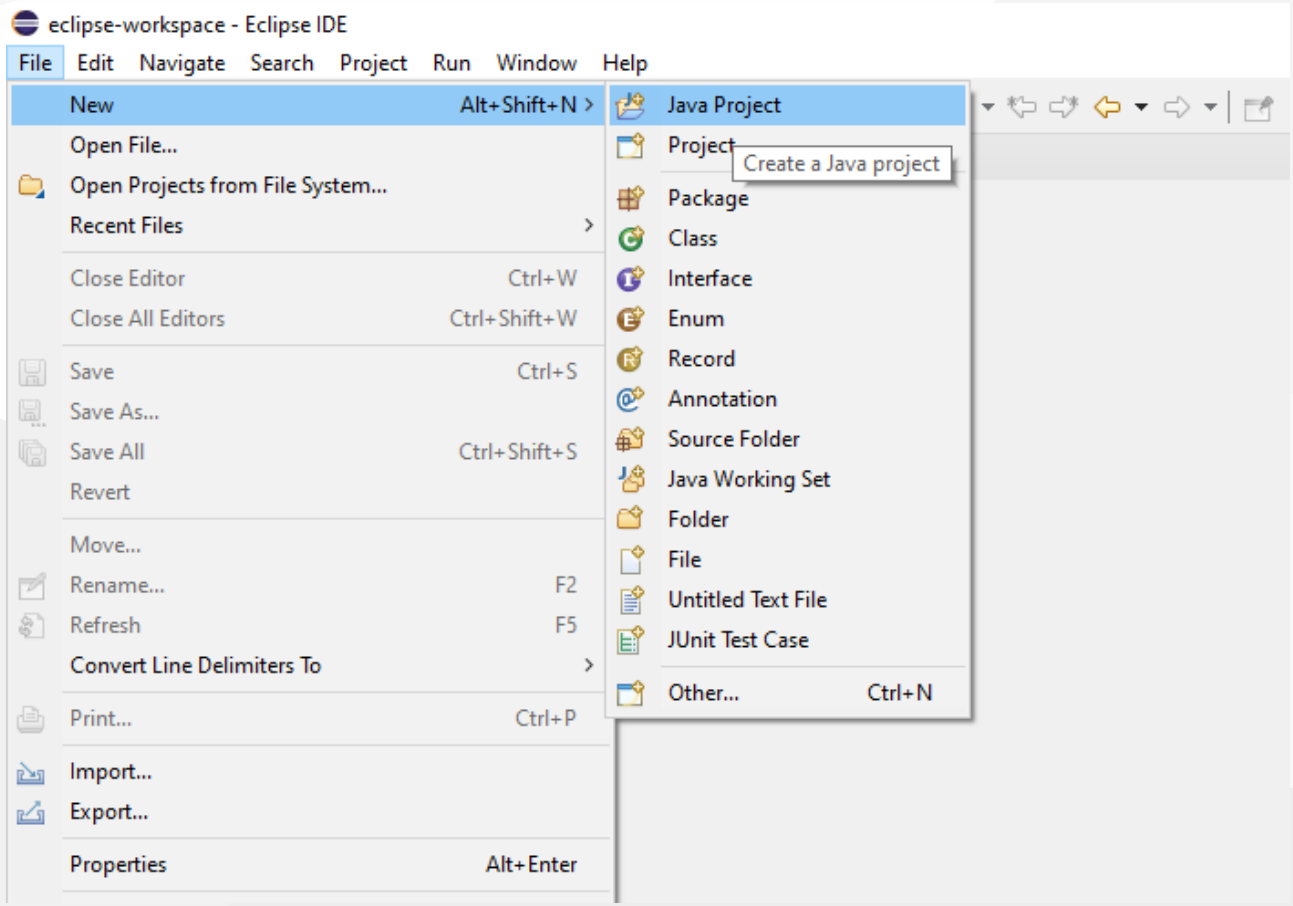


Netbeans (Java) (10)

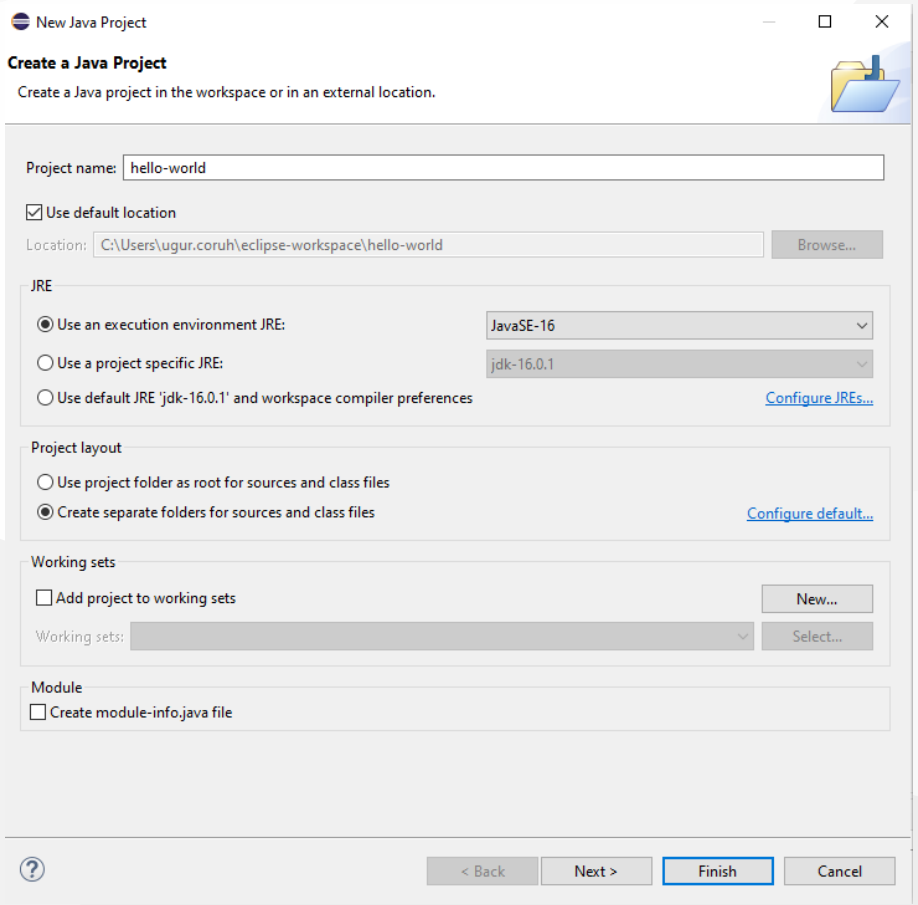


Eclipse (Java) (1)

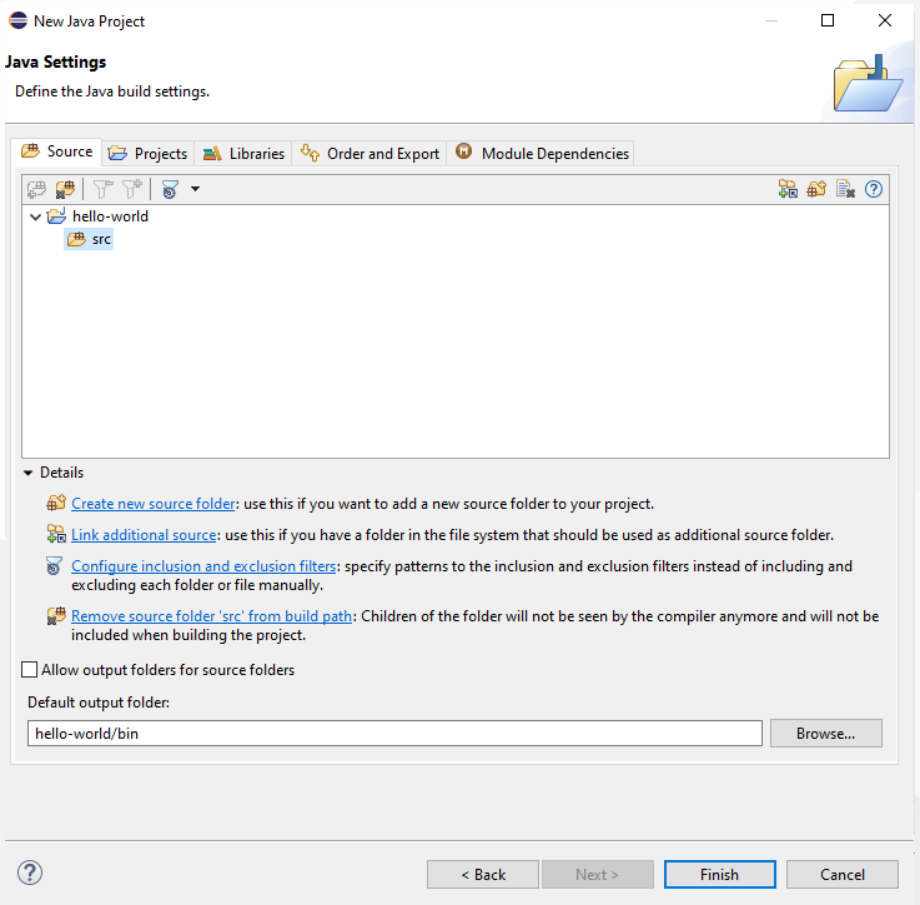
- Select File -> New Project



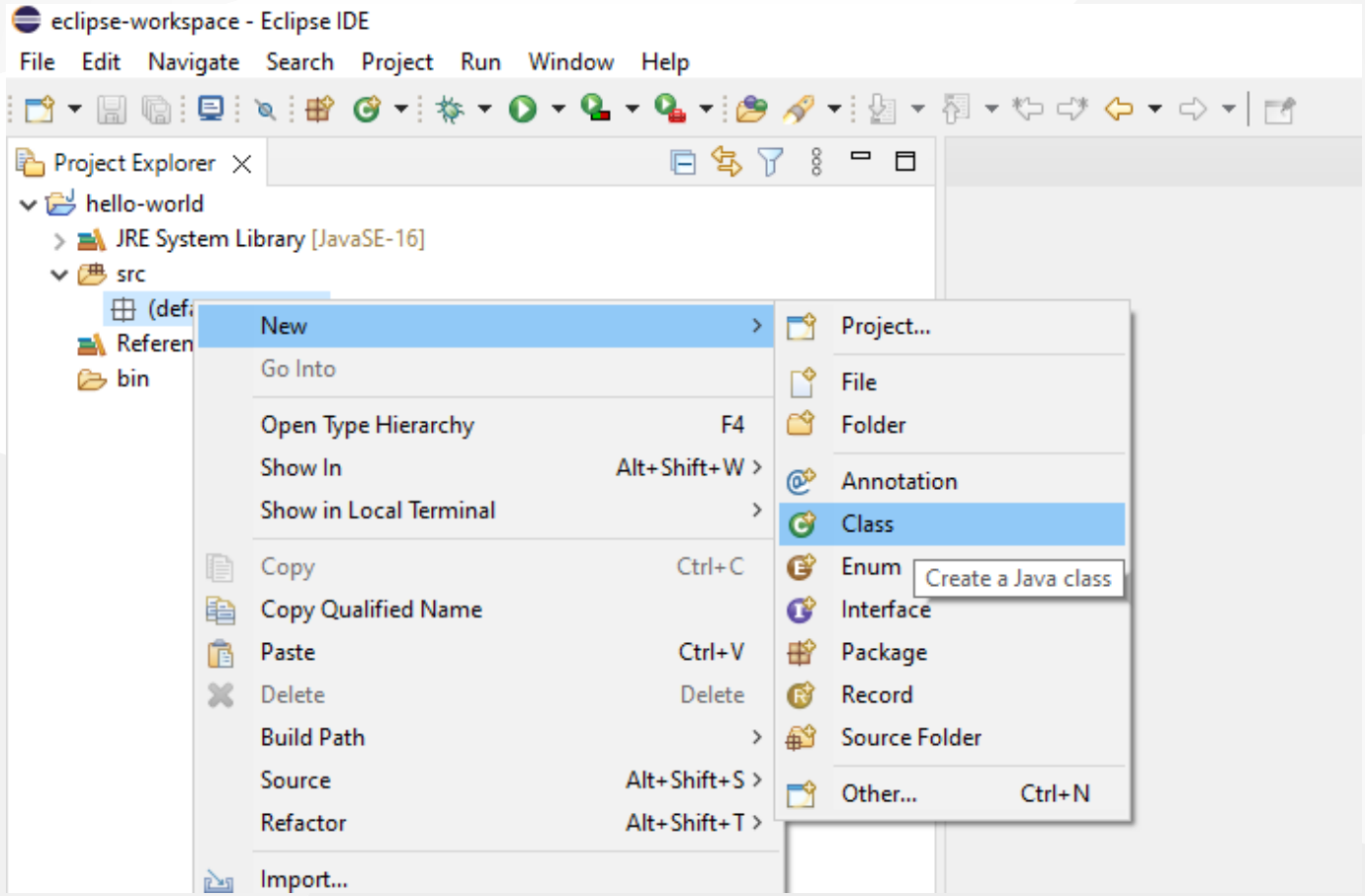
Eclipse (Java) (2)



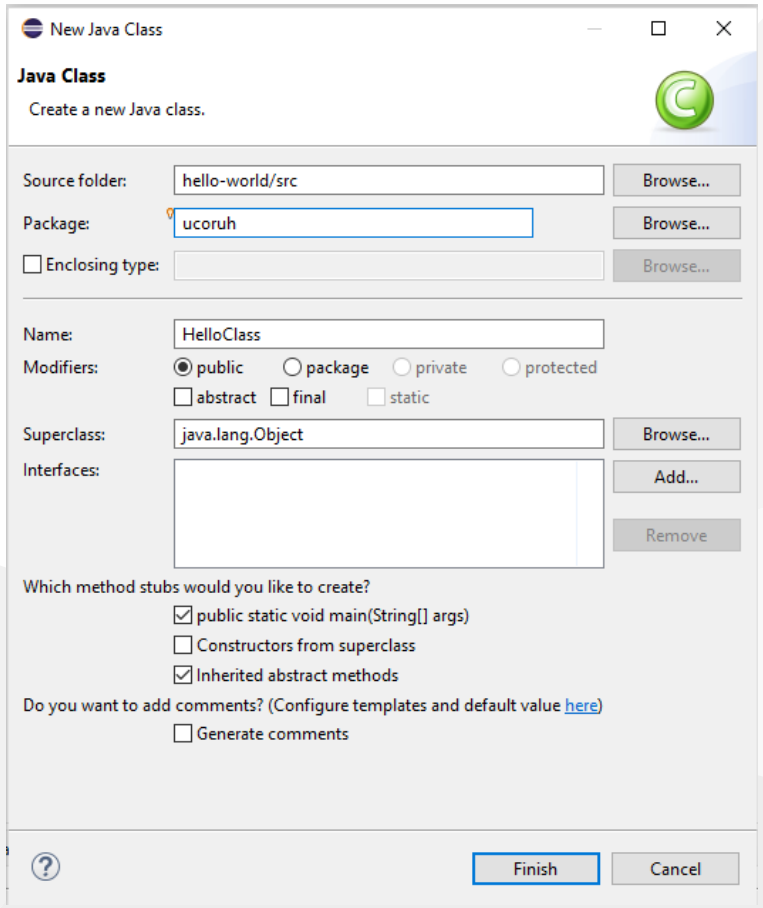
Eclipse (Java) (3)



Eclipse (Java) (4)



Eclipse (Java) (5)

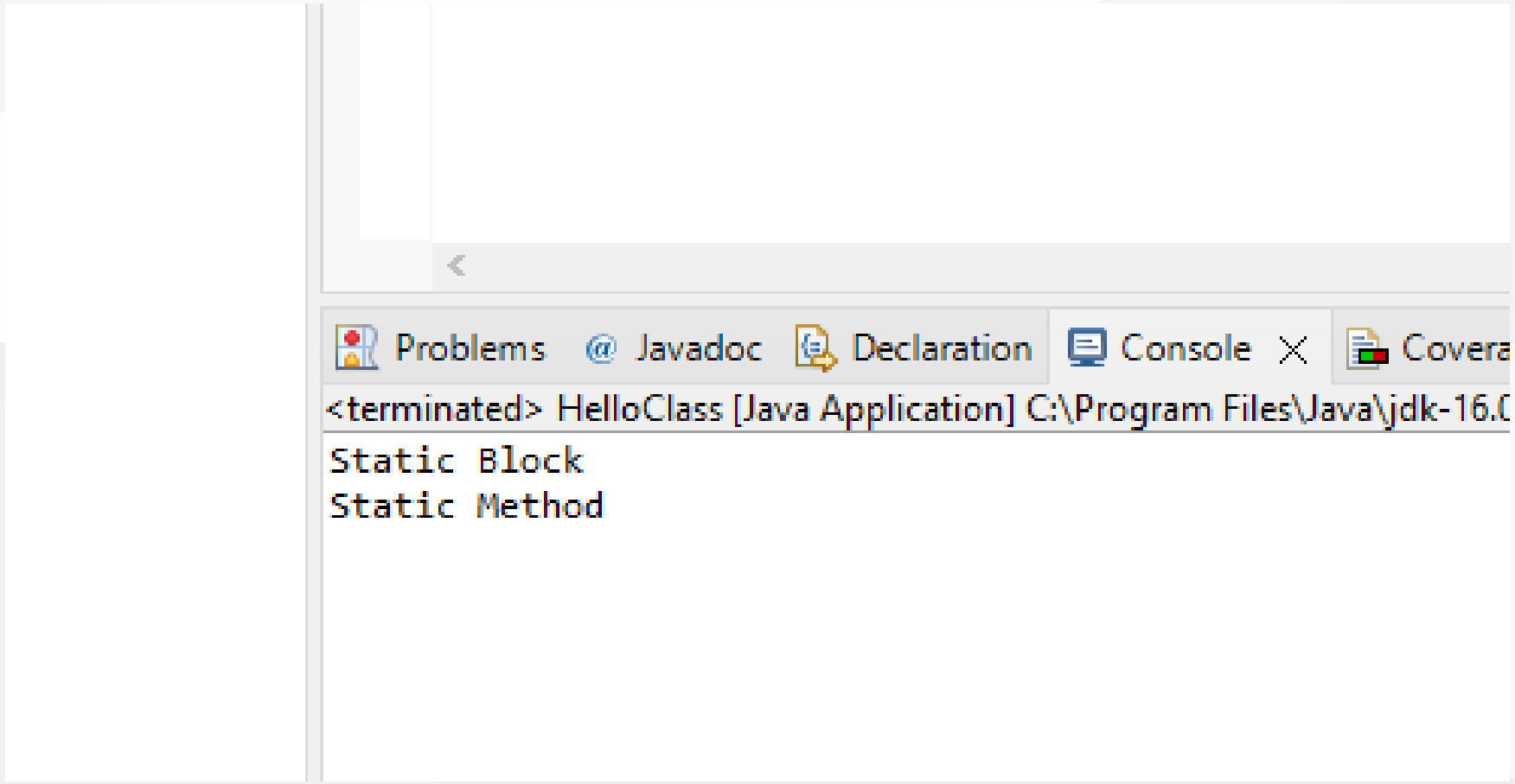


Eclipse (Java) (6)

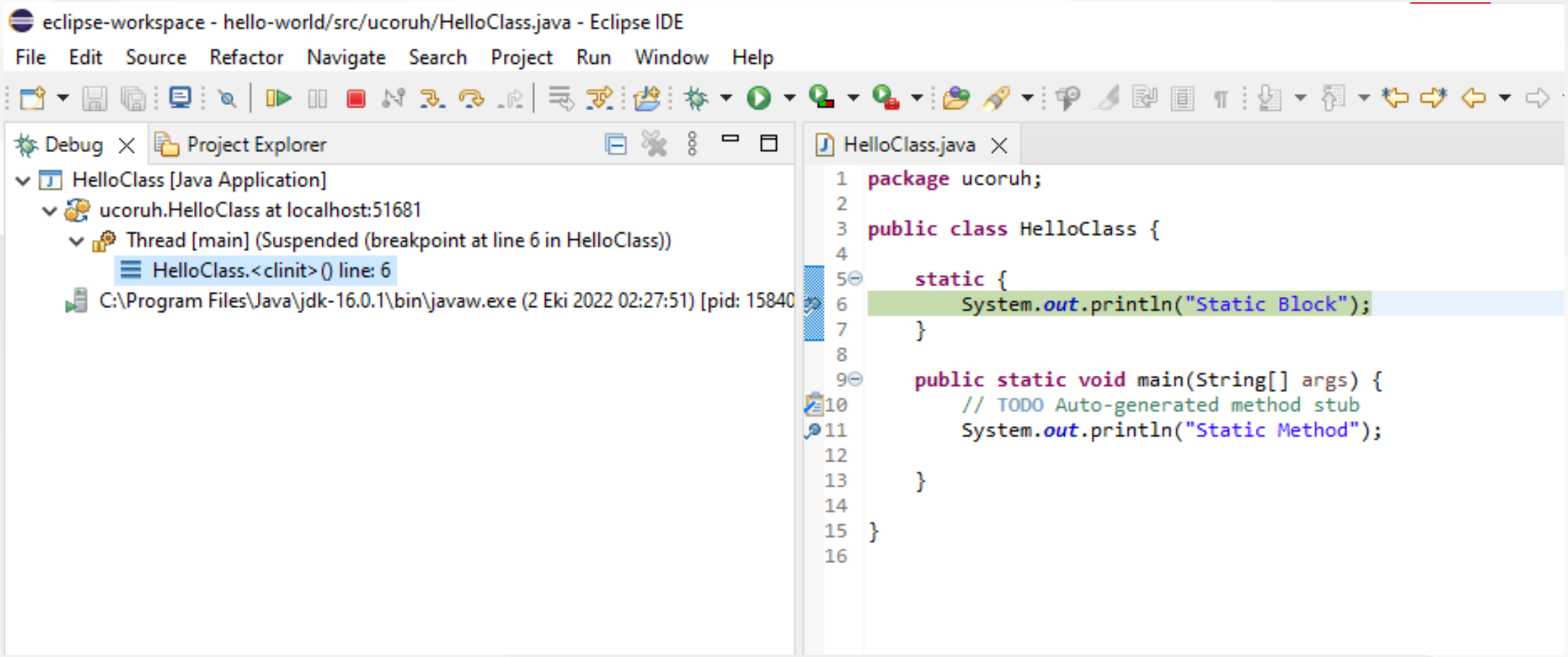
- Update source

```
package ucoruh;

public class HelloClass {

	static {
		System.out.println("Static Block");
	}

	public static void main(String[] args) {
		// TODO Auto-generated method stub
	    System.out.println("Static Method");

	}

}
```

Eclipse (Java) (7)

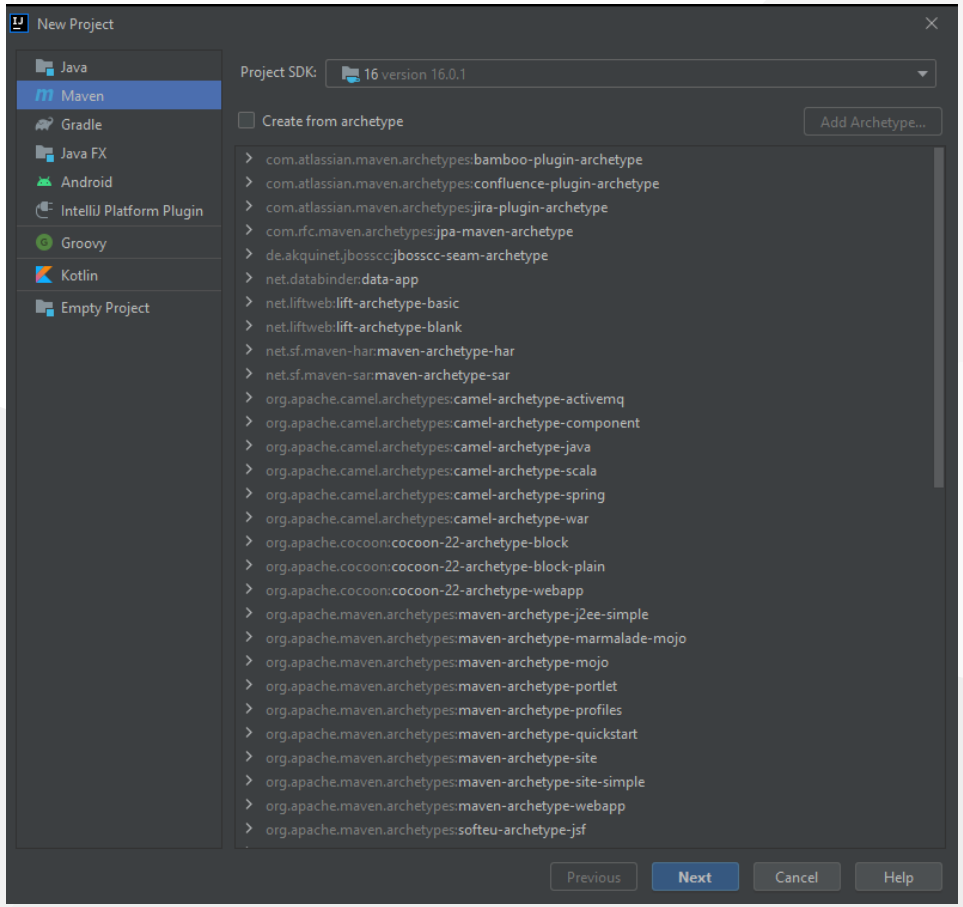


Eclipse (Java) (8)



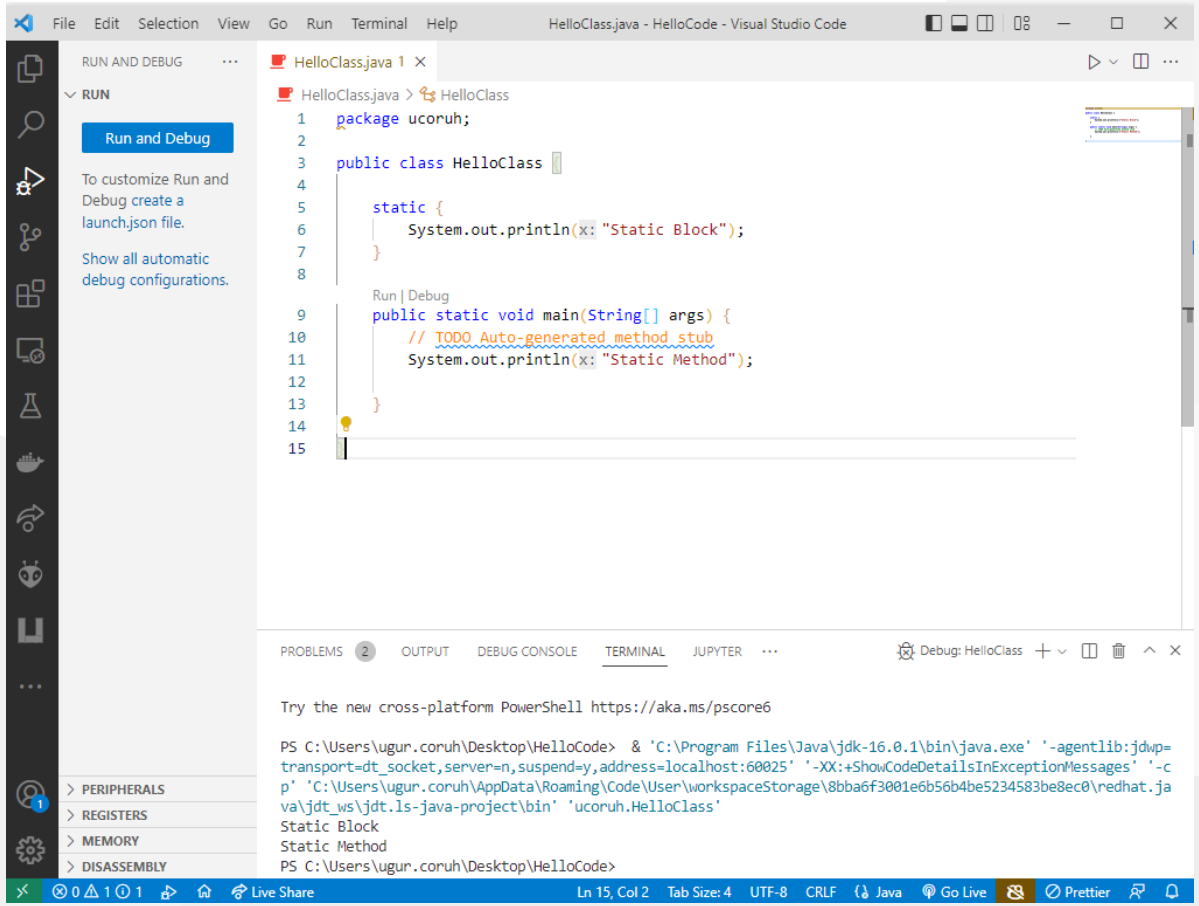
Intellij Idea (Jet Brains) (Java)

- Download IntelliJ IDEA: The Capable & Ergonomic Java IDE by JetBrains
  - Select Community Version or Student Ultimate Version



VSCode (Java)

- Java Extension Run&Debug Java Files



Notepad++ (Java)

- How to Compile and Run Java Programs Using Notepad++

Cmake (Java)

- UseJava — CMake 3.24.2 Documentation
- GitHub - ptitpoulpe/cmake-swig-java-example: An example of combining cmake, swig and java

C# Environment and Development

Visual Studio Community Edition (C#)

//TODO//

Notepad++ (C#)

- This use command-line utilities for csharp, nppexec should be configured for this utility.
- Compiling/Executing a C# Source File in Command Prompt - Stack Overflow

```
c:\windows\Microsoft.NET\Framework\v3.5\
```

```
c:\windows\Microsoft.NET\Framework\v3.5\bin\csc.exe
            /t:exe /out:MyApplication.exe MyApplication.cs  ...
```

Cmake (C#)

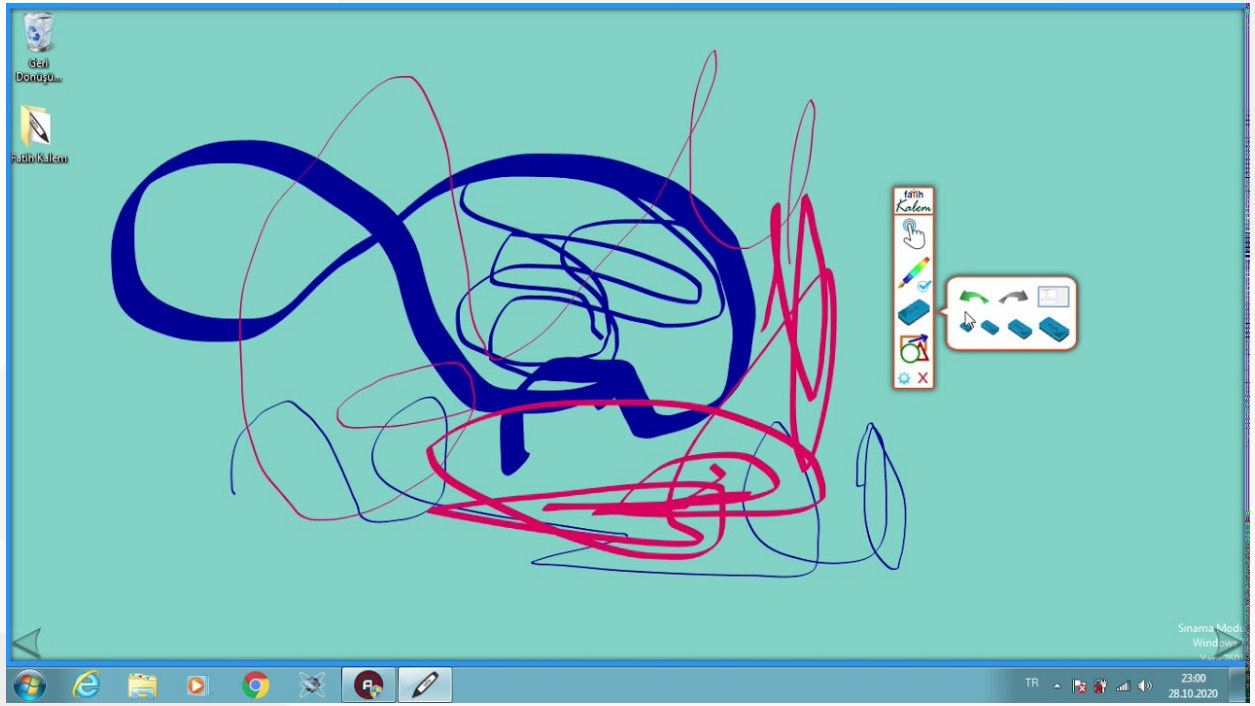
- GitHub - crud89/DotNetWithCMake: Your swiss army knife for creating .NET assemblies with CMake and integrating unmanaged code.

Common Tools and Platforms

Fatih Kalem

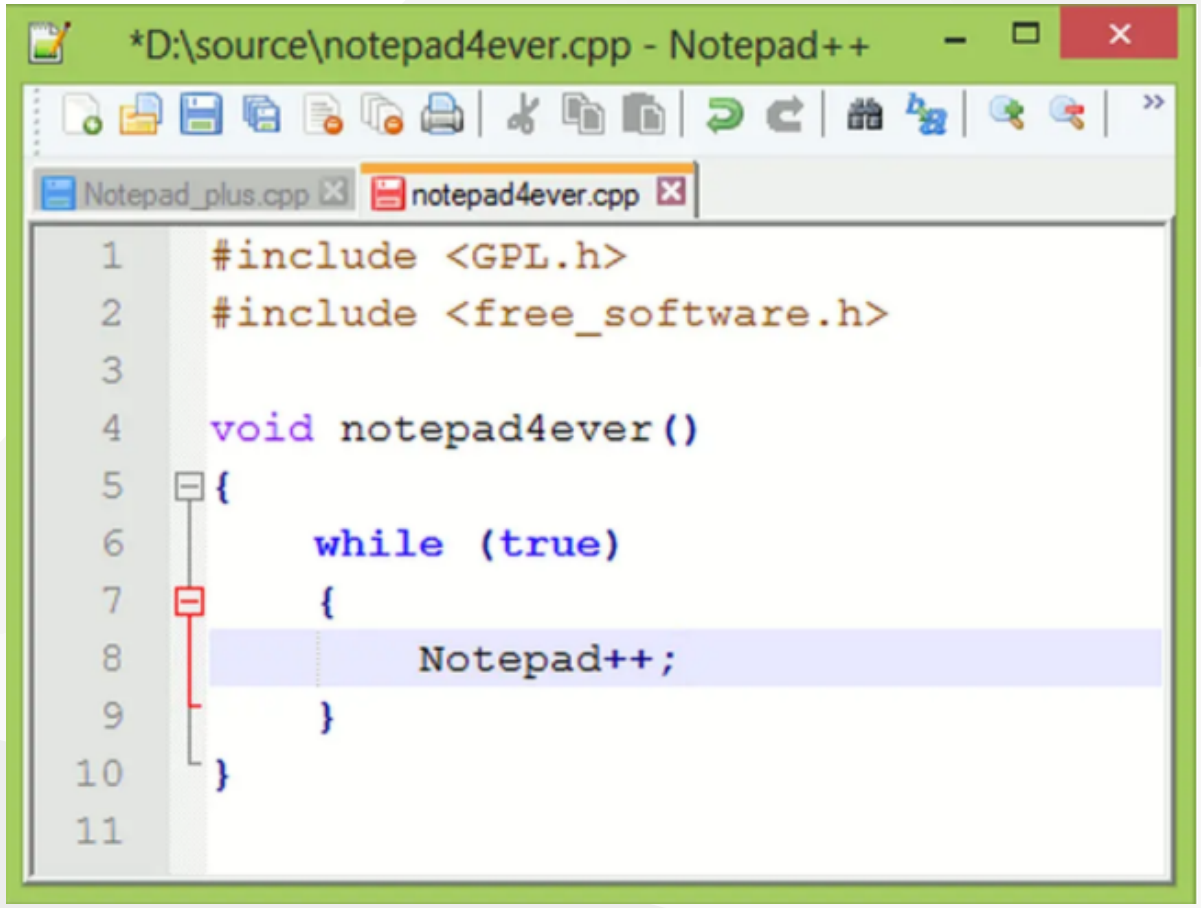
https://cdnvideo.eba.gov.tr/fatihkalem/fatihkalem_portable.zip

https://cdnvideo.eba.gov.tr/fatihkalem/fatihkalem_setup.exe



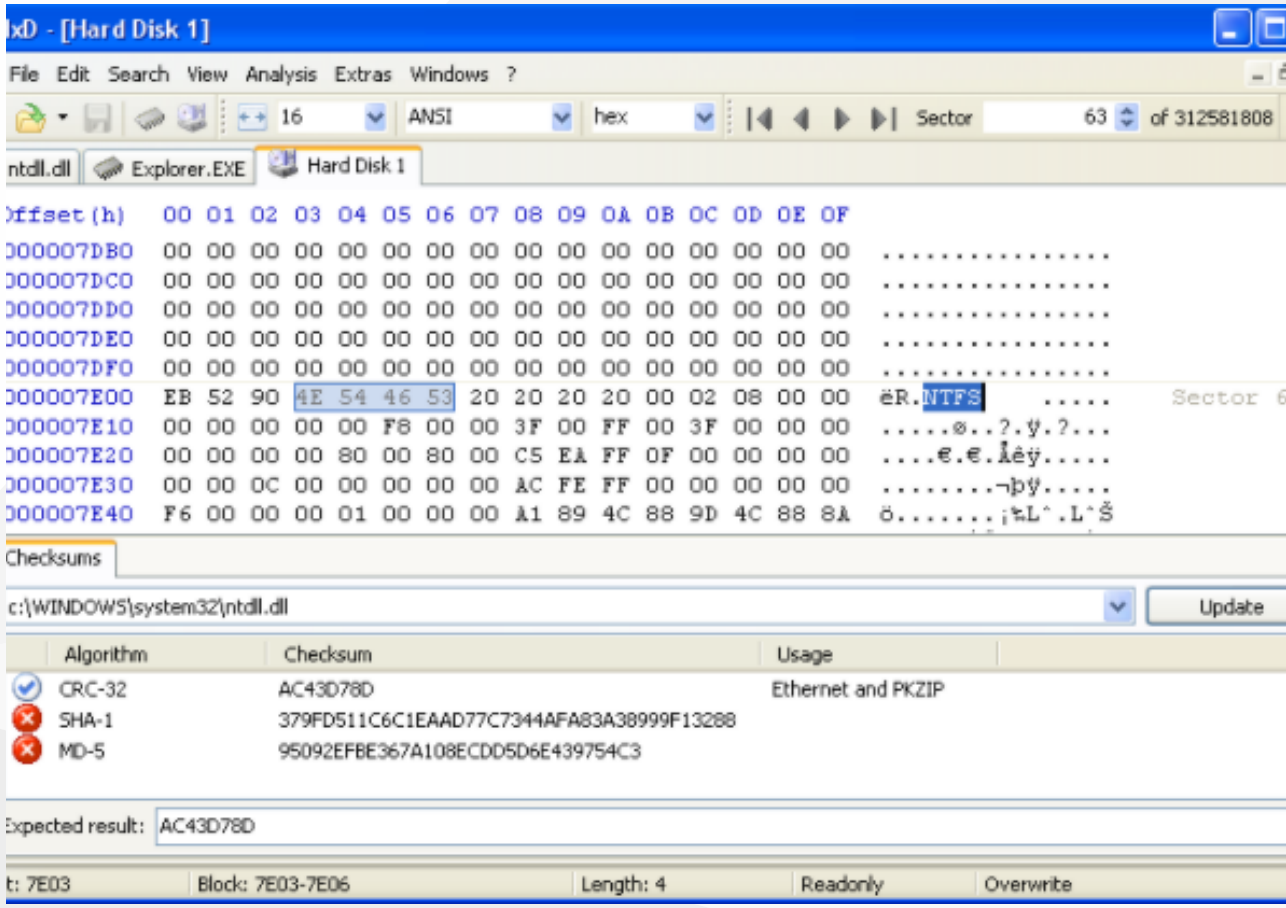
Notepad++ (Notepad for Source Code)

Downloads | Notepad++

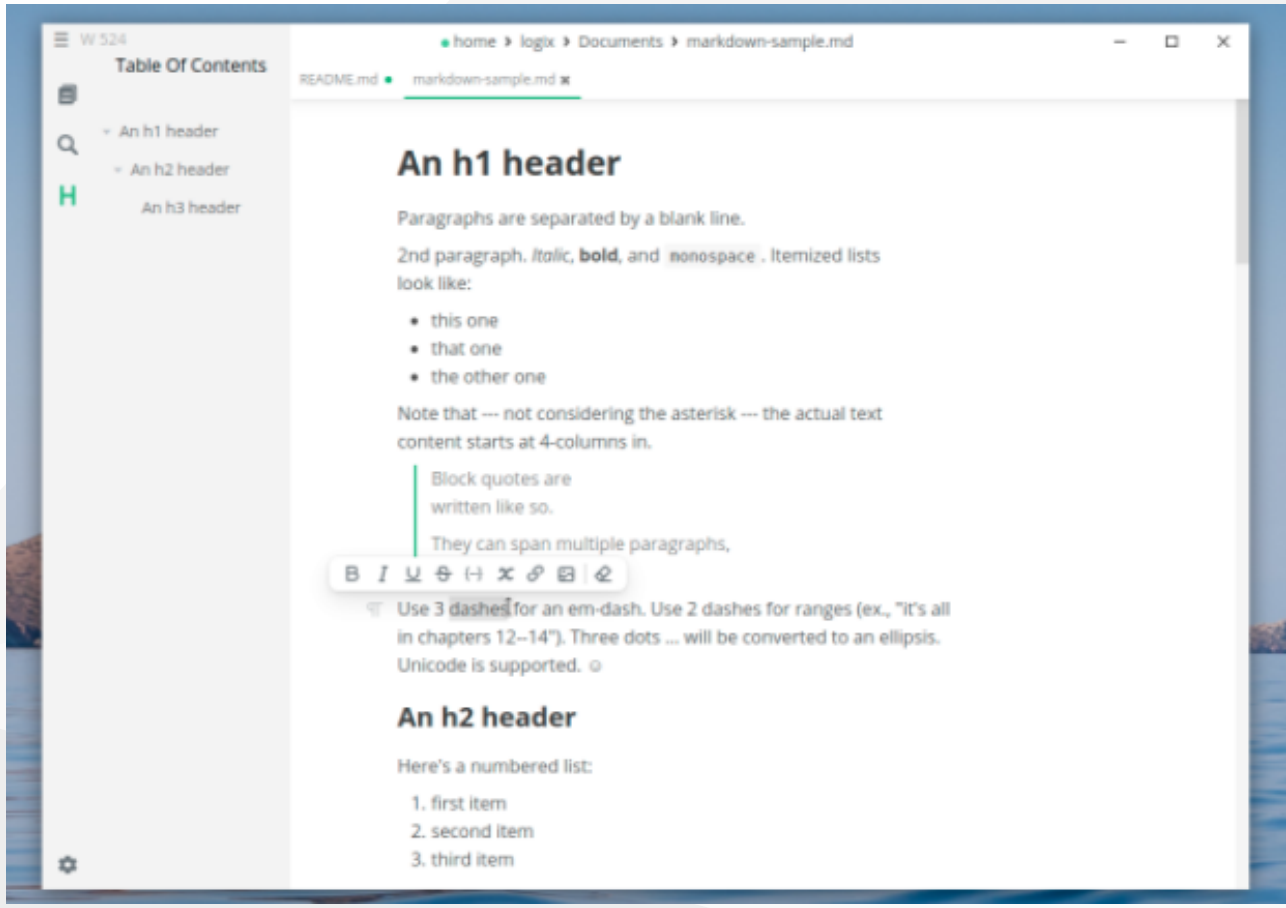


HxD (Hex Editor)

HxD - Freeware Hex Editor and Disk Editor | mh-nexus

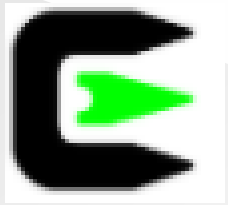


MarktextApp (Markdown Syntax Editor)

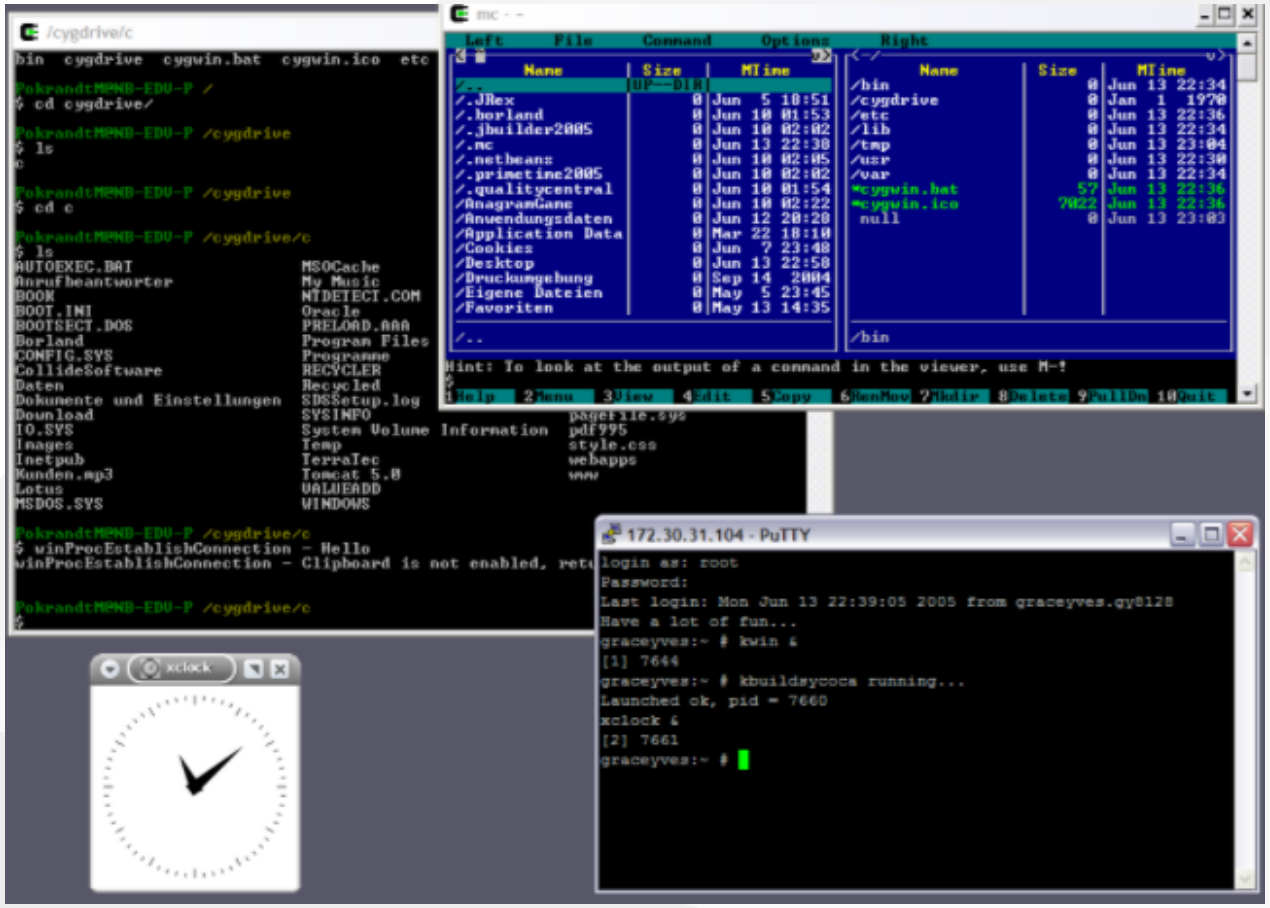


- https://marktext.app/
- https://github.com/marktext/marktext/releases
- Download latest version
  - https://github.com/marktext/marktext/releases/tag/v0.17.1

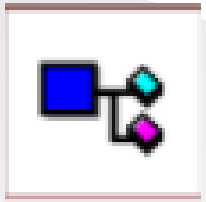
Cygwin (Linux environment for Windows)



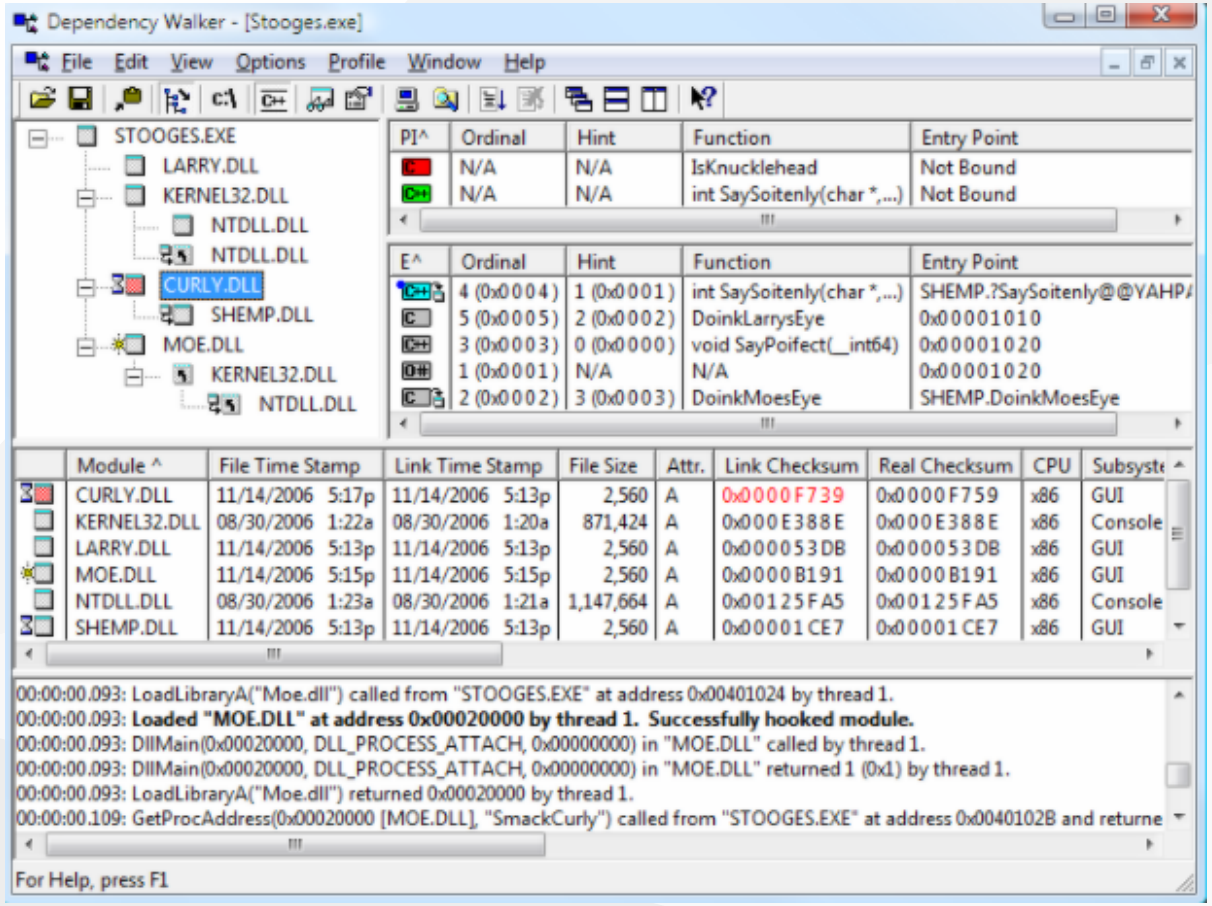
- https://www.cygwin.com/



Dependency Walker (32-bit or 64-bit Windows module dependency checker)



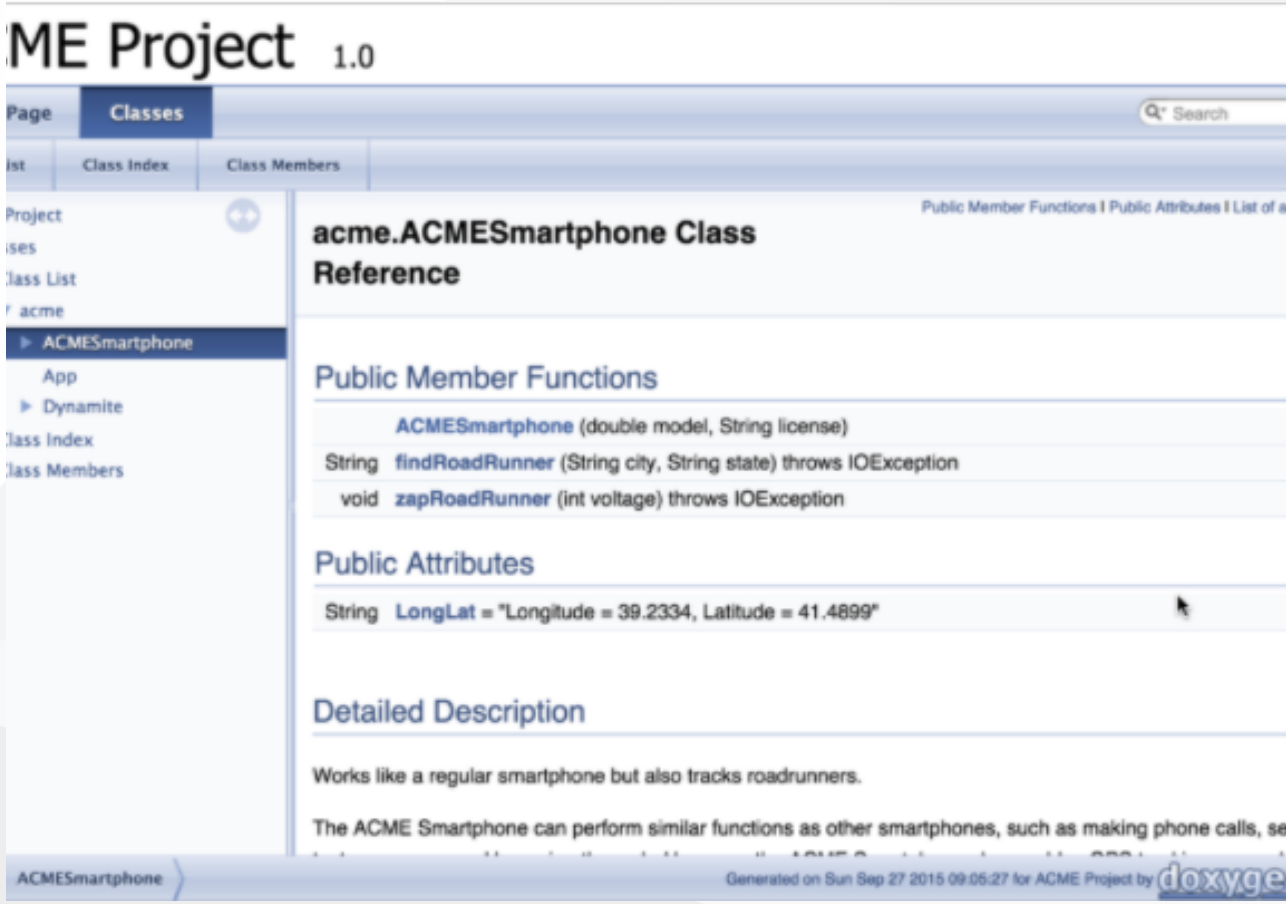
- https://www.dependencywalker.com/



Doxygen (Code Documentation)

doxygen

Doxygen: Doxygen

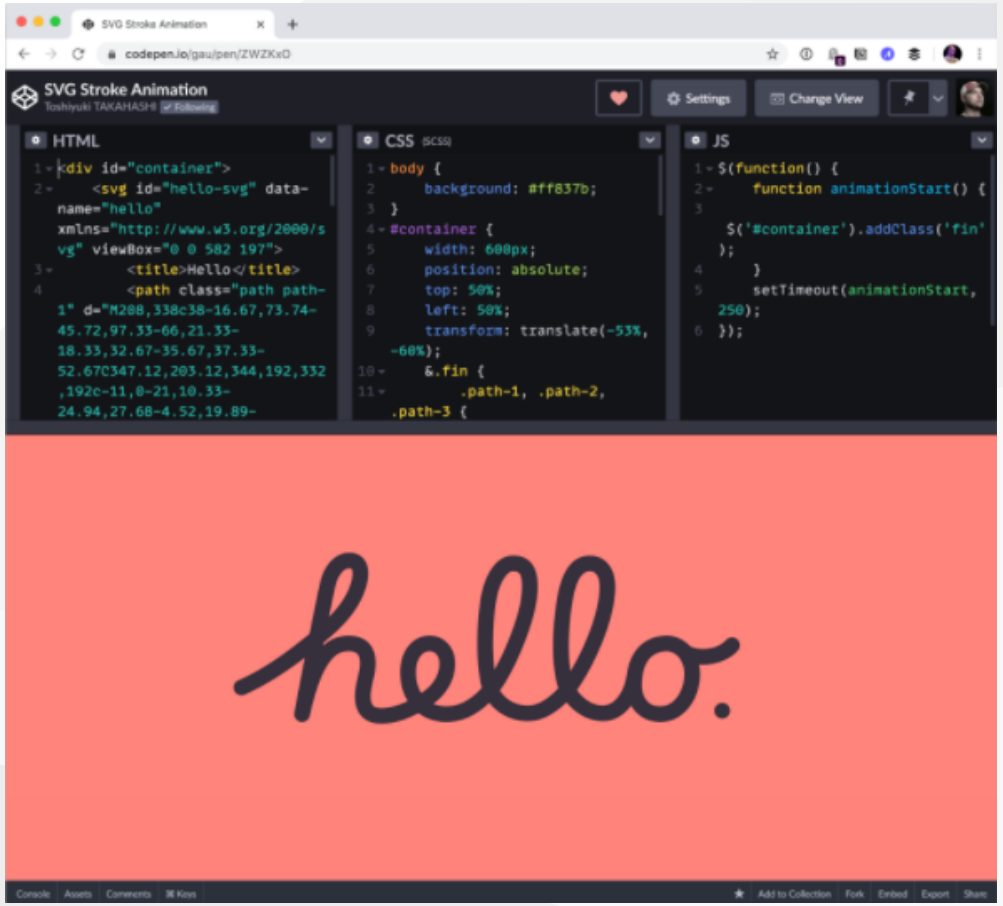


Sonarlint (Code Quality and Code Security Extension)

https://www.sonarlint.org/

Codepen.io (online code sharing)

- https://codepen.io/
- CodePen is a social development environment. At its heart, it allows you to write code in the browser, and see the results of it as you build.
- A useful and liberating online code editor for developers of any skill, and particularly empowering for people learning to code. We focus primarily on front-end languages like HTML, CSS, JavaScript, and preprocessing syntaxes that turn into those things



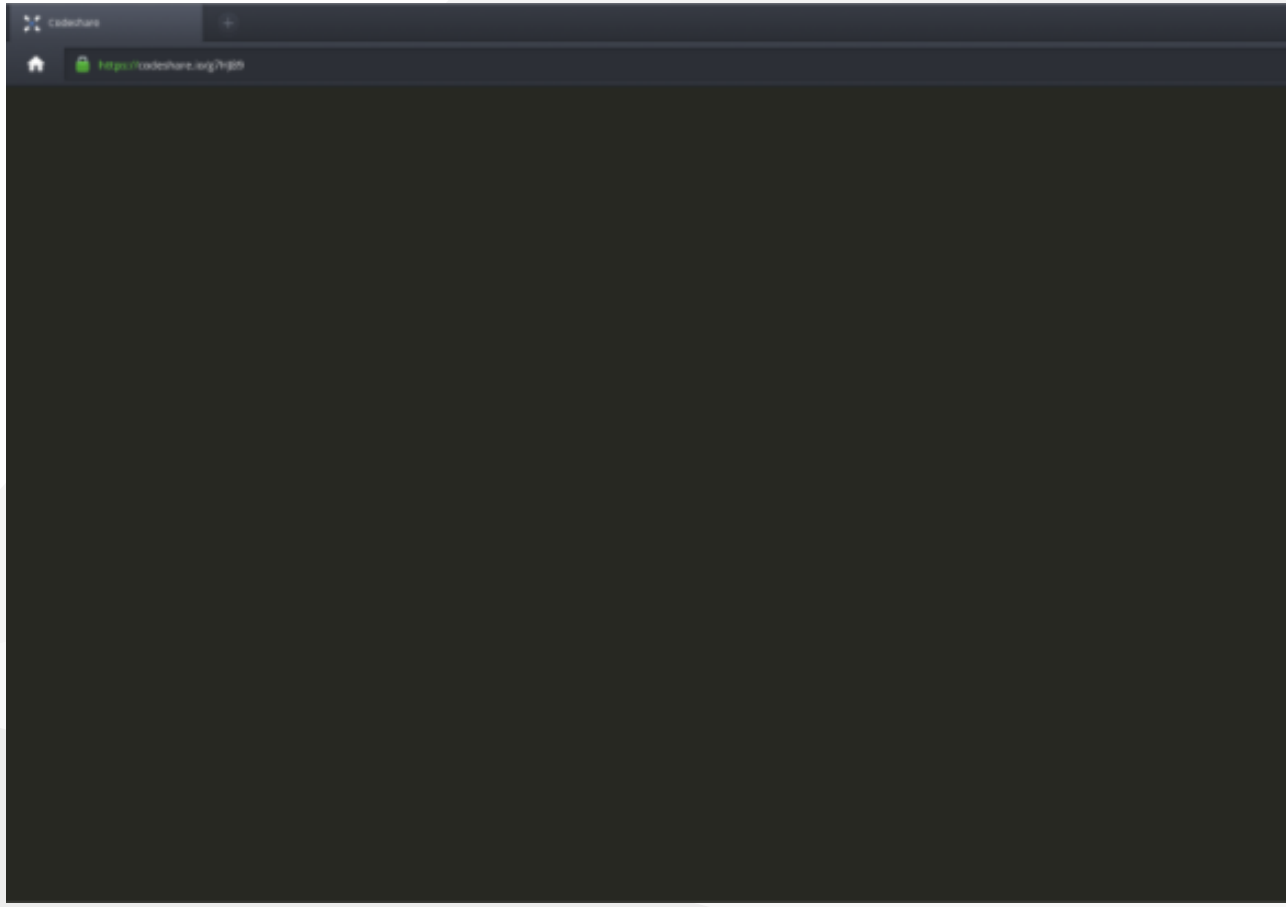
Codepen.io (online code sharing)

- Credit Card Sample on Codepen
  - https://codepen.io/quinlo/pen/YONMEa
- Checkout trends https://codepen.io/trending

Codeshare.io (real-time code sharing)

CodeShare

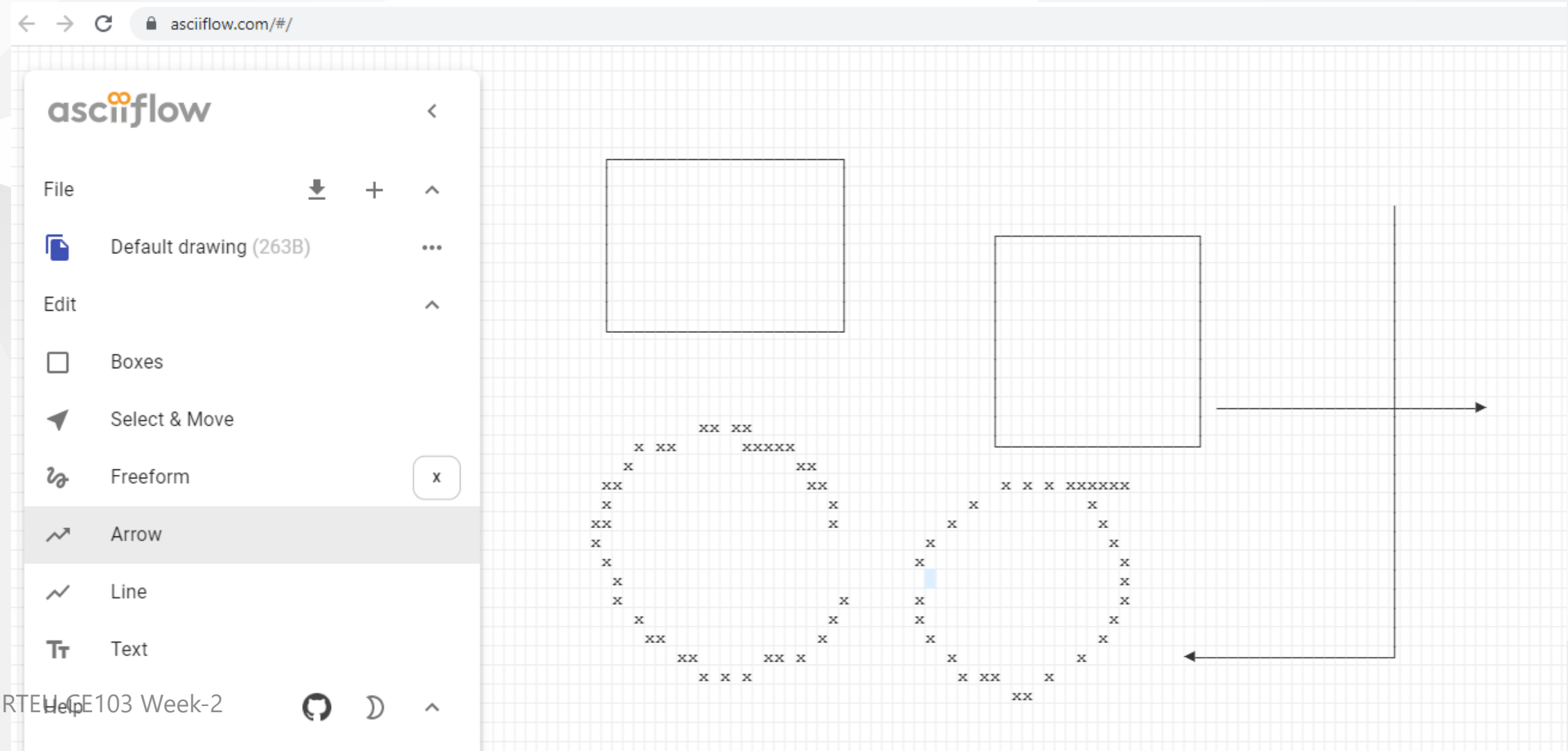
- https://codeshare.io/
- Share Code in Real-time with Developers, An online code editor for interviews, troubleshooting, teaching & more...



Codebeautify.org (online data conversion tools)

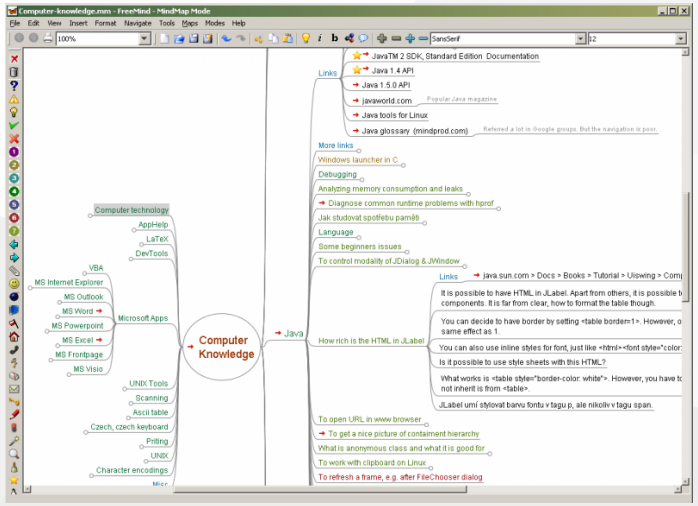
- Has several tools for developers (Code Formatter, JSON Beautifier, XML Viewer, Hex Converters and more...)
- https://codebeautify.org/

- Asciflow provides ascii based drawings that you can copy directly to textfiles and source codes. Visit the following link
  - https://asciiflow.com/



Freemind (opensource mindmap application)

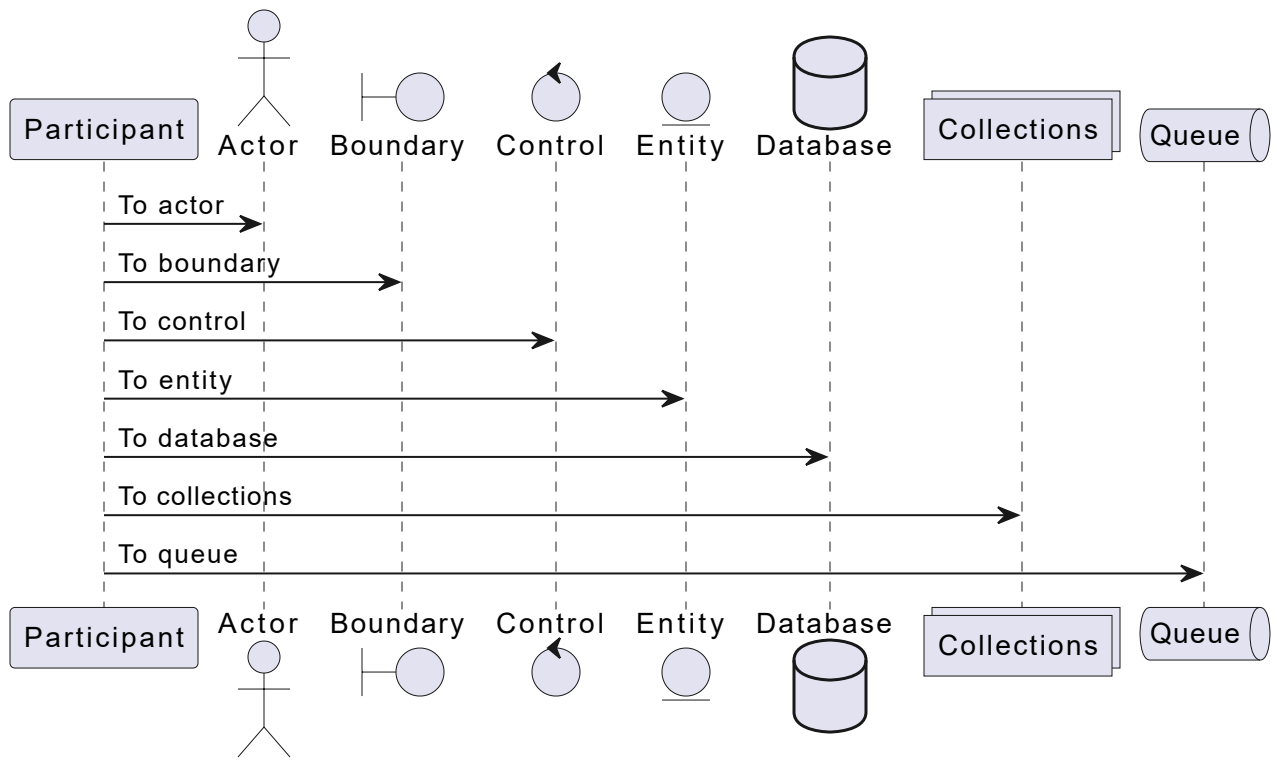
- Freemind is open source java based desktop mindmap application. Can export files to several formats
  - Main Page - FreeMind



Mockup Designers

- Mockflow
  - Signup - MockFlow
- Wireflow
  - https://wireflow.co/

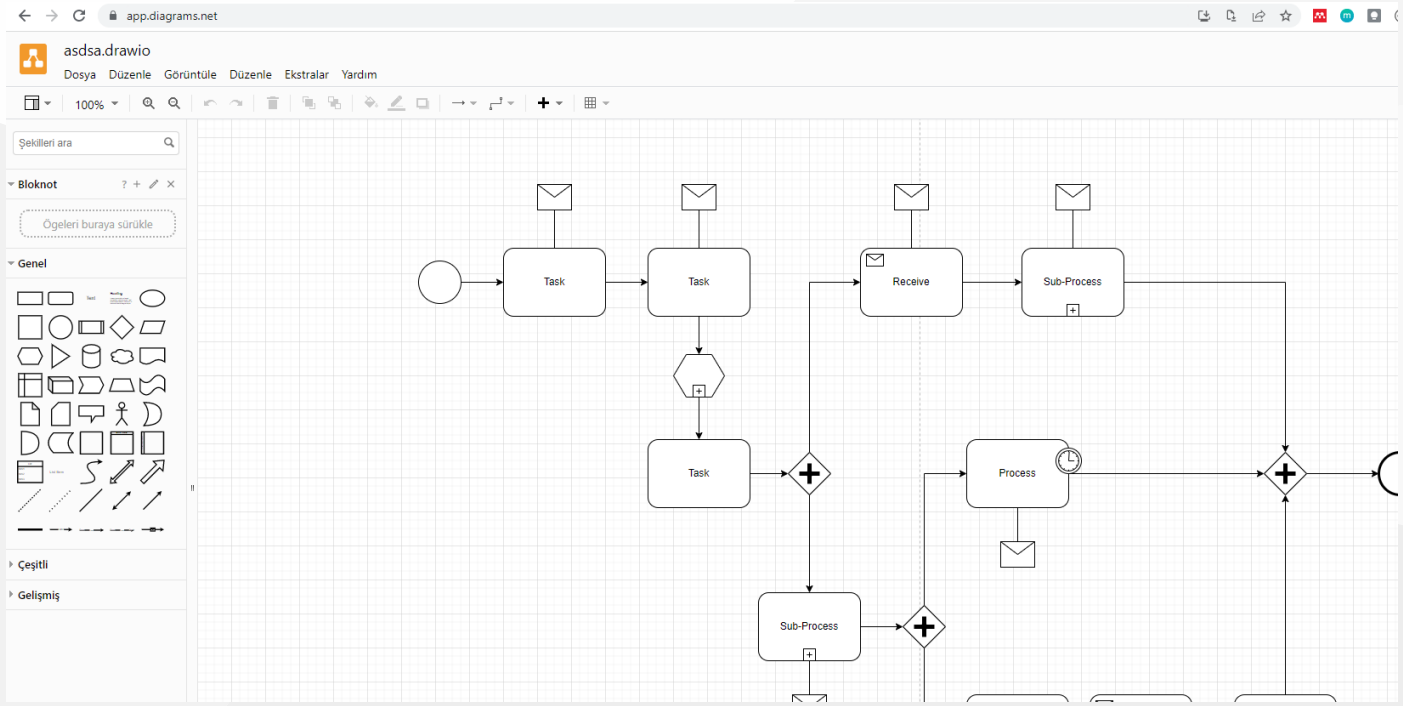
PlantUML (software designer)

- Text based designer for software engineers
  - https://plantuml.com/
- 

- Also visit course notes that related to plantuml CE204 Object-Oriented Programming - RTEU C204 Object Oriented Programming Course Notes

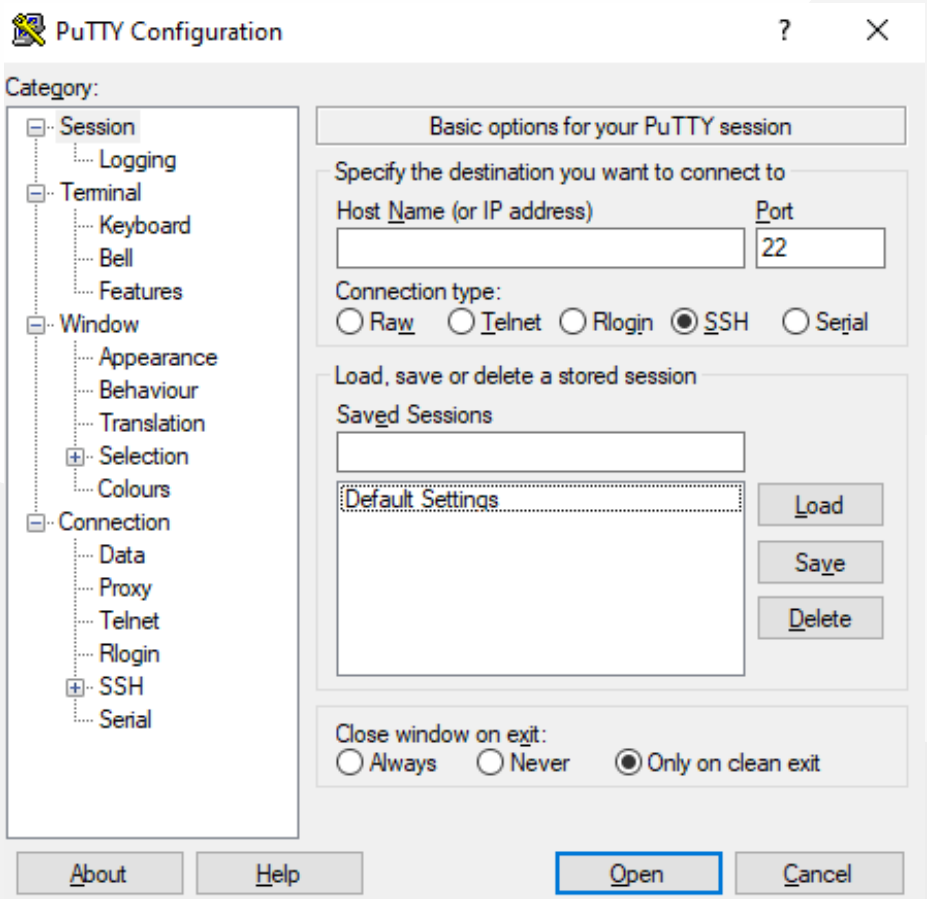
Drawio (drawing tool)

- Online and Offline Drawing Tool
  - https://app.diagrams.net/
- Offline Installer
  - Releases · jgraph/drawio-desktop · GitHub

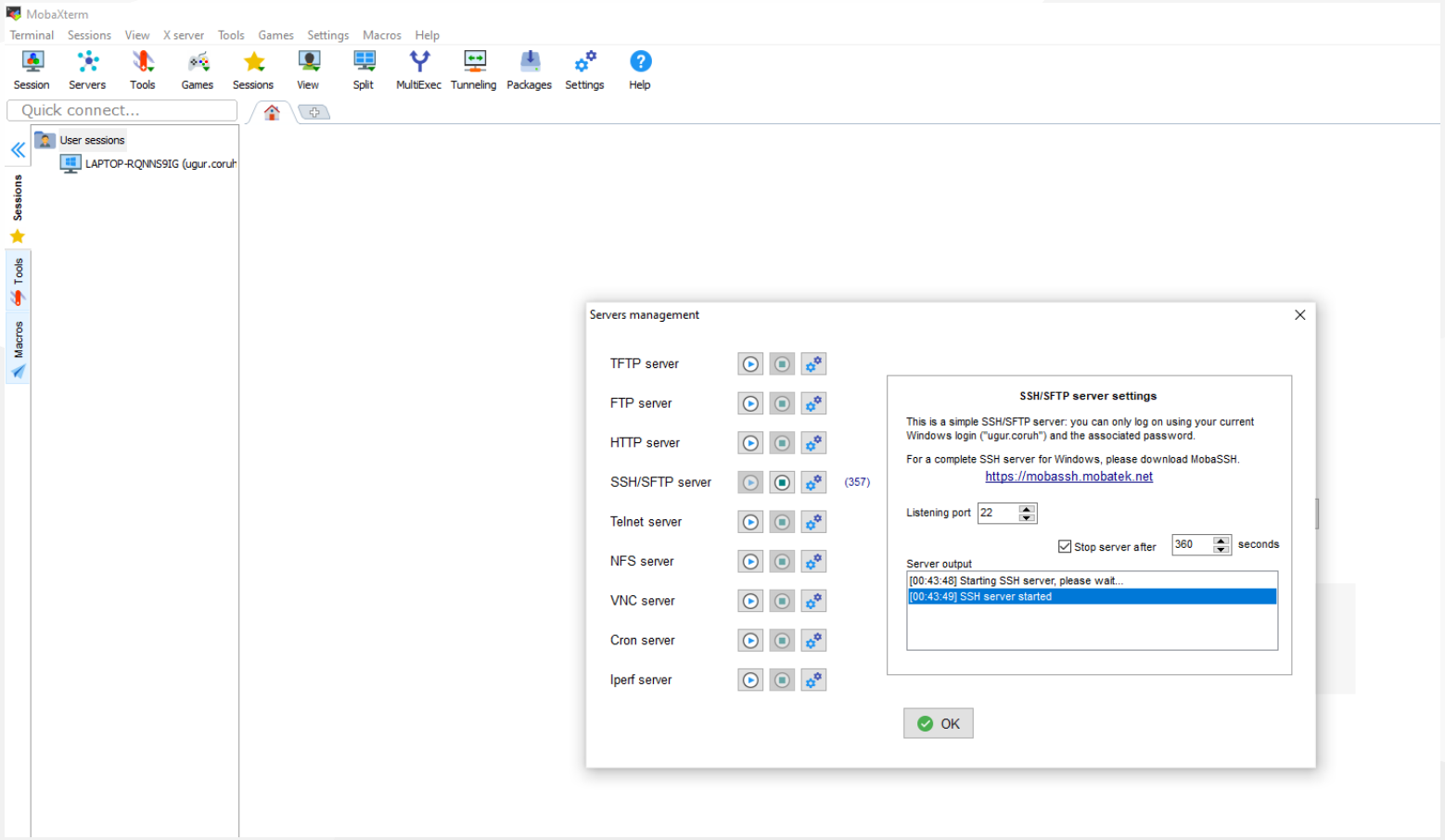


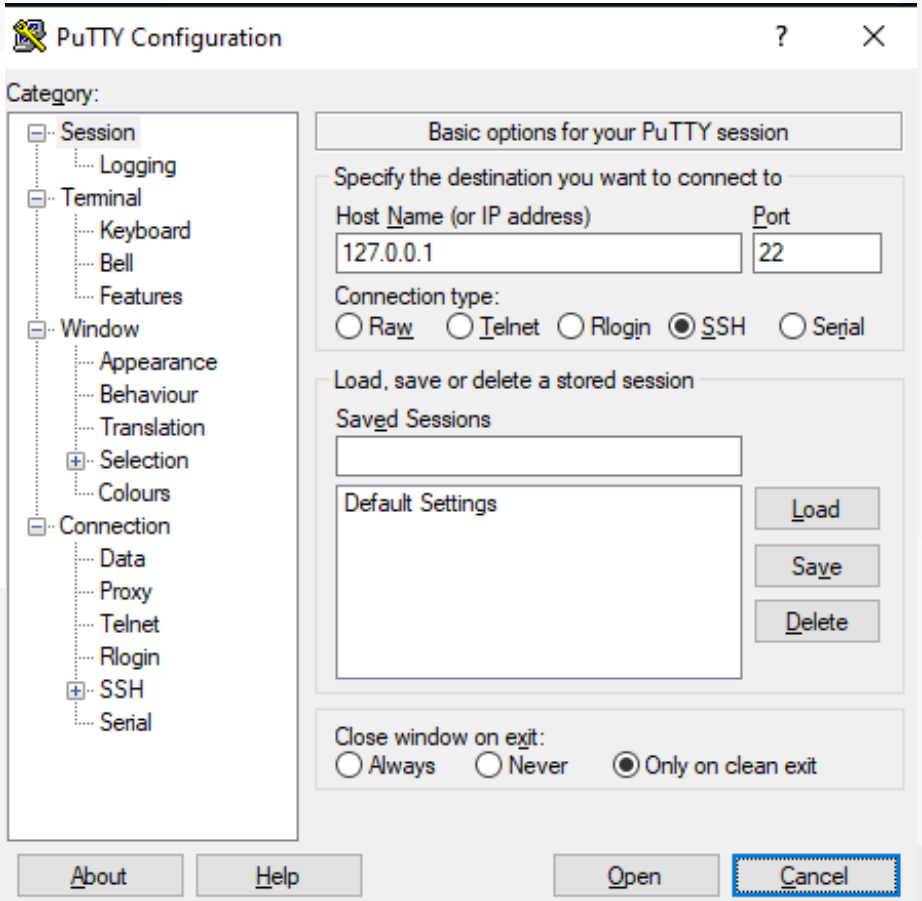
Putty (Remote Connection)

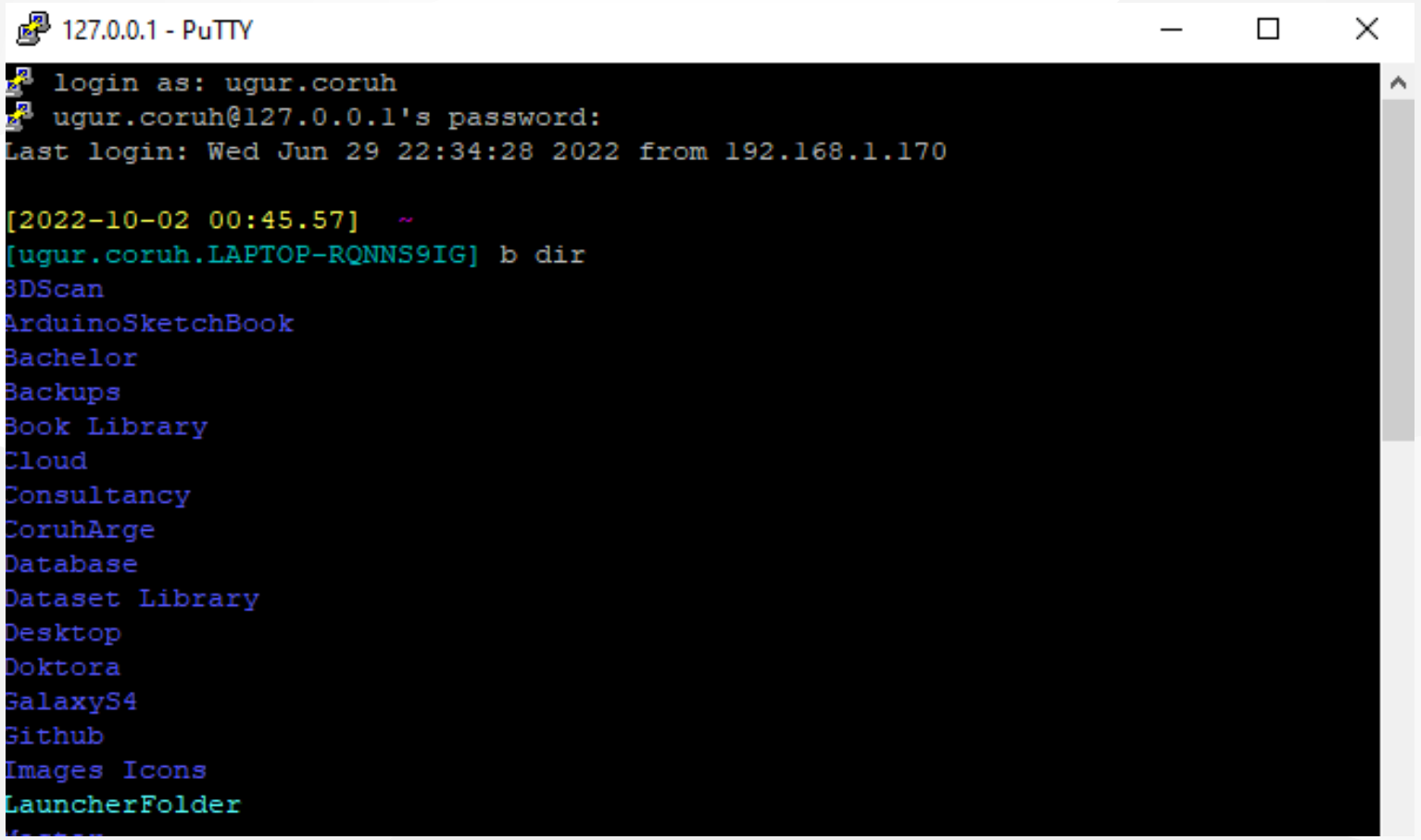
- Commonly use for SSH connection



- We can run a SSH server with MobaXterm and can connect to same computer with Putty.




PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
Telnet
Rlogin
SSH
Serial
Basic options for your PuTTY session
Specify the destination you want to connect to
Host Name (or IP address)
Port
127.0.0.1
22
Connection type:
Raw
Telnet
Rlogin
SSH
Serial
Load, save or delete a stored session
Saved Sessions
Default Settings
Load
Save
Delete
Close window on exit:
Always
Never
Only on clean exit
About
Help
Open
Cancel


127.0.0.1 - PuTTY
login as: ugur.coruh
ugur.coruh@127.0.0.1's password:
Last login: Wed Jun 29 22:34:28 2022 from 192.168.1.170
[2022-10-02 00:45.57] ~
[ugur.coruh.LAPTOP-RQNNS9IG] b dir
3DScan
ArduinoSketchBook
Bachelor
Backups
Book Library
Cloud
Consultancy
CoruhArge
Database
Dataset Library
Desktop
Doktora
GalaxyS4
Github
Images Icons
LauncherFolder

- How to Download and Upload Files over SSH – TecAdmin

Here are some useful examples for downloading files from the remote system over SSH protocol.

- This will connect to example.com server with user "**username**" and copy the **/backup/file.zip** file to local system directory **/local/dir**. To use theis command replace the values as per your environment.

```
scp username@example.com:/backup/file.zip /local/dir
```

- If the SSH is running on a non-standard port, You can specify the port using `-P` option with SCP command.

```
scp -P 2222 username@example.com:/backup/file.zip /local/dir
```

- If your remote server required a private key to connect server, You can use `-i` followed by a private key file path to connect your server using the SCP command. This can be helpful for AWS servers.

Upload file using SSH

You can also upload files to the remote server using SSH protocol using the SCP command. Use the following example command for uploading files to the SSH server.

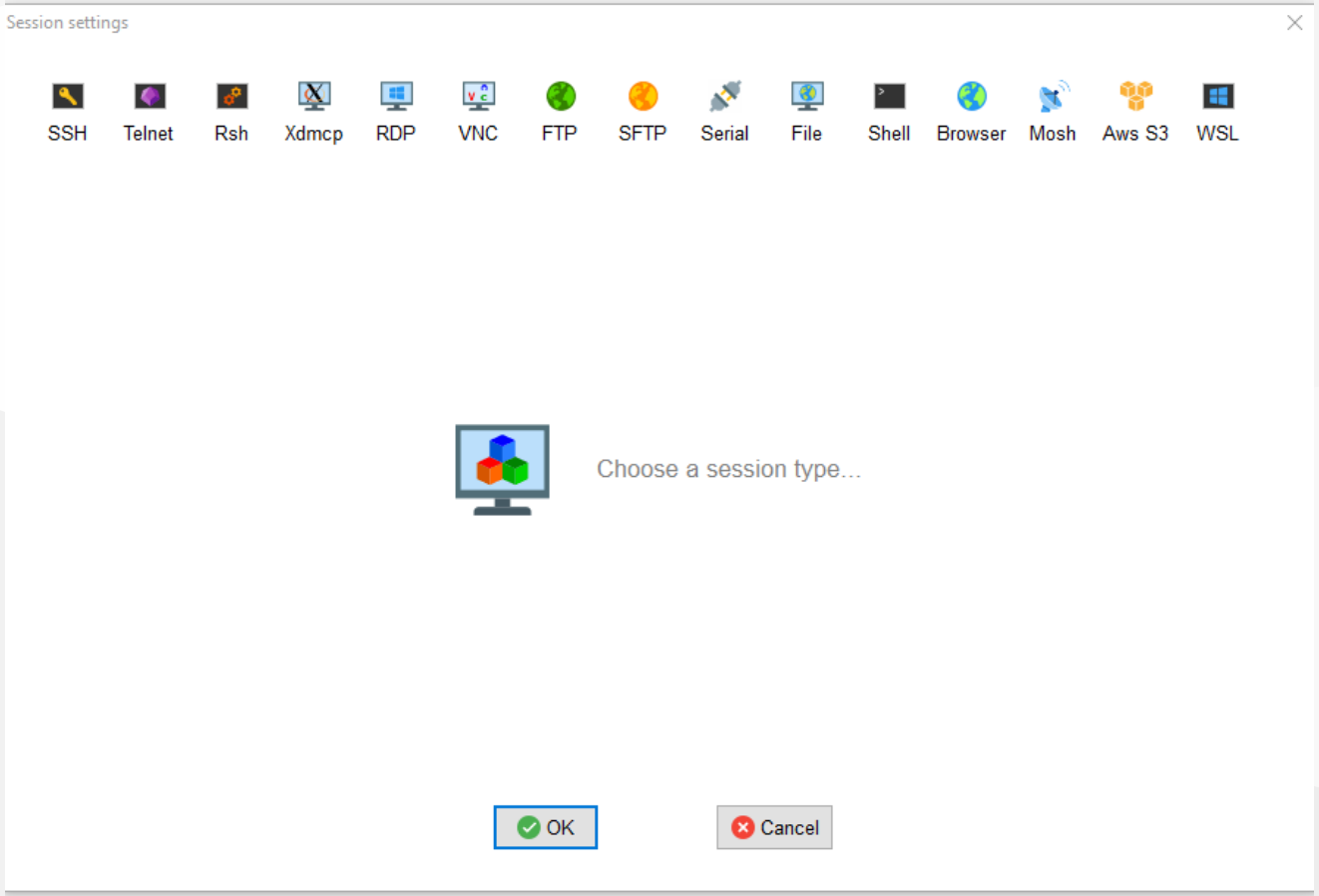
```
scp file.zip username@example.com:/remote/dir
```

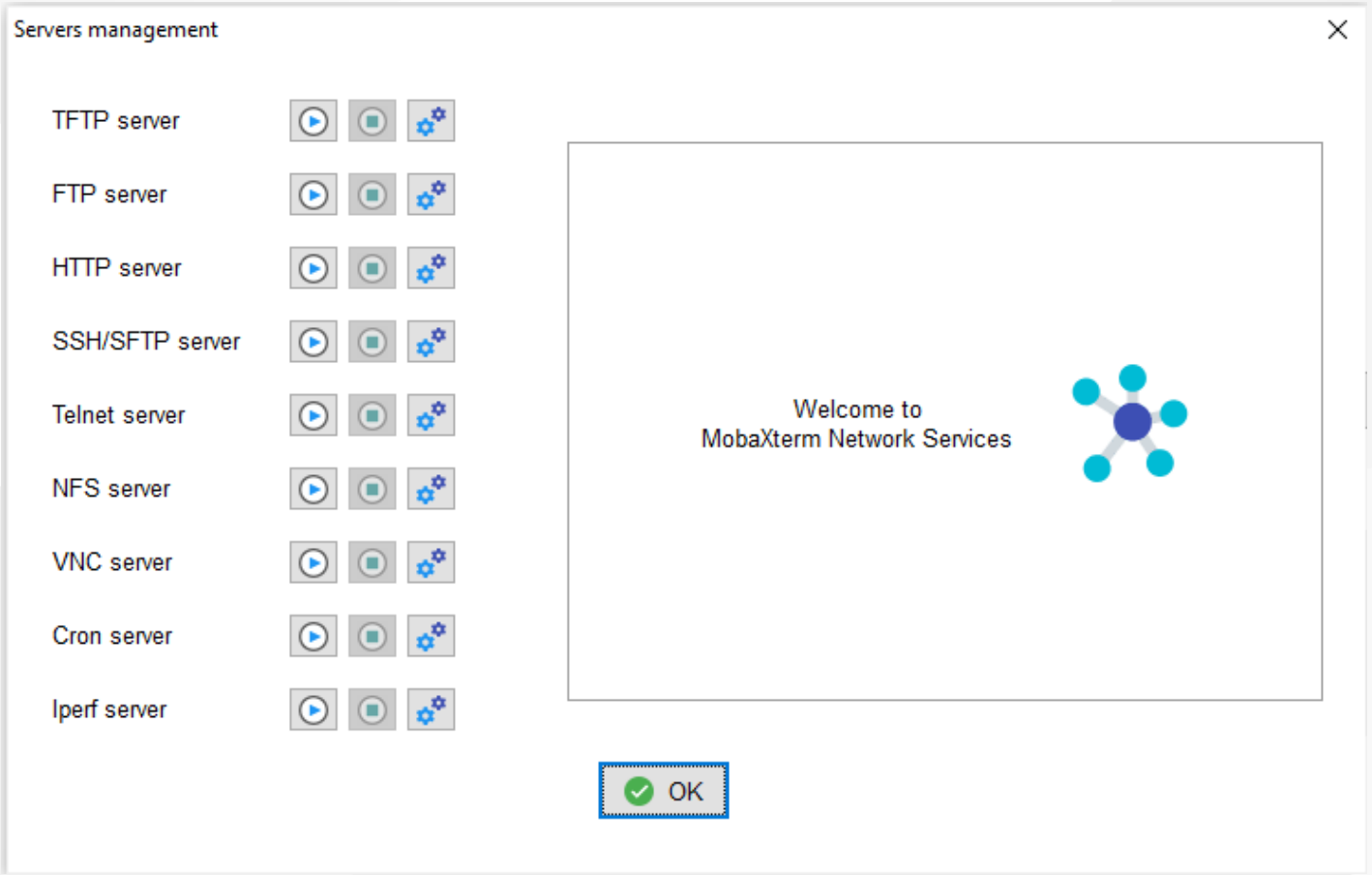
Similarity you can use **-P** switch to define port of the SSH server and **-i** to define private key for the user authentication.

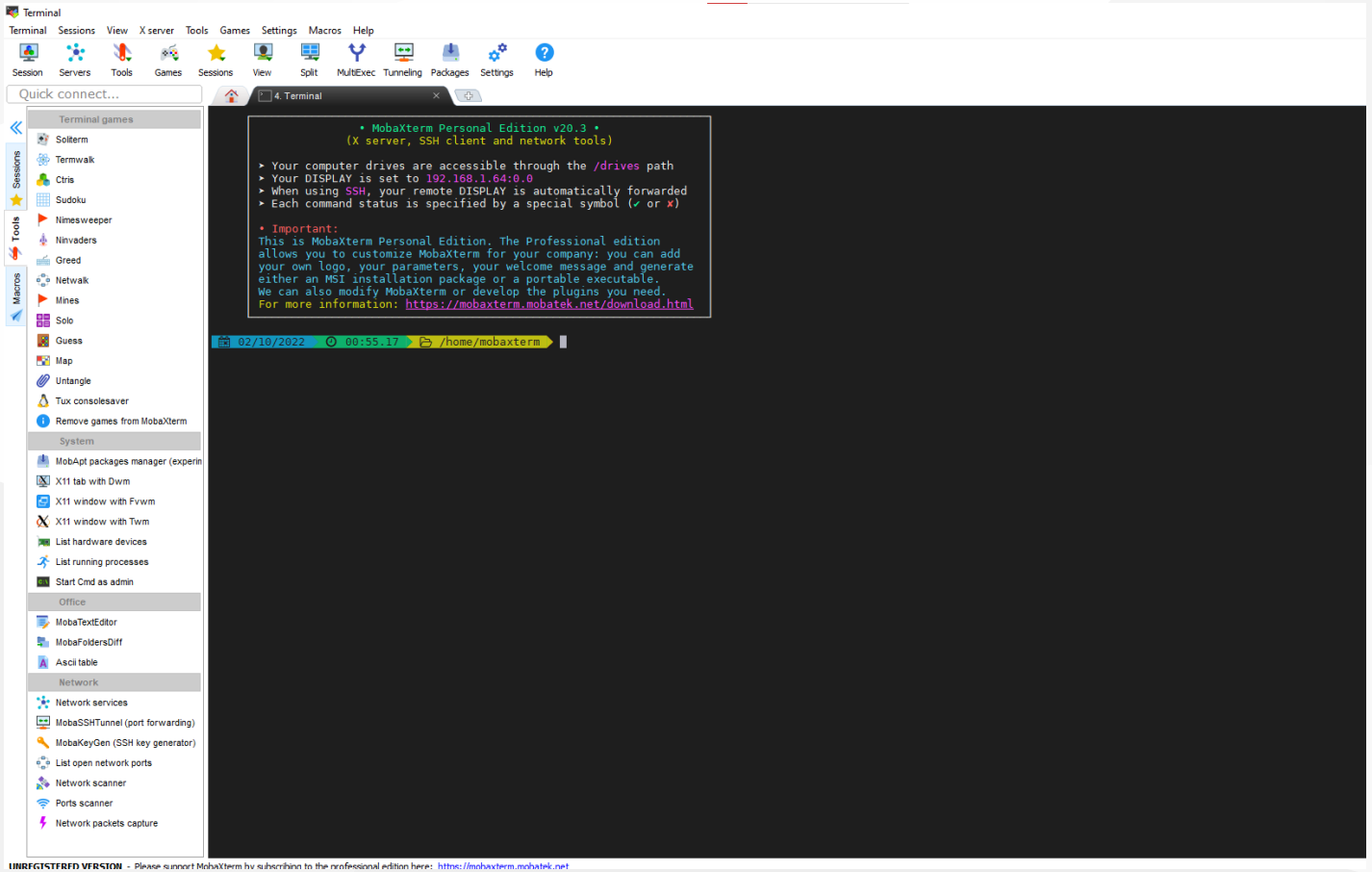
- Also you can use SSH tunnels for remote code development
  - Developing on Remote Machines using SSH and Visual Studio Code
  - Visual Studio Code Server

MobaXterm (Remote Connection)

- Multip Purpose Remote Connection Toolkit

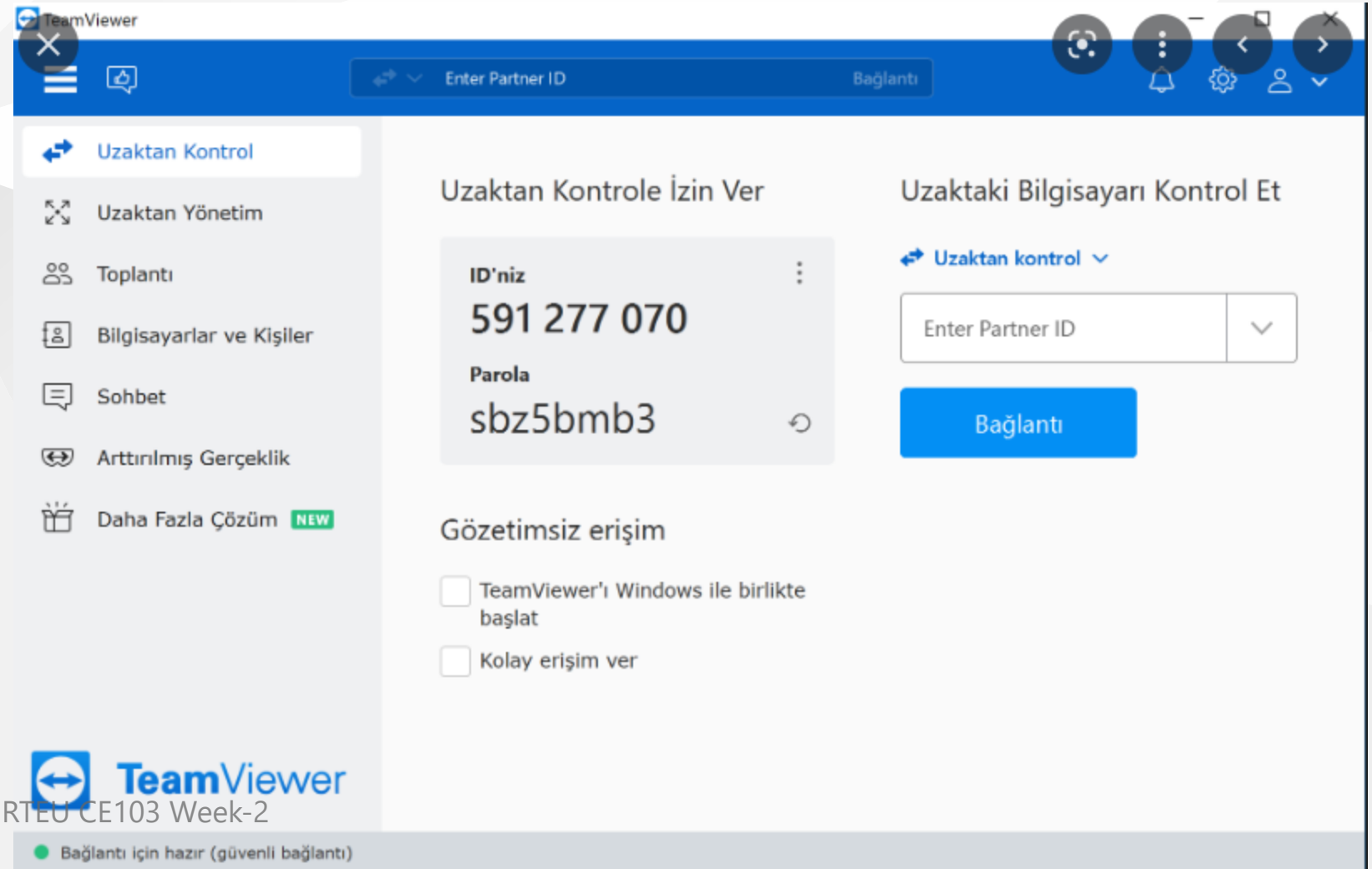



Servers management
TFTP server
FTP server
HTTP server
SSH/SFTP server
Telnet server
NFS server
VNC server
Cron server
Iperf server
Welcome to
MobaXterm Network Services
OK


Terminal
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
4. Terminal
Terminal games
Solitaire
Termwalk
Ctris
Sudoku
Nimesweeper
Ninvaders
Greed
Netwalk
Mines
Solo
Guess
Map
Untangle
Tux consolesaver
Remove games from MobaXterm
System
MobApt packages manager (experin
X11 tab with Dwm
X11 window with Fvwm
X11 window with Twm
List hardware devices
List running processes
Start Cmd as admin
Office
MobaTextEditor
MobaFoldersDiff
Ascii table
Network
Network services
MobaSSHTunnel (port forwarding)
MobaKeyGen (SSH key generator)
List open network ports
Network scanner
Ports scanner
Network packets capture
• MobaXterm Personal Edition v20.3 •
(X server, SSH client and network tools)
▸ Your computer drives are accessible through the /drives path
▸ Your DISPLAY is set to 192.168.1.64:0.0
▸ When using SSH, your remote DISPLAY is automatically forwarded
▸ Each command status is specified by a special symbol (✔ or ✘)
• Important:
This is MobaXterm Personal Edition. The Professional edition
allows you to customize MobaXterm for your company: you can add
your own logo, your parameters, your welcome message and generate
either an MSI installation package or a portable executable.
We can also modify MobaXterm or develop the plugins you need.
For more information: https://mobaxterm.mobatek.net/download.html
02/10/2022 00:55.17 /home/mobaxterm
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net

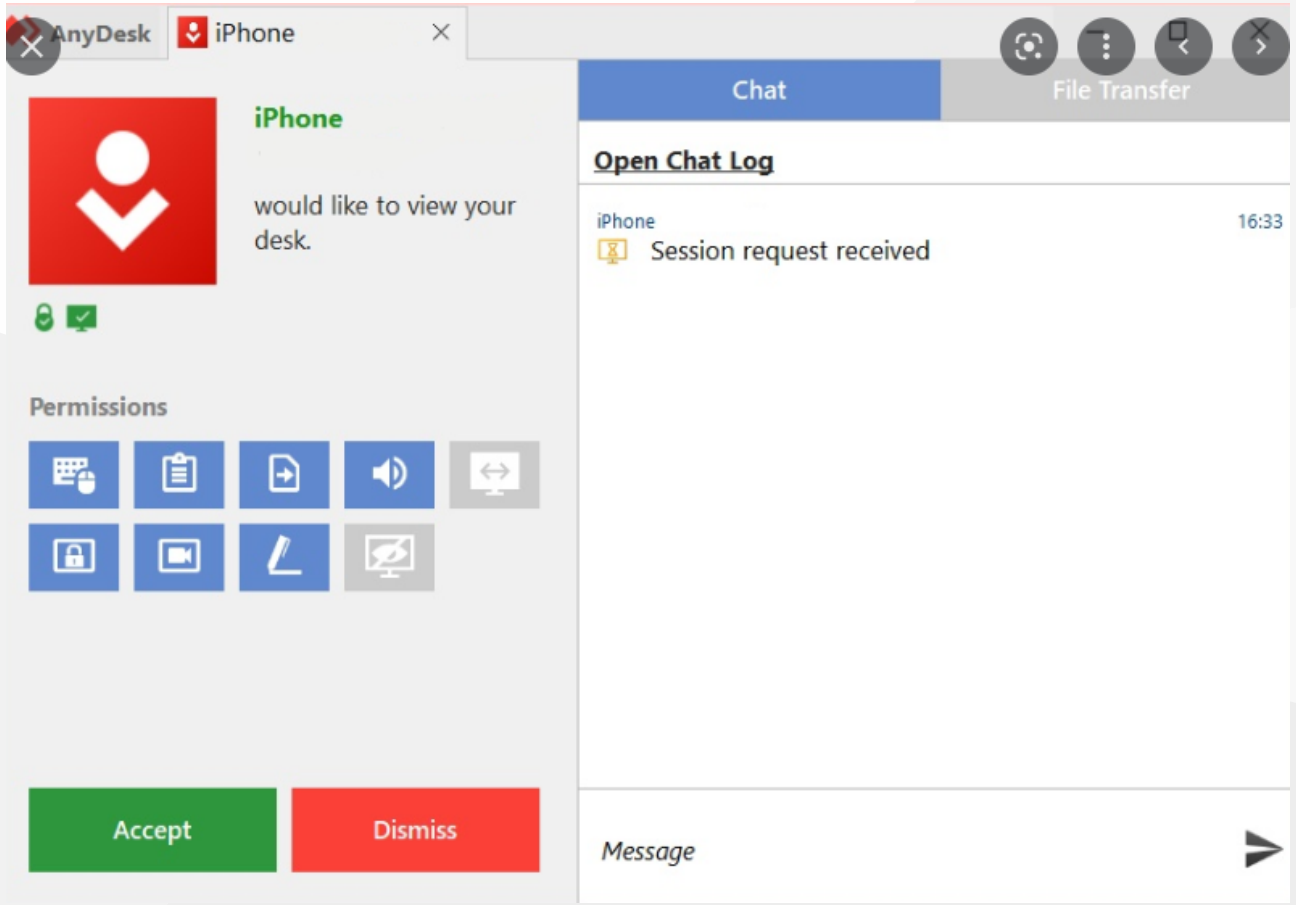
Teamviewer (Remote Connection)

- Remote connection tool
  - TeamViewer – Uzaktan Destek, Uzaktan Erişim, Hizmet Masası, Çevrimiçi İşbirliği ve Toplantılar



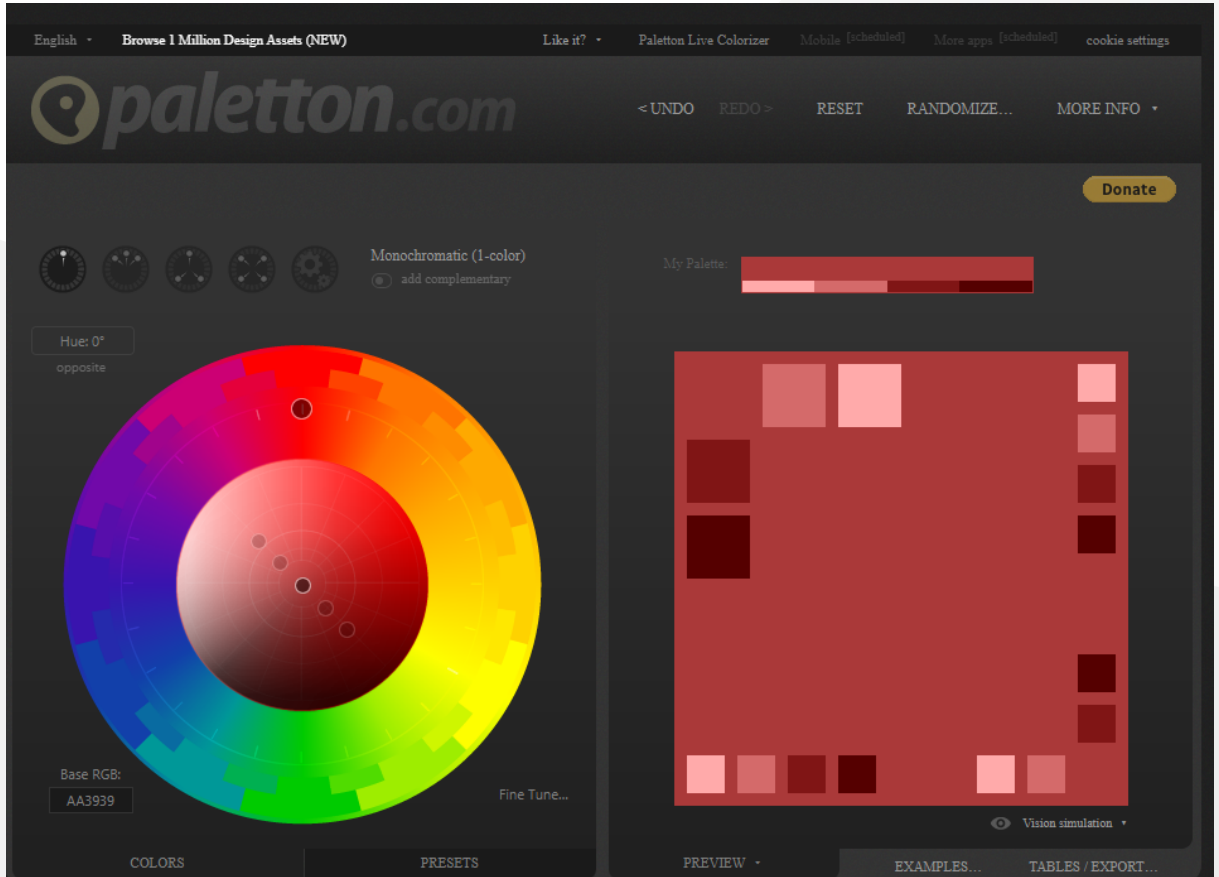
AnyDesk

- Remote connection tool
  - The Fast Remote Desktop Application – AnyDesk



Paletton.com and Colorhunt.co (Color Chooser)

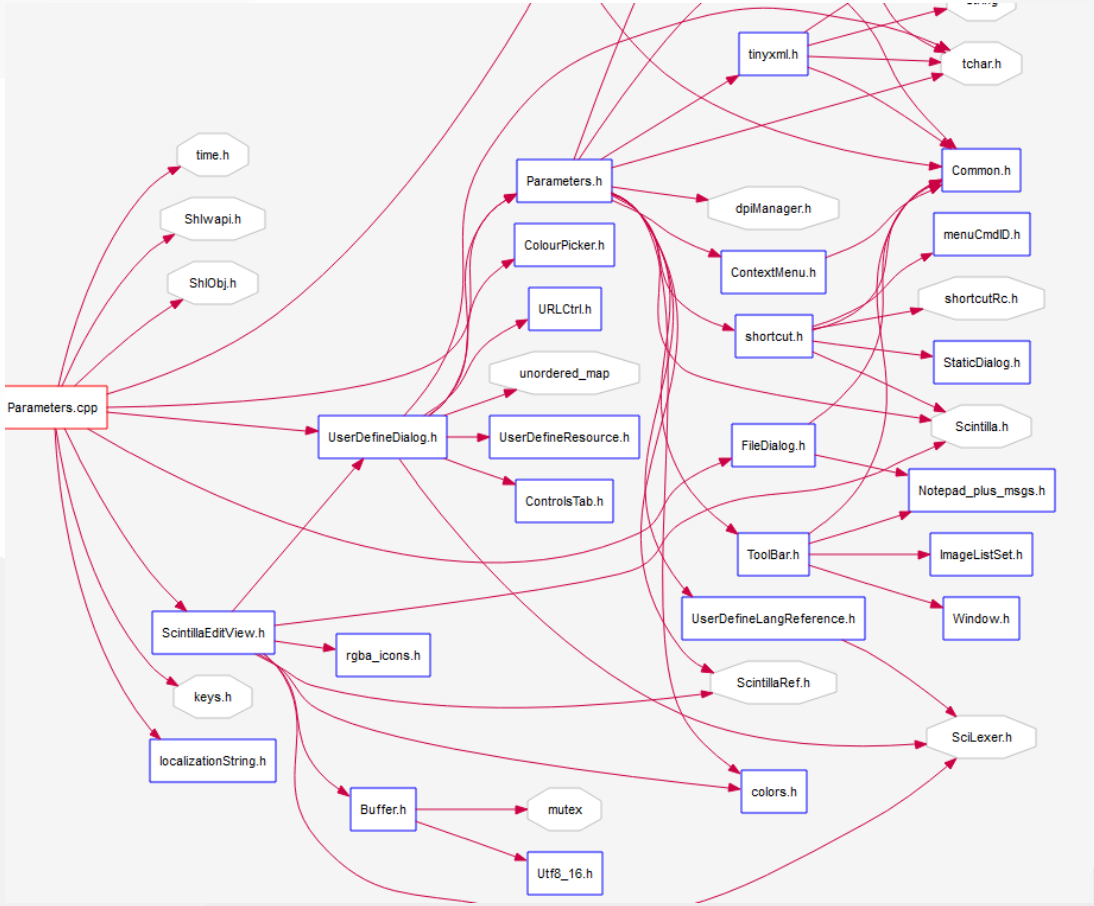
- Generates color pallettes and sample usages
  - Paletton - The Color Scheme Designer
  - https://colorhunt.co/
  - Also check Colors Tutorial




Palette usage examples
lorem ipsum
DUIS AUTE
IRURE DOLOR
LOREM
IPSUM
DOLOR
SIT AMET
ALIQUIP
Mollit Anim
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.
Lorem
Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.
Ipsum
Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.
Duis aute irure dolor
Lorem ipsum
Dolor sit amet
Consectetur adipisicing
Lorem ipsum dolor sit amet
Duis aute
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ullamco laboris nisi ut aliquip.
Ut labore... »
Excepteur sint occaecat
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ullamco.
Adipisicing elit, sed do eiusmod tempor sunt in culpa qui officia.
Deserunt »
Duis aute
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ullamco laboris nisi ut aliquip.
Ut labore... »
Copyright © Paletton.com Lorem | Ipsum | Dolor | Sit amet | Aliquip
Page layout
White page
Dark page
Positive design
Negative design
Artwork
Animated
Vision simulation
Fine Tune...
Randomize...
Close

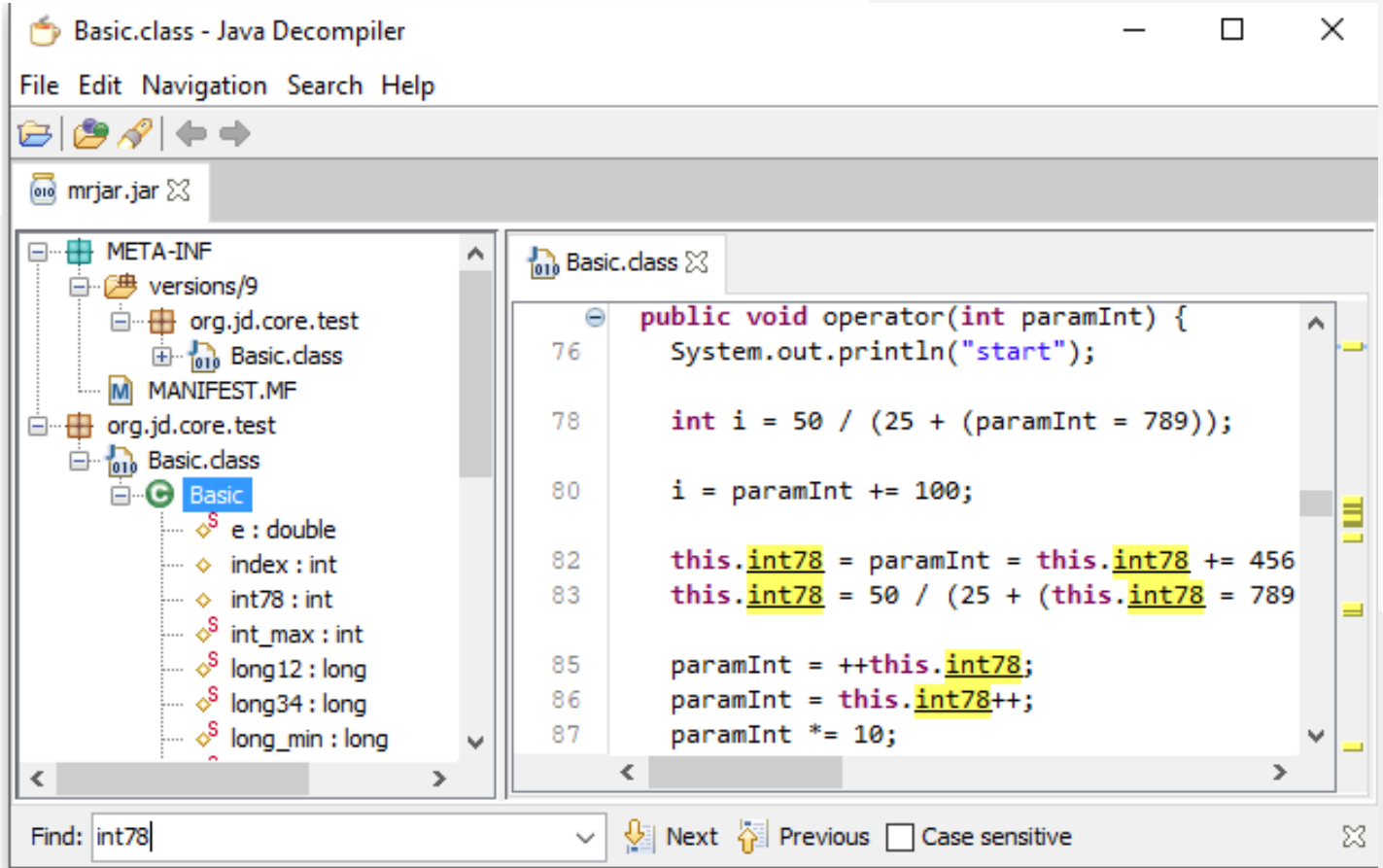
Understand (Static Code Analysis)

- https://emenda.com/scitools-understand/


Parameters.cpp
time.h
Shlwapi.h
ShlObj.h
UserDefineDialog.h
unordered_map
UserDefineResource.h
ControlsTab.h
ScintillaEditView.h
rgba_icons.h
keys.h
localizationString.h
Buffer.h
mutex
Utf8_16.h
Parameters.h
ColourPicker.h
URLCtrl.h
tinyxml.h
tchar.h
Common.h
dpiManager.h
ContextMenu.h
shortcut.h
menuCmdID.h
shortcutRc.h
StaticDialog.h
Scintilla.h
FileDialog.h
Notepad_plus_msgs.h
ToolBar.h
ImageListSet.h
Window.h
UserDefineLangReference.h
ScintillaRef.h
SciLexer.h
colors.h

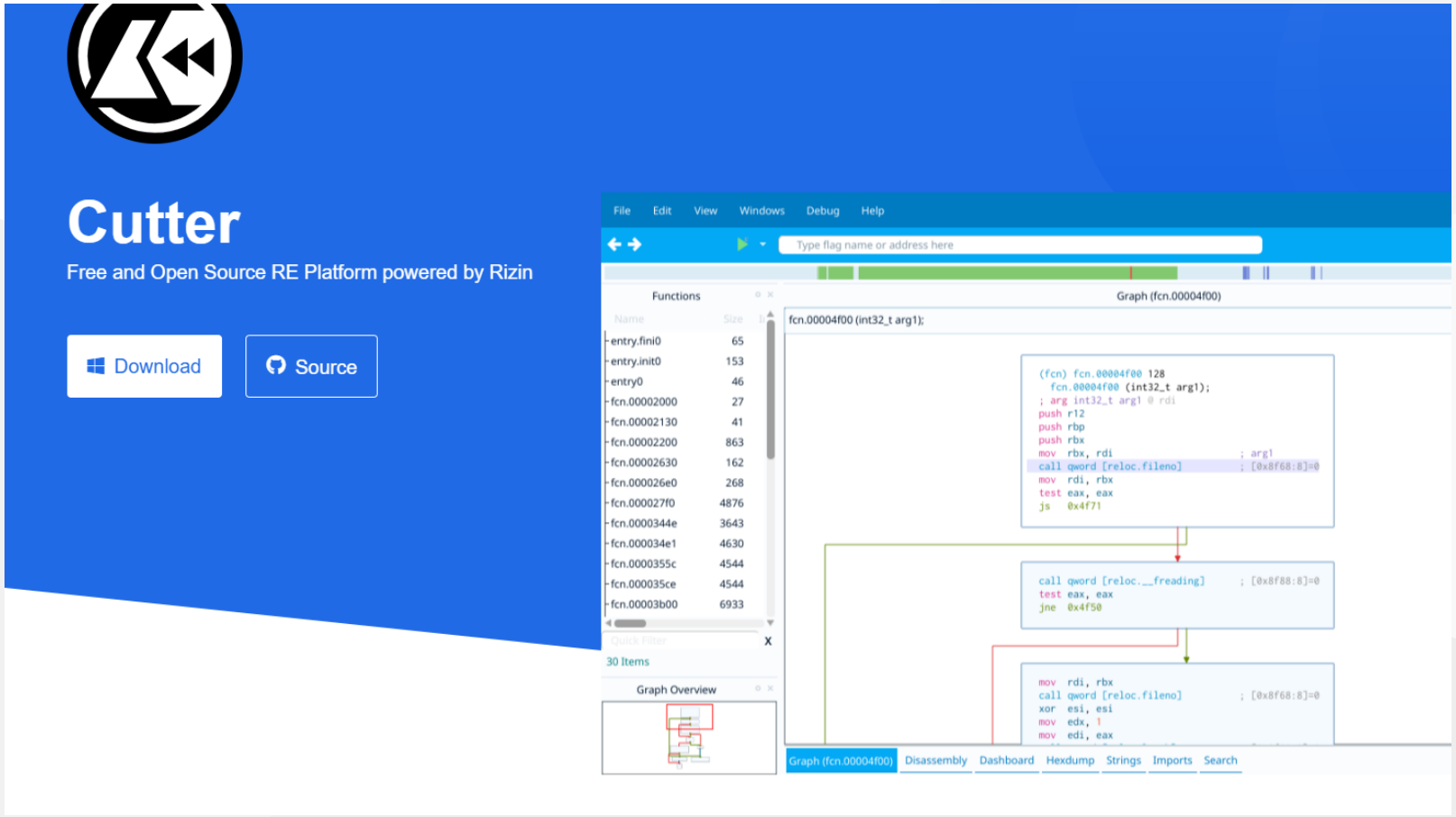
JD Project (Java Decompiler)

- Java Decompiler for Jar and Class Files, If code is not obfuscated it recover source code from compiled files. Just drag and drop files to GUI
  - http://java-decompiler.github.io/
  - You can use it standalone app or with eclipse



Cutter (Multi-Platform Reverse Engineering Tool)

- Cutter's goal is to be an advanced FREE and open-source reverse-engineering platform while keeping the user experience at mind. Cutter is created by reverse engineers for reverse engineers.
- https://cutter.re/

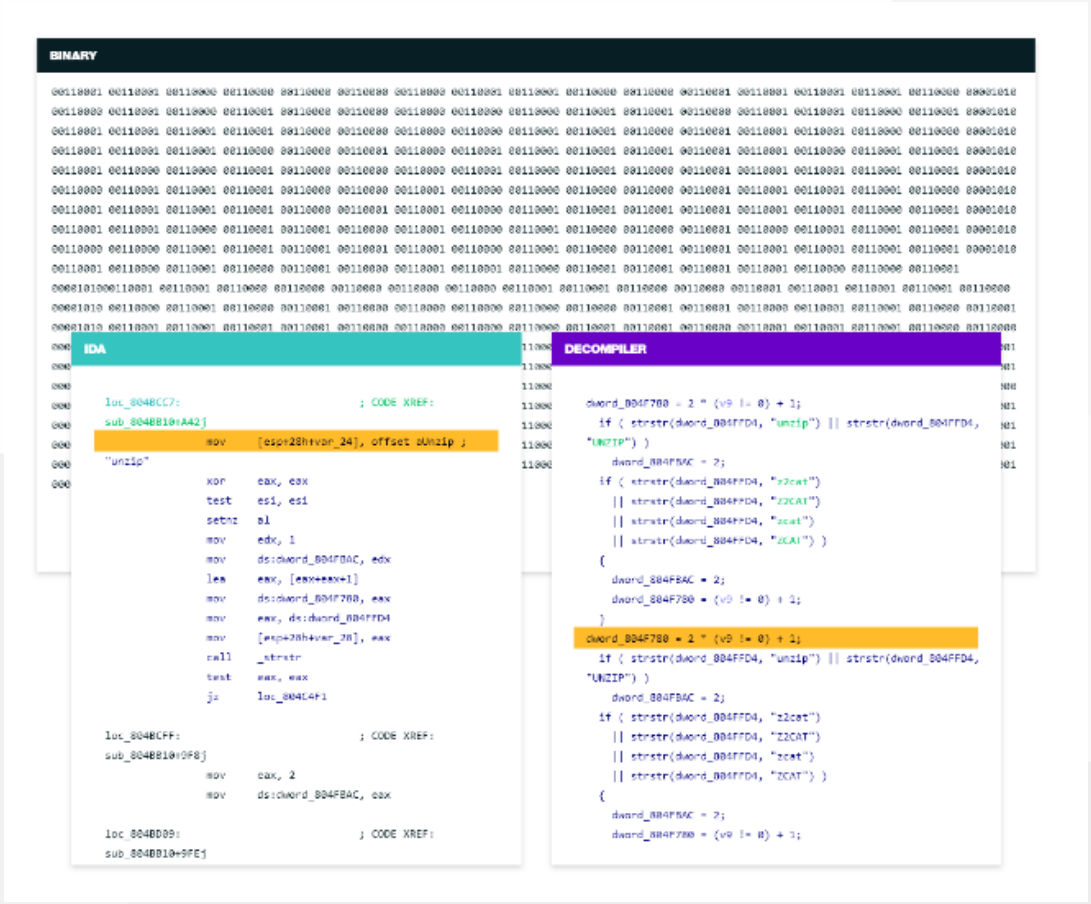


IDA Pro / Freeware (Native Reverse Engineering Tool)

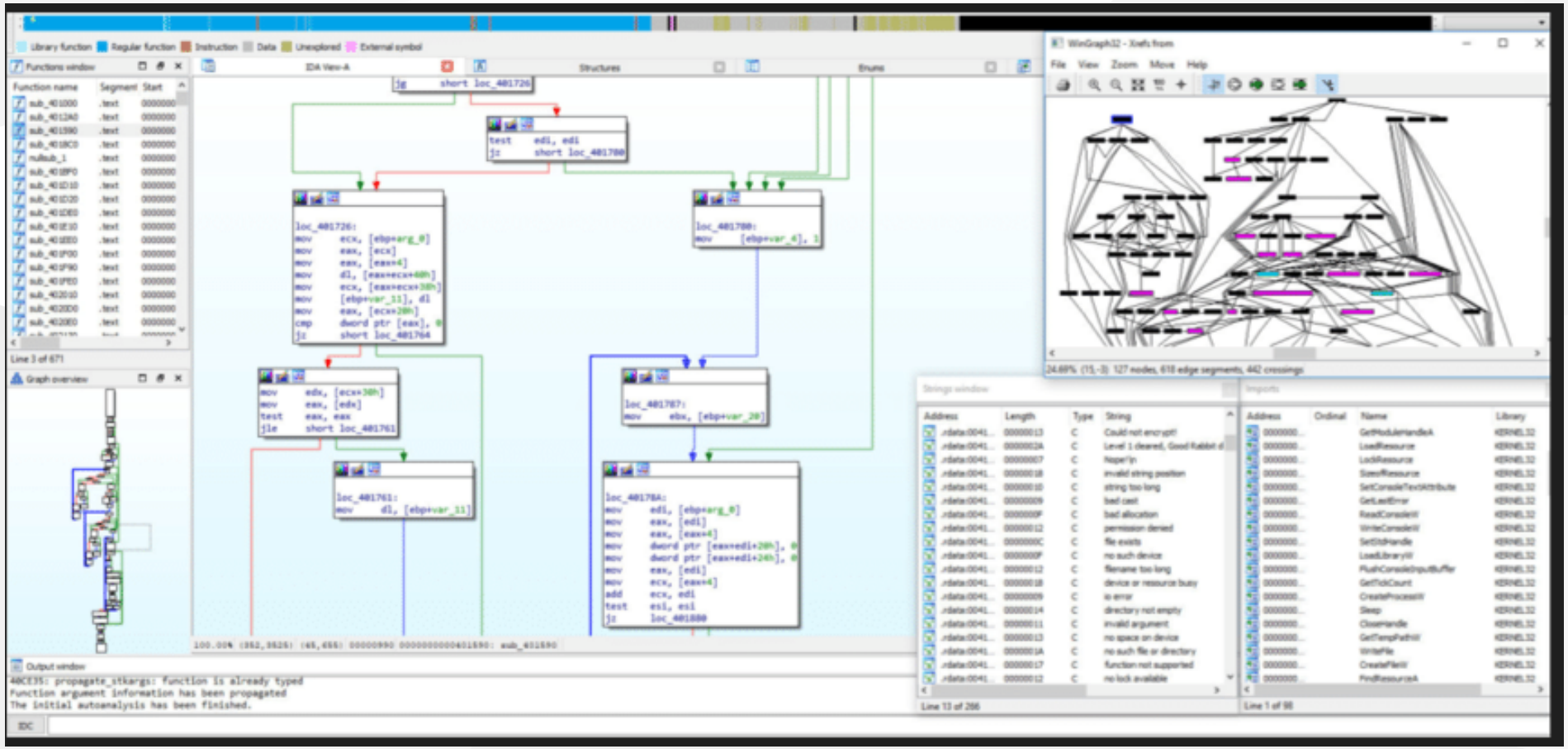
- IDA Pro as a disassembler is capable of creating maps of their execution to show the binary instructions that are actually executed by the processor in a symbolic representation (assembly language). Advanced techniques have been implemented into IDA Pro so that it can generate assembly language source code from machine-executable code and make this complex code more human-readable.

IDA Pro / Freeware (Native Reverse Engineering Tool)

- Hex Rays - State-of-the-art binary code analysis solutions

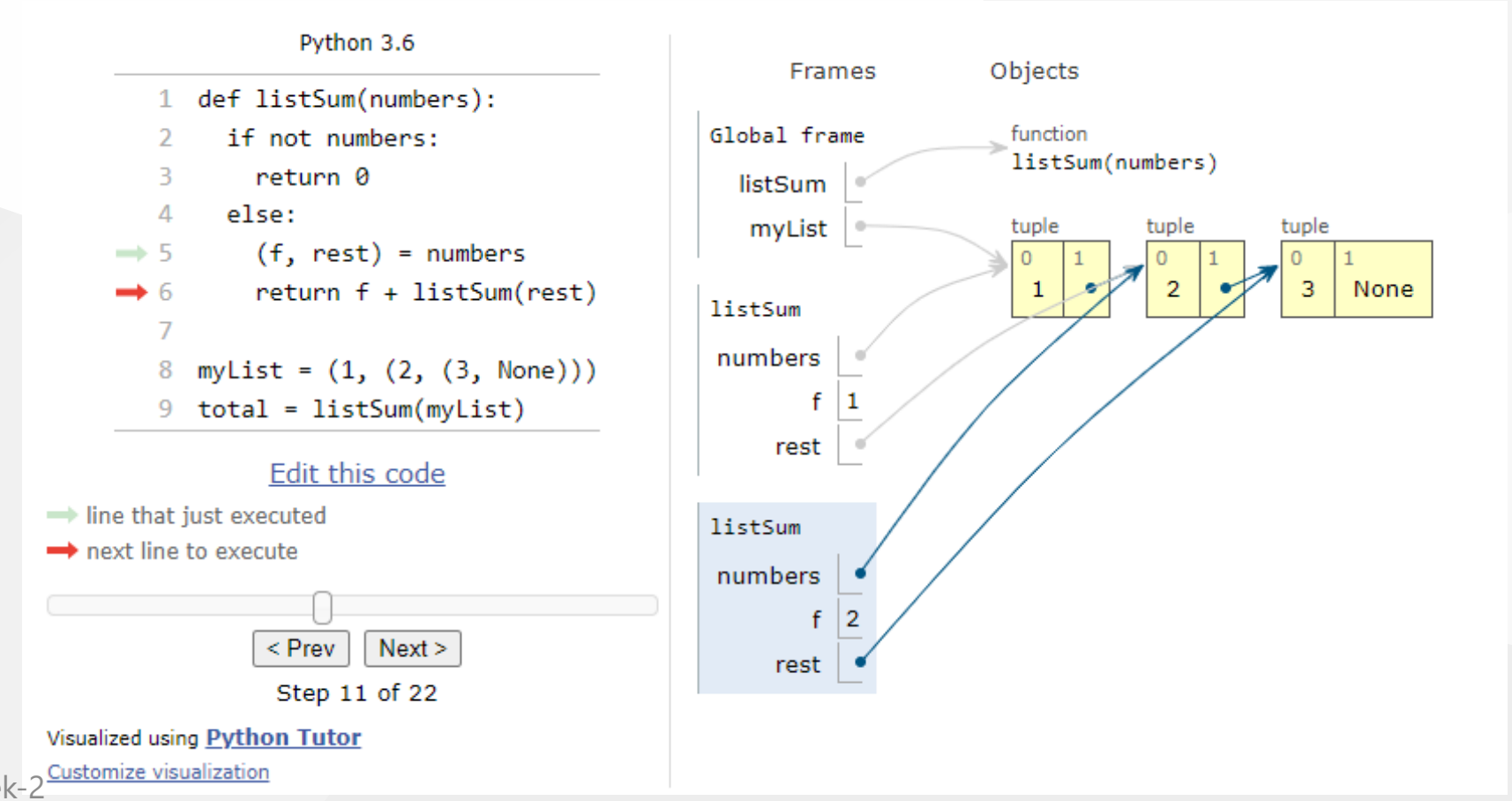


IDA Pro / Freeware (Native Reverse Engineering Tool)



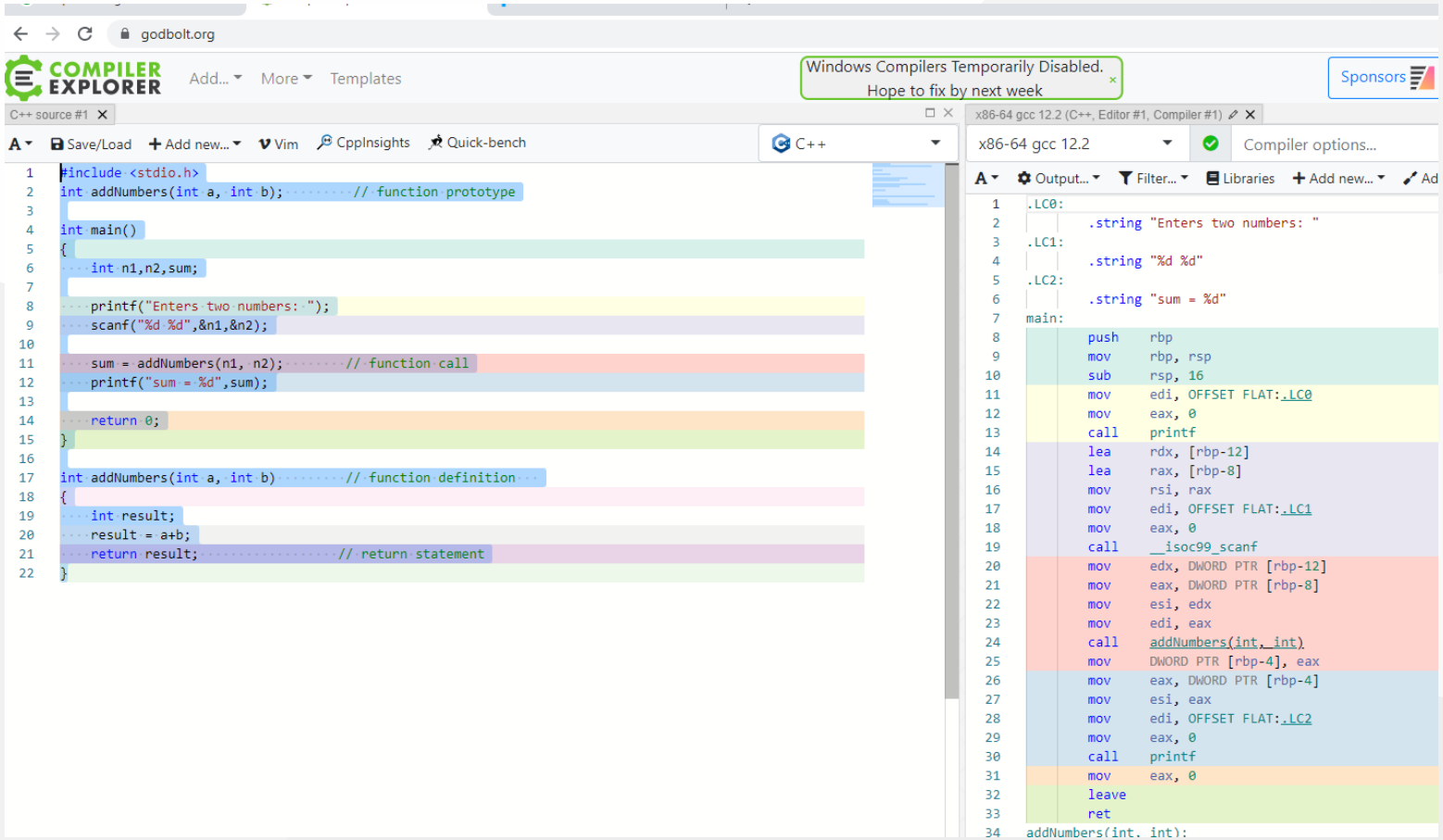
Code Visualization (Python, C , C++ , Java)

- This coding tutor tool helps you learn Python, JavaScript, C, C++, and Java by visualizing code execution.
  - https://pythontutor.com/



Assembly of C Code

- Multilanguage supported. Convert source code to assembly codes
  - https://godbolt.org/



Mobile Device Screen Sharing for Demo

- Show USB or Wifi connected Mobile Device Screen on PC and Provide Controls
  - GitHub - Genymobile/scrcpy: Display and control your Android device
  - Run `scrcpy` for single mobile phone.
  - Open Source Project - Scrcpy now works wirelessly

Travis-CI

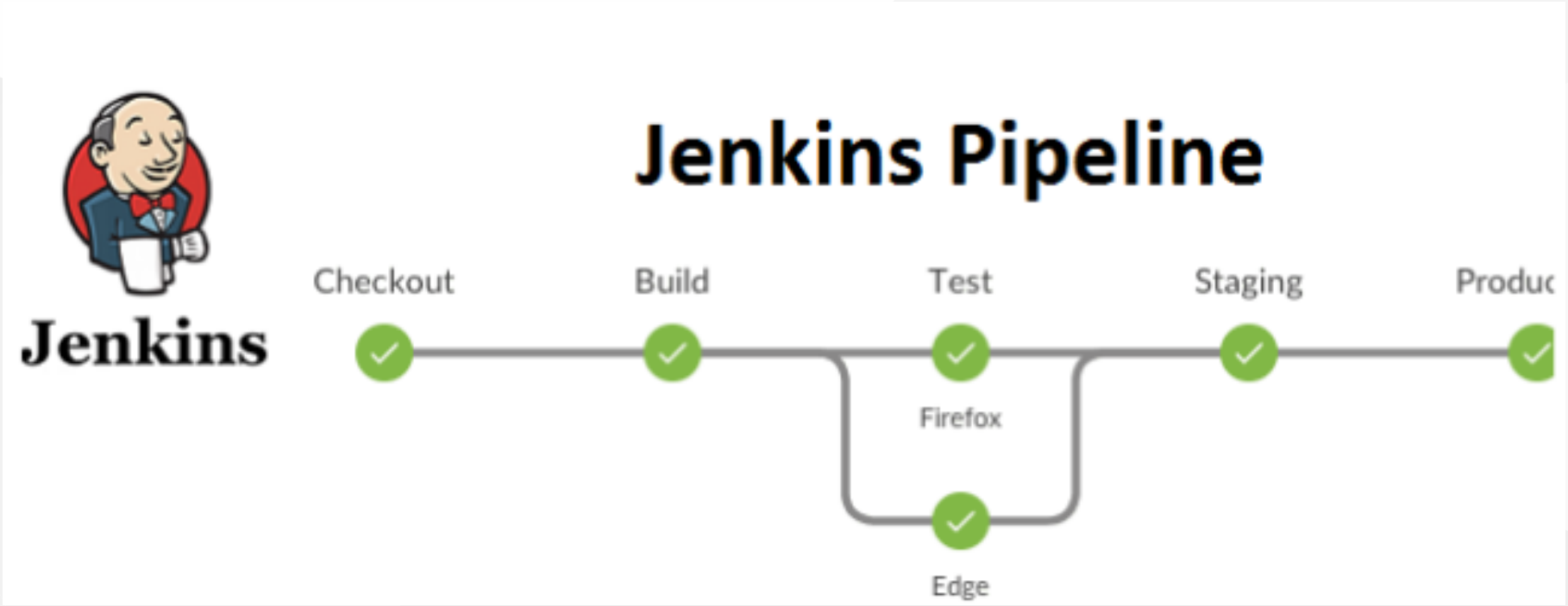
- Travis-CI is a continues integration platform
- Travis-CI free option removed for this reason, its not in our scope.
- It uses Travis.yml files for actions.

AppVeyor

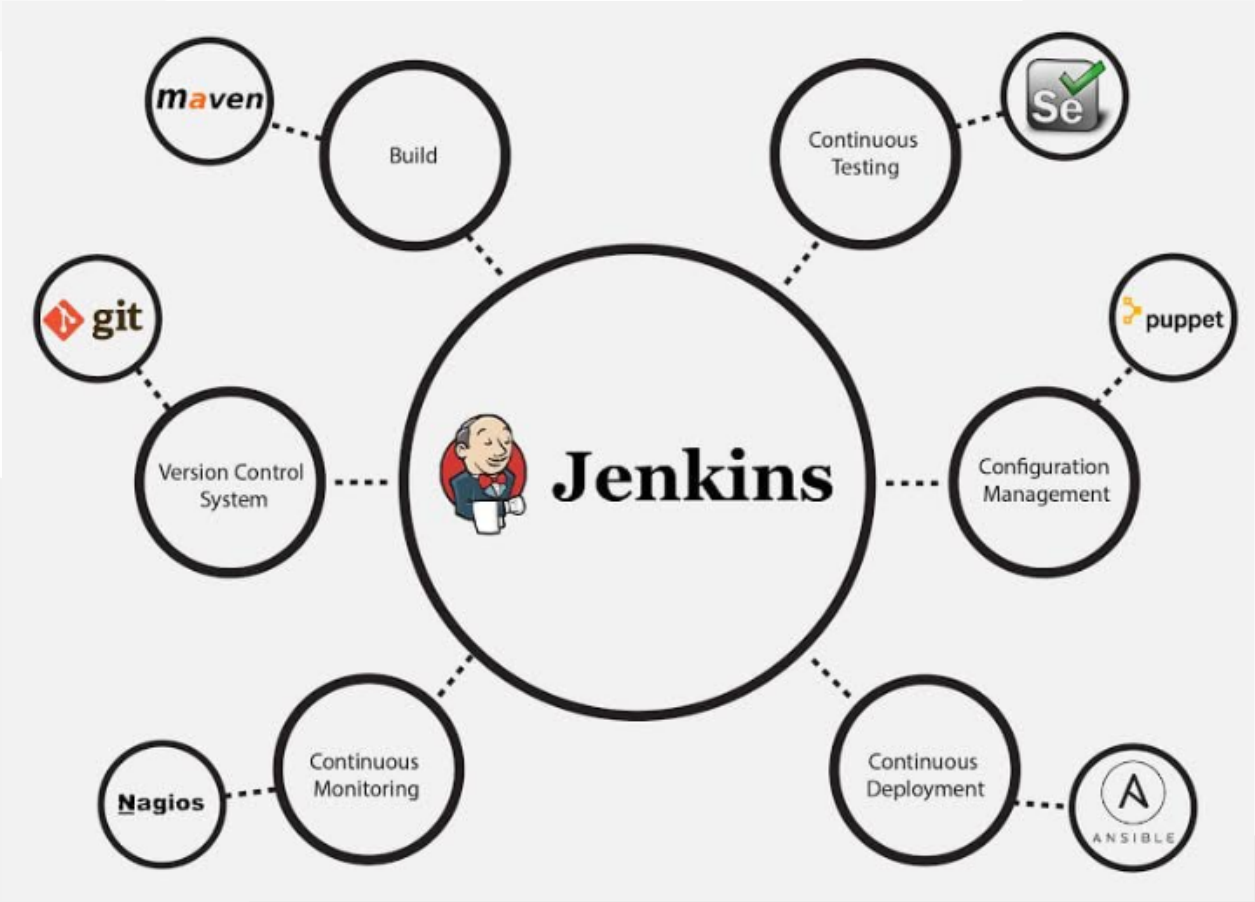
- Another CI platform it has free option for public builds.
  - https://www.appveyor.com
  - GitHub - Kimserey/hello-world-nuget
  - hello-world-nuget/appveyor.yml at master · Kimserey/hello-world-nuget · GitHub

Jenkins

- Self-hosted solution for CI operations, Has integration with Github and several platforms.
  - https://www.jenkins.io/
  - https://www.jenkins.io/doc/pipeline/tour/hello-world/

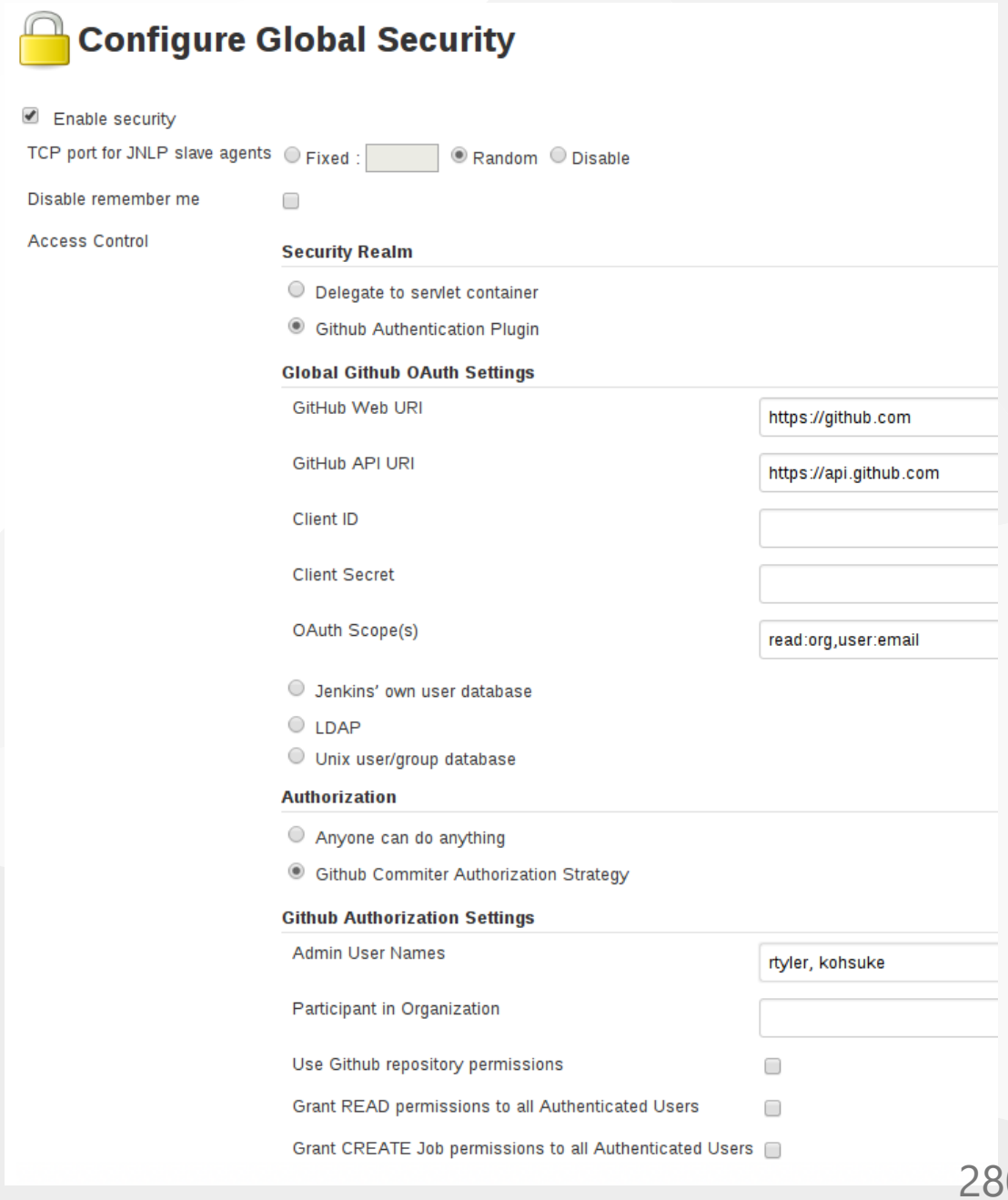


Jenkins


maven
Build
Continuous Testing
Se
git
puppet
Version Control System
Jenkins
Configuration Management
Nagios
Continuous Monitoring
Continuous Deployment
ANSIBLE

Jenkins

- https://www.jenkins.io/solutions/github/



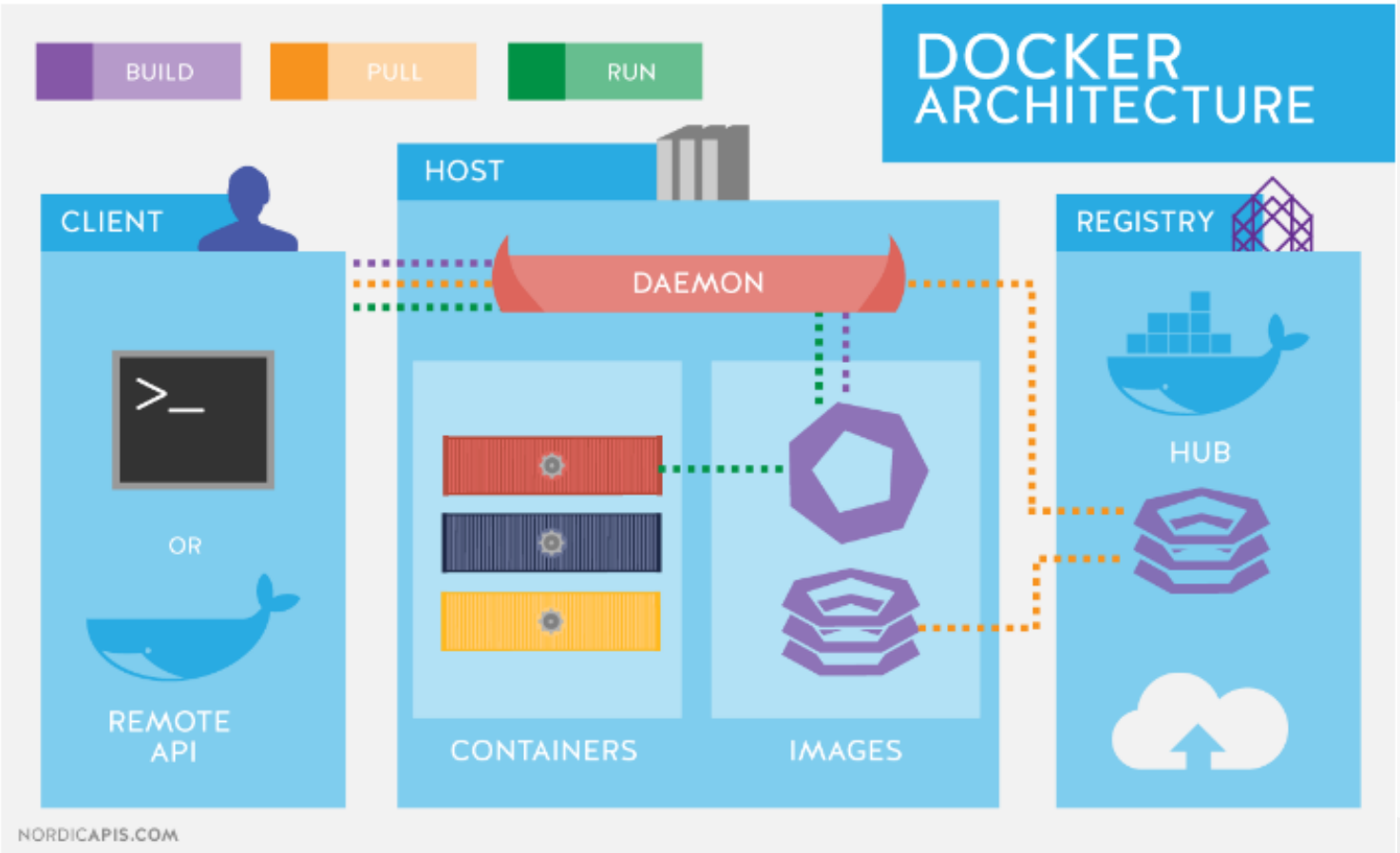
Vagrant

- Vagrant is a tool for building and managing virtual machine environments in a single workflow. With an easy-to-use workflow and focus on automation, Vagrant lowers development environment setup time, increases production parity, and makes the "works on my machine" excuse a relic of the past.
    - https://www.vagrantup.com/
- Setup Development Environment with Vagrant
    - Setting Up Development Environment Using Vagrant - Edureka
    - development-environment/Vagrantfile at master · gantsign/development-environment · GitHub

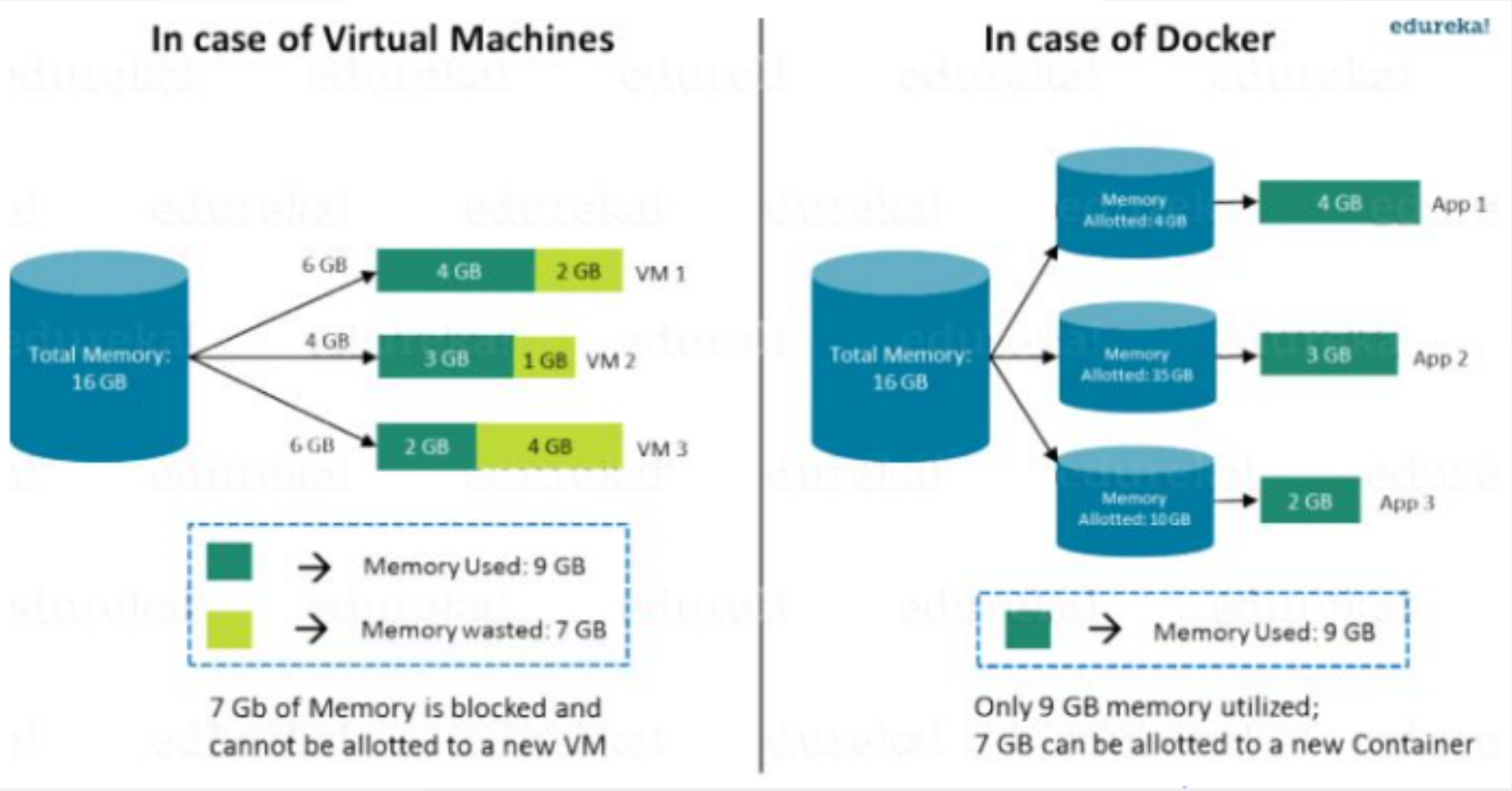
Docker / Docker Compose / Kubernetes (1)

- Docker takes away repetitive, mundane configuration tasks and is used throughout the development lifecycle for fast, easy and portable application development – desktop and cloud.
  - https://www.youtube.com/watch?v=nBwJm0onzeo&ab_channel=GaryExplains Dockerfile
  - https://devopedia.org/docker
- DockerHub
- Docker Compose Yaml
- Dockerrun.aws.json (AWS)

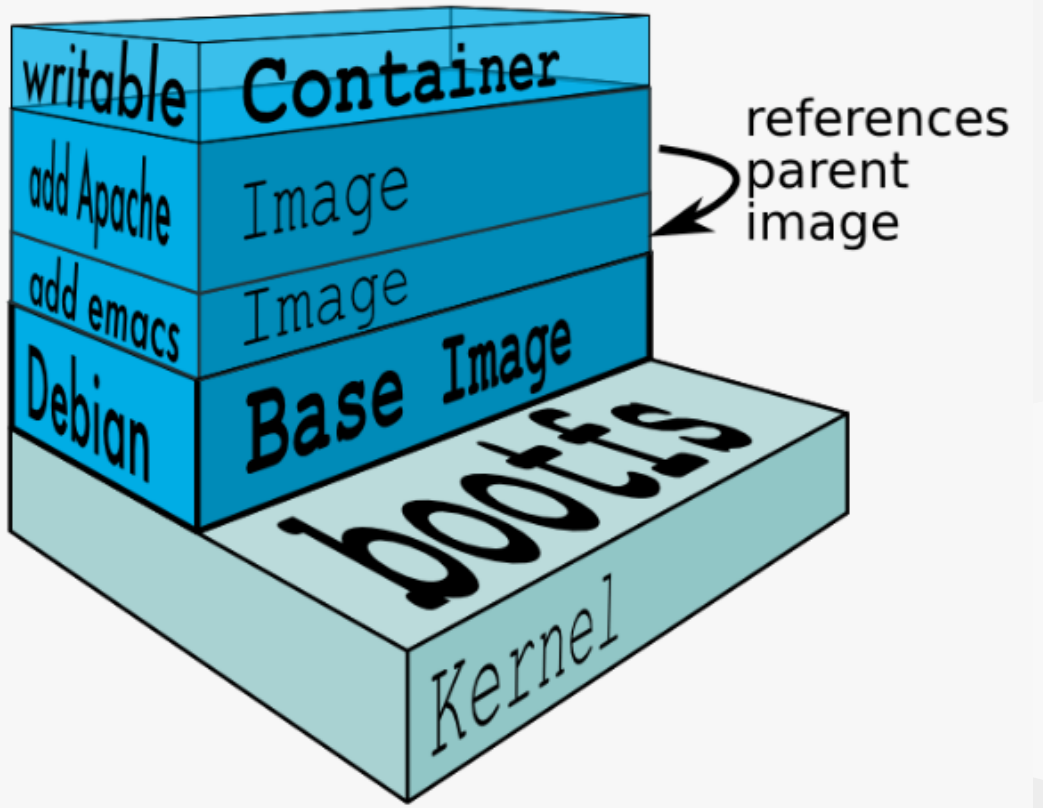
Docker / Docker Compose / Kubernetes (2)



Docker / Docker Compose / Kubernetes (3)



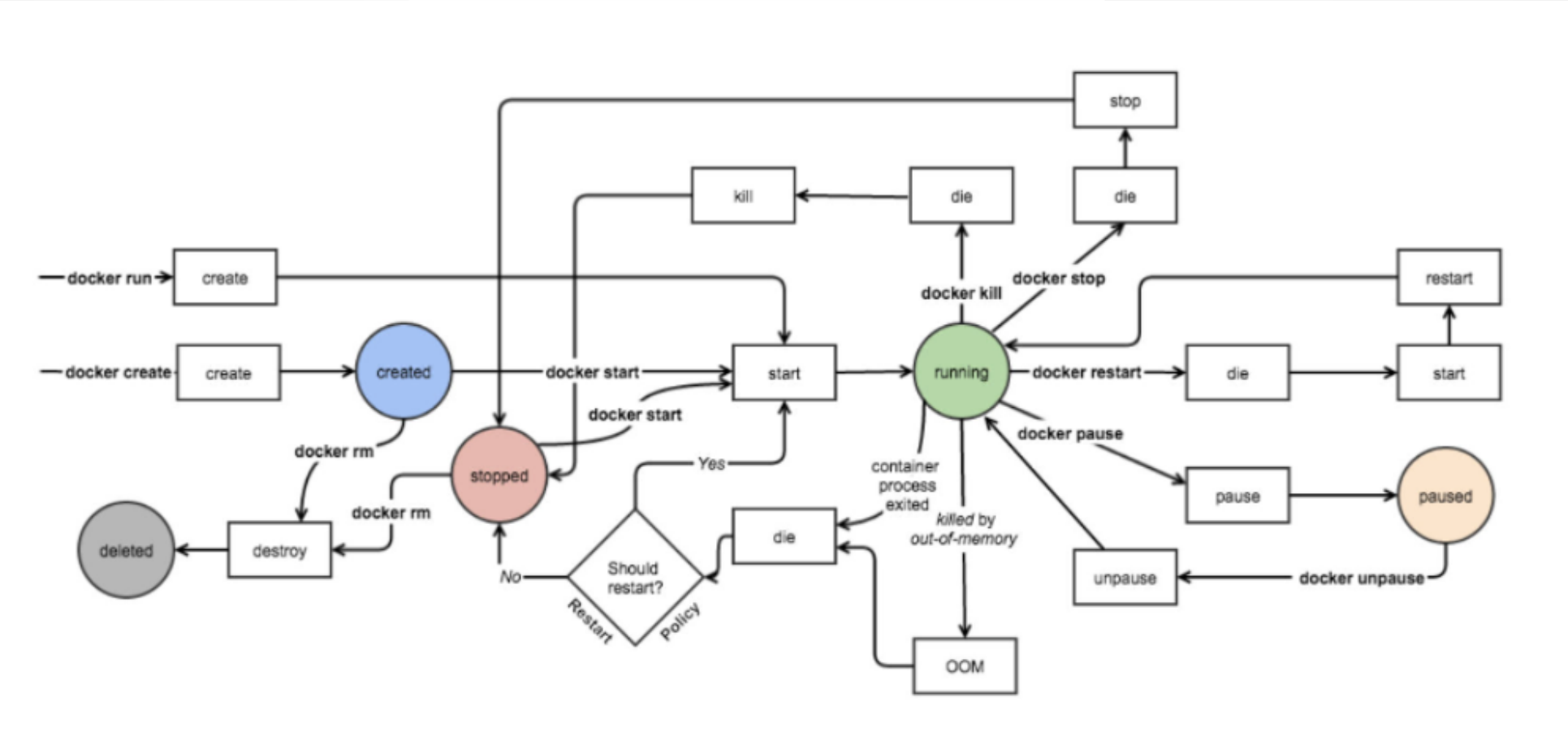
Docker / Docker Compose / Kubernetes (4)



Docker / Docker Compose / Kubernetes (5)

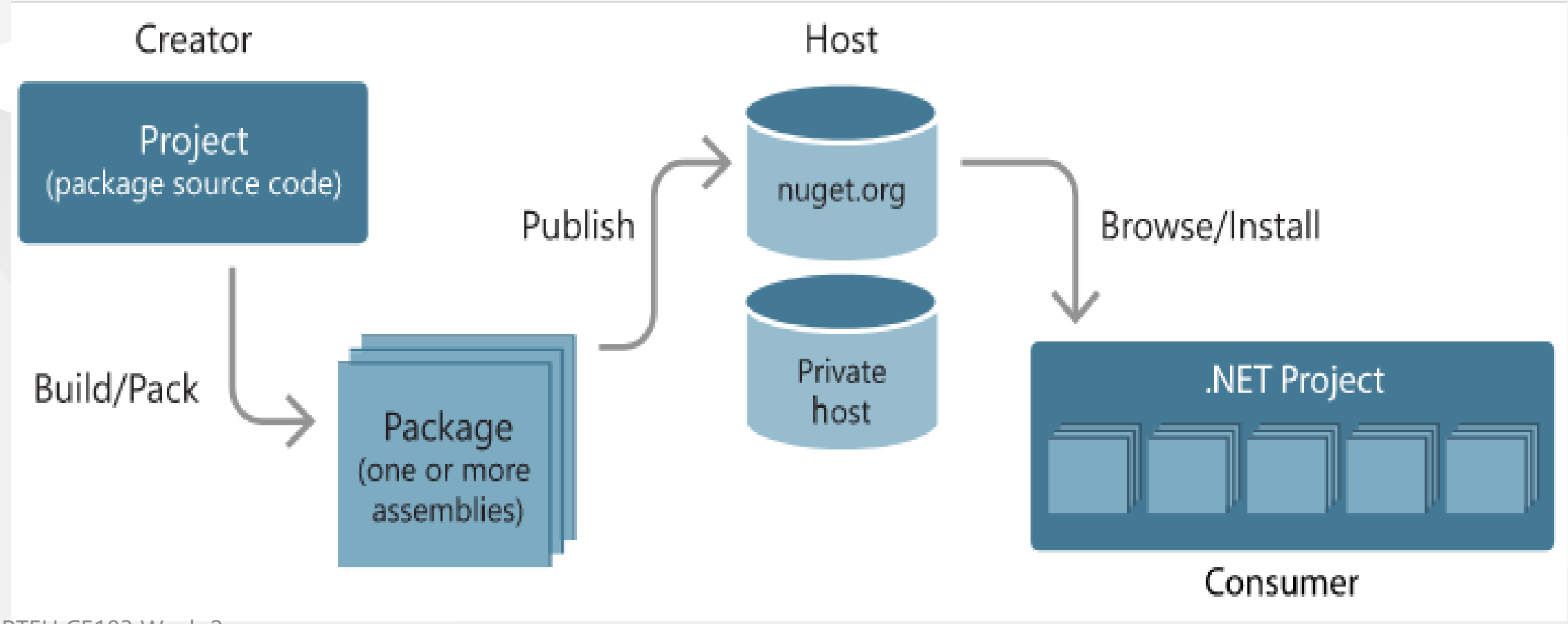
```
FROM node:9.3.0-alpine

RUN npm install -g @angular/cli@1.5.5 \
     && mkdir -p /usr/src/pintail-whoami

WORKDIR /usr/src/pintail-whoami

ADD . /usr/src/pintail-whoami

RUN npm install && ng build

EXPOSE 80

CMD node server.js $HOSTNAME
```

Docker / Docker Compose / Kubernetes (6)



Nuget Packages (1)

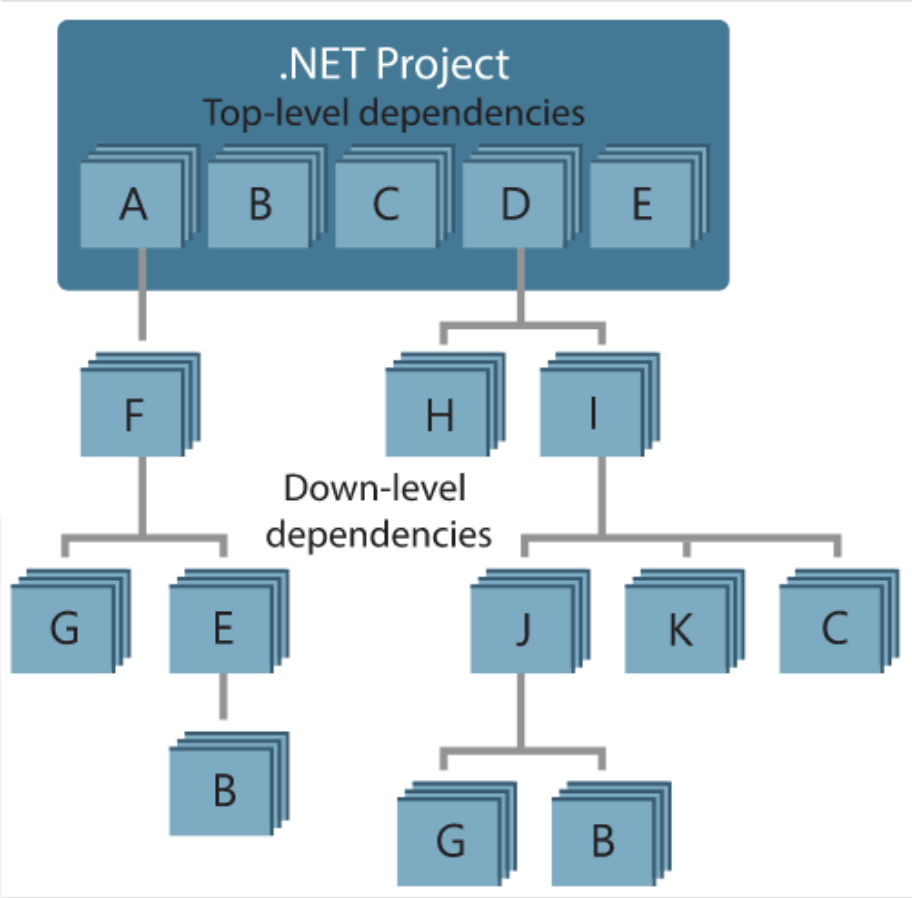
- https://www.nuget.org/packages
- What is NuGet and what does it do? | Microsoft Learn



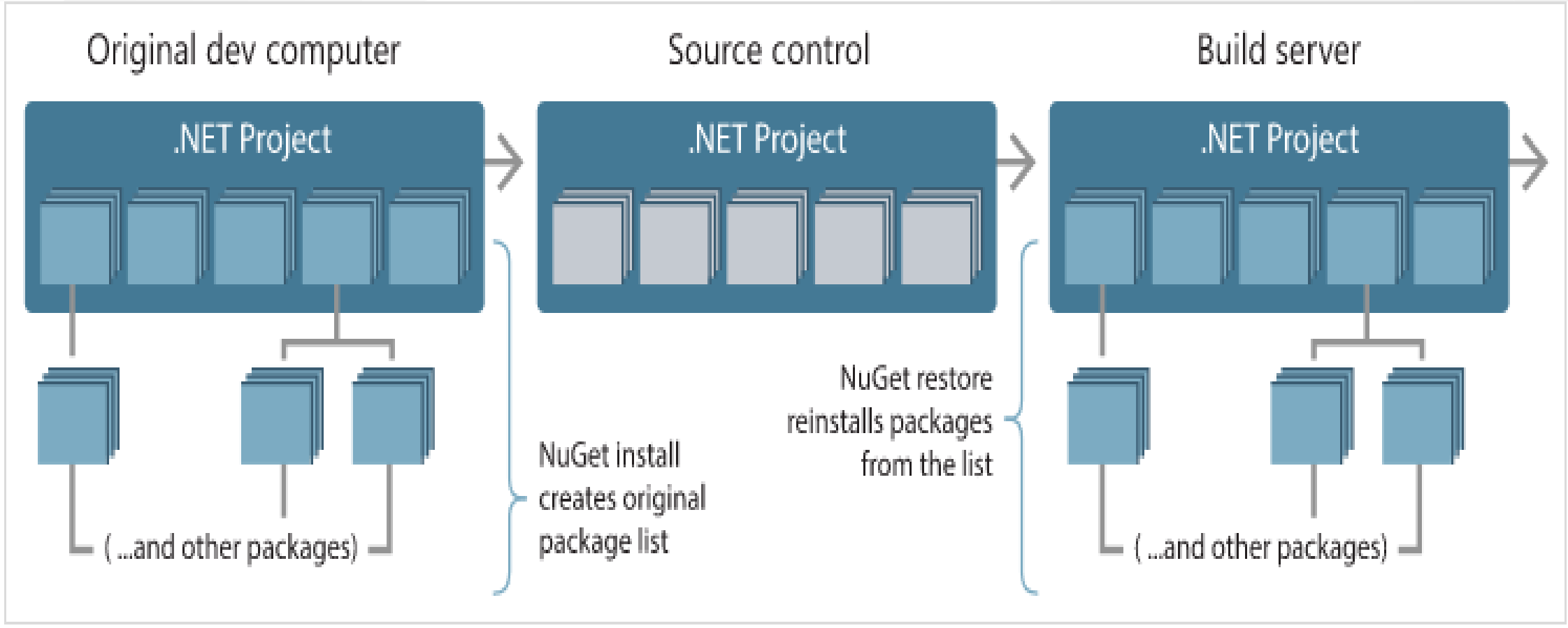
NuGet Tools (2)

Tool	Platforms	Applicable Scenarios	Description
dotnet CLI	All	Creation, Consumption	CLI tool for .NET Core and .NET Standard libraries, and for SDK-style projects that target .NET Framework (see SDK attribute). Provides certain NuGet CLI capabilities directly within the .NET Core tool chain. As with the `nuget.exe` CLI, the dotnet CLI does not interact with Visual Studio projects.
nuget.exe CLI	All	Creation, Consumption	CLI tool for .NET Framework libraries and non-SDK-style projects that target .NET Standard libraries. Provides all NuGet capabilities, with some commands applying specifically to package creators, some applying only to consumers, and others applying to both. For example, package creators use the `nuget pack` command to create a package from various assemblies and related files, package consumers use `nuget install` to include packages in a project folder, and everyone uses `nuget config` to set NuGet configuration variables. As a platform-agnostic tool, the NuGet CLI does not interact with Visual Studio projects.
Package Manager Console	Visual Studio on Windows	Consumption	Provides PowerShell commands for installing and managing packages in Visual Studio projects.
Package Manager UI	Visual Studio on Windows	Consumption	Provides an easy-to-use UI for installing and managing packages in Visual Studio projects.
Manage NuGet UI	Visual Studio for Mac	Consumption	Provide an easy-to-use UI for installing and managing packages in Visual Studio for Mac projects.
MSBuild	Windows	Creation, Consumption	Provides the ability to create packages and restore packages used in a project directly through the MSBuild tool chain.

Managing dependencies (3)

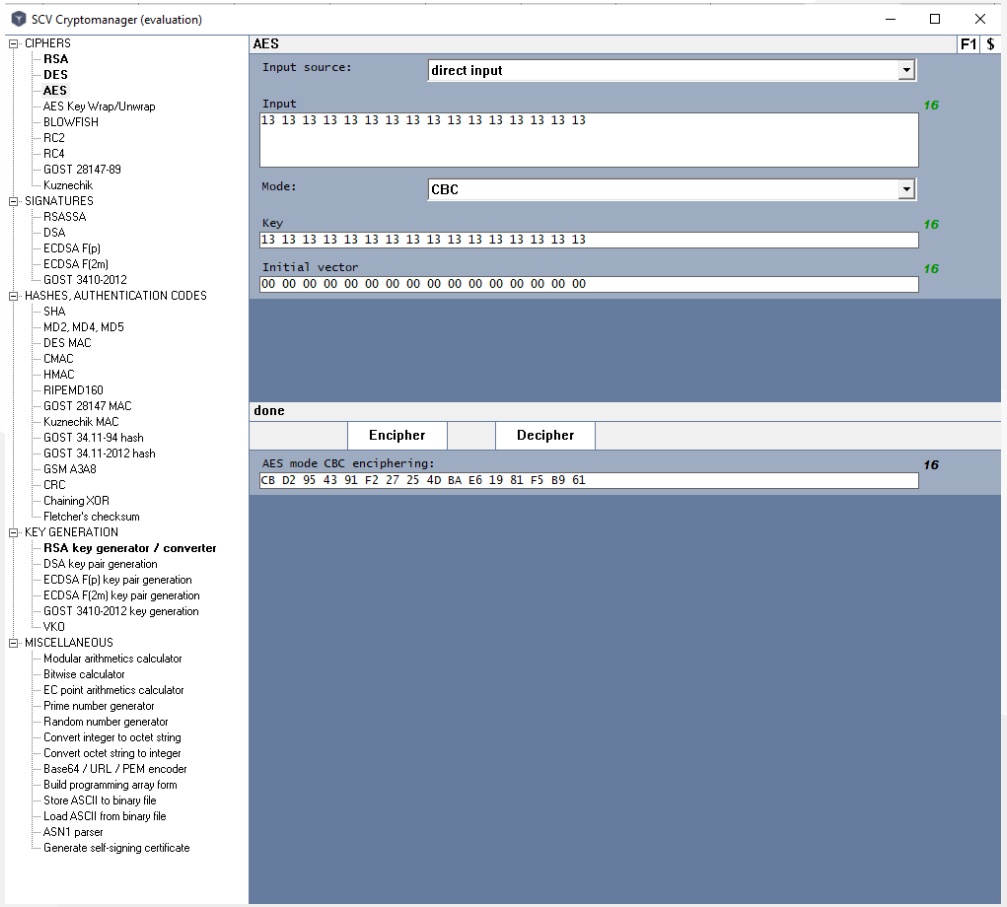


Tracking references and restoring packages (4)



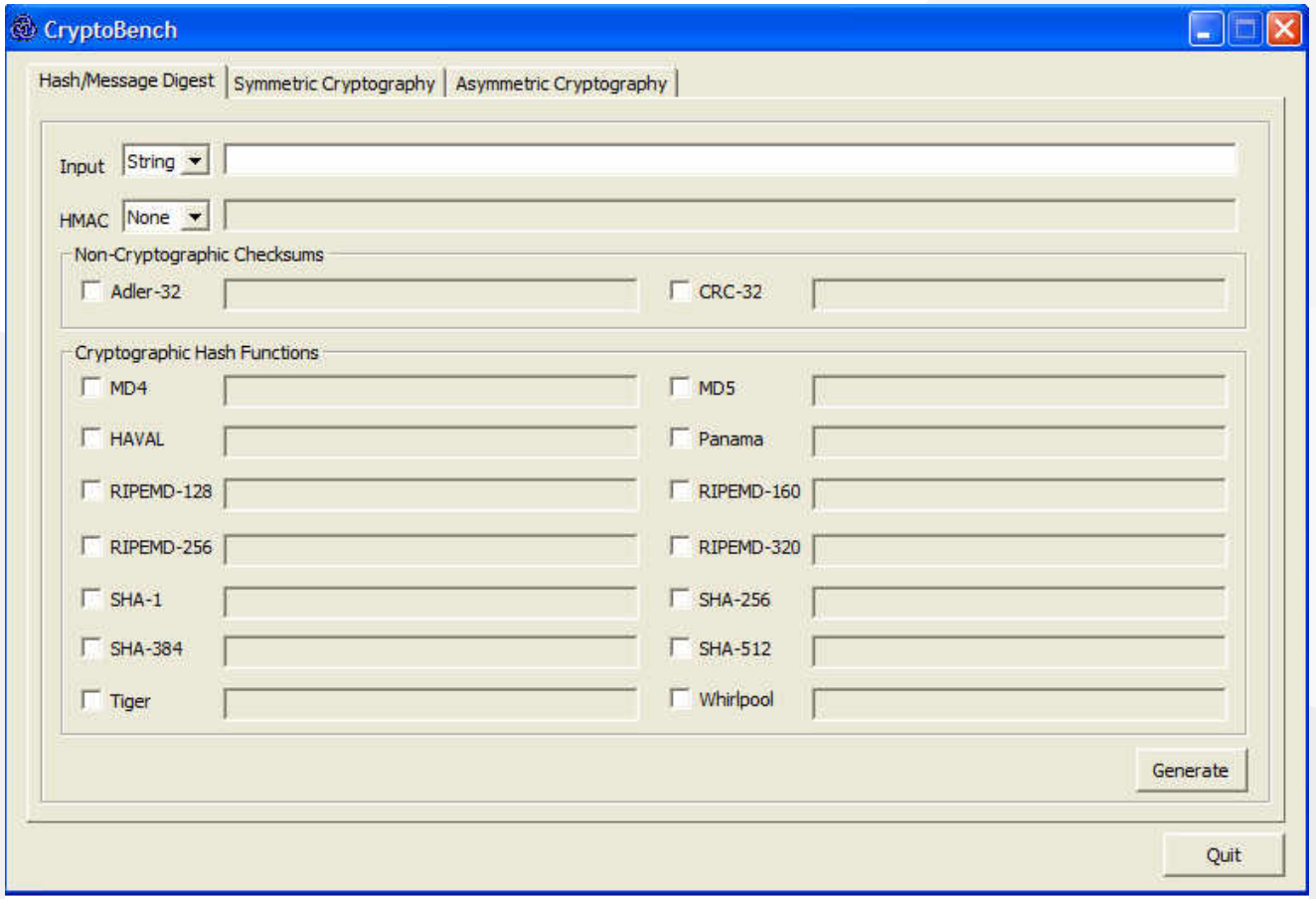
SCV Cryptomanager

- SCV Crypto Manager has several tools for cryptographic operations.
  - https://cryptomanager.com/download.php



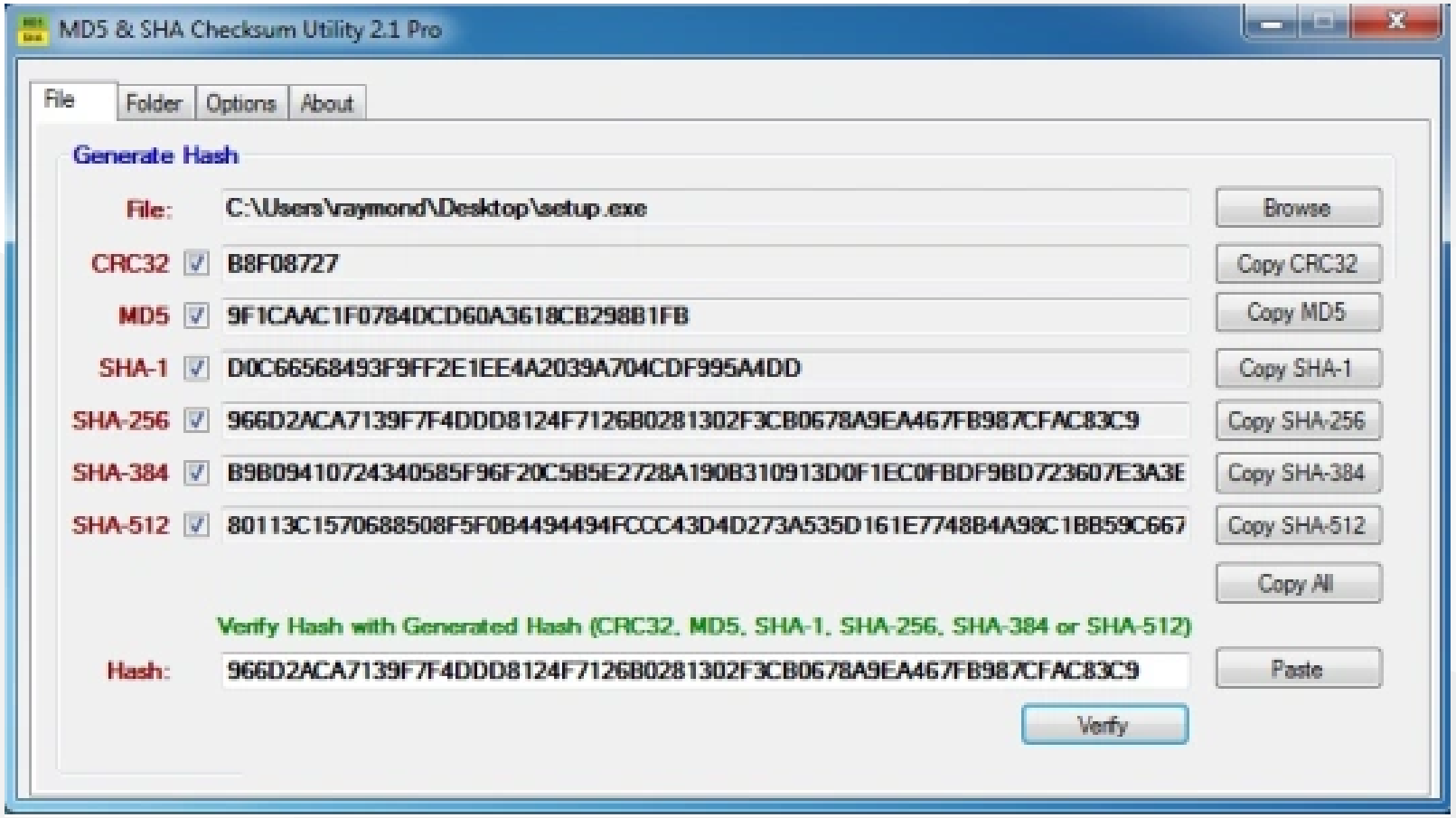
Addario CryptoBench

- CryptoBench can be used for hash and symmetric asymmetric encryption-decryption operations.
  - CryptoBench Download Page
  - http://www.addario.org/files/CryptoBench v1.0.1.zip



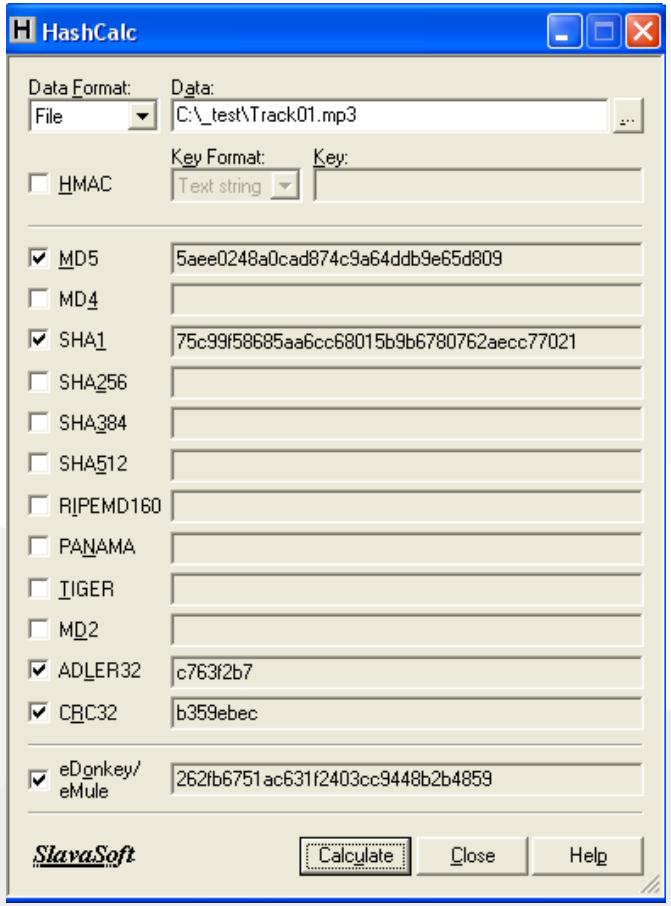
Raymond's MD5 & SHA Checksum Utility

- Hash Calculation Utility
- MD5 & SHA Checksum Utility | Raymond's WordPress



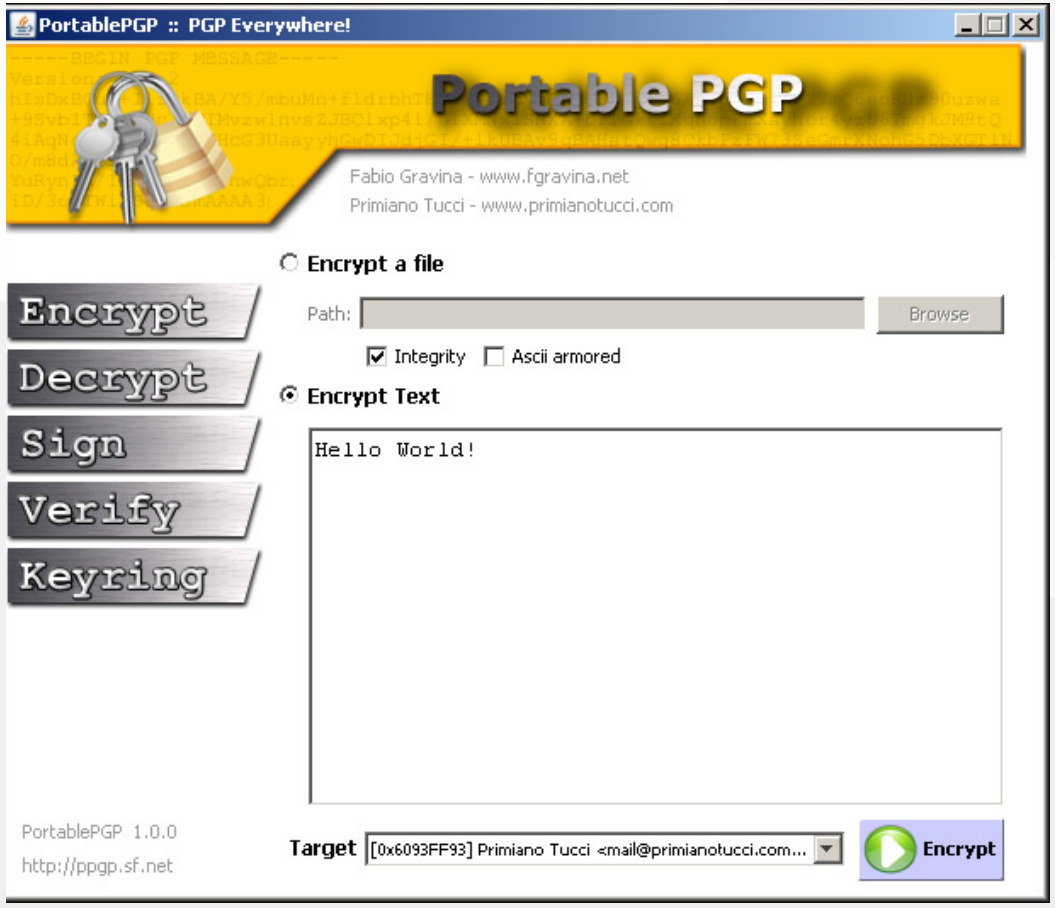
SlavaSoft HashCalc

- SlavaSoft HashCalc - Hash, CRC, and HMAC Calculator



Portable PGP

- Portable PGP uses for the generation of PGP keys to transfer files securely via e-mail or other channels. You can encrypt or sign your documents with this tool then the receiver can open or verify your e-mail.
- https://ppgp.sourceforge.net/



Online Programming Envoriments

- Hackerrank
  - https://www.hackerrank.com/
- CS50 Sandbox
  - https://sandbox.cs50.io/
- Programiz C Online Complier
  - Online C Compiler

$$End - Of - Week - 2$$