

CE103 Algorithms and Programming I

Week-2

Fall Semester, 2021-2022

Download [DOC](#), [SLIDE](#), [PPTX](#)

Algorithm Basics

Flowgorithm

<http://www.flowgorithm.org/>

Pseudocode

[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 analysis of algorithms in details.

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)

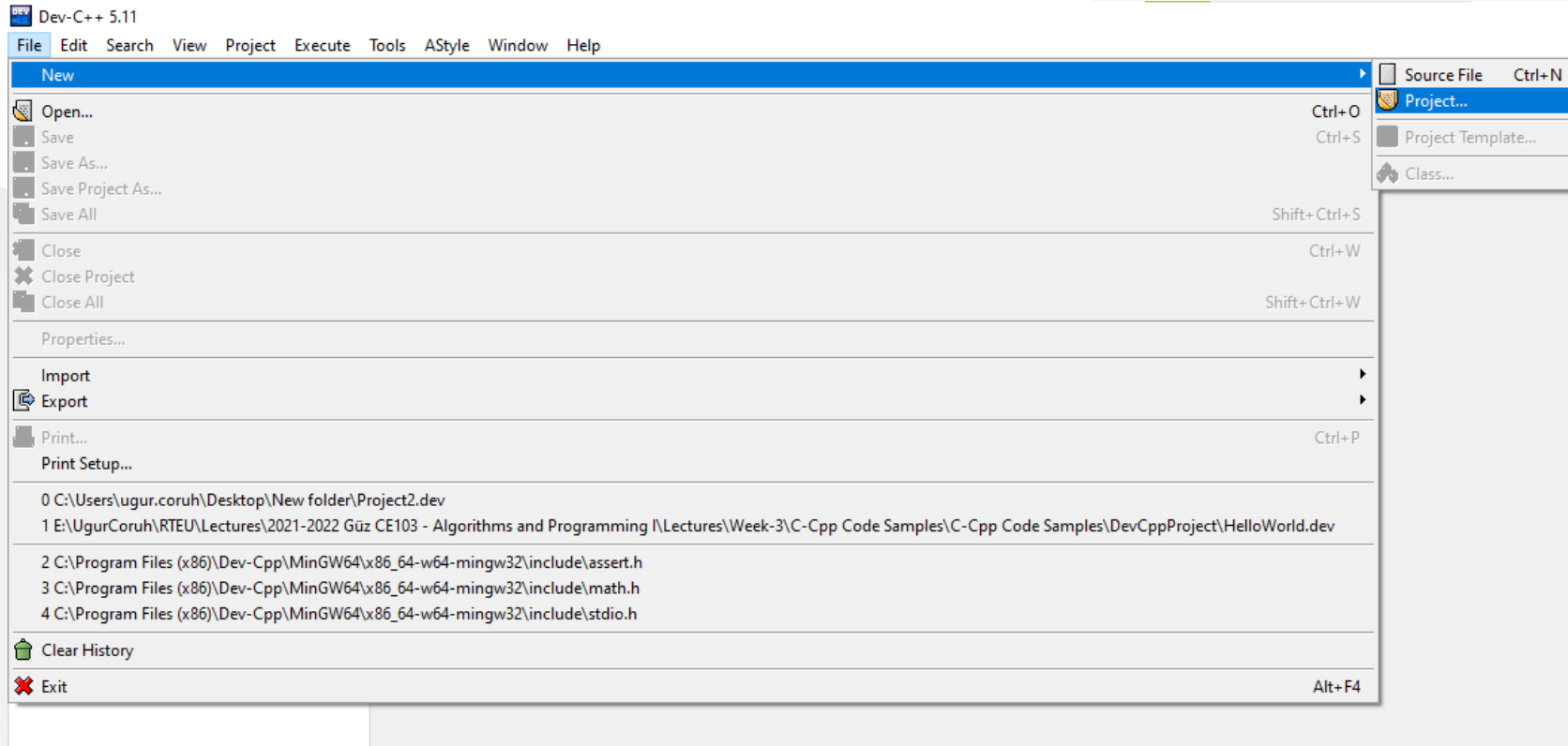
Download DevC++ IDE from following link

<https://www.bloodshed.net/>

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

Open DevC++ IDE for C Project Generation

Open File -> New -> Project



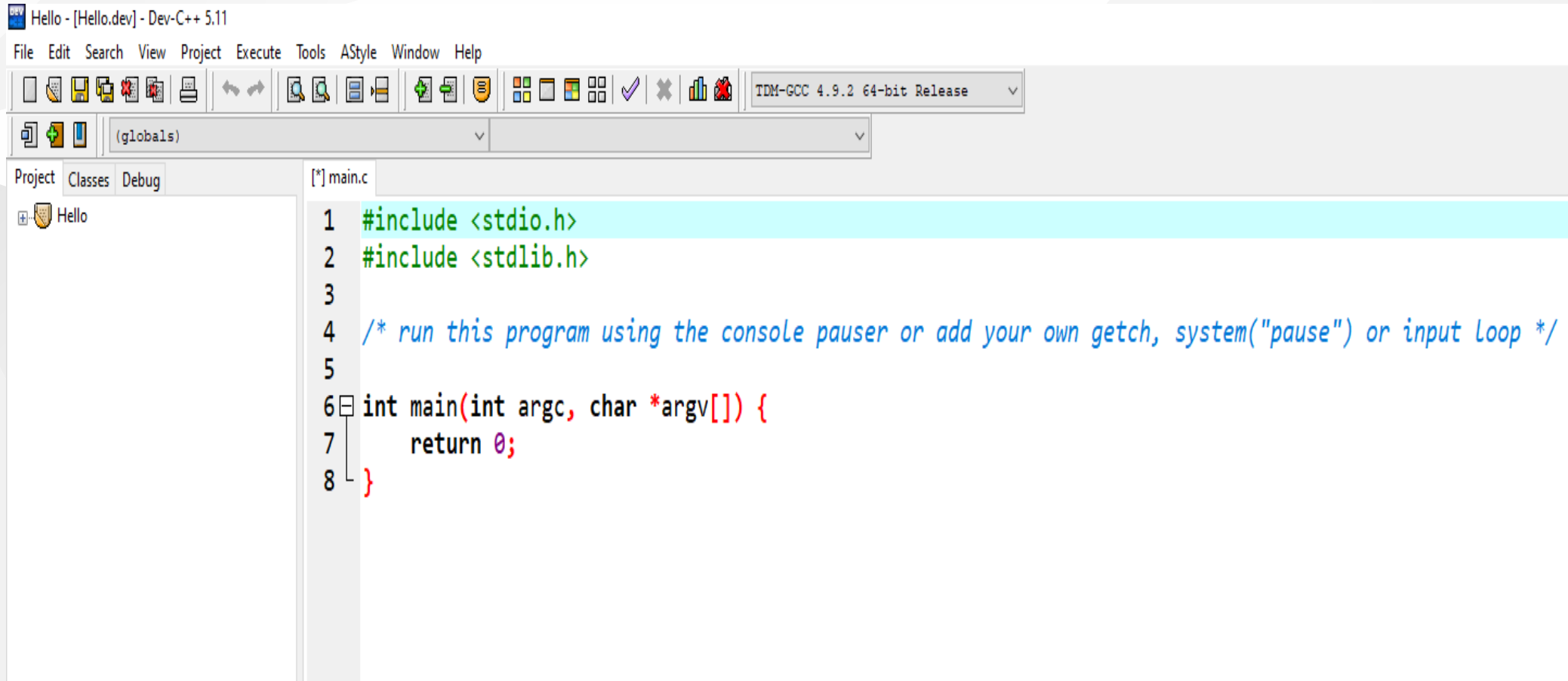
DevCpp (Install / Compile / Run / Debug) (3)

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 empty body



The screenshot shows the Dev-C++ IDE interface. The title bar reads 'Hello - [Hello.dev] - Dev-C++ 5.11'. The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar contains various icons for file operations, editing, and execution. The compiler selection dropdown shows 'TDM-GCC 4.9.2 64-bit Release'. The project explorer on the left shows a project named 'Hello'. The main editor window displays the following code in 'main.c':

```
1 #include <stdio.h>
2 #include <stdlib.h>
3
4 /* run this program using the console pauser or add your own getch, system("pause") or input loop */
5
6 int main(int argc, char *argv[]) {
7     return 0;
8 }
```

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

```
#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[]) {
    retAdd 0;
}
```

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

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

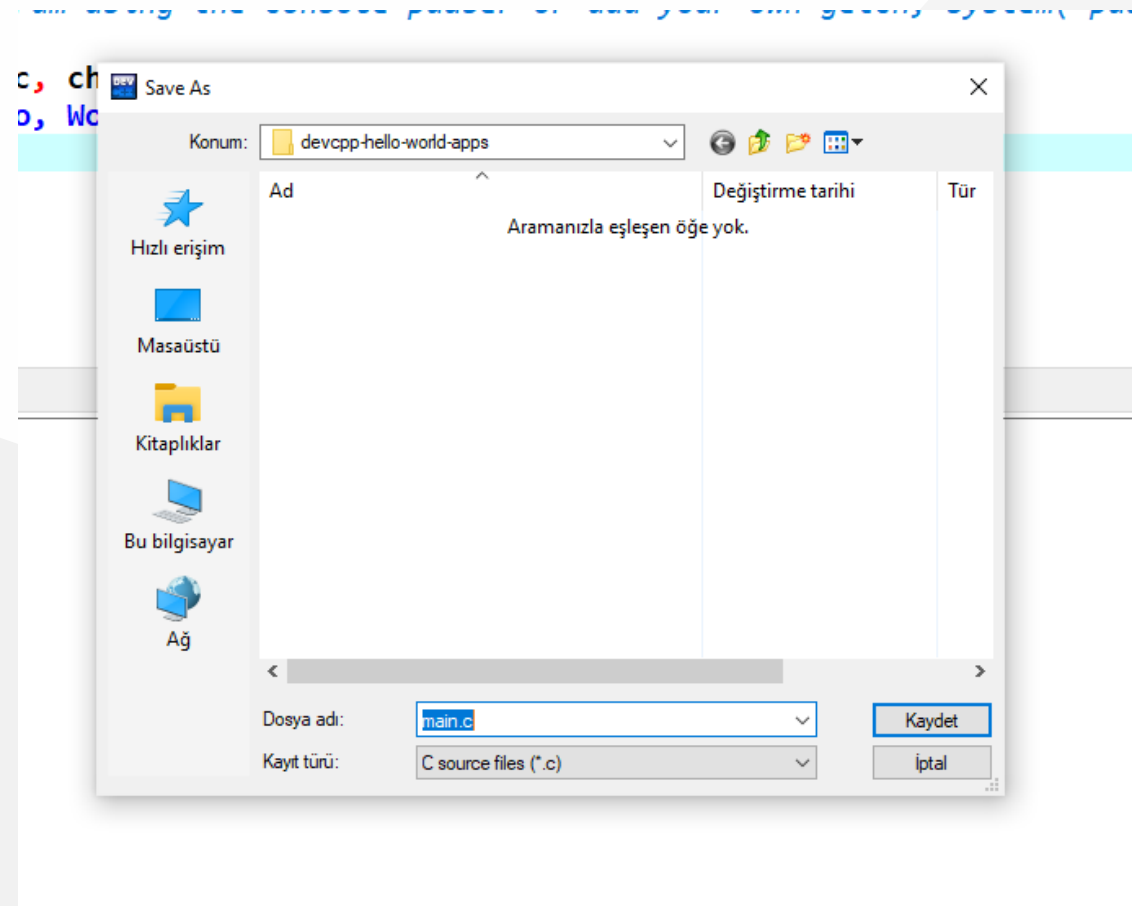
```
#include <stdio.h>
#include <stdlib.h>

/* 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!");
    getch();
    return 0;
}
```

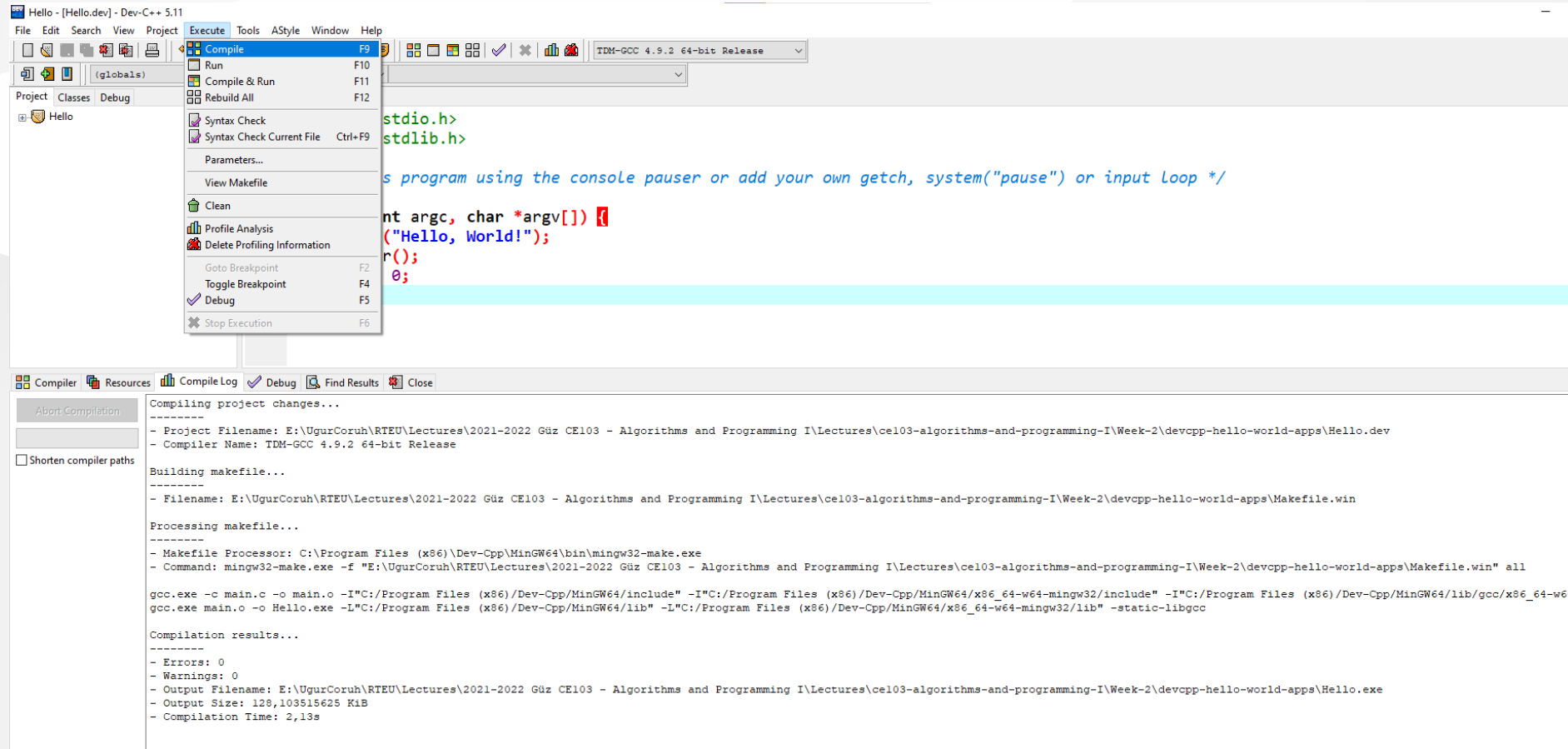
DevCpp (Install / Compile / Run / Debug) (7)

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

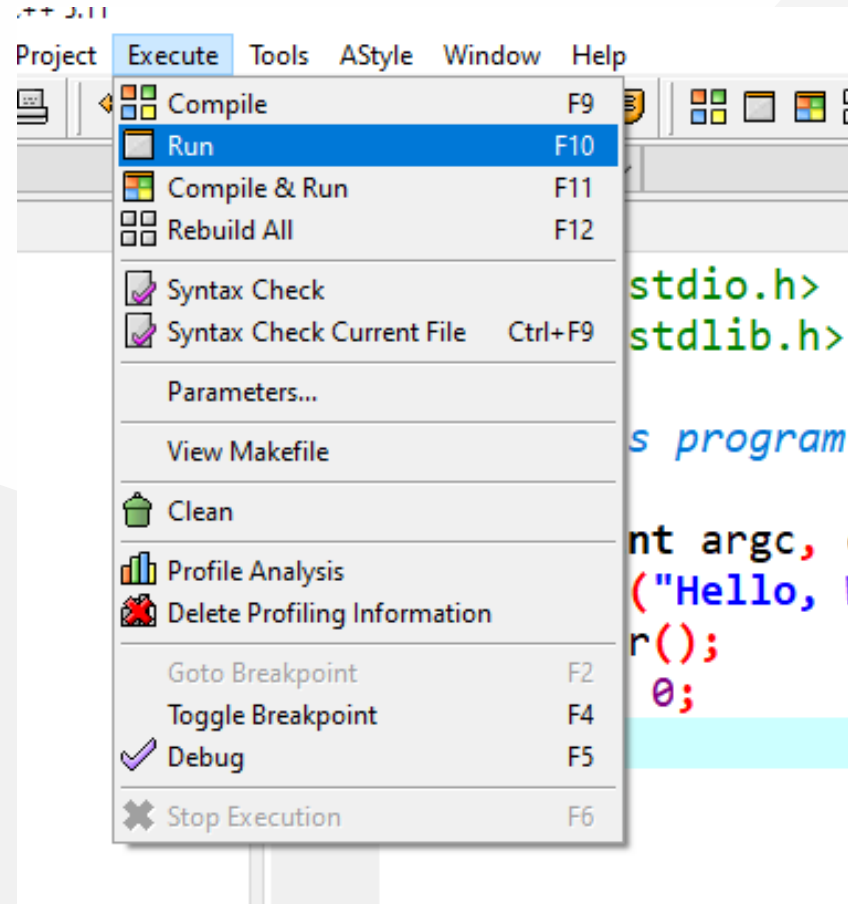
Processing makefile...
-----
- Makefile Processor: C:\Program Files (x86)\Dev-Cpp\MinGW64\bin\mingw32-make.exe
- Command: mingw32-make.exe -f "E:\UgurCoruh\RTEU\Lectures\2021-2022 Güz CE103 - Algorithms and Programming I\Lectures\ce103-algorithms-and-programming-I\Week-2\devcpp-hello-world-apps\Makefile.win"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

```
#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[]) {

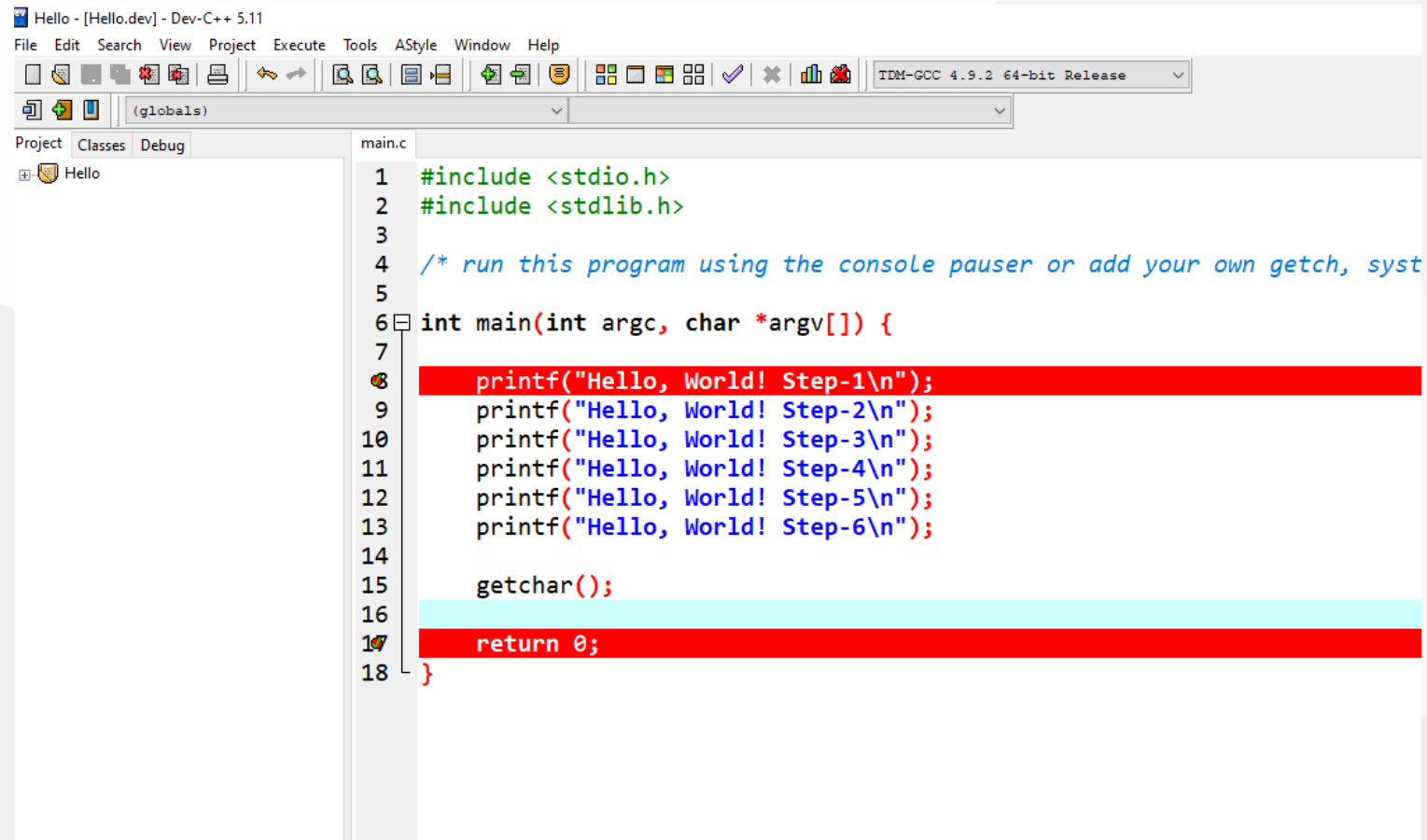
    printf("Hello, World! Step-1\n");
    printf("Hello, World! Step-2\n");
    printf("Hello, World! Step-3\n");
    printf("Hello, World! Step-4\n");
    printf("Hello, World! Step-5\n");
    printf("Hello, World! Step-6\n");

    getchar();

    return 0;
}
```

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

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



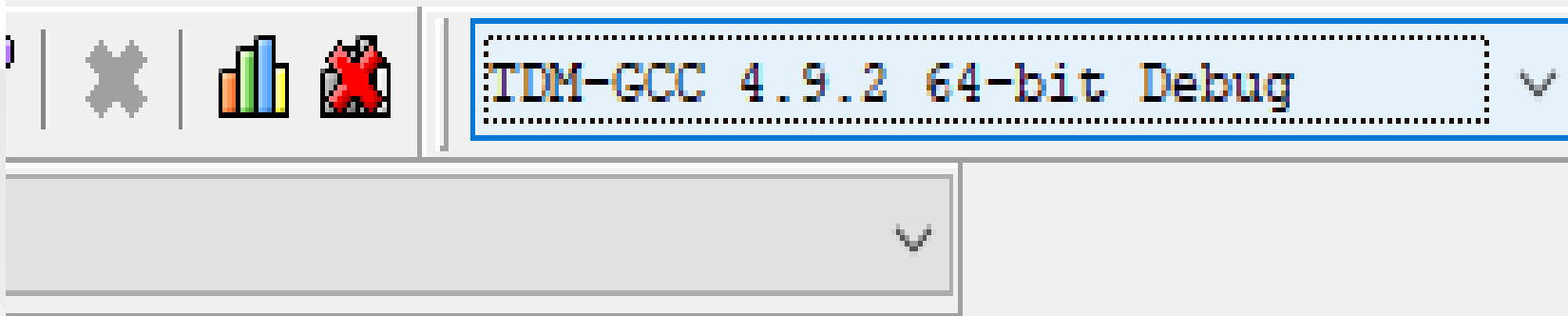
The screenshot shows the Dev-C++ IDE interface. The title bar reads "Hello - [Hello.dev] - Dev-C++ 5.11". The menu bar includes File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, and Help. The toolbar contains various icons for file operations, compilation, and debugging. The compiler is set to "TDM-GCC 4.9.2 64-bit Release". The left sidebar shows a project named "Hello" under the "Project" tab. The main editor window displays the file "main.c" with the following code:

```
1 #include <stdio.h>
2 #include <stdlib.h>
3
4 /* run this program using the console pauser or add your own getch, syst
5
6 int main(int argc, char *argv[]) {
7
8     printf("Hello, World! Step-1\n");
9     printf("Hello, World! Step-2\n");
10    printf("Hello, World! Step-3\n");
11    printf("Hello, World! Step-4\n");
12    printf("Hello, World! Step-5\n");
13    printf("Hello, World! Step-6\n");
14
15    getchar();
16
17    return 0;
18 }
```

Red vertical markers (breakpoints) are placed on the line numbers for lines 8, 17, and 18. The line numbers 8, 17, and 18 are highlighted in red. The line of code for line 8 is also highlighted in red. The line of code for line 17 is highlighted in light blue. The line of code for line 18 is highlighted in red.

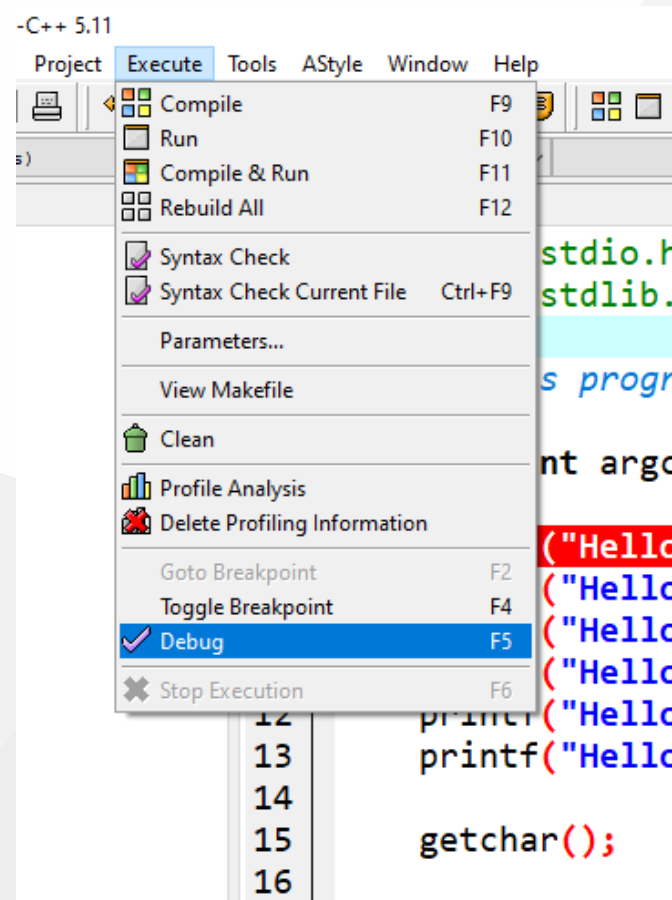
DevCpp (Install / Compile / Run / Debug) (13)

In the ,menu section select compiler with debug option



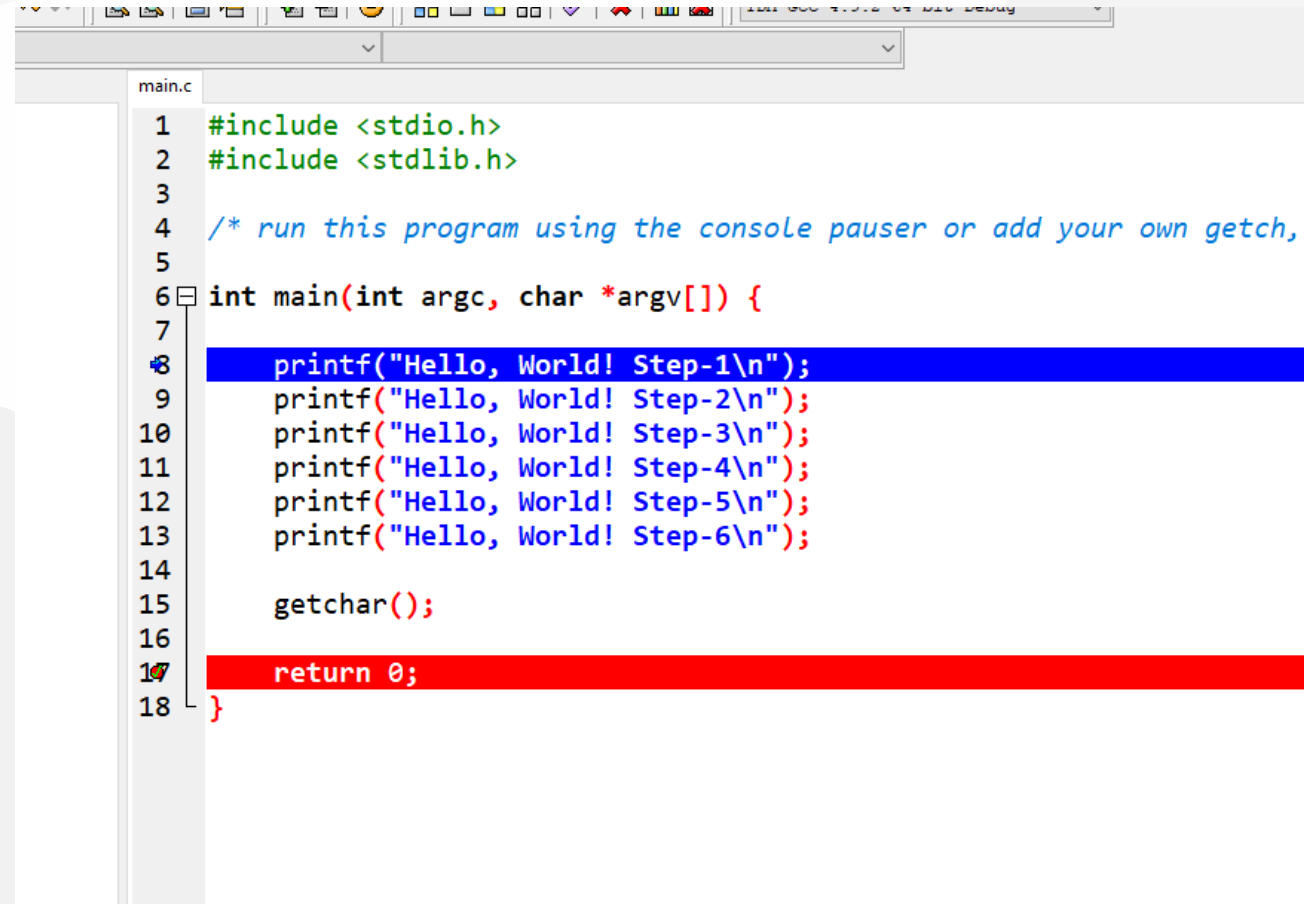
DevCpp (Install / Compile / Run / Debug) (14)

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



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

Debugger will stop at breakpoint at the debug point (blue line)



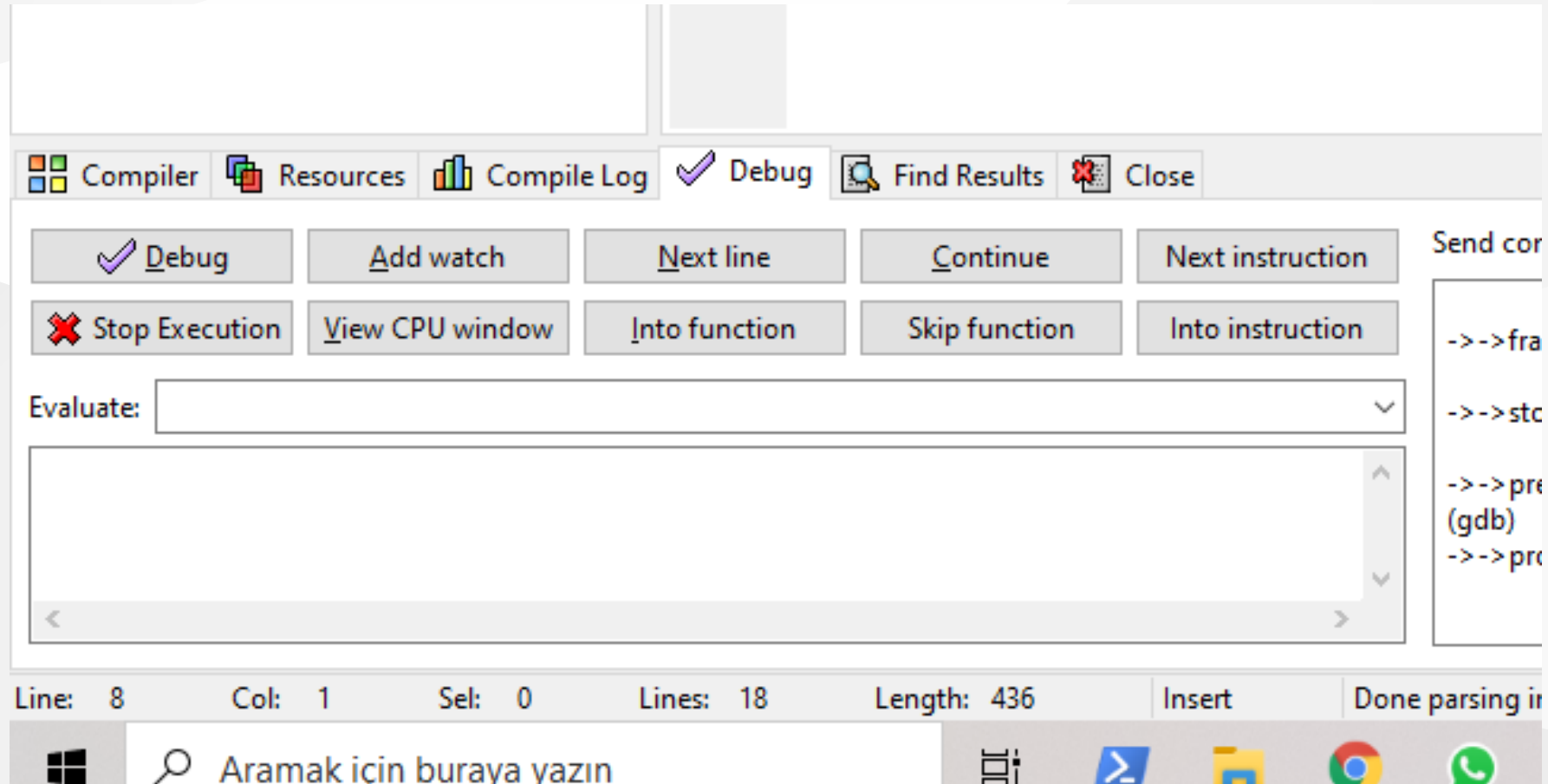
The screenshot shows the Dev-Cpp IDE with a C program named 'main.c'. The code is as follows:

```
1 #include <stdio.h>
2 #include <stdlib.h>
3
4 /* run this program using the console pauser or add your own getch,
5
6 int main(int argc, char *argv[]) {
7
8     printf("Hello, World! Step-1\n");
9     printf("Hello, World! Step-2\n");
10    printf("Hello, World! Step-3\n");
11    printf("Hello, World! Step-4\n");
12    printf("Hello, World! Step-5\n");
13    printf("Hello, World! Step-6\n");
14
15    getch();
16
17    return 0;
18 }
```

A blue horizontal line is drawn across line 8, indicating a breakpoint. The line number 8 is also highlighted in blue in the left margin. Line 17 is highlighted in red.

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

Moving to 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, 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 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)

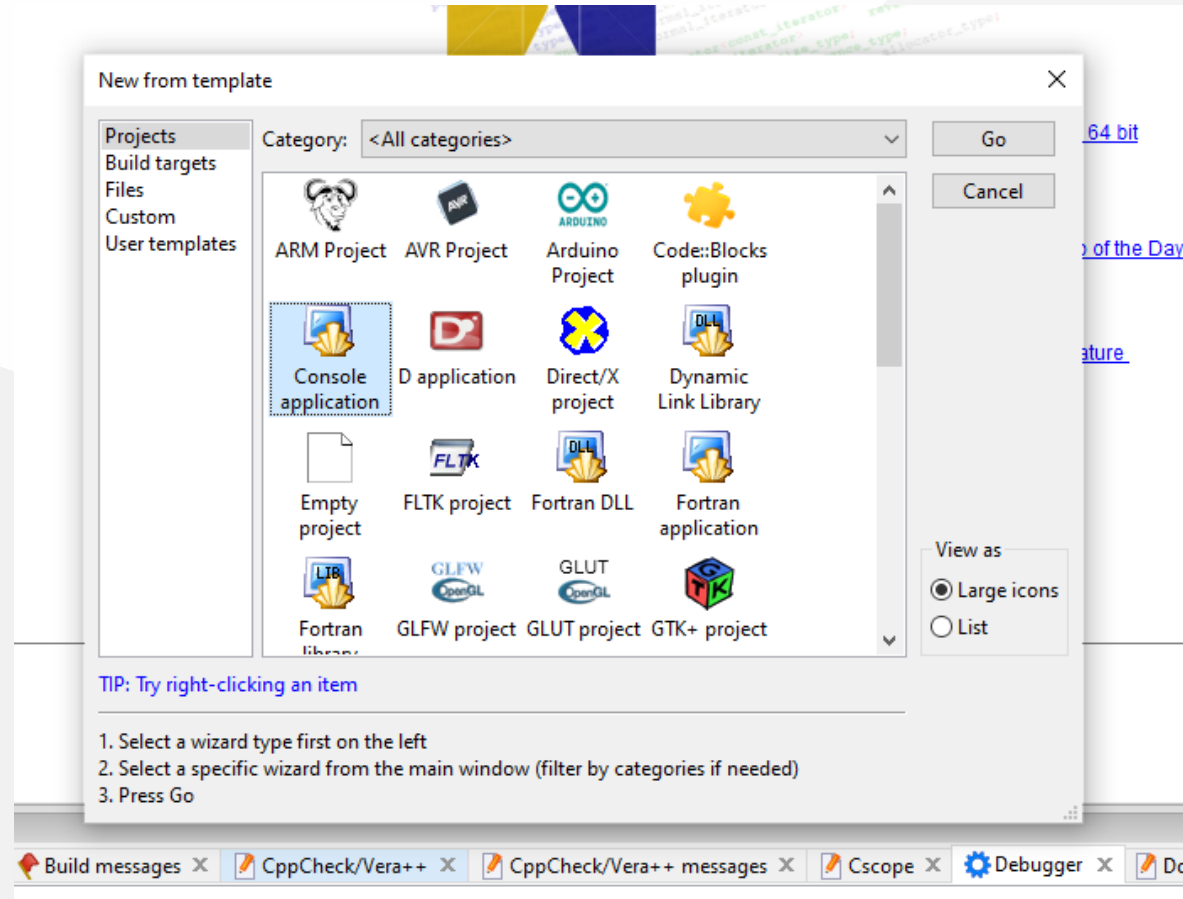
Download Code Blocks from the following link

[Binary releases - Code::Blocks](#)

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

Open Code Blocks and

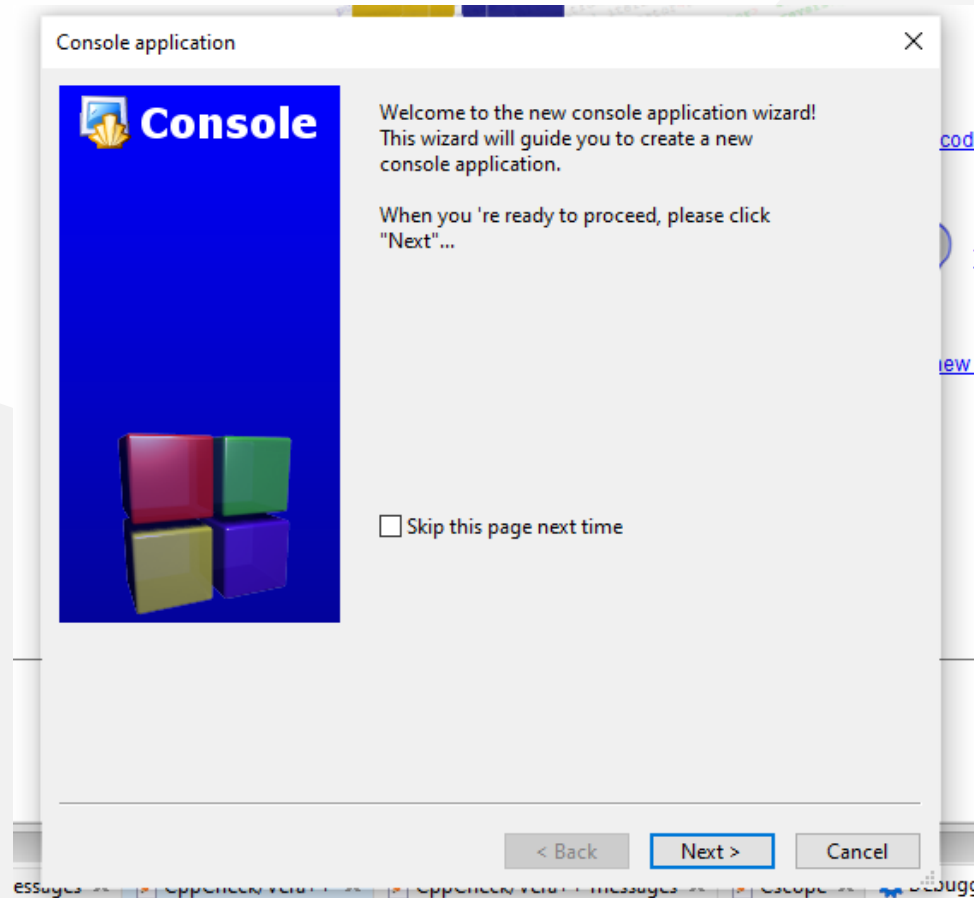
Select File->New->Project



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

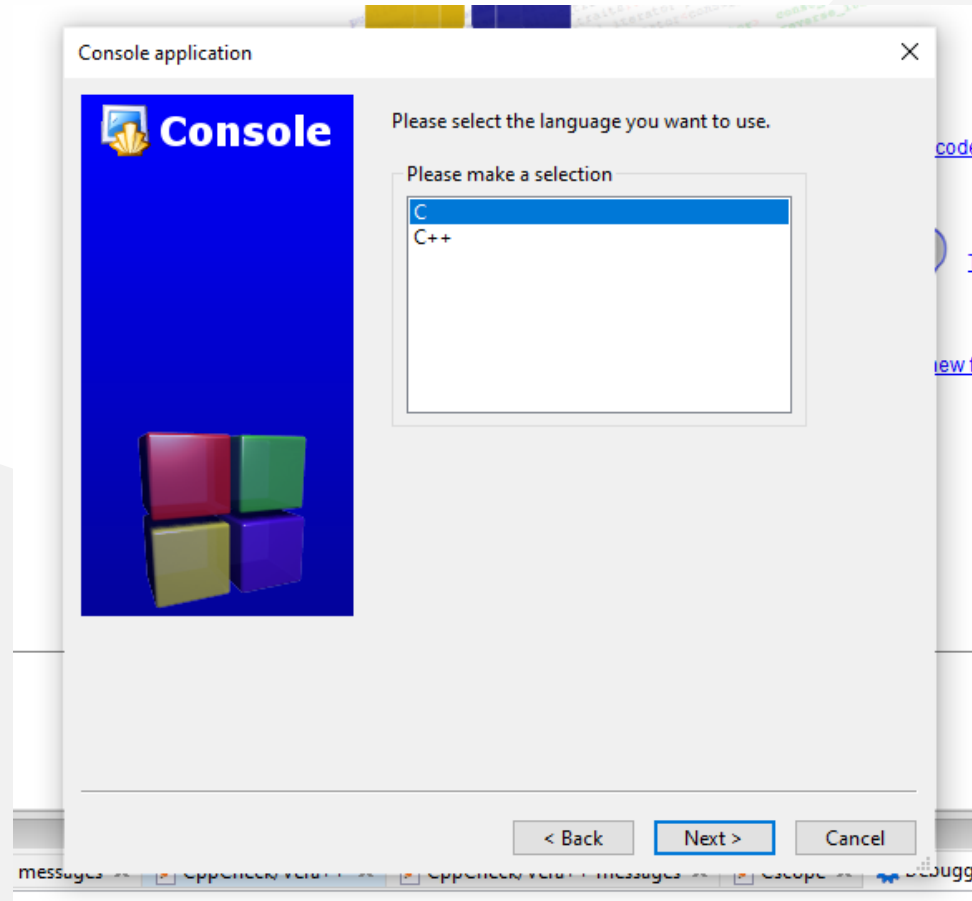
Select Console Application

Click Next from Opening Window



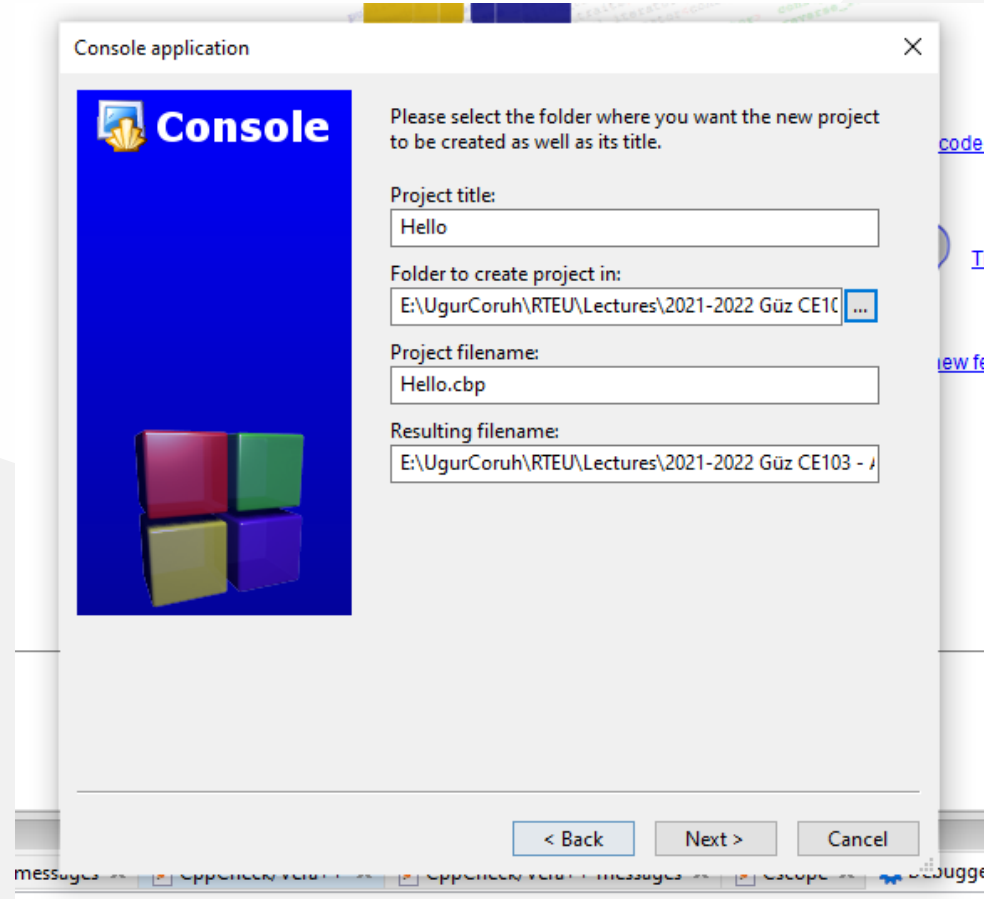
Code Blocks (Install / Compile / Run / Debug) (4)

Select C for Sample Project



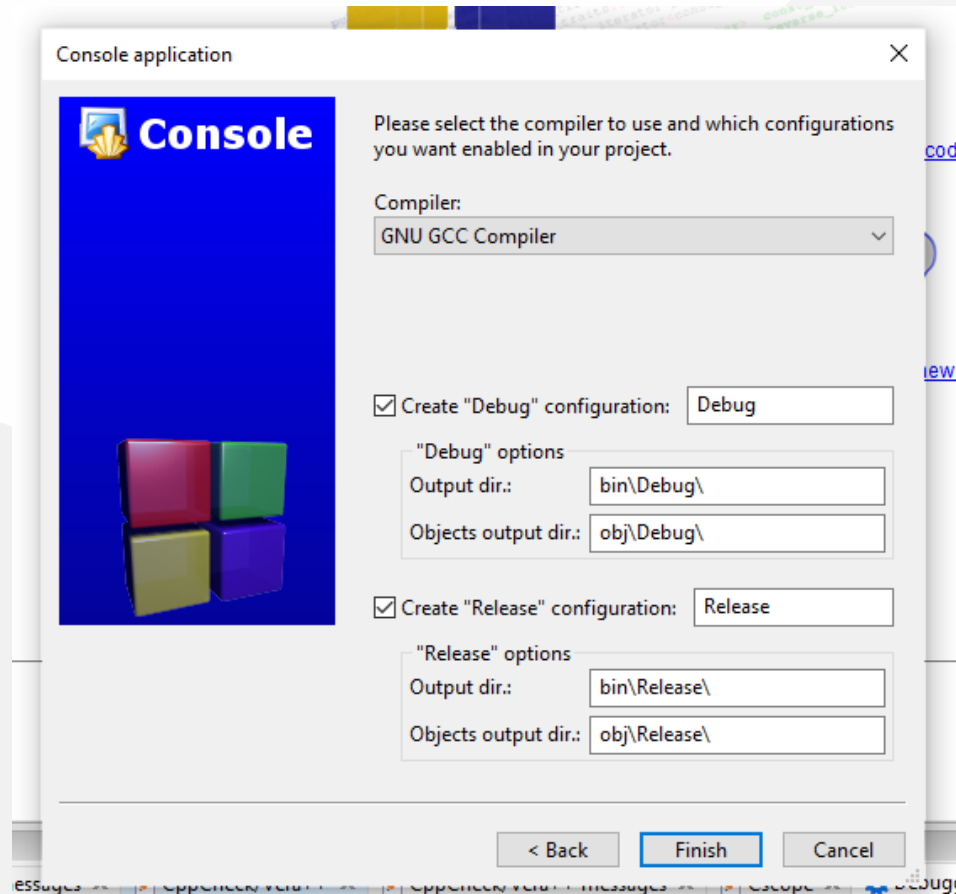
Code Blocks (Install / Compile / Run / Debug) (5)

Write a project name and title also set a project folder



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

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



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

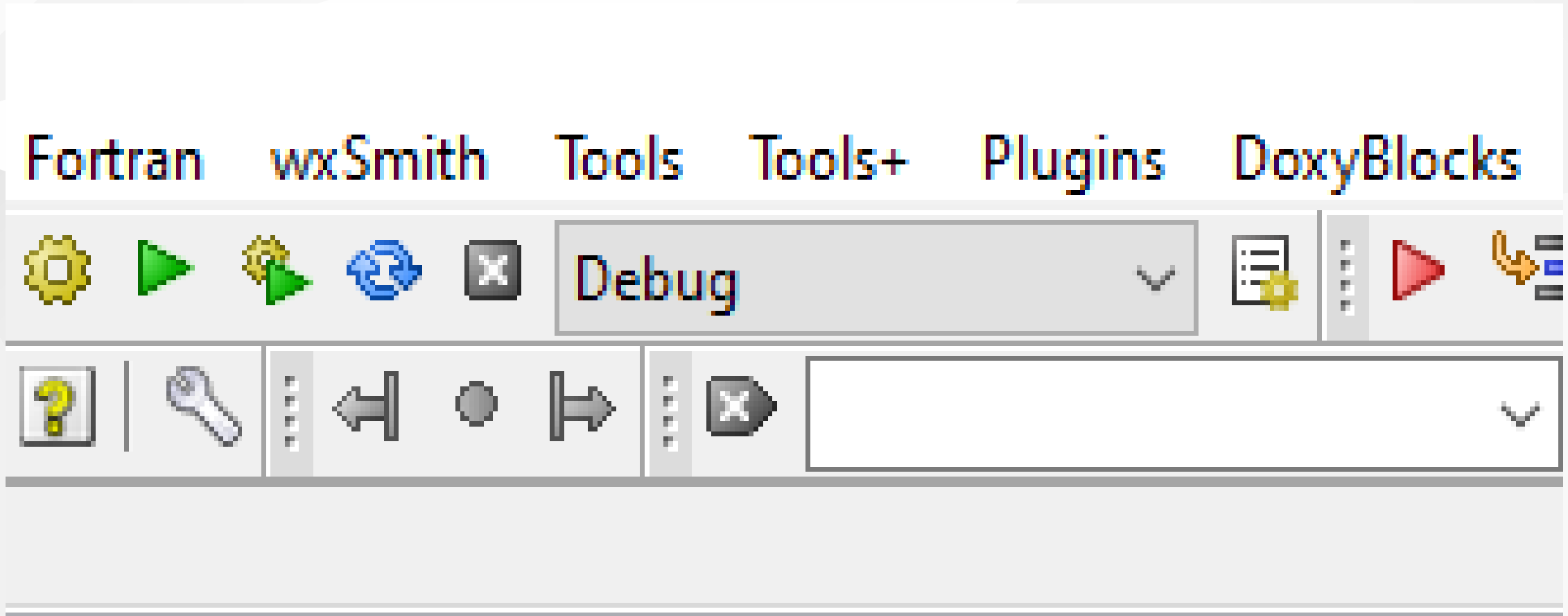
After this wizard you will have the following code

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

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

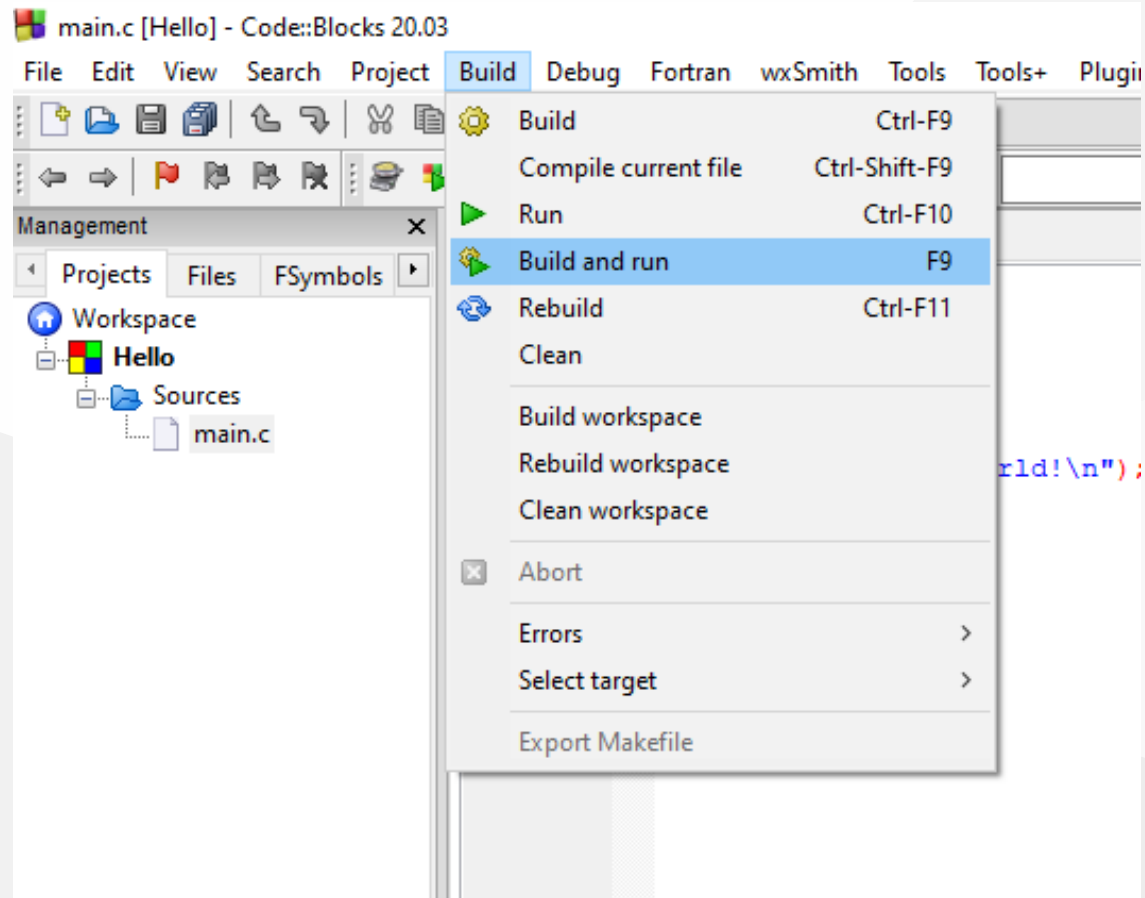
Code Blocks (Install / Compile / Run / Debug) (8)

Select Debug Build from menu



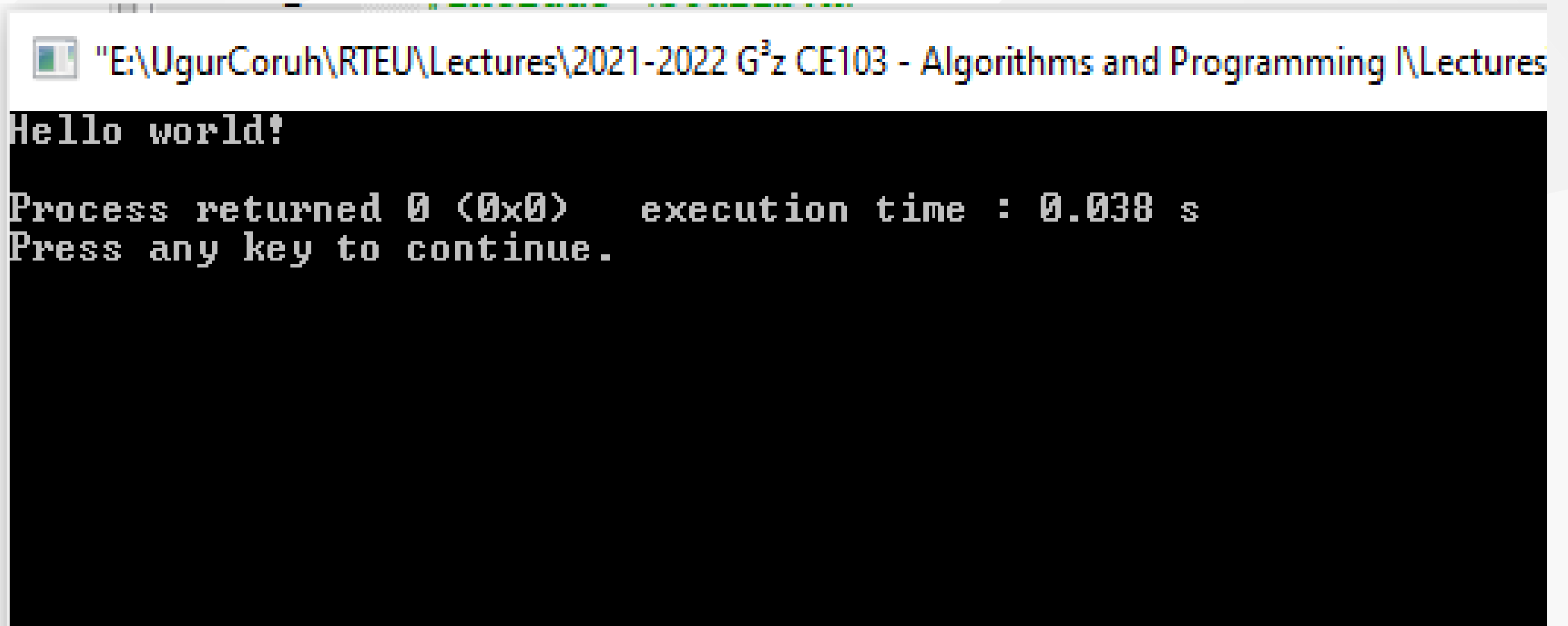
Code Blocks (Install / Compile / Run / Debug) (9)

Run with Build and Run F9



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

You should see the following output



The screenshot shows a Code Blocks IDE window with the following content:

```
"E:\UgurCoruh\RTEU\Lectures\2021-2022 G3z CE103 - Algorithms and Programming I\Lectures  
Hello world!  
Process returned 0 (0x0)    execution time : 0.038 s  
Press any key to continue.
```

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

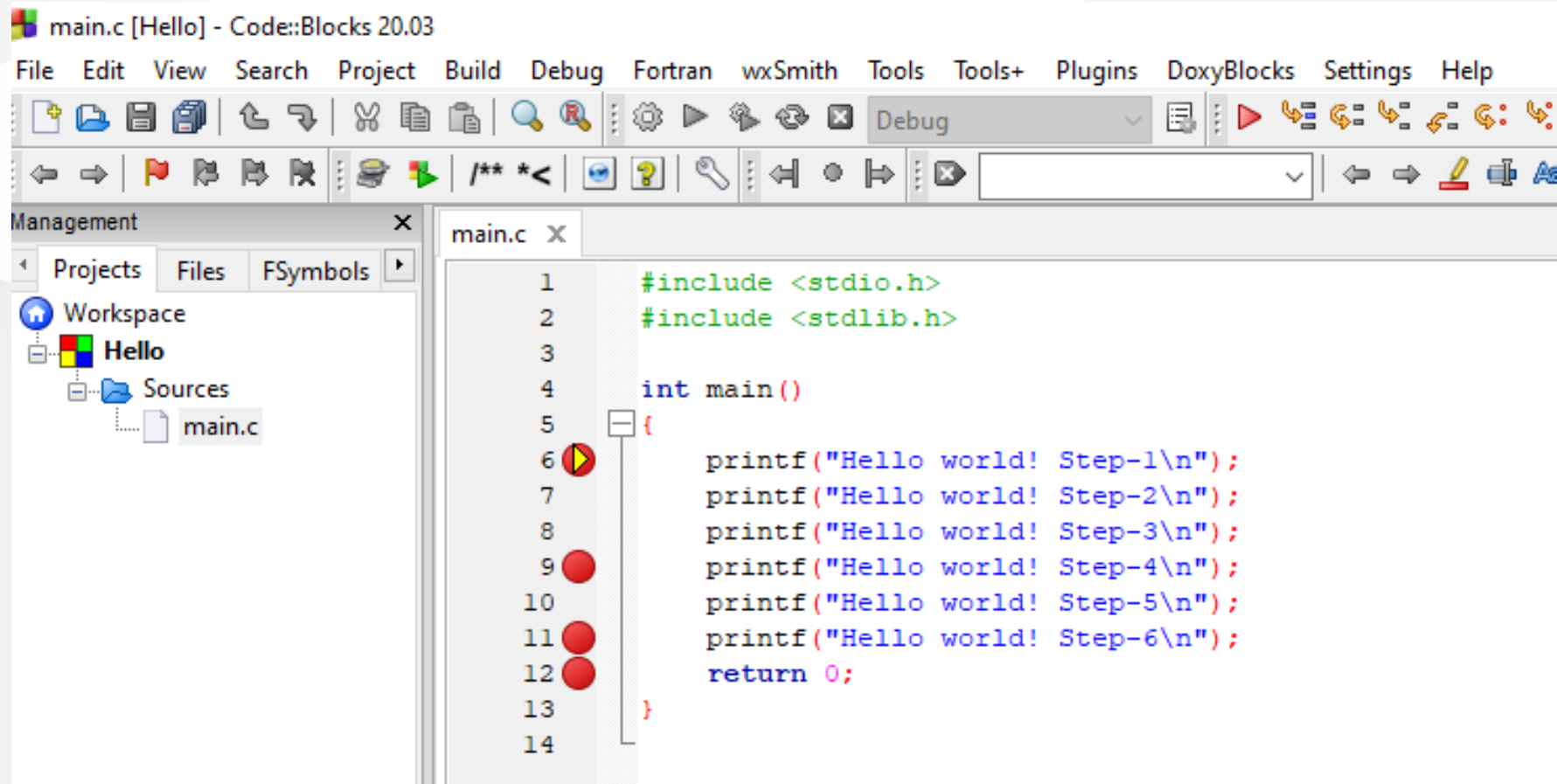
Add the following lines to your source code for debugging

```
#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;
}
```

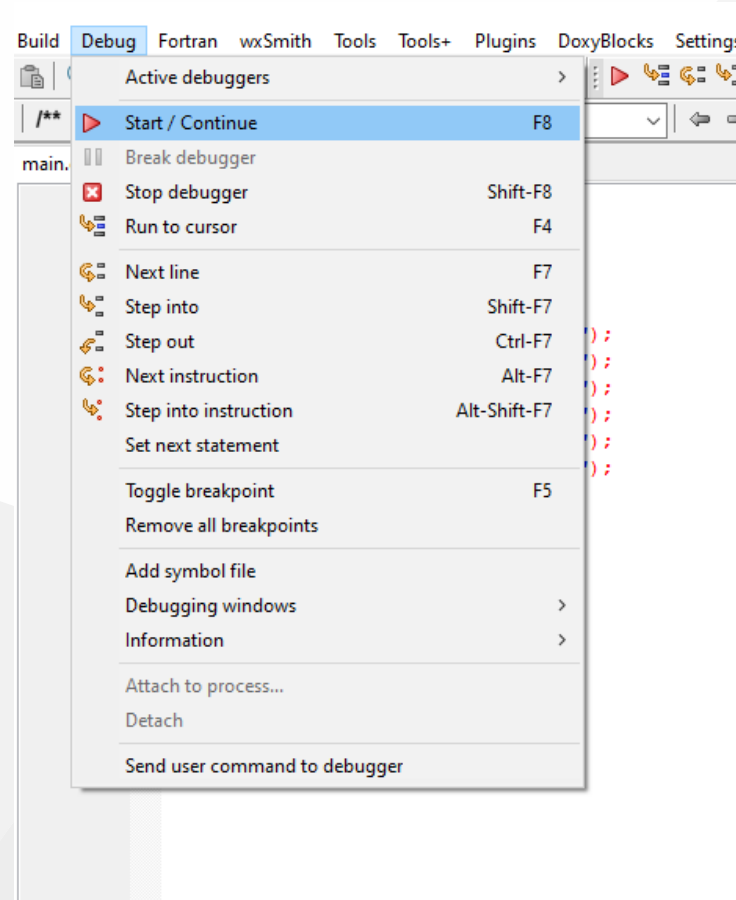
Code Blocks (Install / Compile / Run / Debug) (12)

and add break points 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 with long or turkish character including path. Just move project to a shorter path and try again

Setting breakpoints

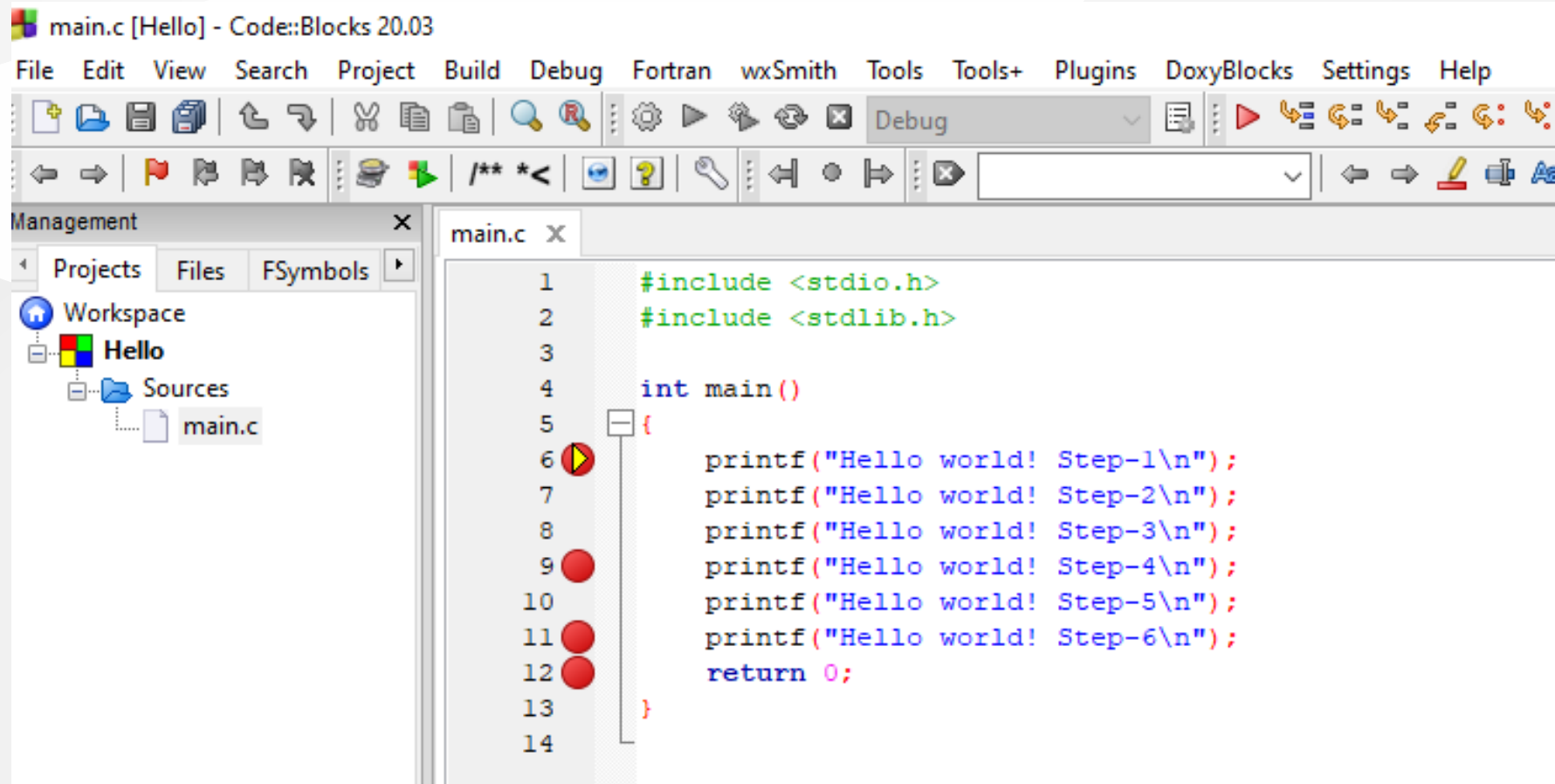
Debugger name and version: GNU gdb (GDB) 8.1

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 debugger



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

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



GCC/G++ Compiler (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](#)

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++ Compiler (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 add gcc and g++ exe paths to 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++ Compiler (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 paths changes according to your setup

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

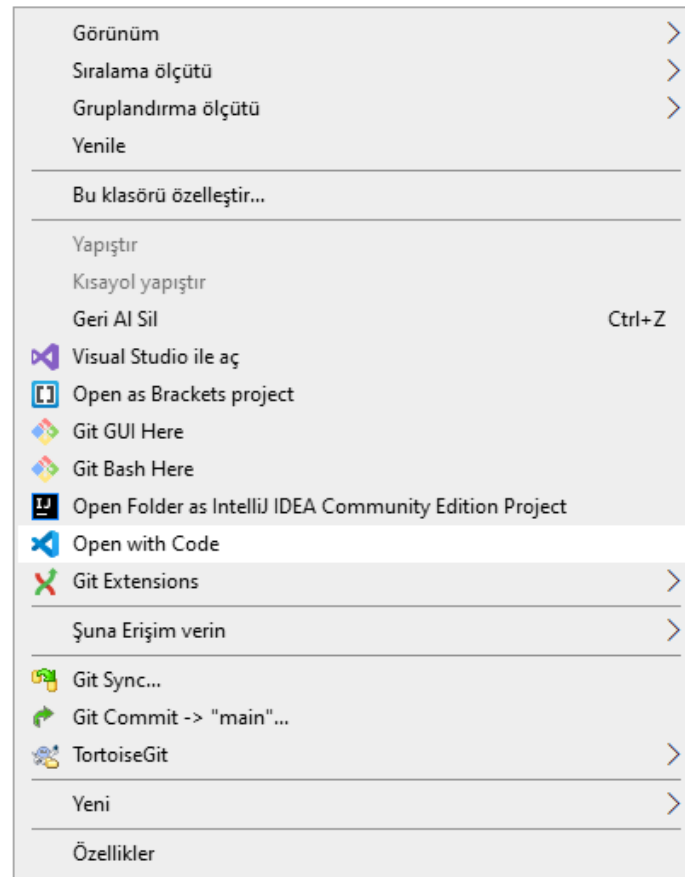
Download Visual Studio Code from the following link

[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

```
Güz C E:\UgurCoruh\RTEU\Lectures\2021-2022 Güz CE103 - Algorithms and Programming I\Lectures\ce103-algorithms-and-programming-  
I\Week-2\vscode-hello-world-apps\C-clang>code .
```

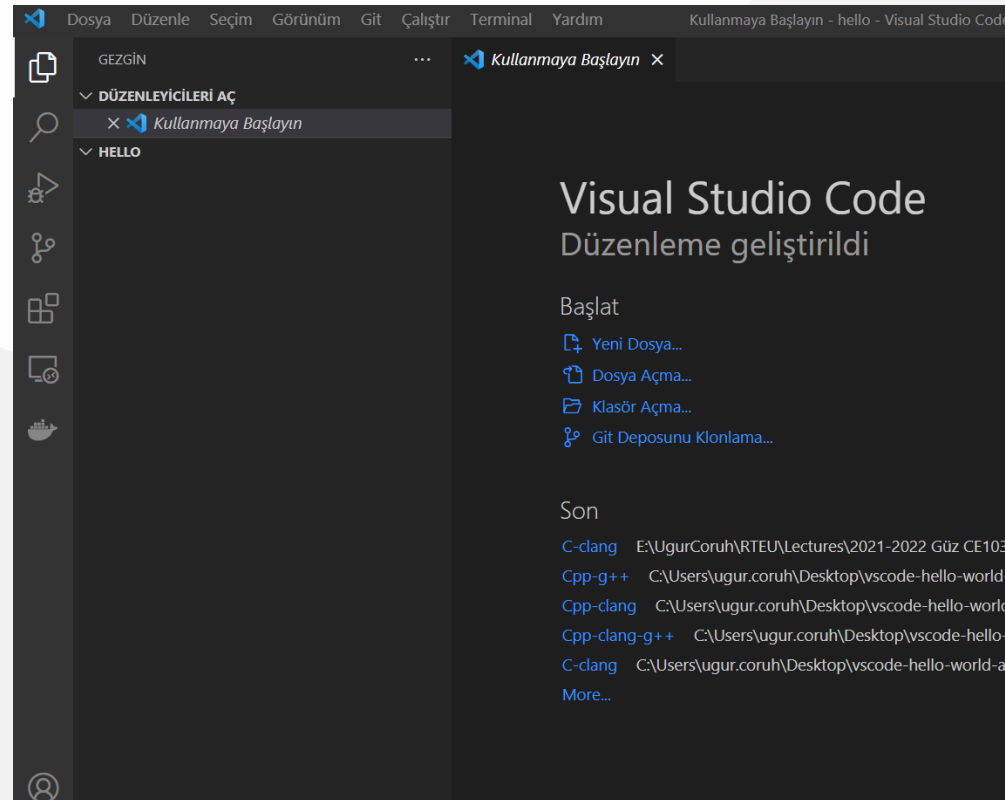
write

```
code .
```

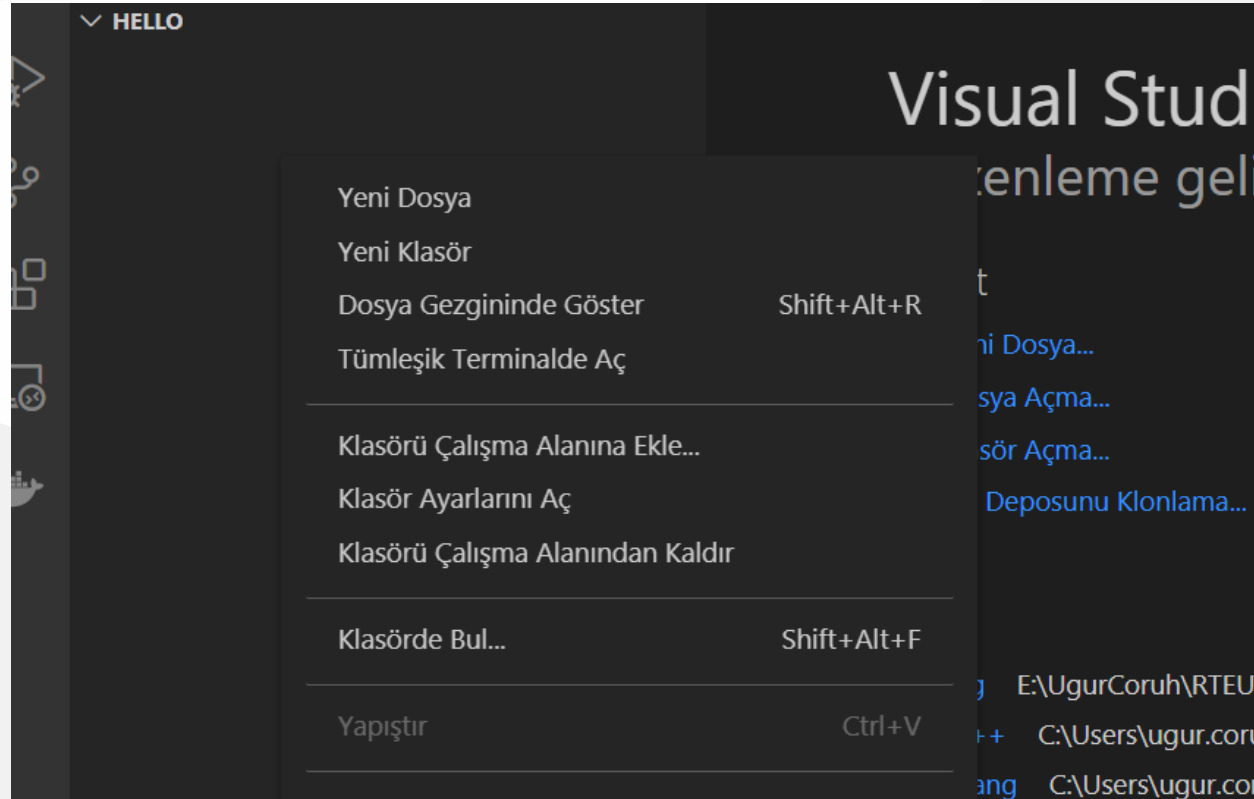
VSCode (Install / Compile / Run / Debug) (4)

This will open vscode for current folder . dot present current folder.

You will see a empty folder in the right window



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



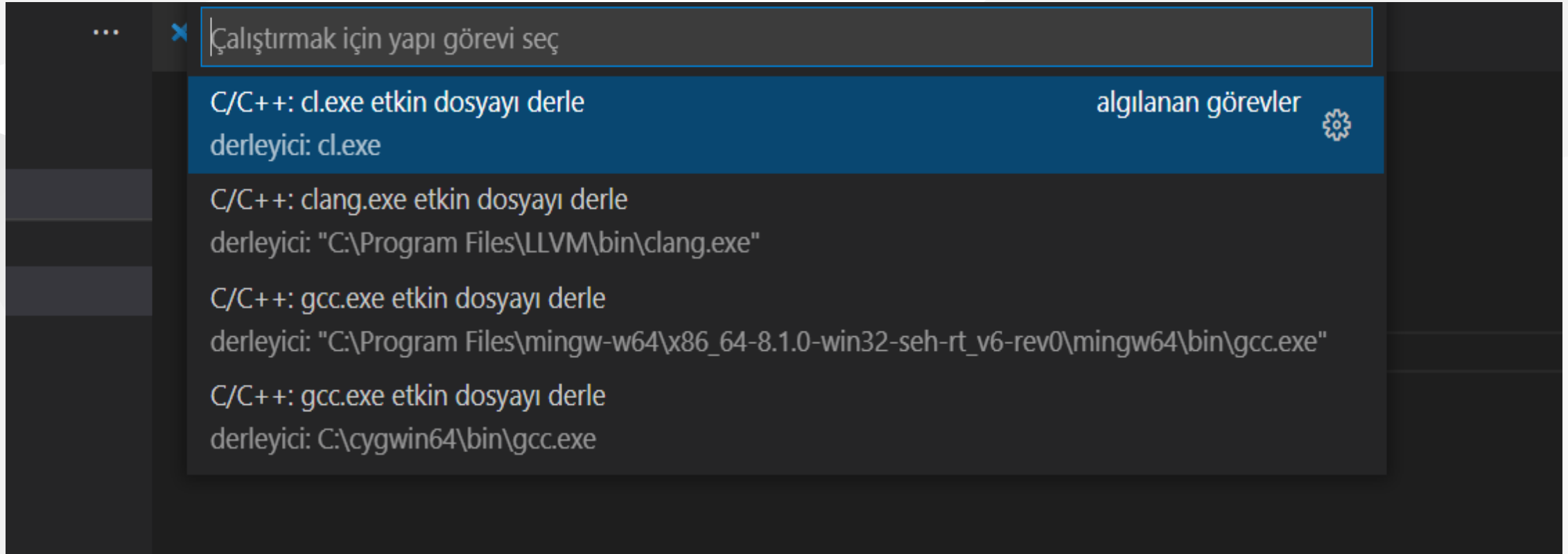
VSCode (Install / Compile / Run / Debug) (6)

Create a hello.c file and write following content

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

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

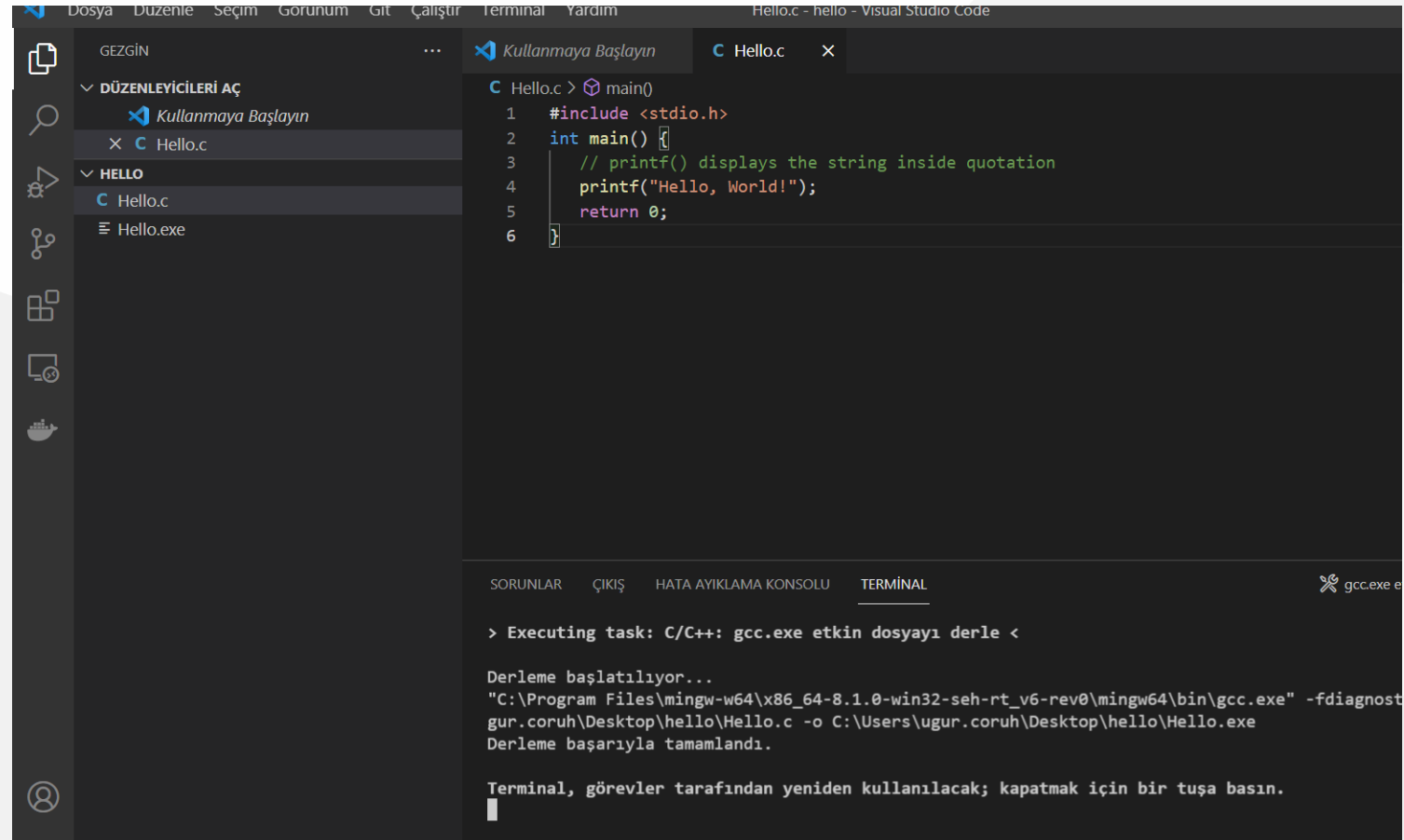
use CTRL+SHIFT+B (you should be on source code section) to build file



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

Select GCC or CLANG for this sample we can use GCC

You will see output generated Hello.exe



The screenshot shows the Visual Studio Code interface with a C file named 'Hello.c' open. The code in the editor is as follows:

```
1 #include <stdio.h>
2 int main()
3 {
4     // printf() displays the string inside quotation
5     printf("Hello, World!");
6     return 0;
7 }
```

The left sidebar shows the Explorer view with the following structure:

- GEZGİN
 - DÜZENLEYİCİLERİ AÇ
 - Kullanmaya Başlayın
 - X C Hello.c
 - HELLO
 - C Hello.c
 - ≡ Hello.exe

The bottom panel shows the TERMINAL view with the following output:

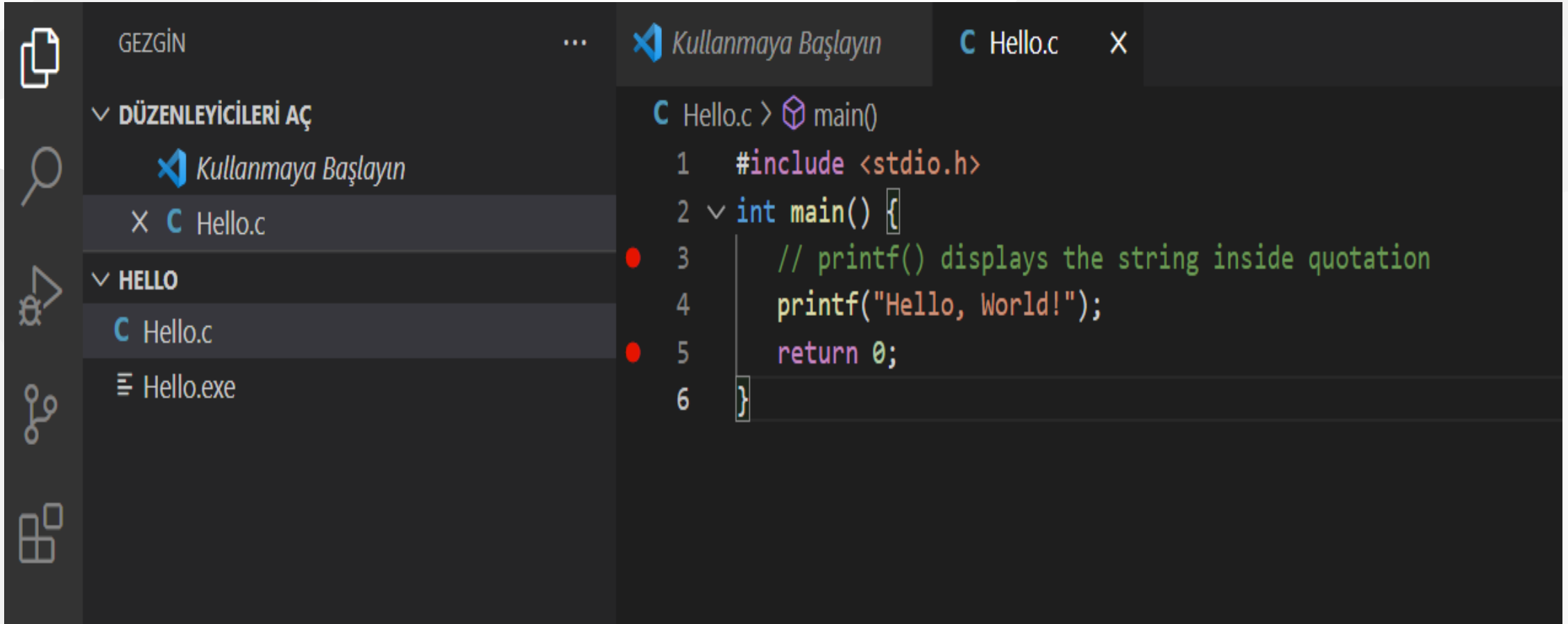
```
> Executing task: C/C++: gcc.exe etkin dosyayı derle <

Derleme başlatılıyor...
"C:\Program Files\mingw-w64\x86_64-8.1.0-win32-seh-rt_v6-rev0\mingw64\bin\gcc.exe" -fdiagnost
gur.coruh\Desktop\hello\Hello.c -o C:\Users\ugur.coruh\Desktop\hello\Hello.exe
Derleme başarıyla tamamlandı.

Terminal, görevler tarafından yeniden kullanılacak; kapatmak için bir tuşa basın.
```

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

for debugging just put breakpoint and build again



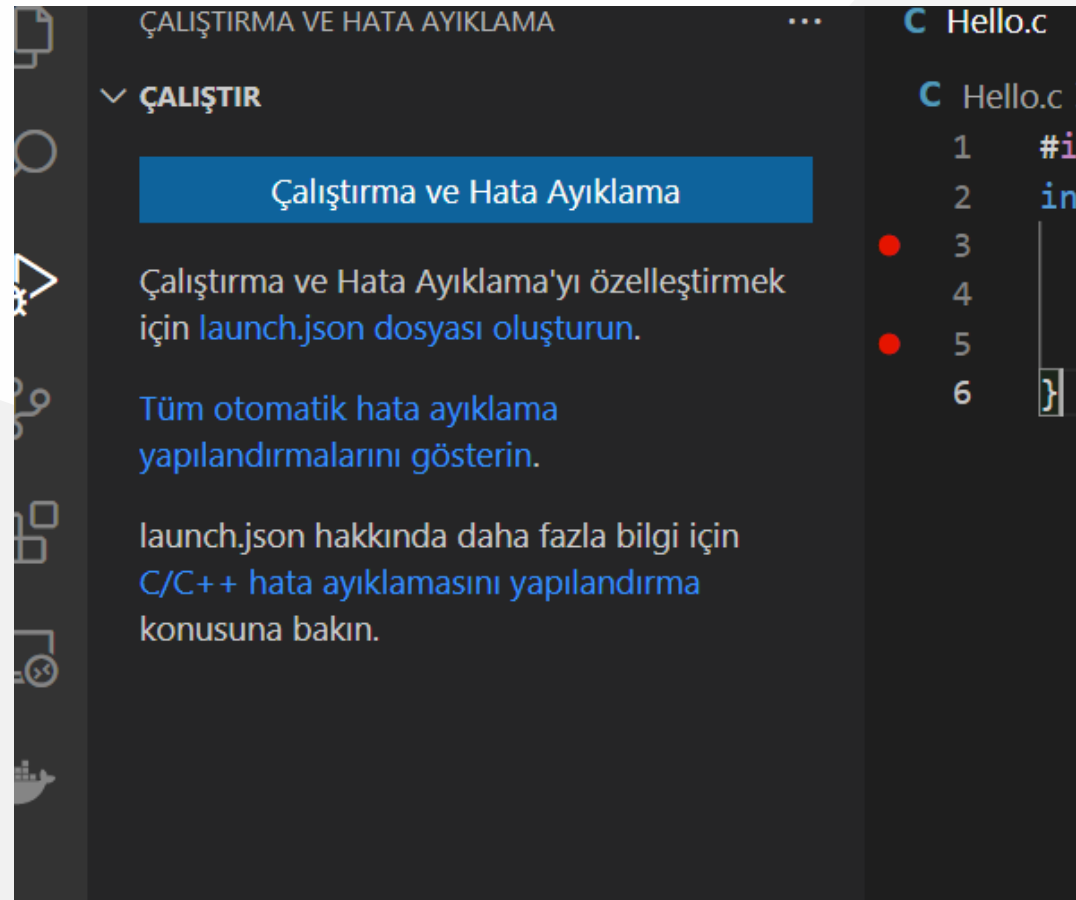
The screenshot shows the Visual Studio Code (VS Code) interface. On the left, the Explorer sidebar is open, showing a file named 'GEZGİN' and a folder named 'DÜZENLEYİCİLERİ AÇ'. Inside this folder, there is a file 'Hello.c' and a file 'Hello.exe'. The main editor area displays the code for 'Hello.c'. The code is as follows:

```
C Hello.c > main()
1  #include <stdio.h>
2  int main() {
3      // printf() displays the string inside quotation
4      printf("Hello, World!");
5      return 0;
6  }
```

Red dots on lines 3 and 5 indicate breakpoints. The status bar at the bottom shows 'C Hello.c'.

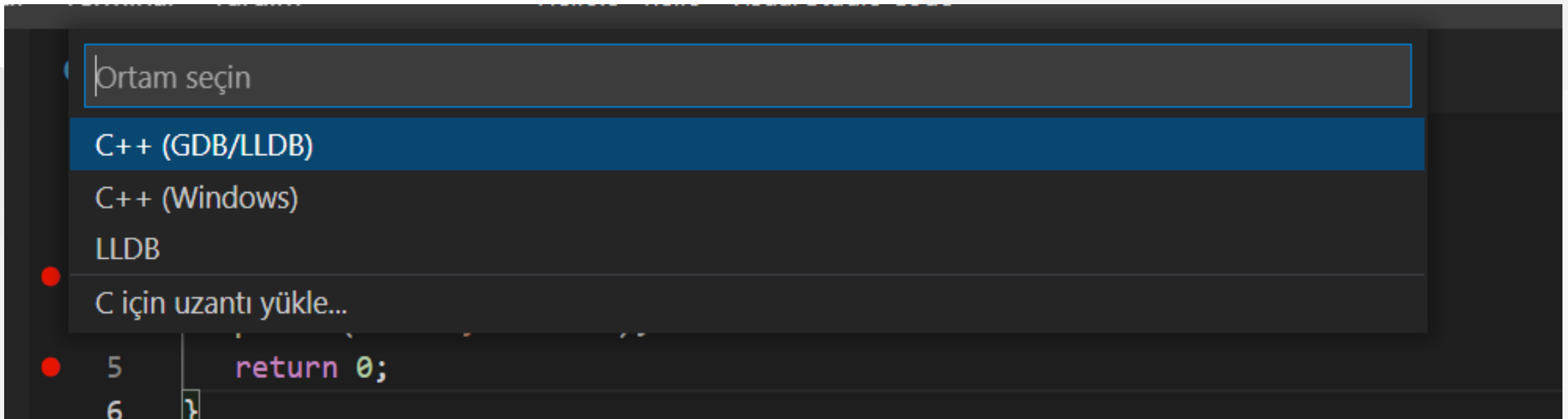
VSCode (Install / Compile / Run / Debug) (10)

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



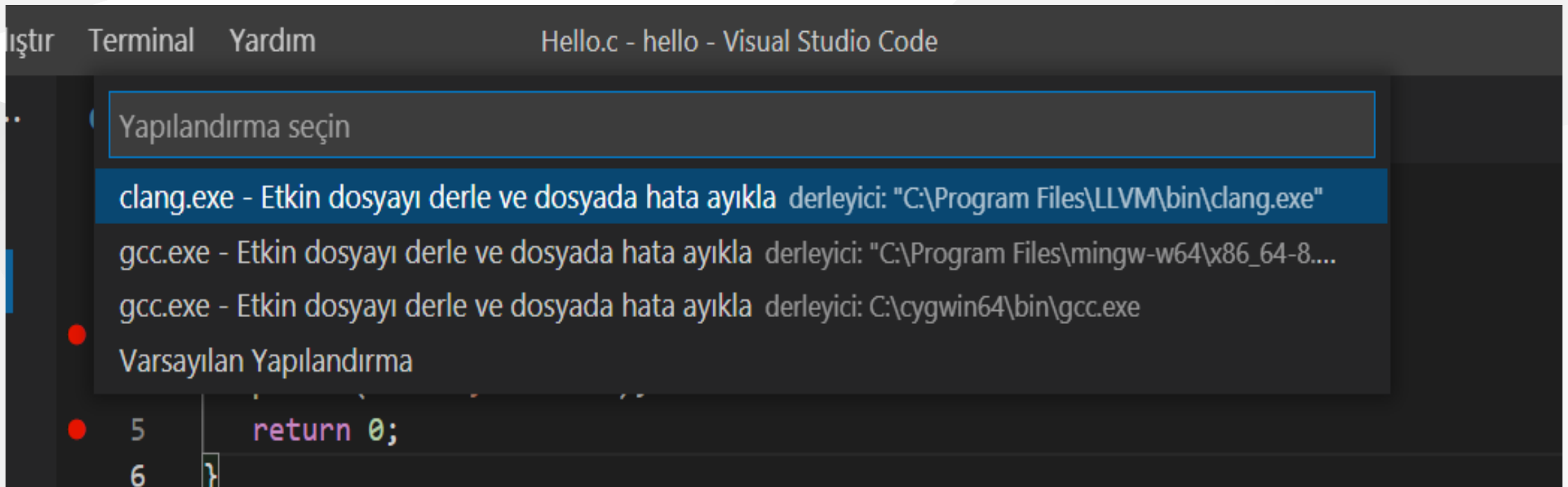
VSCode (Install / Compile / Run / Debug) (11)

from opening window select C++ GDB/LLDB



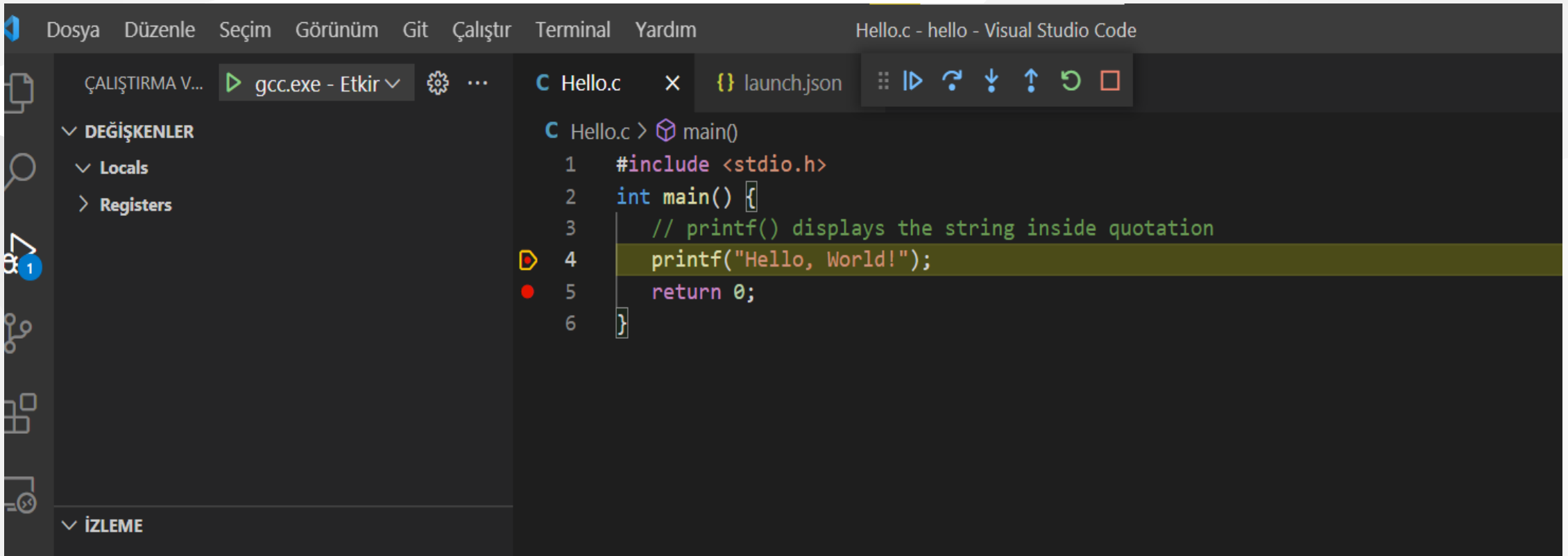
VSCode (Install / Compile / Run / Debug) (12)

from next opening menu select mingw-w64 gcc.exe



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

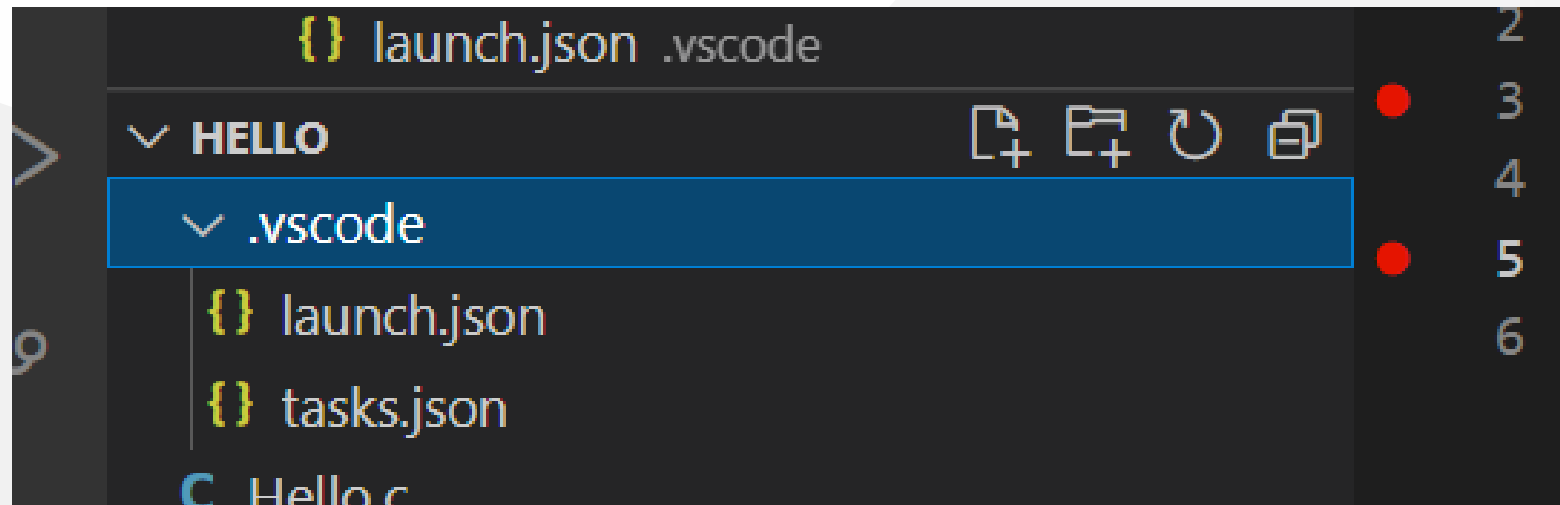
this will run debugger and you will see debug points activated



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 do not support debug 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 writing Debug and Selecting Configure Debugger Option)

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

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 Community Edition (Install / Compile / Run / Debug)

//TODO//



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 downloaded then skip this step)

MinGW installer (clang)

[Download MinGW-w64 - for 32 and 64 bit Windows from SourceForge.net](#)

LLVM installer (gcc / g++)

[Download LLVM releases](#)

Also use the following notes

<https://llvm.org/devmtg/2014-04/PDFs/Talks/clang-cl.pdf>

Notepad++ (Install / Compile) (3)

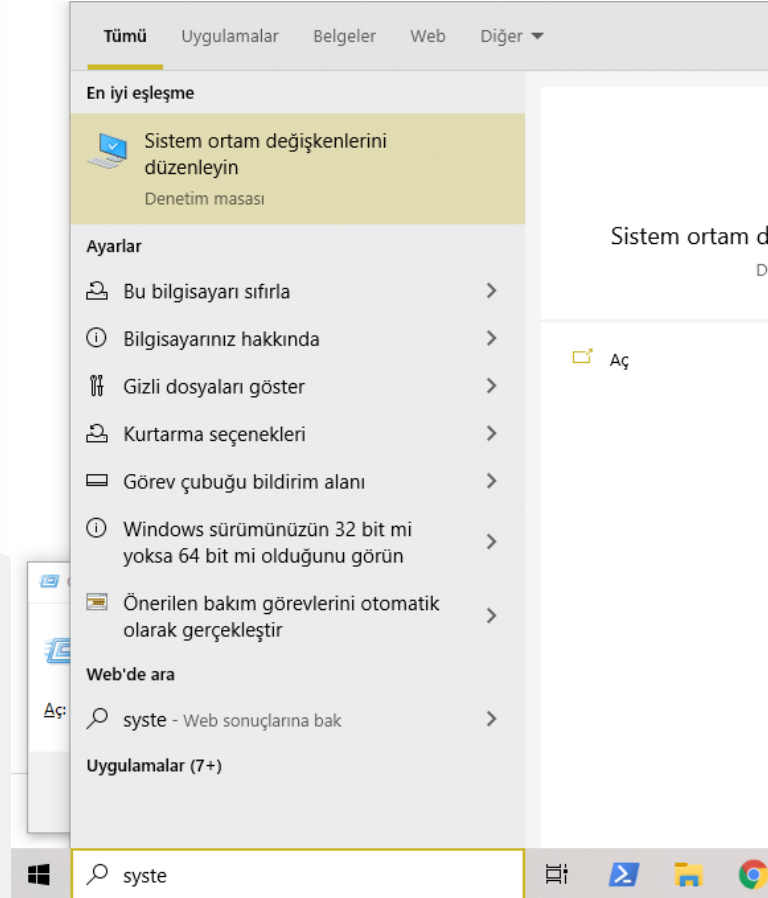
Open a console with "cmd" and test the following commands if commands are not recognized then set the system environment variable add gcc and g++ exe paths to path variable (add to both system and user path variable)

```
gcc --version
```

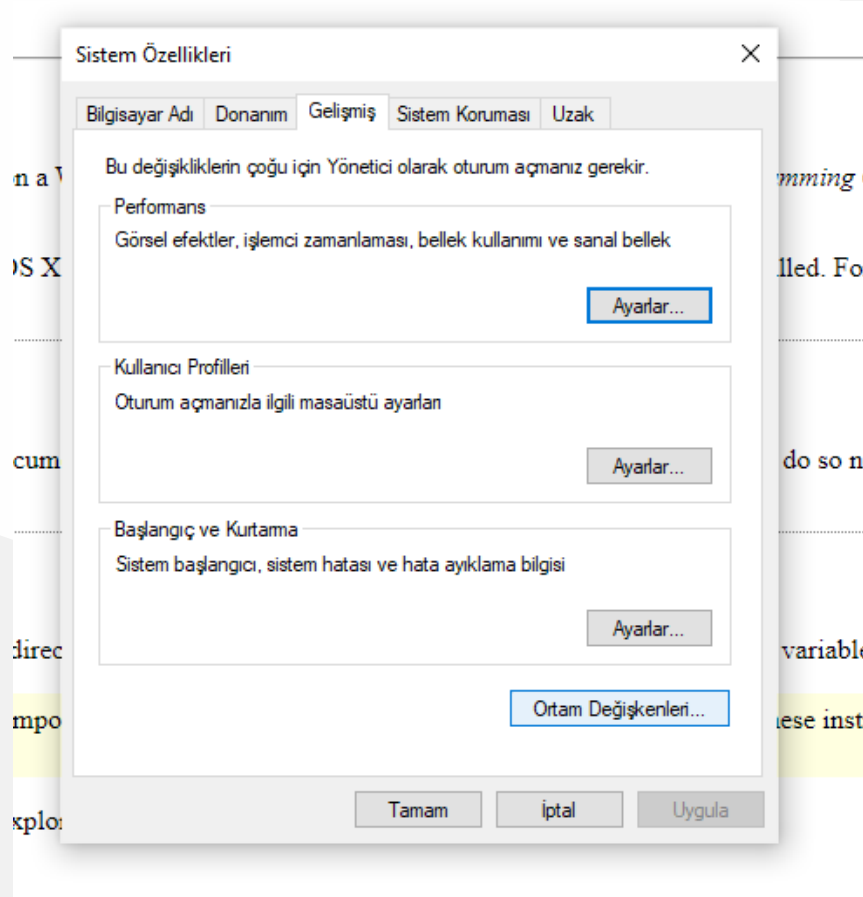
```
g++ --version
```

```
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.
```

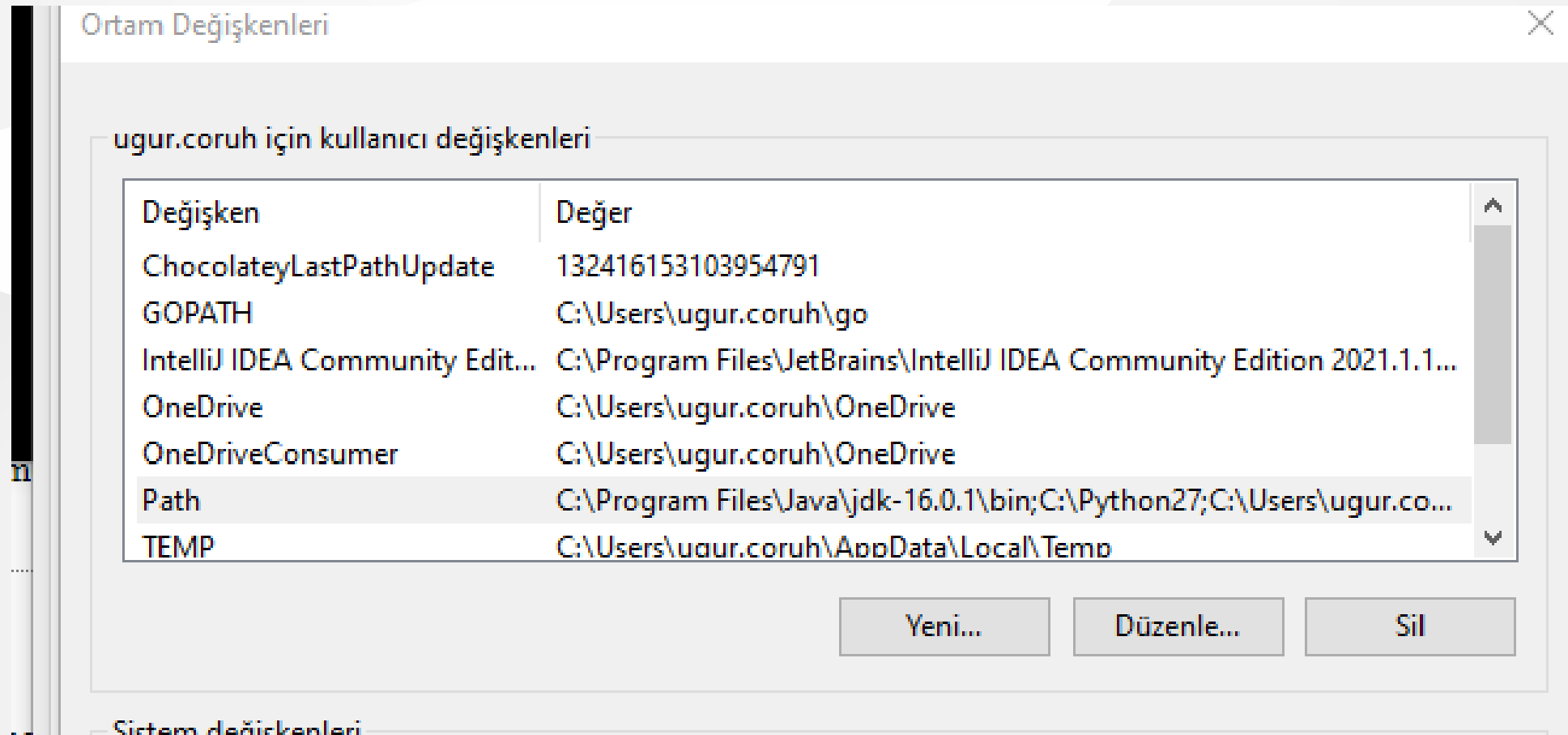
Notepad++ (Install / Compile) (4)



Notepad++ (Install / Compile) (5)



Notepad++ (Install / Compile) (6)



Notepad++ (Install / Compile) (7)

lirect

mpo

splo

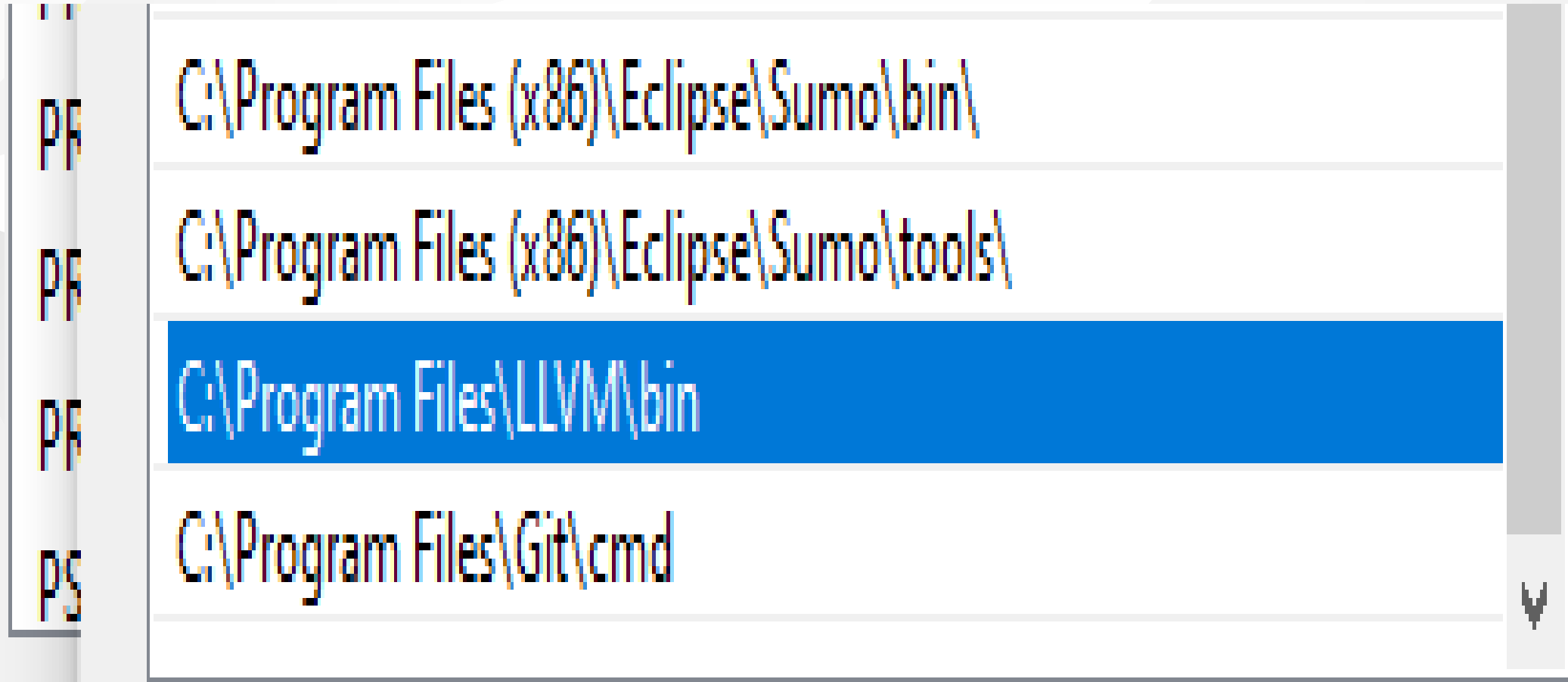
Sistem değişkenleri

Değişken	Değer
Path	C:\Program Files\Java\jre1.8.0_231\bin;C:\Program Files\Java\jdk-1...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC;.PY;.PYW
PROCESSOR_ARCHITECTURE	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 94 Stepping 3, GenuineIntel
PROCESSOR_LEVEL	6
PROCESSOR_REVISION	5e03
PSModulePath	%ProgramFiles%\WindowsPowerShell\Modules;C:\WINDOWS\cvt

ere executable cod

l your computer w

Notepad++ (Install / Compile) (8)



Notepad++ (Install / Compile) (9)

```
C:\Users\ugur.coruh\go\bin  
C:\Program Files (x86)\Python38-32  
C:\Program Files (x86)\Python38-32\Scripts  
C:\Users\ugur.coruh\AppData\Roaming\Python\Python38\Scripts  
C:\Program Files\mingw-w64\x86_64-8.1.0-win32-seh-rt_v6-rev0\mingw64\bin  
C:\Program Files (x86)\Microsoft Visual Studio\2019\Community\VC\...  
%IntelliJ IDEA Community Edition%  
%USERPROFILE%\dotnet\tools  
%USERPROFILE%\go\bin
```

Yukarı Taşı

Aşağı Taşı

Metni düzenle...

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)

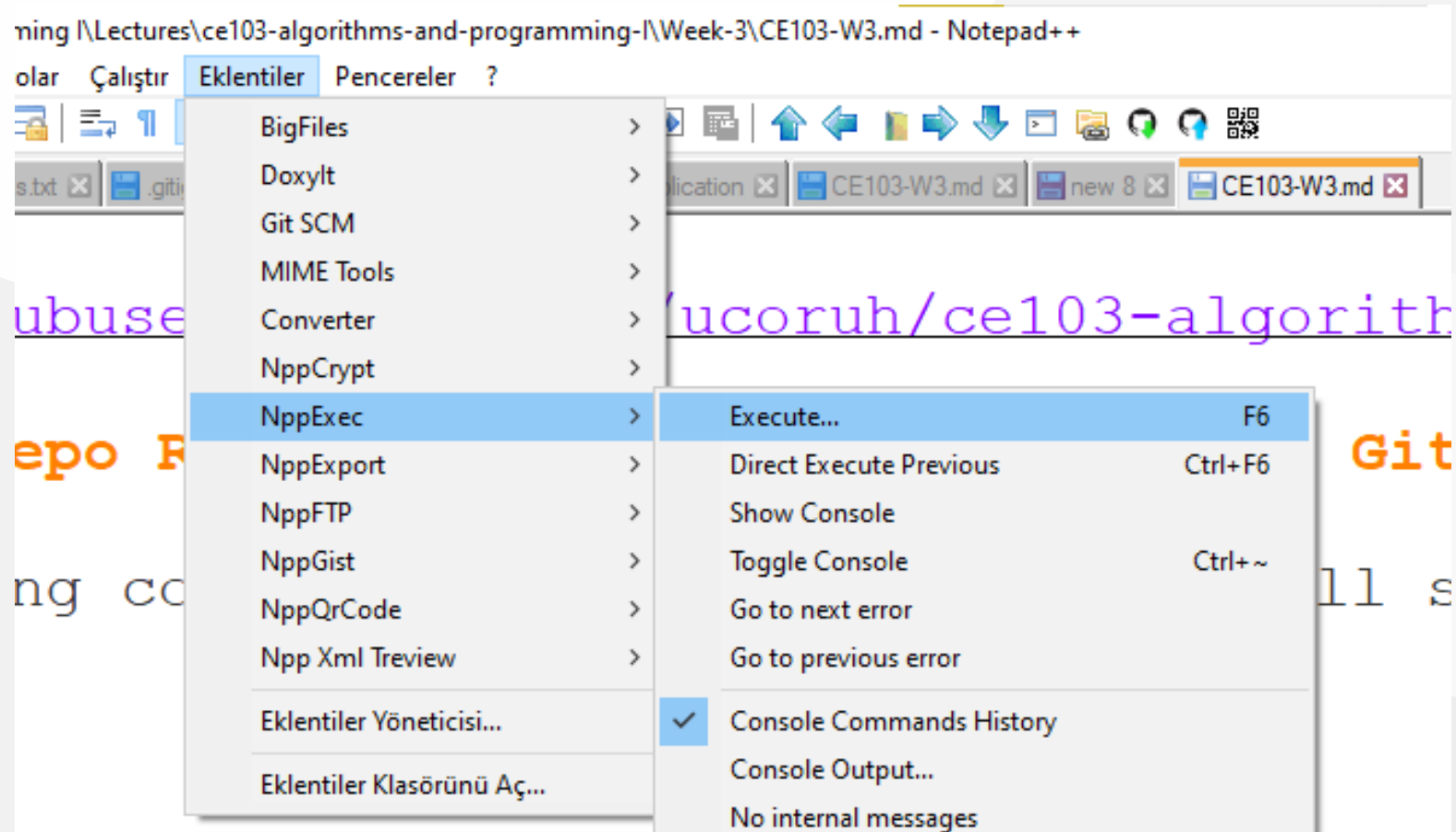
for clang.exe , lldb.exe

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

Notepad++ (Install / Compile) (12)

This folder paths changes according to your setup

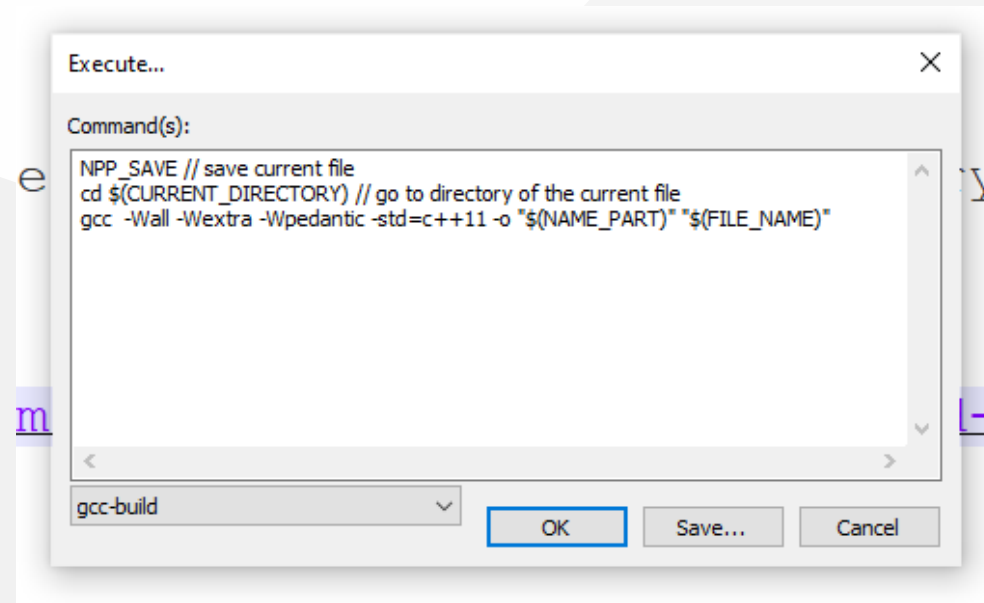
Open NppExec extension (install from extension manager if not exist)



Notepad++ (Install / Compile) (13)

write the following commands in 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 script as gcc-build and for more information check the following link

[How To Setup Notepad for Writing C++ Programs](#)

You can modify or add multiple scripts for another tasks.

Vi/Vim (C/C++)

//TODO//



Eclipse (C/C++)

//TODO//



Netbeans (C/C++)

//TODO//



Turbo C++/C

`//TODO//`



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-platforms
- 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

```
#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)
```

CE103 Algorithms and Programming I Cmake (C++/C) (7) (Windows Environment)

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

sample-scanf

Share View

sample-scanf

Photo Print Photo Print

Name	Date modified	Type	Size
CMakeLists.txt	11/7/2021 12:10 AM	TXT File	1 KB
main.c	11/4/2020 10:25 AM	C Source	1 KB

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

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

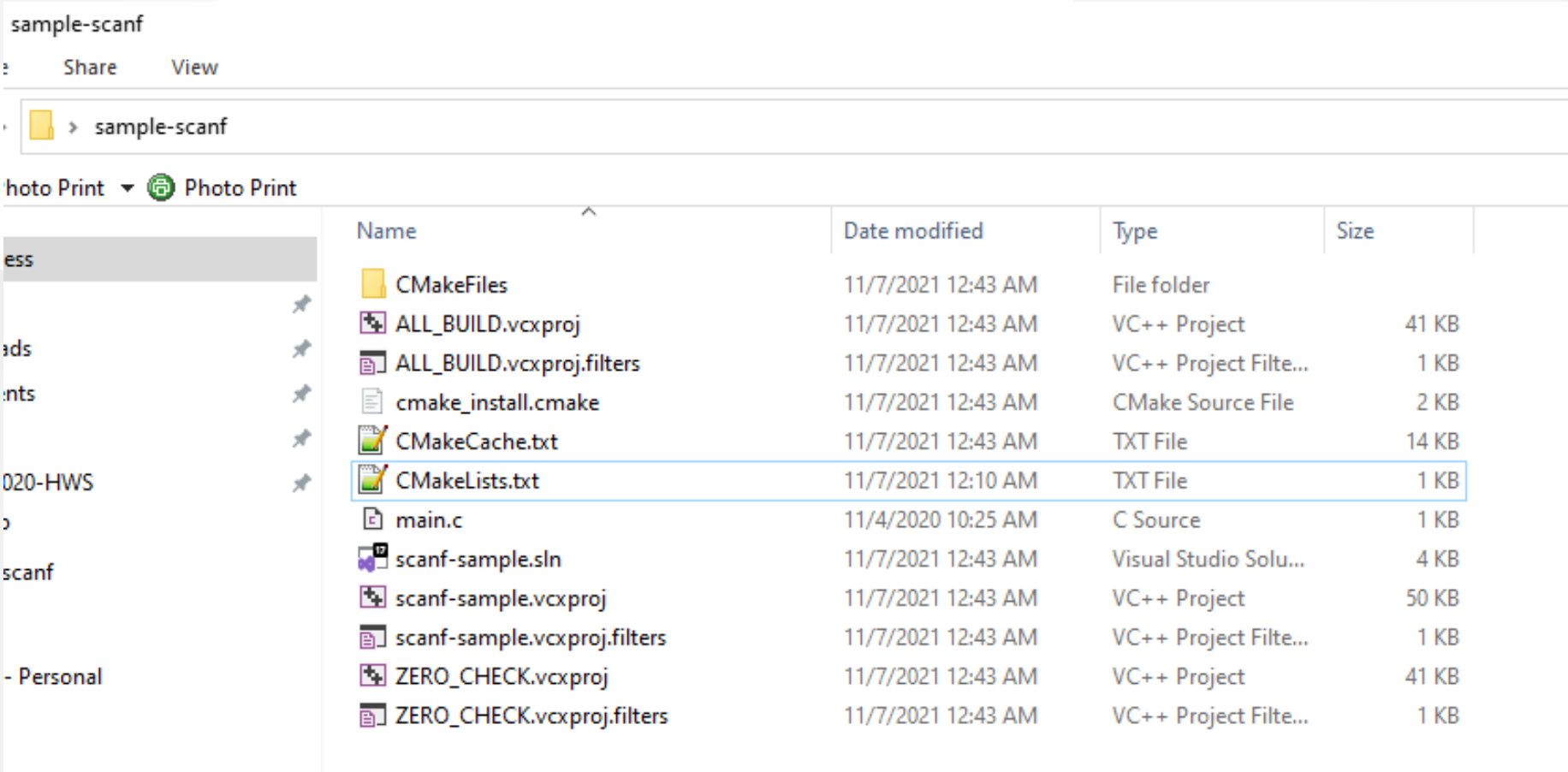
I have Visual Studio 2022 Community Edition Installed on My Computer, for these reason build tools are selected for visual studio environment and the following outputs are generated

```
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>
```

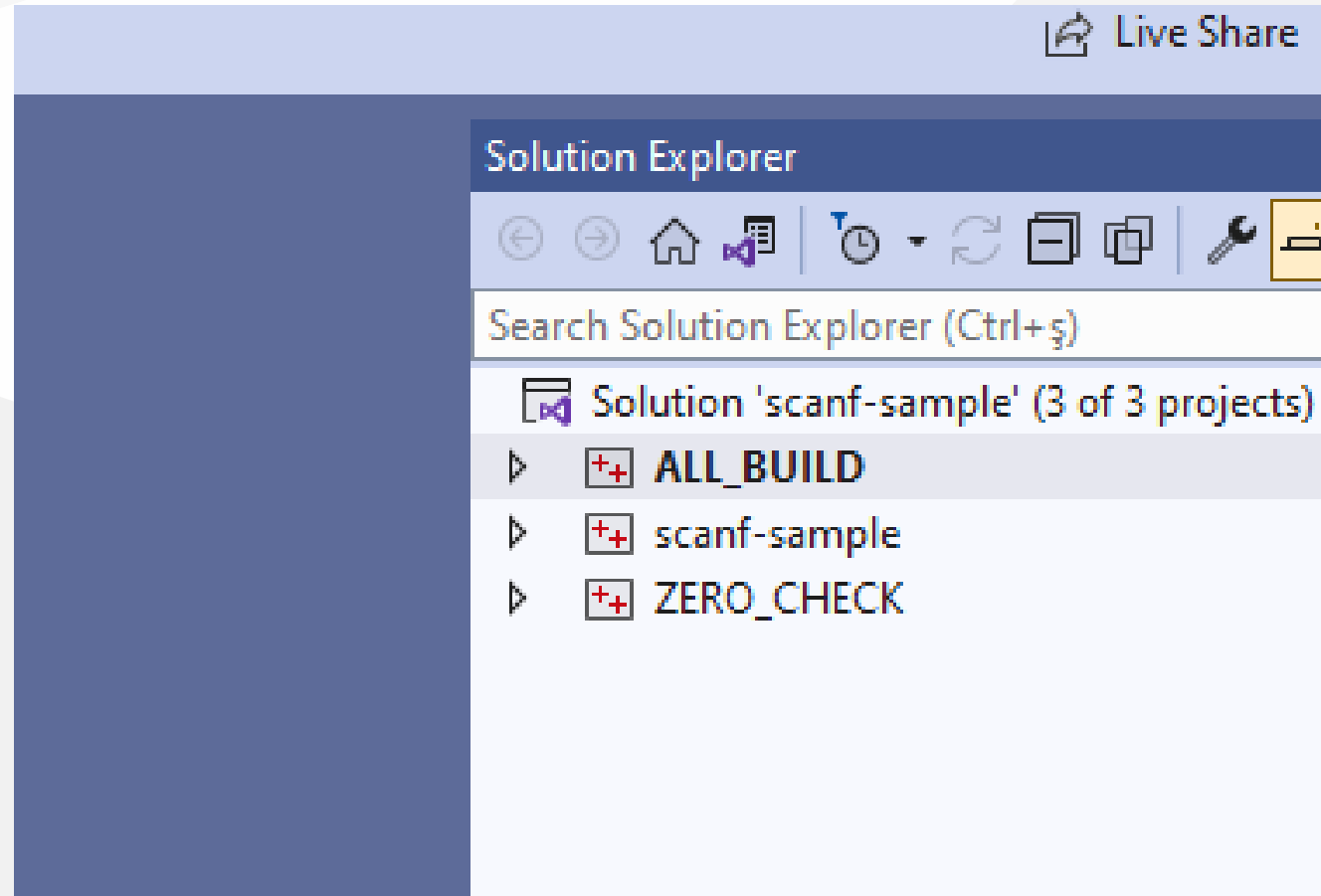
Cmake (C++/C) (9) (Windows Environment)

also following files are generated



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

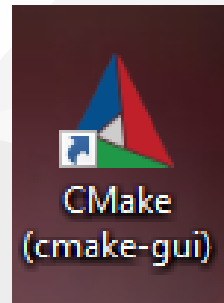
if we open scanf-sample.sln file we will have automated generated project files



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

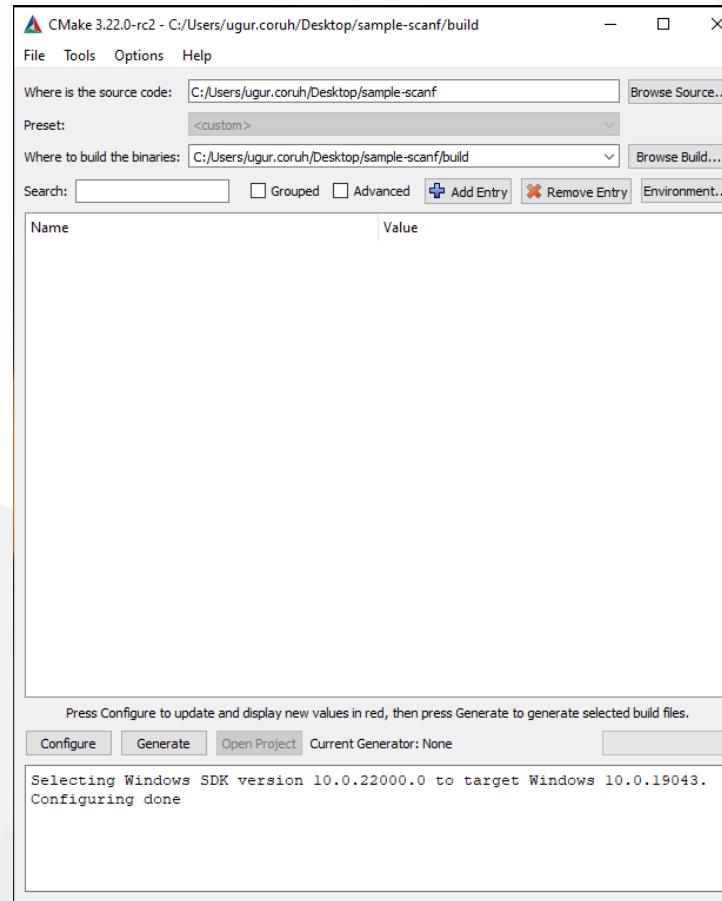
you can make scanf-sample with startup project with right click and then run on visual studio.

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



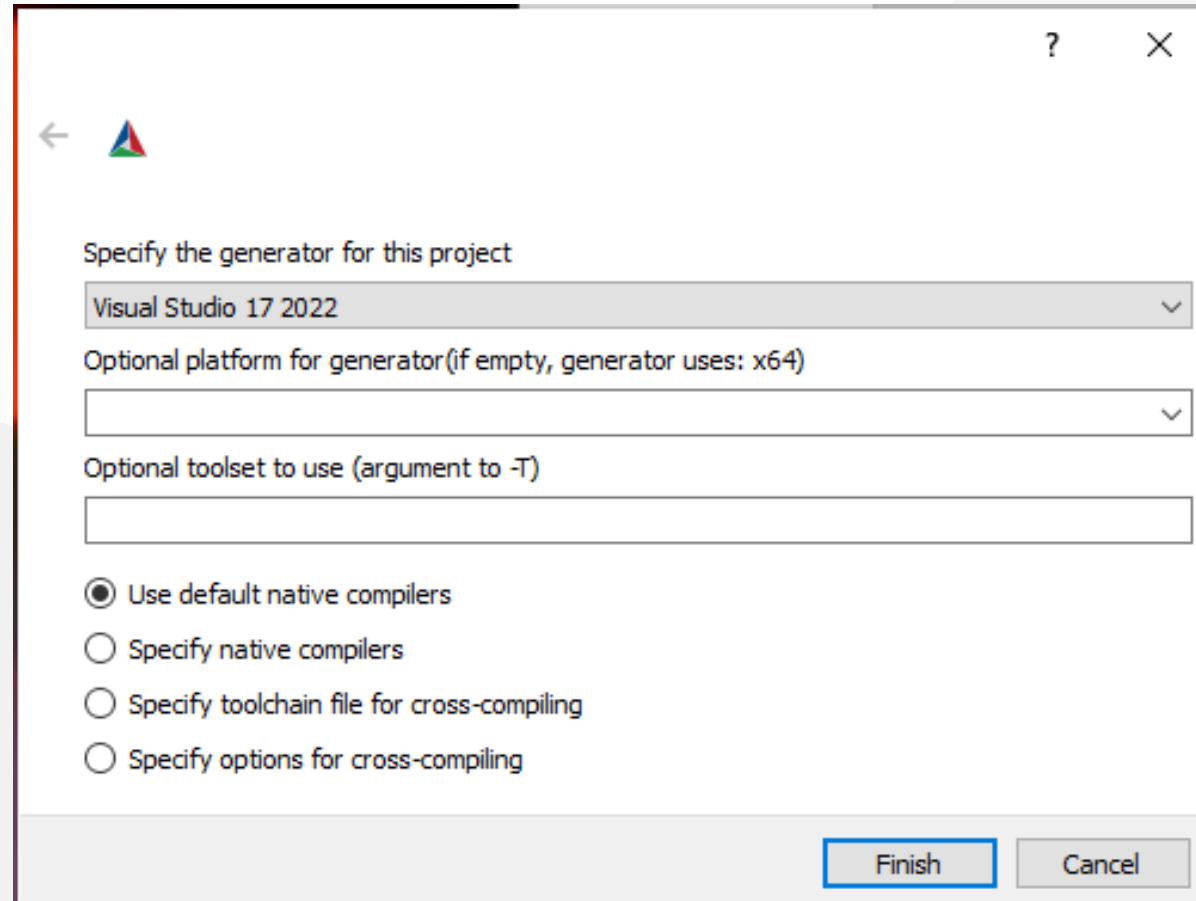
Cmake (C++/C) (12) (Windows Environment)

Open GUI and Select *File* -> *Delete Cache*

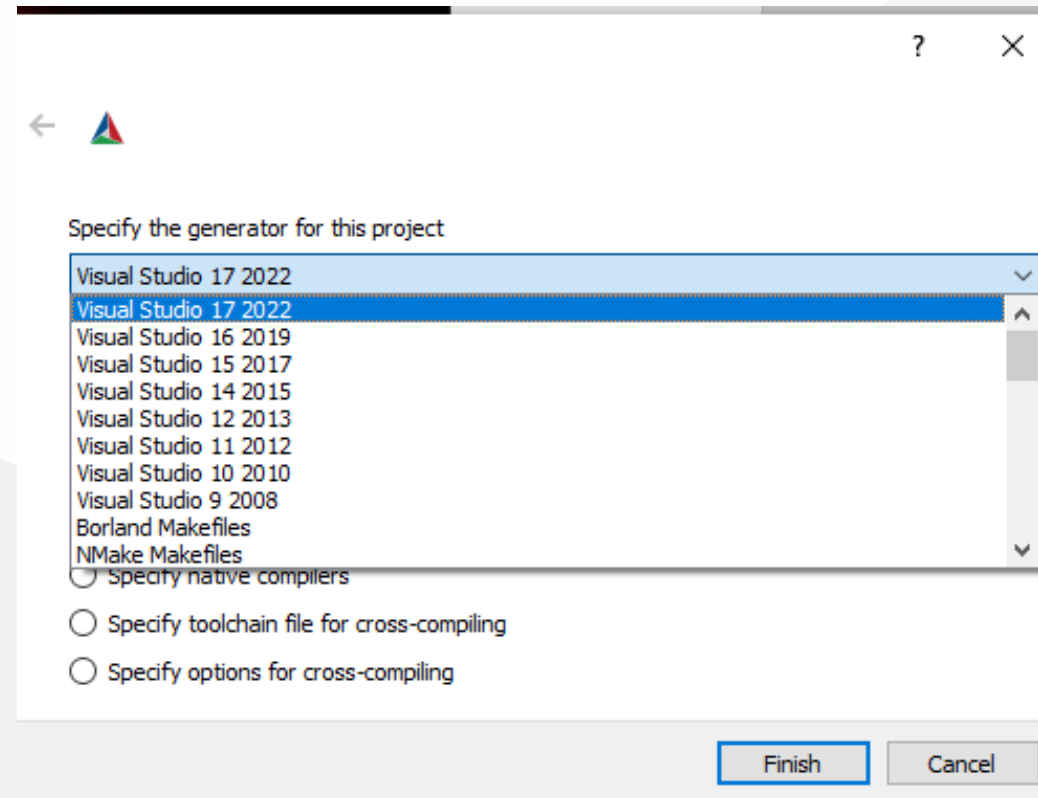


Cmake (C++/C) (13) (Windows Environment)

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](https://github.com/ttroy50/cmake-examples)

Make (1)

Sample

hello.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

s-and-programming-I > Week-2 > hello-make

Print

	Name	Date modified
	 compile.bat	11/7/2021
	 hello.c	11/2/2021
	 Makefile	11/2/2021
		
		

ing-I

JAVA Environment and Development

//TODO//



JDK and JRE Setup

//TODO//



System Environments and Paths for Java

//TODO//



Netbeans (Java)

//TODO//



Eclipse (Java)

//TODO//



IntelliJ Idea (Jet Brains) (Java)

//TODO//



VSCode (Java)

//TODO//



Notepad++ (Java)

```
//TODO//
```



Cmake (Java)

ASTERICS_HPC

C# Environment and Development

Visual Studio Community Edition (C#)

//TODO//



Notepad++ (C#)

```
//TODO//
```



Cmake (C#)

Outline

Common Tools and Platforms

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++](#)

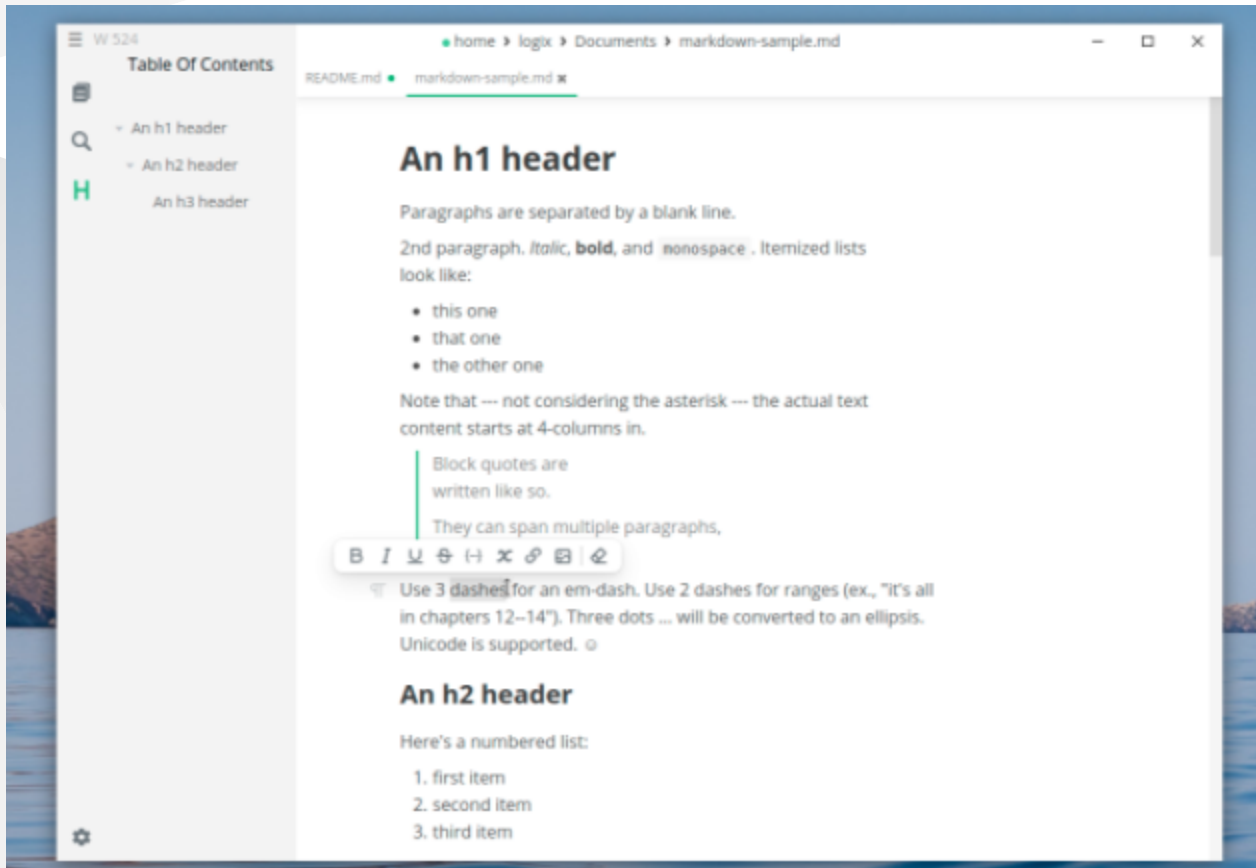
HxD (Hex Editor)

HxD - Freeware Hex Editor and Disk Editor | [mh-nexus](http://mh-nexus.de/)

Marktext (Markdown Syntax Editor)



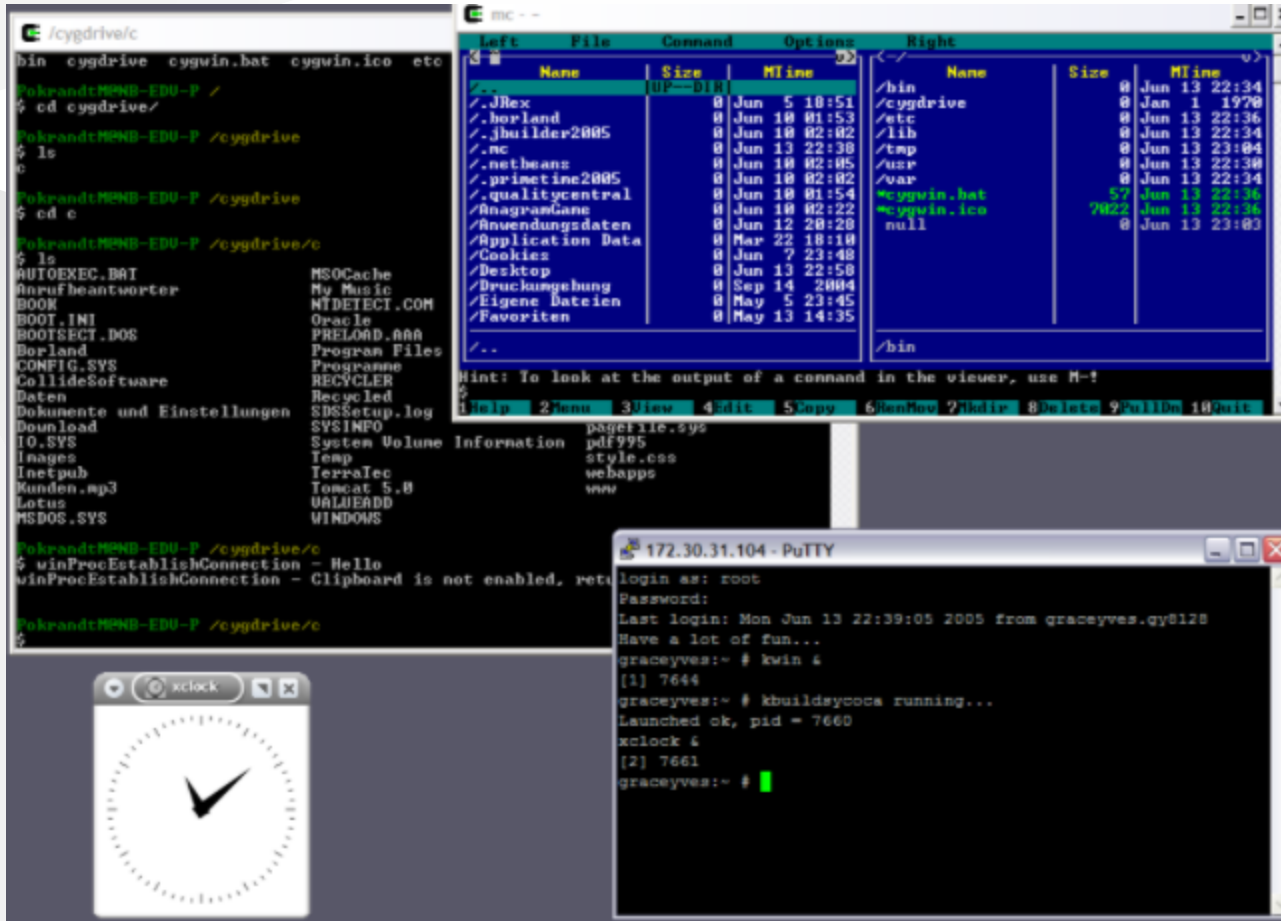
<https://marktext.app/>



Cygwin (Linux environment for Windows)



<https://www.cygwin.com/>



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



<https://www.dependencywalker.com/>

Dependency Walker - [Stooges.exe]

File Edit View Options Profile Window Help

STOOGES.EXE

- LARRY.DLL
- KERNEL32.DLL
- NTDLL.DLL
- CURLY.DLL
- SHEMP.DLL
- MOE.DLL
- KERNEL32.DLL
- NTDLL.DLL

PI^	Ordinal	Hint	Function	Entry Point
	N/A	N/A	IsKnucklehead	Not Bound
	N/A	N/A	int SaySoitenly(char *,...)	Not Bound

E^	Ordinal	Hint	Function	Entry Point
4 (0x0004)	1 (0x0001)		int SaySoitenly(char *,...)	SHEMP.?SaySoitenly@@YAHPI
5 (0x0005)	2 (0x0002)		DoinkLarrysEye	0x00001010
3 (0x0003)	0 (0x0000)		void SayPoifect(_int64)	0x00001020
1 (0x0001)	N/A		N/A	0x00001020
2 (0x0002)	3 (0x0003)		DoinkMoesEye	SHEMP.DoinkMoesEye

Module ^	File Time Stamp	Link Time Stamp	File Size	Attr.	Link Checksum	Real Checksum	CPU	Subsystem
CURLY.DLL	11/14/2006 5:17p	11/14/2006 5:13p	2,560	A	0x0000F739	0x0000F759	x86	GUI
KERNEL32.DLL	08/30/2006 1:22a	08/30/2006 1:20a	871,424	A	0x000E388E	0x000E388E	x86	Console
LARRY.DLL	11/14/2006 5:13p	11/14/2006 5:13p	2,560	A	0x000053DB	0x000053DB	x86	GUI
MOE.DLL	11/14/2006 5:15p	11/14/2006 5:15p	2,560	A	0x0000B191	0x0000B191	x86	GUI
NTDLL.DLL	08/30/2006 1:23a	08/30/2006 1:21a	1,147,664	A	0x00125FA5	0x00125FA5	x86	Console
SHEMP.DLL	11/14/2006 5:13p	11/14/2006 5:13p	2,560	A	0x00001CE7	0x00001CE7	x86	GUI

00:00:00.093: LoadLibraryA("Moe.dll") called from "STOOGES.EXE" at address 0x00401024 by thread 1.

00:00:00.093: Loaded "MOE.DLL" at address 0x00020000 by thread 1. Successfully hooked module.

00:00:00.093: DllMain(0x00020000, DLL_PROCESS_ATTACH, 0x00000000) in "MOE.DLL" called by thread 1.

00:00:00.093: DllMain(0x00020000, DLL_PROCESS_ATTACH, 0x00000000) in "MOE.DLL" returned 1 (0x1) by thread 1.

00:00:00.093: LoadLibraryA("Moe.dll") returned 0x00020000 by thread 1.

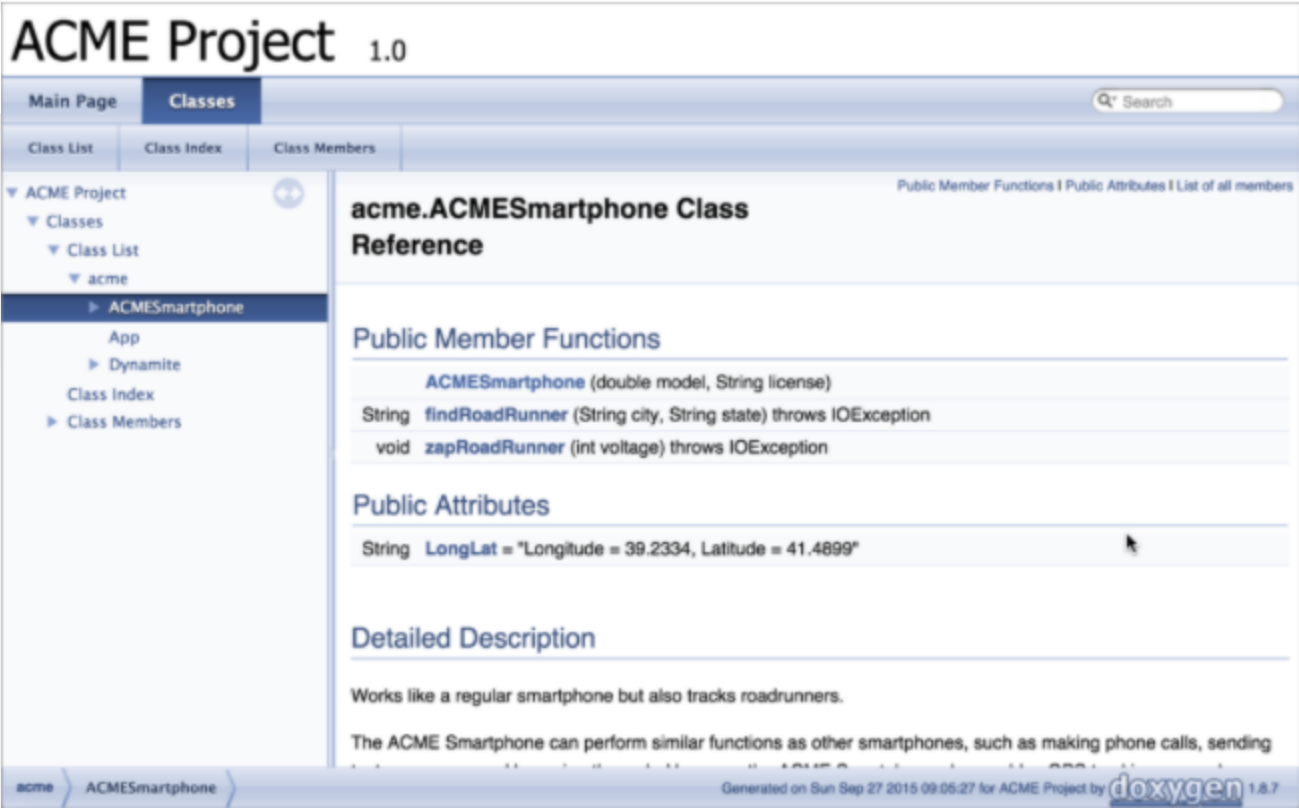
00:00:00.109: GetProcAddress(0x00020000 [MOE.DLL], "SmackCurly") called from "STOOGES.EXE" at address 0x0040102B and returne

For Help, press F1

Doxygen (Code Documentation)



Doxygen: Doxygen

A screenshot of a web browser displaying Doxygen-generated documentation for the "ACME Project 1.0". The interface includes a navigation sidebar on the left with a tree view showing the project structure: "ACME Project" > "Classes" > "Class List" > "acme" > "ACMESmartphone". The main content area is titled "acme.ACMESmartphone Class Reference" and contains sections for "Public Member Functions" (listing methods like findRoadRunner and zapRoadRunner), "Public Attributes" (listing LongLat), and "Detailed Description" (describing the smartphone's capabilities). The footer indicates the documentation was generated on Sun Sep 27 2015 09:05:27 for the ACME Project by Doxygen 1.8.7.

Sonarlint (Code Quality and Code Security Extension)



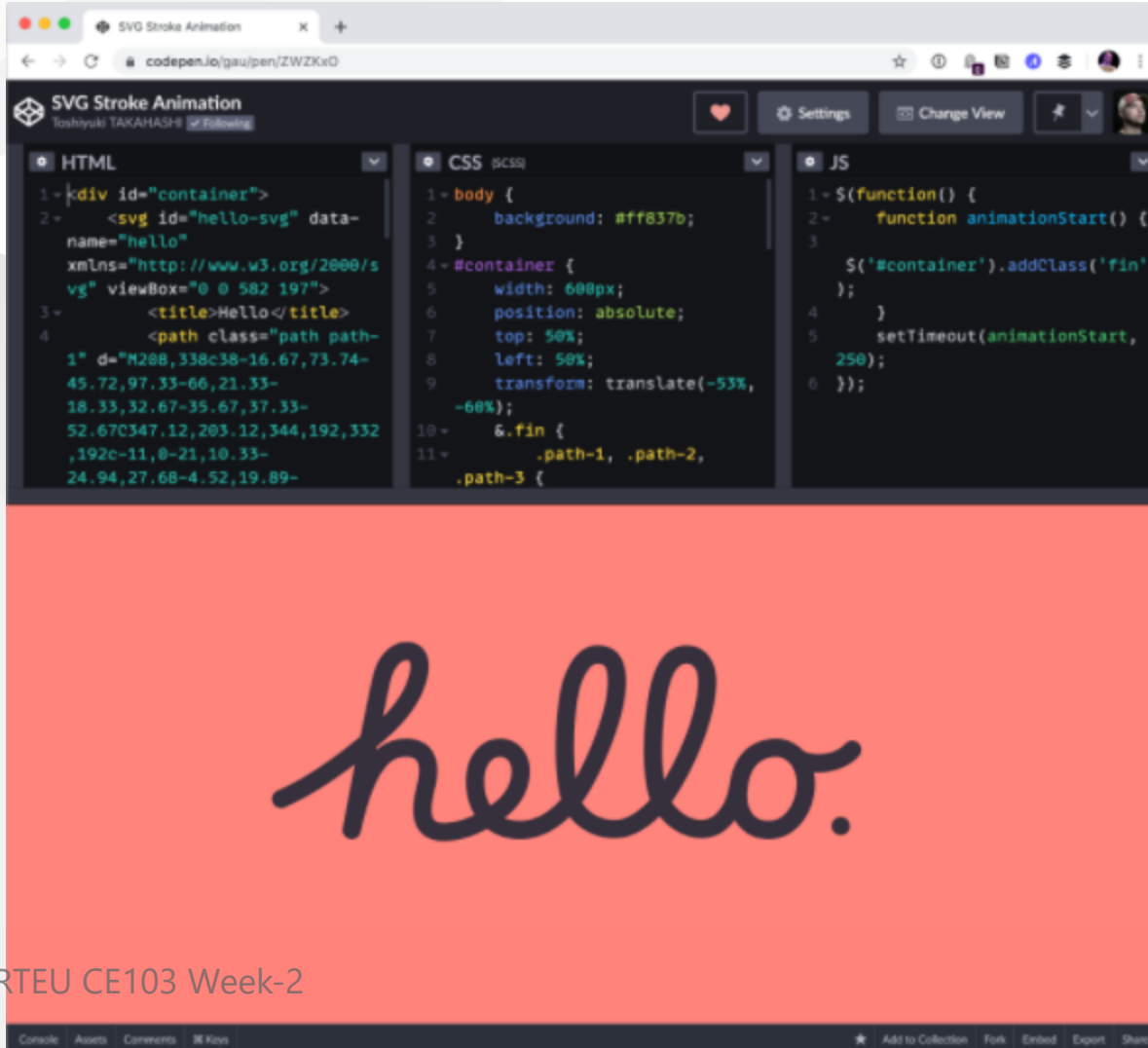
<https://www.sonarlint.org/>

Codepen.io (online code sharing)

CE103 Algorithms and Programming I



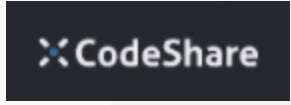
<https://codepen.io/>



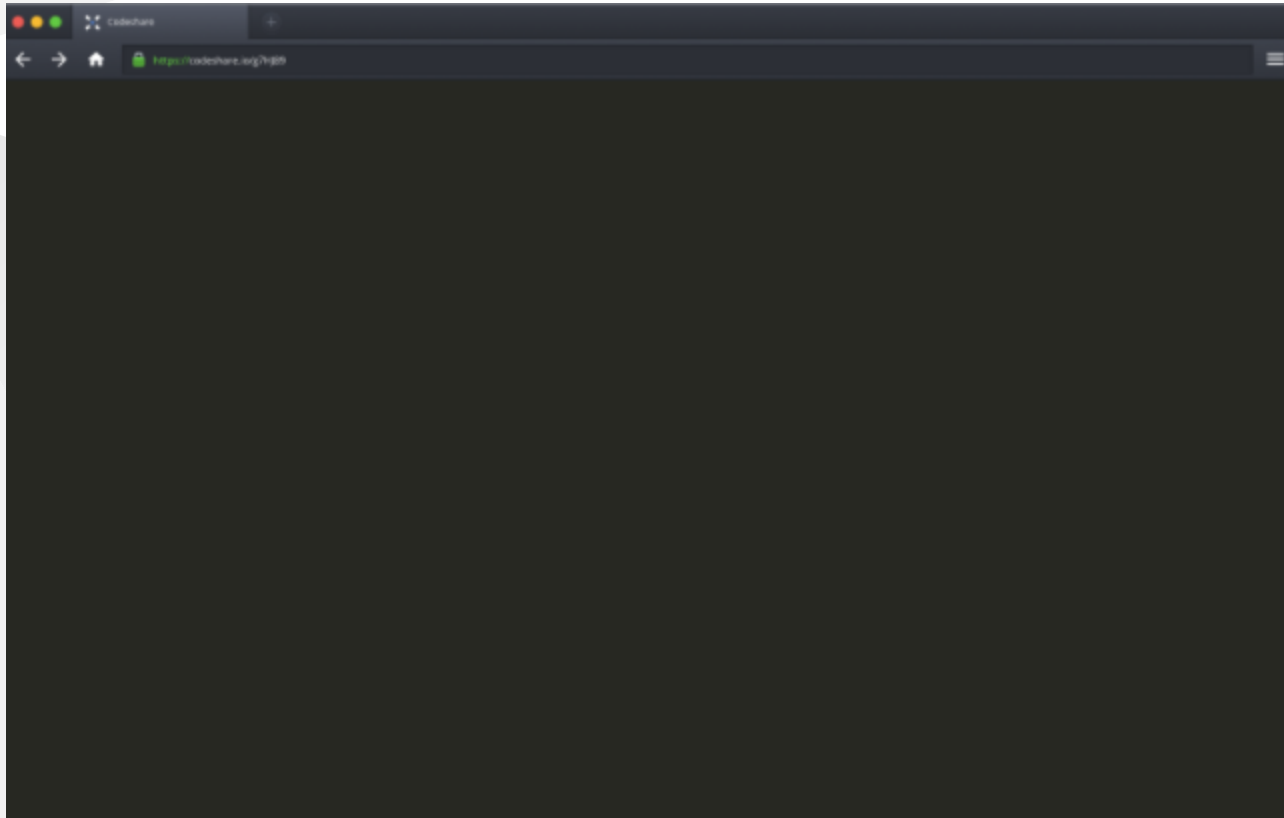
Credit Card Sample

<https://codepen.io/quinlo/pen/YONMEa>

CodeShare.io (real time code sharing)



<https://codeshare.io/>



Codebeautify.org (online data conversion tools)



<https://codebeautify.org/>

[AsciiFlow.com](https://www.asciiflow.com) (ASCII drawing tool)

```
//TODO//
```



Freemind (opensource mindmap application)

//TODO//



Wireflow (user flow designer)

//TODO//



PlantUML (software designer)

//TODO//



Drawio (drawing tool)

//TODO//



Putty (Remote Connection)

//TODO//



MobaXterm (Remote Connection)

//TODO//



Teamviewer (Remote Connection)

//TODO//



```
//TODO//
```



Understand (Static Code Analysis)

```
//TODO//
```



JD Project (Java Decompiler)

//TODO//



Cutter (Multi-Platform Reverse Engineering Tool)

//TODO//



IDA Pro / Freeware (Native Reverse Engineering Tool)

//TODO//



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

<https://pythontutor.com/>

//TODO//



Assembly of C Code

<https://godbolt.org/>

//TODO//



Mobile Device Screen Sharing for Demo

GitHub - Genymobile/scrcpy: Display and control your Android device

Travis-CI

- Travis.yml

//TODO//



Jenkins

//TODO//



Valgrind

//TODO//



Docker

- https://www.youtube.com/watch?v=nBwJm0onzeo&ab_channel=GaryExplains Dockerfile

- DockerHub
- Docker Compose Yaml
- Dockerrun.aws.json (AWS)

//TODO//



Nuget Packages

//TODO//



Vim for Windows

- vim/vim-wim32-installer (windows vim installer)

//TODO//



SCV Cryptomanager

//TODO//



Addario CryptoBench

//TODO//



Raymond's MD5 & SHA Checksum Utility

//TODO//



SlavaSoft HashCalc

//TODO//



Portable PGP

//TODO//



Online Programming Envoriments

- i. Hackerrank
- ii. CS50 Sandbox
- iii. Programiz C Online Compiler

//TODO//

