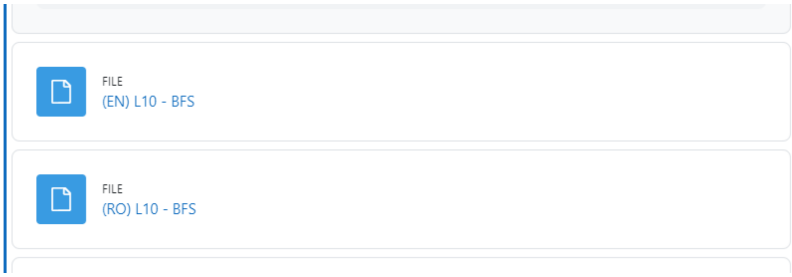
1 Assignment 9: Tutorial

1.1 Visual Studio Project Setup

1. Go to moodle and select one of the following:



FILE

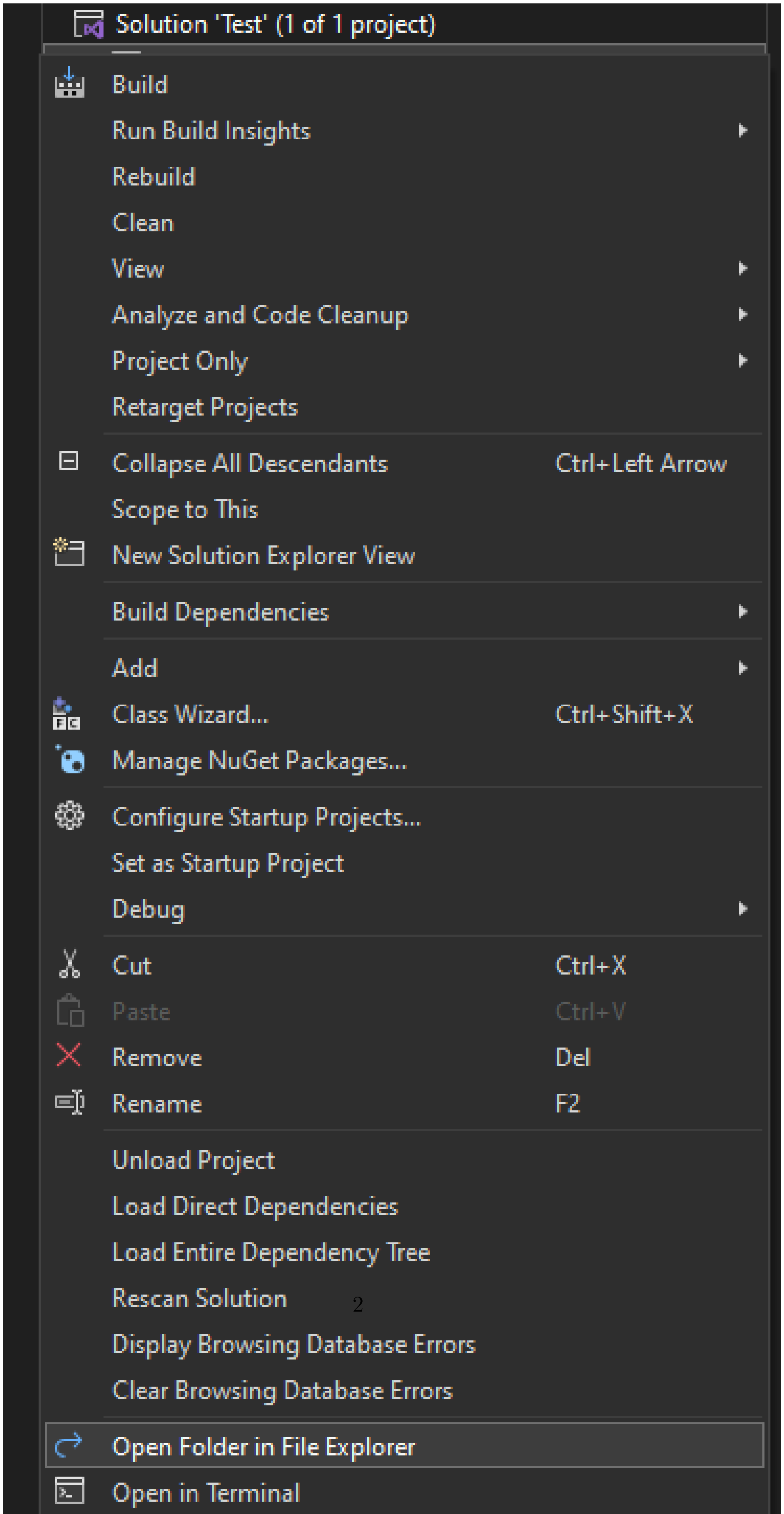
(EN) L10 - BFS

FILE

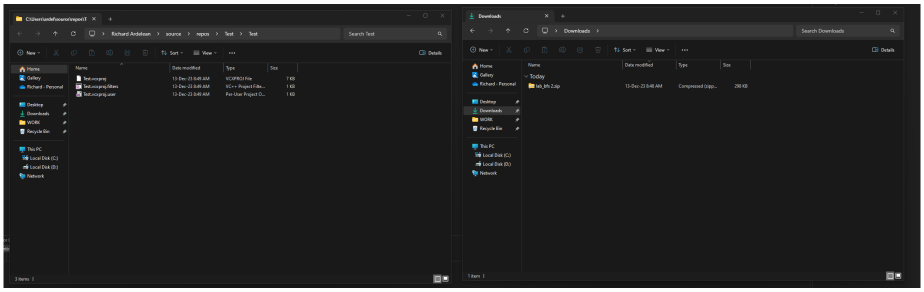
(RO) L10 - BFS

This will result in a '.zip' file being downloaded.

2. Create an Empty C++ Project and by right-clicking on the project (not the solution) you will be able to select 'Open Folder in File Explorer'.


Solution 'Test' (1 of 1 project)
Build
Run Build Insights
Rebuild
Clean
View
Analyze and Code Cleanup
Project Only
Retarget Projects
Collapse All Descendants Ctrl+Left Arrow
Scope to This
New Solution Explorer View
Build Dependencies
Add
Class Wizard... Ctrl+Shift+X
Manage NuGet Packages...
Configure Startup Projects...
Set as Startup Project
Debug
Cut Ctrl+X
Paste Ctrl+V
Remove Del
Rename F2
Unload Project
Load Direct Dependencies
Load Entire Dependency Tree
Rescan Solution
Display Browsing Database Errors
Clear Browsing Database Errors
Open Folder in File Explorer
Open in Terminal

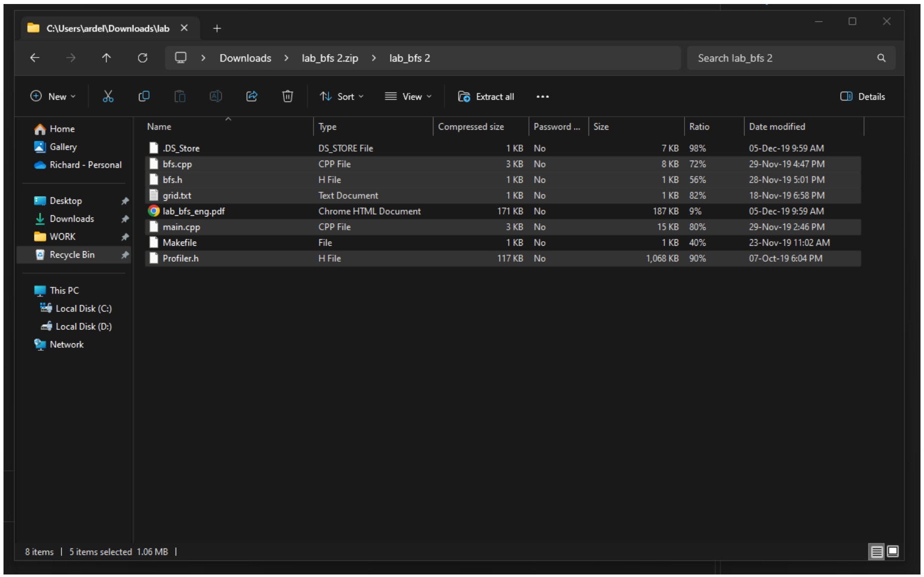
3. At this point, a ‘File Explorer’ window will be opened. Open another ‘File Explorer’ with the location of your downloads (most likely the Downloads folder).



Name	Date modified	Type	Size
Test.vcxproj	13-Dec-23 8:49 AM	VCXPROJ File	7 KB
Test.vcxproj.filters	13-Dec-23 8:49 AM	VC++ Project Filte...	1 KB
Test.vcxproj.user	13-Dec-23 8:49 AM	Per-User Project O...	1 KB

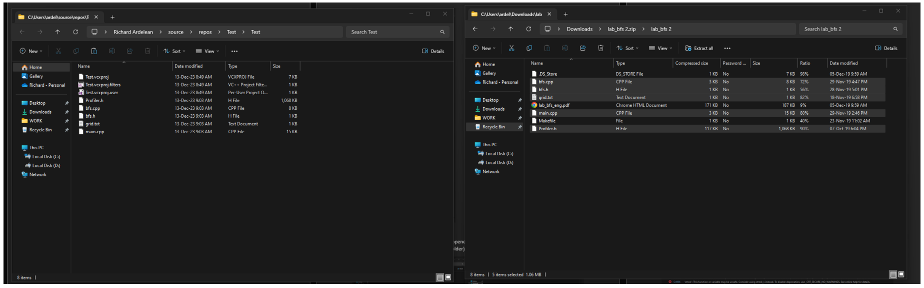
Name	Date modified	Type	Size
lab_bfs 2.zip	13-Dec-23 8:48 AM	Compressed (zipp...	298 KB

4. Open the ‘.zip’ file and copy as shown below the files from the zip file to the folder of the project.



Name	Type	Compressed size	Password ...	Size	Ratio	Date modified
.DS_Store	DS_STORE File	1 KB	No	7 KB	98%	05-Dec-19 9:59 AM
bfs.cpp	CPP File	3 KB	No	8 KB	72%	29-Nov-19 4:47 PM
bfs.h	H File	1 KB	No	1 KB	56%	28-Nov-19 5:01 PM
grid.txt	Text Document	1 KB	No	1 KB	82%	18-Nov-19 6:58 PM
lab_bfs_eng.pdf	Chrome HTML Document	171 KB	No	187 KB	9%	05-Dec-19 9:59 AM
main.cpp	CPP File	3 KB	No	15 KB	80%	29-Nov-19 2:46 PM
Makefile	File	1 KB	No	1 KB	40%	23-Nov-19 11:02 AM
Profiler.h	H File	117 KB	No	1,068 KB	90%	07-Oct-19 6:04 PM

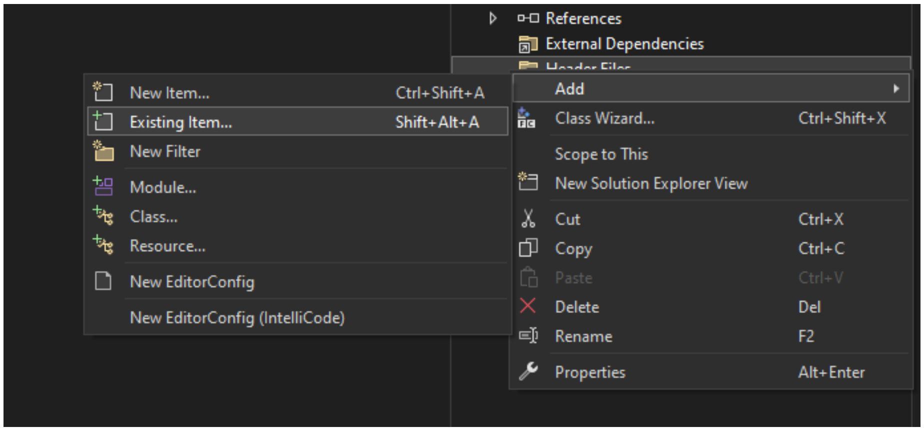
8 items | 5 items selected 1.06 MB |



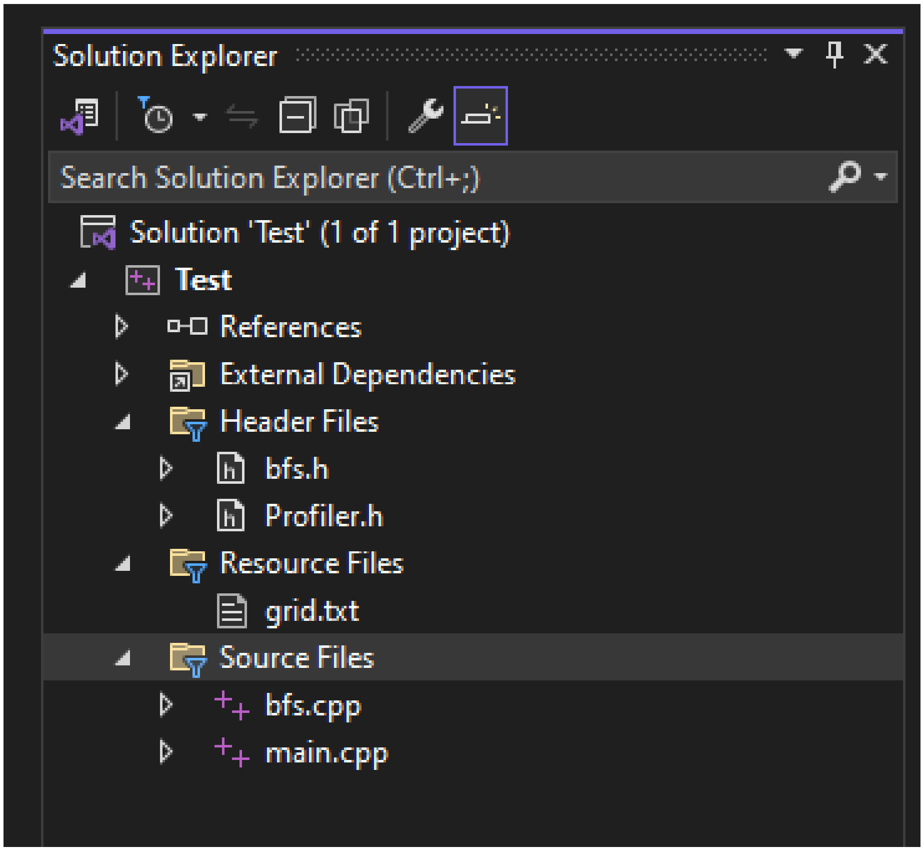
C:\Users\ardel\source\repos\T
Richard Ardelean › source › repos › Test › Test
Search Test
8 items
C:\Users\ardel\Downloads\lab
Downloads › lab_bfs 2.zip › lab_bfs 2
Search lab_bfs 2
8 items | 5 items selected 1.06 MB |

Name	Date modified	Type	Size
Test.vcxproj	13-Dec-23 8:49 AM	VCXPROJ File	7 KB
Test.vcxproj.filters	13-Dec-23 8:49 AM	VC++ Project Filte...	1 KB
Test.vcxproj.user	13-Dec-23 8:49 AM	Per-User Project O...	1 KB
Profiler.h	13-Dec-23 9:03 AM	H File	1,068 KB
bfs.cpp	13-Dec-23 9:03 AM	CPP File	8 KB
bfs.h	13-Dec-23 9:03 AM	H File	1 KB
grid.txt	13-Dec-23 9:03 AM	Text Document	1 KB
main.cpp	13-Dec-23 9:03 AM	CPP File	15 KB

5. By selecting the folders from the Visual Studio Solution Explorer ‘Header Files / Resources / Source Files’ use the following options:

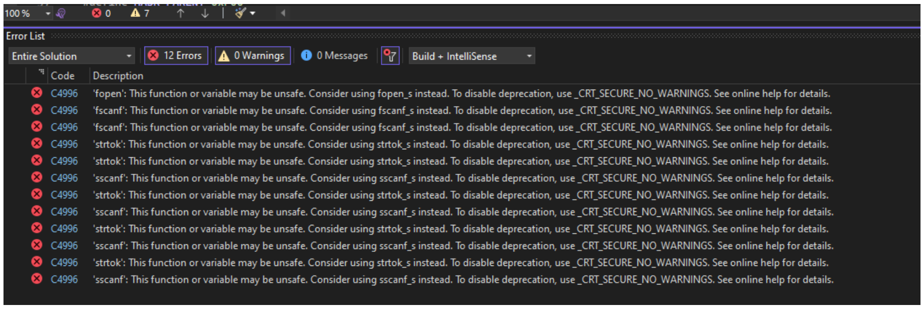


6. Such that, the following setup is accomplished:



1.2 Visual Studio ‘unsafe’ error

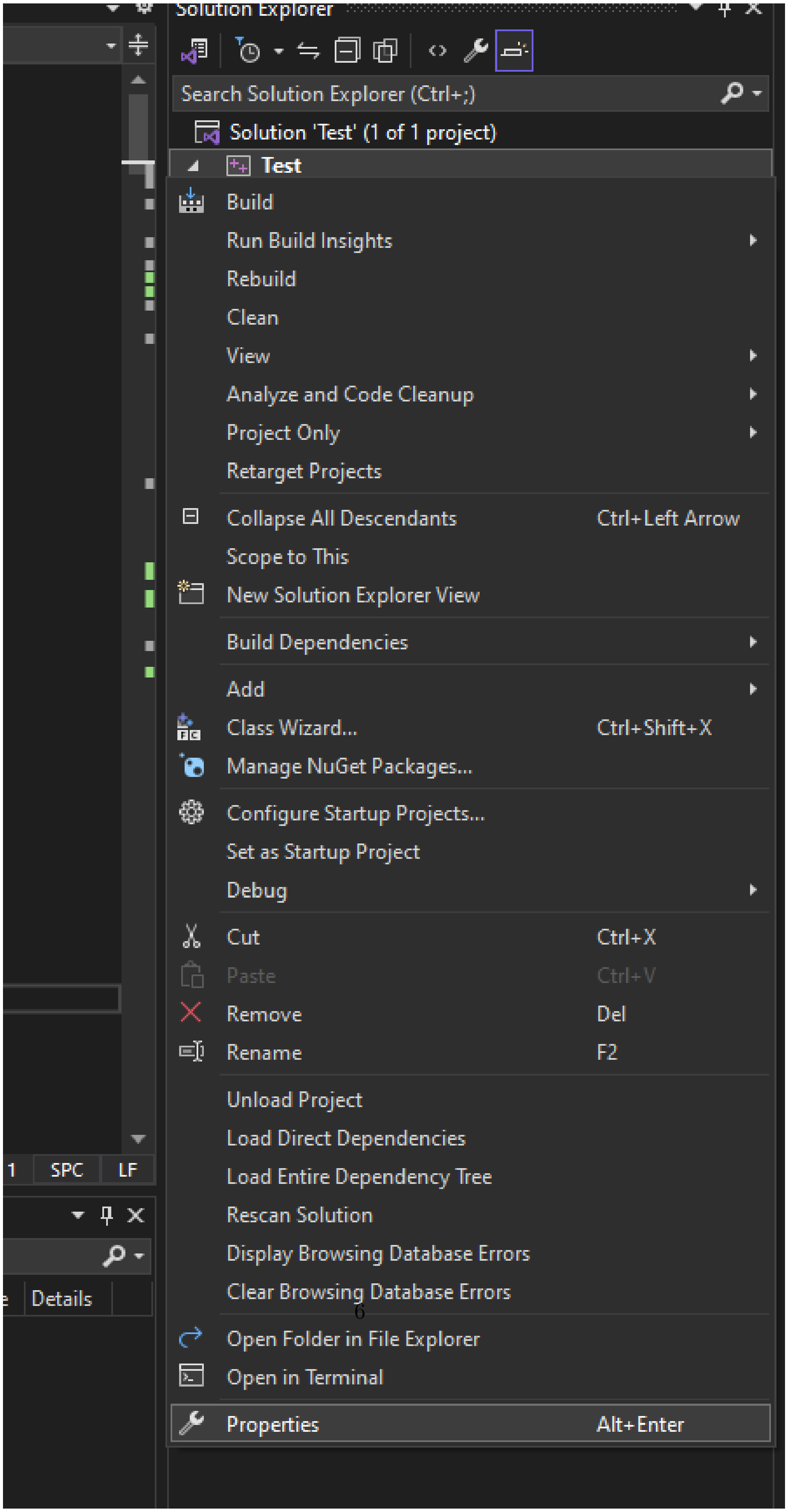
Example:



Code	Description
C4996	'fopen': This function or variable may be unsafe. Consider using fopen_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'fscanf': This function or variable may be unsafe. Consider using fscanf_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'fscanf': This function or variable may be unsafe. Consider using fscanf_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'strtok': This function or variable may be unsafe. Consider using strtok_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'strtok': This function or variable may be unsafe. Consider using strtok_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'sscanf': This function or variable may be unsafe. Consider using sscanf_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'strtok': This function or variable may be unsafe. Consider using strtok_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'sscanf': This function or variable may be unsafe. Consider using sscanf_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'strtok': This function or variable may be unsafe. Consider using strtok_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'sscanf': This function or variable may be unsafe. Consider using sscanf_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'strtok': This function or variable may be unsafe. Consider using strtok_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.
C4996	'sscanf': This function or variable may be unsafe. Consider using sscanf_s instead. To disable deprecation, use _CRT_SECURE_NO_WARNINGS. See online help for details.

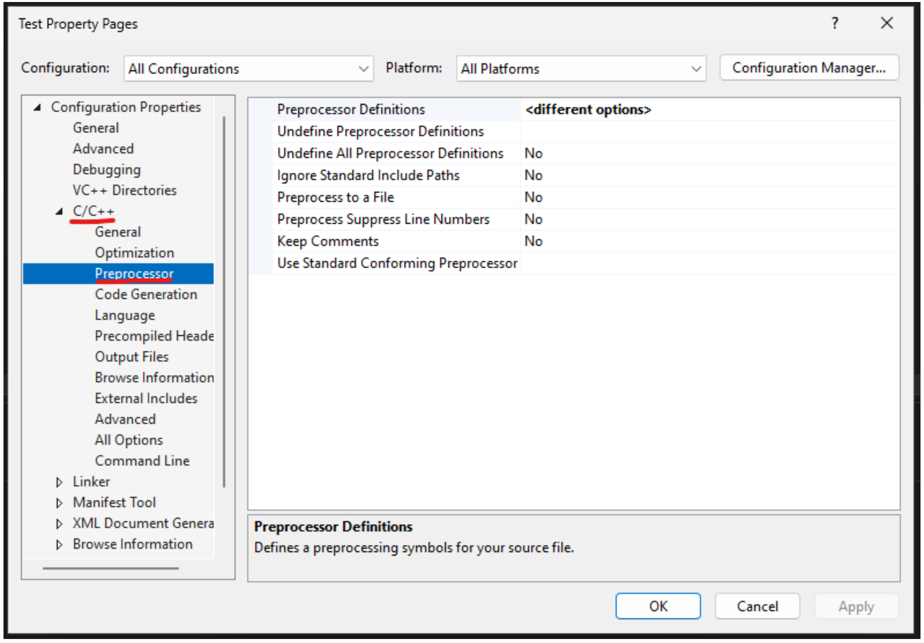
Solution:

Right-click on the project (not the Solution which will most likely have the same name) and select ‘Properties’.


Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'Test' (1 of 1 project)
Test
Build
Run Build Insights
Rebuild
Clean
View
Analyze and Code Cleanup
Project Only
Retarget Projects
Collapse All Descendants Ctrl+Left Arrow
Scope to This
New Solution Explorer View
Build Dependencies
Add
Class Wizard... Ctrl+Shift+X
Manage NuGet Packages...
Configure Startup Projects...
Set as Startup Project
Debug
Cut Ctrl+X
Paste Ctrl+V
Remove Del
Rename F2
Unload Project
Load Direct Dependencies
Load Entire Dependency Tree
Rescan Solution
Display Browsing Database Errors
Clear Browsing Database Errors
Open Folder in File Explorer
Open in Terminal
Properties Alt+Enter
1
SPC
LF
Details

Update the ‘Configuration’ and ‘Platform’ in the upper side of the window to ‘All Configurations’ and ‘All Platforms’, respectively.

Go to ‘C/C++’ and select ‘Preprocessor’.



Configuration: All Configurations

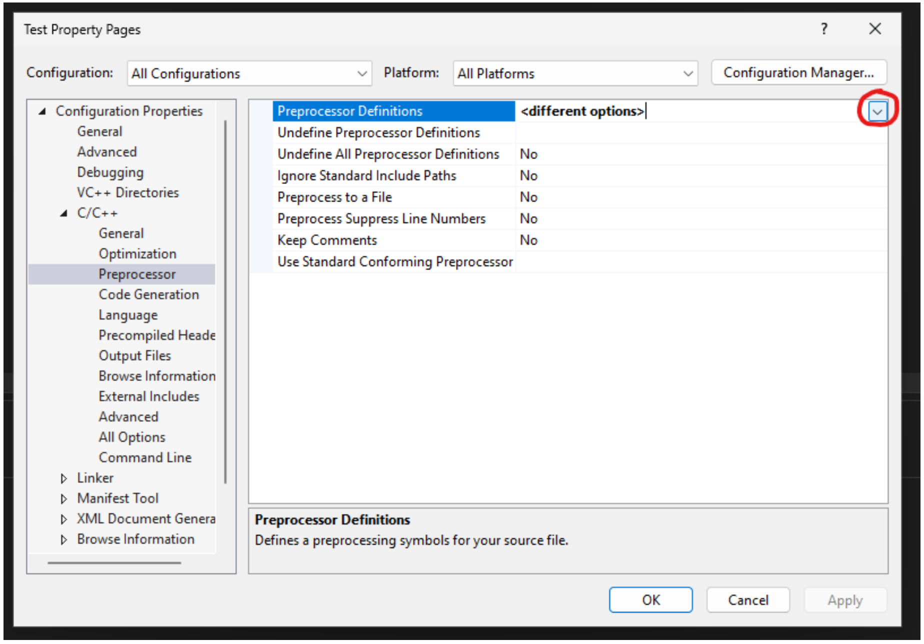
Platform: All Platforms

Preprocessor Definitions	<different options>
Undefine Preprocessor Definitions	
Undefine All Preprocessor Definitions	No
Ignore Standard Include Paths	No
Preprocess to a File	No
Preprocess Suppress Line Numbers	No
Keep Comments	No
Use Standard Conforming Preprocessor	

Preprocessor Definitions

Defines a preprocessing symbols for your source file.

Then click on ‘Preprocessor Definitions’ and on the dropdown arrow.



Configuration: All Configurations

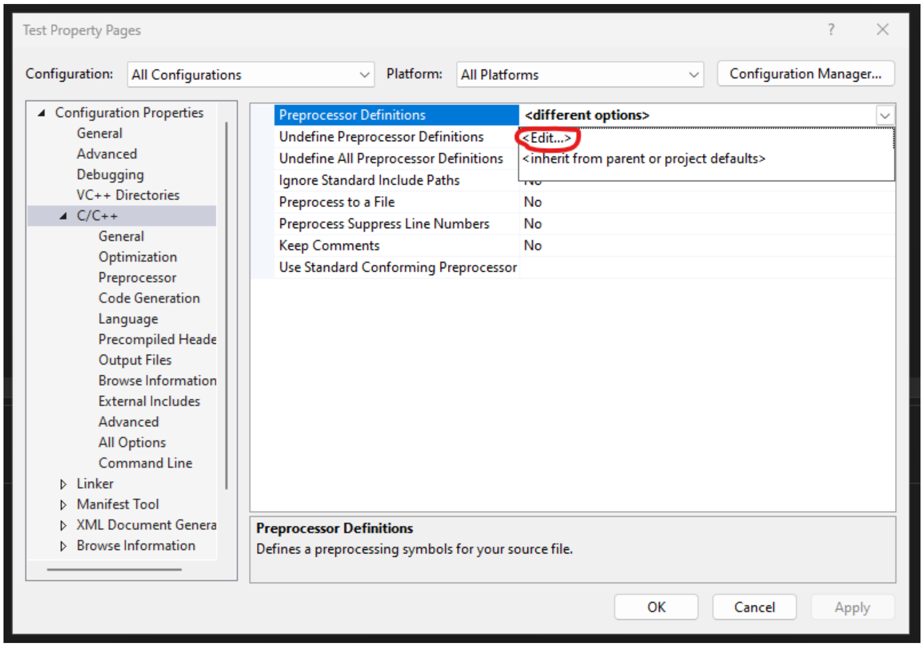
Platform: All Platforms

Preprocessor Definitions	<different options>
Undefine Preprocessor Definitions	
Undefine All Preprocessor Definitions	No
Ignore Standard Include Paths	No
Preprocess to a File	No
Preprocess Suppress Line Numbers	No
Keep Comments	No
Use Standard Conforming Preprocessor	

Preprocessor Definitions

Defines a preprocessing symbols for your source file.

Select ‘Edit’

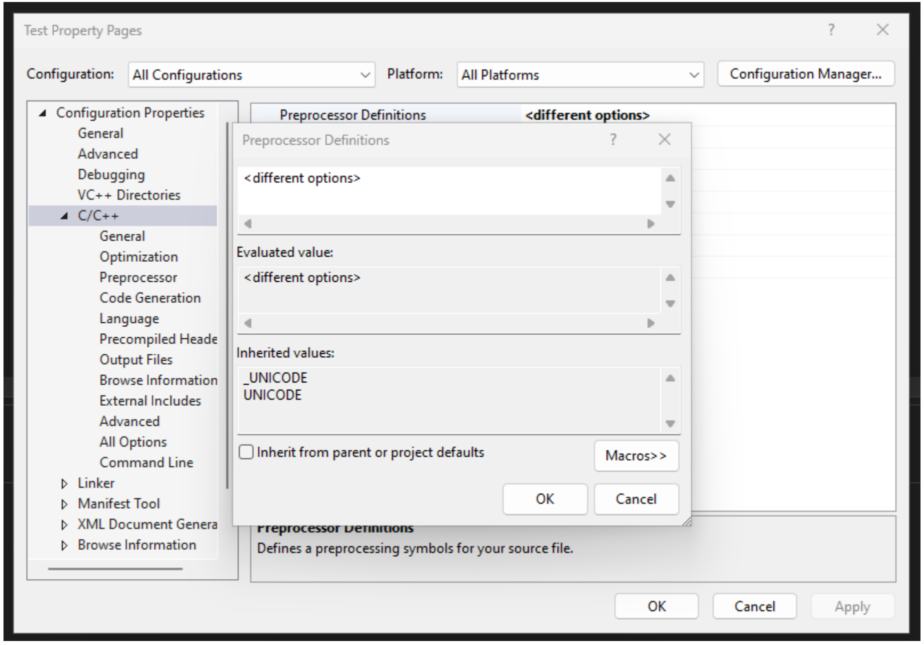


Configuration: All Configurations
Platform: All Platforms

Preprocessor Definitions	**<different options>**
Undefine Preprocessor Definitions	
Undefine All Preprocessor Definitions	
Ignore Standard Include Paths	No
Preprocess to a File	No
Preprocess Suppress Line Numbers	No
Keep Comments	No
Use Standard Conforming Preprocessor	

Preprocessor Definitions
Defines a preprocessing symbols for your source file.

And the following new window will open:



Configuration: All Configurations
Platform: All Platforms

Preprocessor Definitions **<different options>**

<different options>

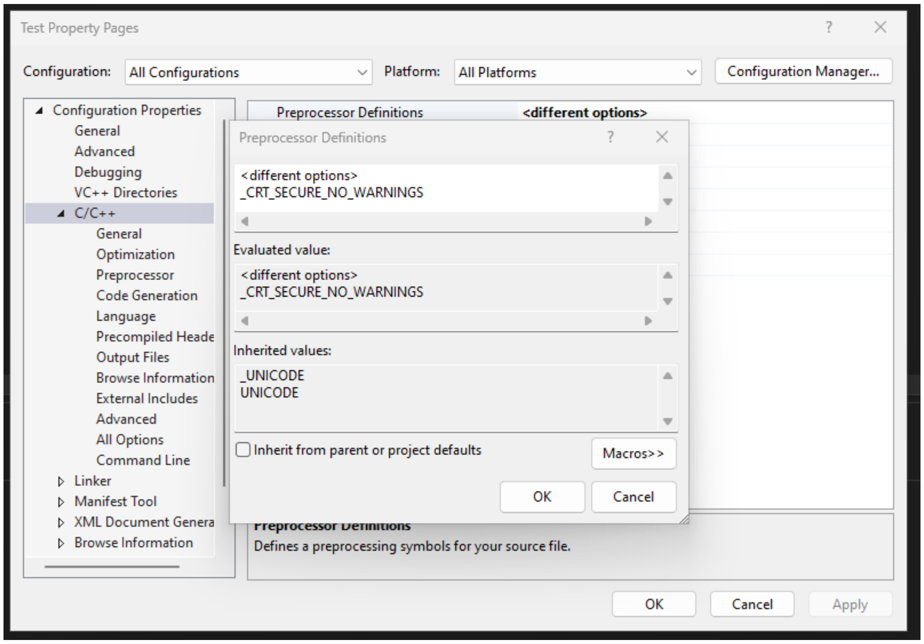
Evaluated value:
<different options>

Inherited values:
_UNICODE
UNICODE

☐ Inherit from parent or project defaults

Preprocessor Definitions
Defines a preprocessing symbols for your source file.

Introduce '_CRT_SECURE_NO_WARNINGS' under '<different options>' as shown below.



Configuration: All Configurations

Platform: All Platforms

Preprocessor Definitions <different options>

Preprocessor Definitions

```
<different options>
_CRT_SECURE_NO_WARNINGS
```

Evaluated value:

```
<different options>
_CRT_SECURE_NO_WARNINGS
```

Inherited values:

```
_UNICODE
UNICODE
```

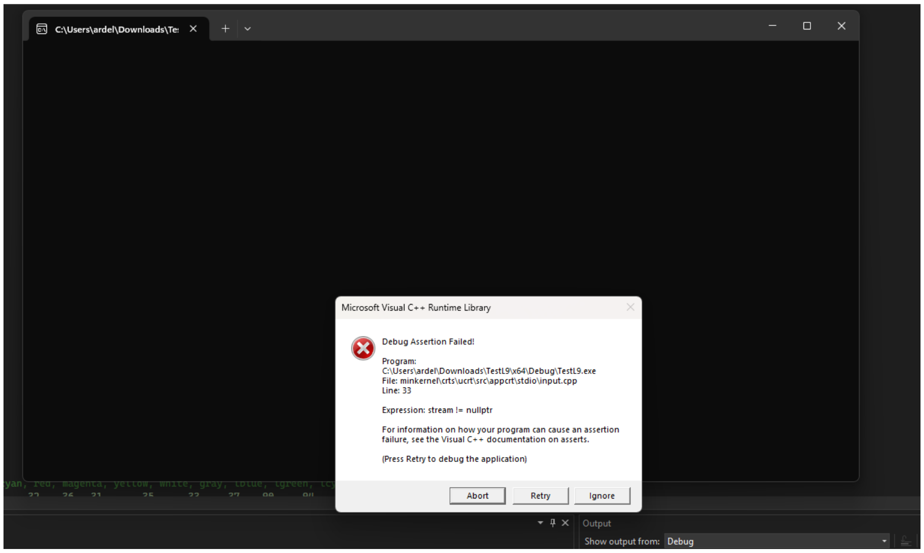
☐ Inherit from parent or project defaults

Preprocessor Definitions
Defines a preprocessing symbols for your source file.

Click on ‘OK’ for all opened windows until you are returned to the main Visual Studio window of the project, and you will be able to run the project.

1.3 Visual Studio ‘Assertion’ Error

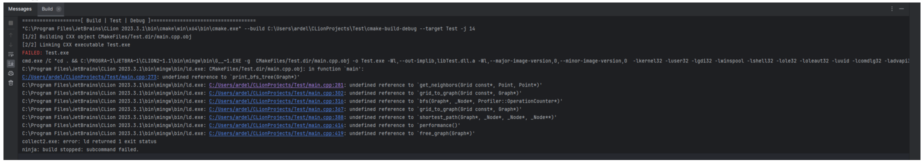
This indicates that you have not followed the tutorial. Go back to the first page and make sure that you have moved the files from the ‘Downloads’ folder to the ‘Project’ folder. You might also need to *remove* all the files from the Visual Studio IDE and *re-add* them by hand.


C:\Users\ardel\Downloads\Te:
Microsoft Visual C++ Runtime Library
Abort
Retry
Ignore
Output
Show output from: Debug

```
Debug Assertion Failed!

Program:
C:\Users\ardel\Downloads\TestL9\x64\Debug\TestL9.exe
File: minkernel\crts\ucrt\src\appcrt\stdio\input.cpp
Line: 33

Expression: stream != nullptr

For information on how your program can cause an assertion
failure, see the Visual C++ documentation on asserts.

(Press Retry to debug the application)
```

1.4 CLion undefined Error

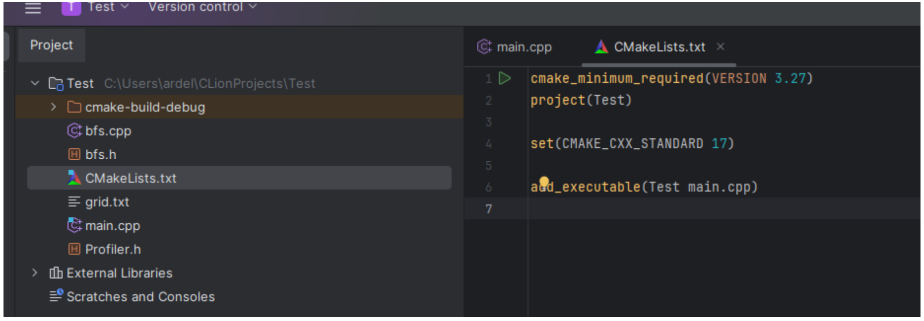
Example:



```
====================[ Build | Test | Debug ]===================================
"C:\Program Files\JetBrains\CLion 2023.3.1\bin\cmake\win\x64\bin\cmake.exe" --build C:\Users\ardel\CLionProjects\Test\cmake-build-debug --target Test -j 14
[1/2] Building CXX object CMakeFiles/Test.dir/main.cpp.obj
[2/2] Linking CXX executable Test.exe
FAILED: Test.exe
cmd.exe /C "cd . && C:\PROGRA~1\JETBRA~1\CLION2~1.1\bin\mingw\bin\G__~1.EXE -g  CMakeFiles/Test.dir/main.cpp.obj -o Test.exe -Wl,--out-implib,libTest.dll.a -Wl,--major-image-version,0,--minor-image-version,0  -lkernel32 -luser32 -lgdi32 -lwinspool -lshell32 -lole32 -loleaut32 -luuid -lcomdlg32 -ladvapi3
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: CMakeFiles/Test.dir/main.cpp.obj: in function `main':
C:/Users/ardel/CLionProjects/Test/main.cpp:273: undefined reference to `print_bfs_tree(Graph*)'
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: C:/Users/ardel/CLionProjects/Test/main.cpp:281: undefined reference to `get_neighbors(Grid const*, Point, Point*)'
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: C:/Users/ardel/CLionProjects/Test/main.cpp:302: undefined reference to `grid_to_graph(Grid const*, Graph*)'
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: C:/Users/ardel/CLionProjects/Test/main.cpp:316: undefined reference to `bfs(Graph*, _Node*, Profiler::OperationCounter*)'
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: C:/Users/ardel/CLionProjects/Test/main.cpp:367: undefined reference to `grid_to_graph(Grid const*, Graph*)'
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: C:/Users/ardel/CLionProjects/Test/main.cpp:388: undefined reference to `shortest_path(Graph*, _Node*, _Node*, _Node**)'
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: C:/Users/ardel/CLionProjects/Test/main.cpp:414: undefined reference to `performance()'
C:\Program Files\JetBrains\CLion 2023.3.1\bin\mingw\bin/ld.exe: C:/Users/ardel/CLionProjects/Test/main.cpp:419: undefined reference to `free_graph(Graph*)'
collect2.exe: error: ld returned 1 exit status
ninja: build stopped: subcommand failed.
```

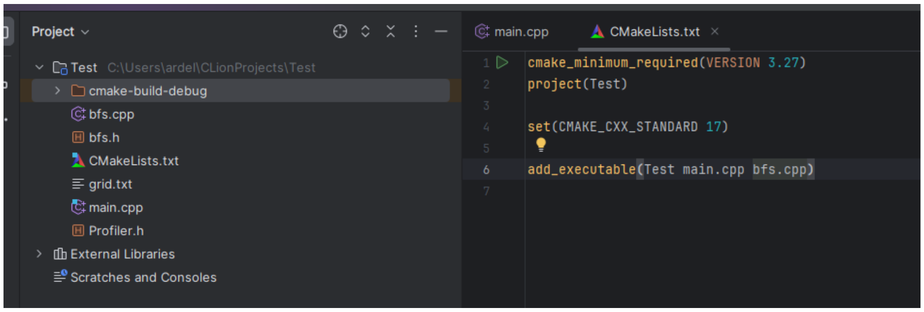
Solution:

Open the ‘CMakeLists.txt’ file and modify in the following manner:



```
cmake_minimum_required(VERSION 3.27)
project(Test)

set(CMAKE_CXX_STANDARD 17)

add_executable(Test main.cpp)
```

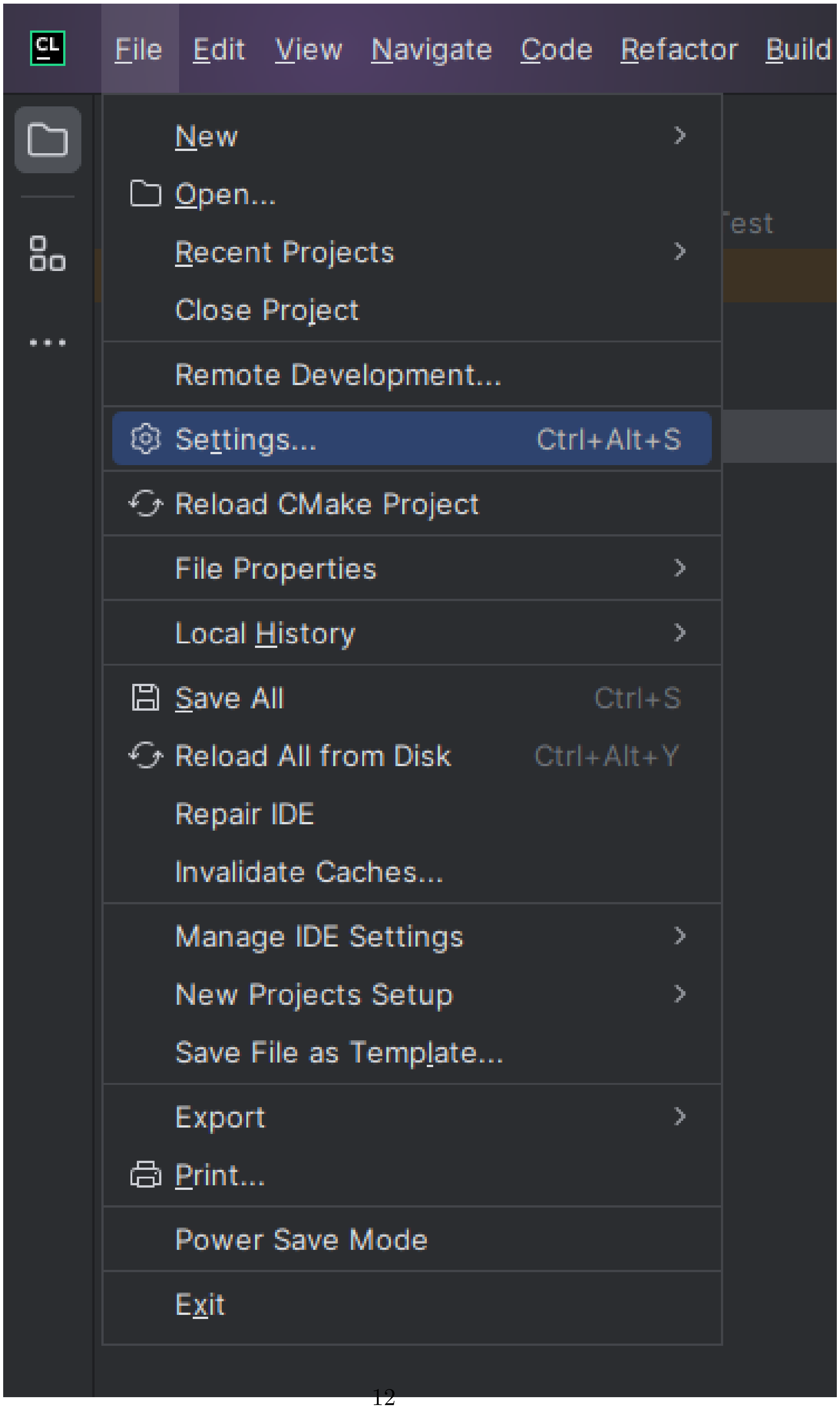
add_executable(Test main.cpp)
into
add_executable(Test main.cpp bfs.cpp)



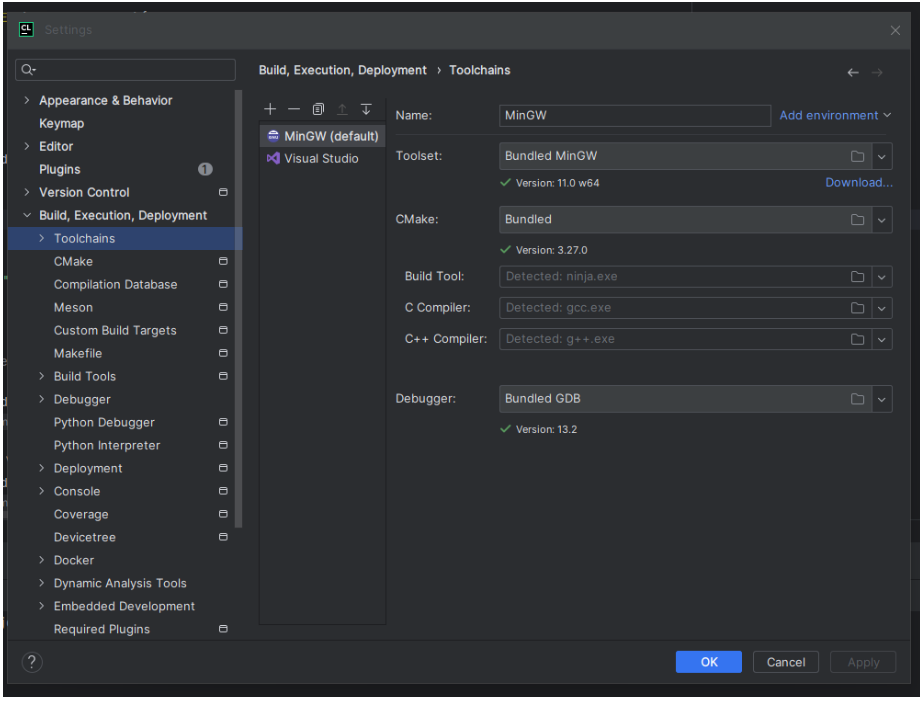
```
cmake_minimum_required(VERSION 3.27)
project(Test)

set(CMAKE_CXX_STANDARD 17)

add_executable(Test main.cpp bfs.cpp)
```

1.5 CLion Visual Studio – Option 1 (slower)

Go to File -> Settings:


CL
File
Edit
View
Navigate
Code
Refactor
Build
New
Open...
Recent Projects
Close Project
Remote Development...
Settings... Ctrl+Alt+S
Reload CMake Project
File Properties
Local History
Save All Ctrl+S
Reload All from Disk Ctrl+Alt+Y
Repair IDE
Invalidate Caches...
Manage IDE Settings
New Projects Setup
Save File as Template...
Export
Print...
Power Save Mode
Exit

In the newly opened window, go to ‘Build, Execution, Deployment’ -> ‘Toolchains’



Name: MinGW

Toolset: Bundled MinGW

✓ Version: 11.0 w64

CMake: Bundled

✓ Version: 3.27.0

Build Tool: Detected: ninja.exe

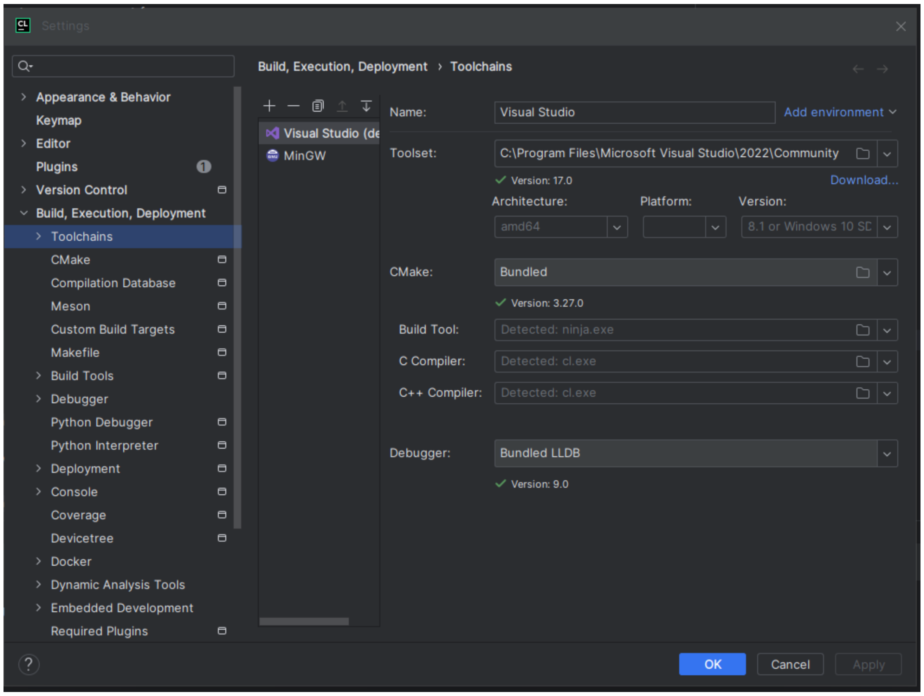
C Compiler: Detected: gcc.exe

C++ Compiler: Detected: g++.exe

Debugger: Bundled GDB

✓ Version: 13.2

Using the arrows, move Visual Studio as default:



Name: Visual Studio

Toolset: C:\Program Files\Microsoft Visual Studio\2022\Community

Version: 17.0

Architecture: amd64

Platform:

Version: 8.1 or Windows 10 SD

CMake: Bundled

Version: 3.27.0

Build Tool: Detected: ninja.exe

C Compiler: Detected: cl.exe

C++ Compiler: Detected: cl.exe

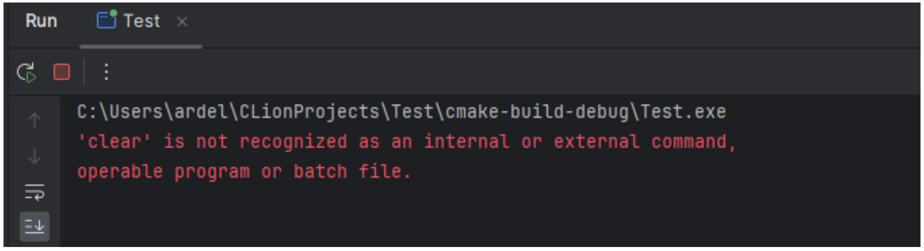
Debugger: Bundled LLDB

Version: 9.0

1.6 CLion MinGW – Option 2 (faster, requires external console)

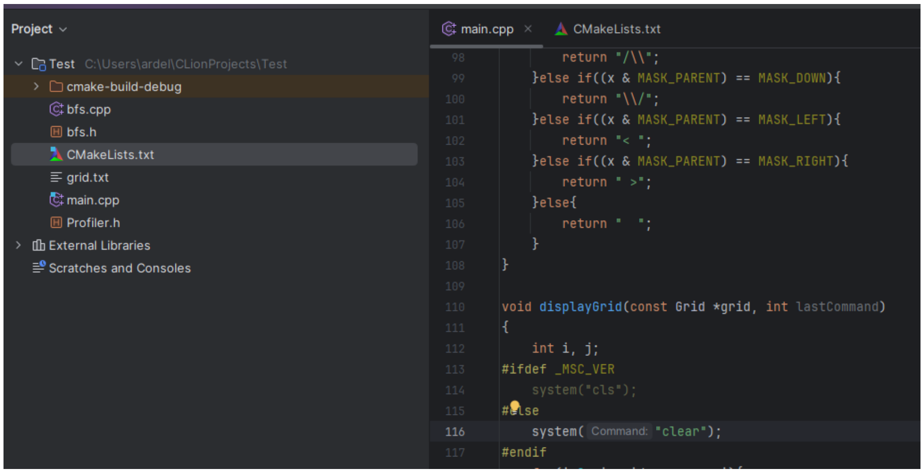
1.6.1 CLion Clear error

Example:



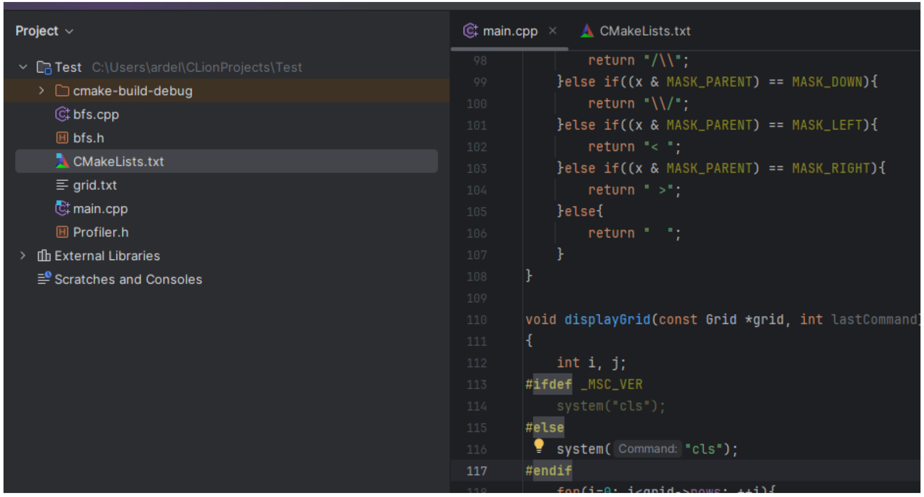
```
C:\Users\ardel\CLionProjects\Test\cmake-build-debug\Test.exe
'clear' is not recognized as an internal or external command,
operable program or batch file.
```

Solution:
Go to the main.cpp file and scroll to lines 113-117 in the displayGrid function.



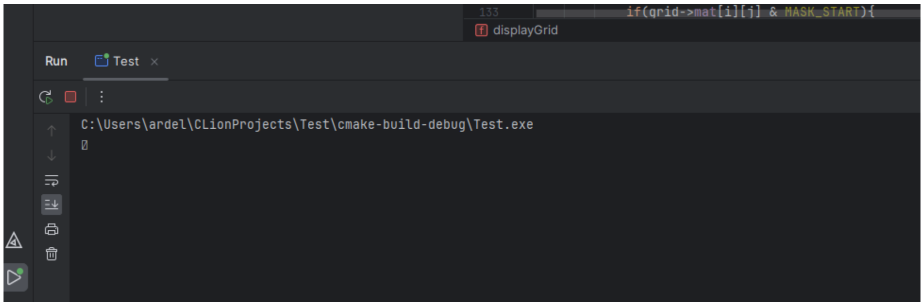
```
98              return "/\\";
99          }else if((x & MASK_PARENT) == MASK_DOWN){
100             return "\\/";
101         }else if((x & MASK_PARENT) == MASK_LEFT){
102             return "< ";
103         }else if((x & MASK_PARENT) == MASK_RIGHT){
104             return " >";
105         }else{
106             return "  ";
107         }
108     }
109
110     void displayGrid(const Grid *grid, int lastCommand)
111     {
112         int i, j;
113     #ifdef _MSC_VER
114         system("cls");
115     #else
116         system( Command: "clear");
117     #endif
```

Modify in the following manner:
In the else branch from line 116
system(”clear”);
to
system(”cls”);



```
98              return "/\\";
99          }else if((x & MASK_PARENT) == MASK_DOWN){
100             return "\\/";
101         }else if((x & MASK_PARENT) == MASK_LEFT){
102             return "< ";
103         }else if((x & MASK_PARENT) == MASK_RIGHT){
104             return " >";
105         }else{
106             return "  ";
107         }
108     }
109
110     void displayGrid(const Grid *grid, int lastCommand
111     {
112         int i, j;
113     #ifdef _MSC_VER
114         system("cls");
115     #else
116         system( Command: "cls");
117     #endif
118         for(i=0; i<grid->rows; ++i){
```

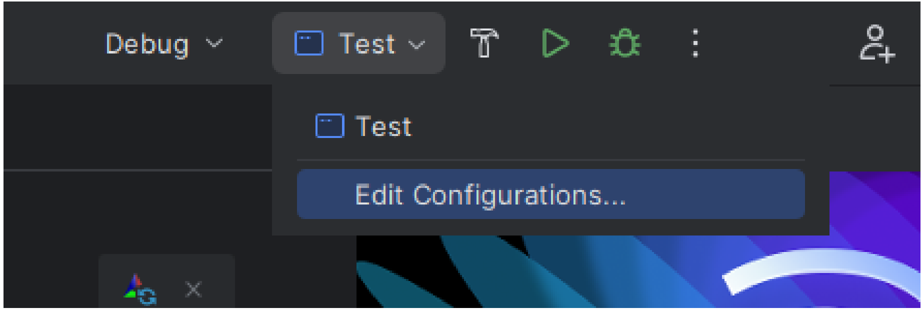
1.6.2 CLion not showing grid



```
if(grid->mat[i][j] & MASK_START){
```

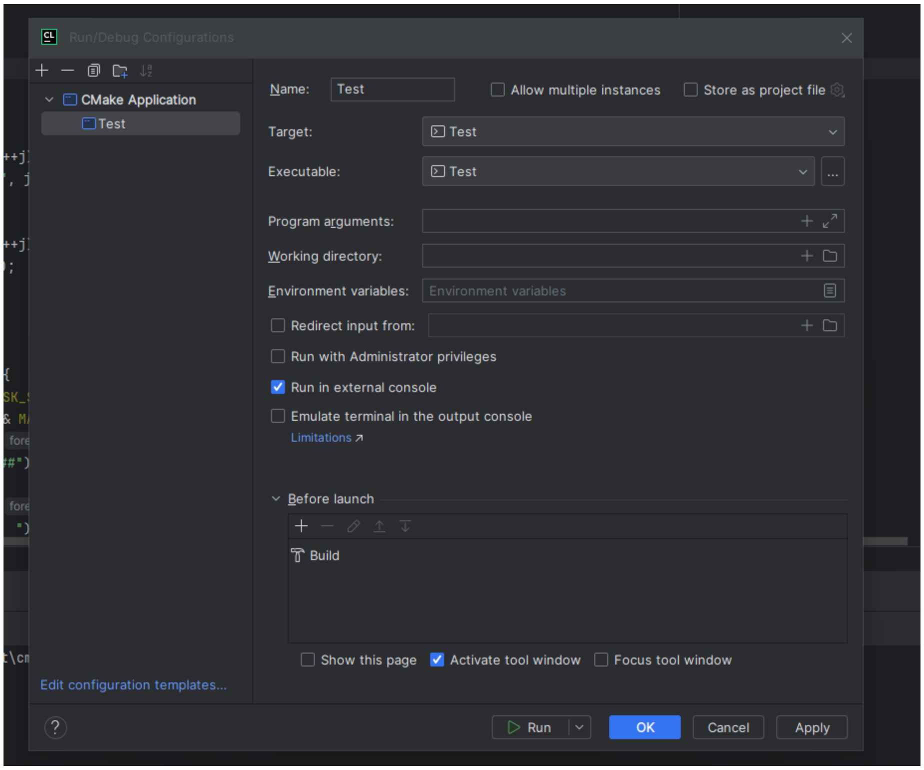
```
C:\Users\ardel\CLionProjects\Test\cmake-build-debug\Test.exe
0
```

Copy the 'grid.txt' file into the 'cmake-build-debug' folder.
Then go to the upper right part of the screen:



Select 'Edit Configurations' and check the following boxes:

- Run in external console



Name: Test ☐ Allow multiple instances ☐ Store as project file

Target: Test

Executable: Test

Program arguments:

Working directory:

Environment variables: Environment variables

☐ Redirect input from:

☐ Run with Administrator privileges

☑ Run in external console

☐ Emulate terminal in the output console

Limitations ↗

Before launch

Build

☐ Show this page ☑ Activate tool window ☐ Focus tool window

1.7 Mac run command

g++ main.cpp bfs.cpp -std=c++11 && ./a.out