

# C PROGRAMMING

# PART I

# 개발환경구축

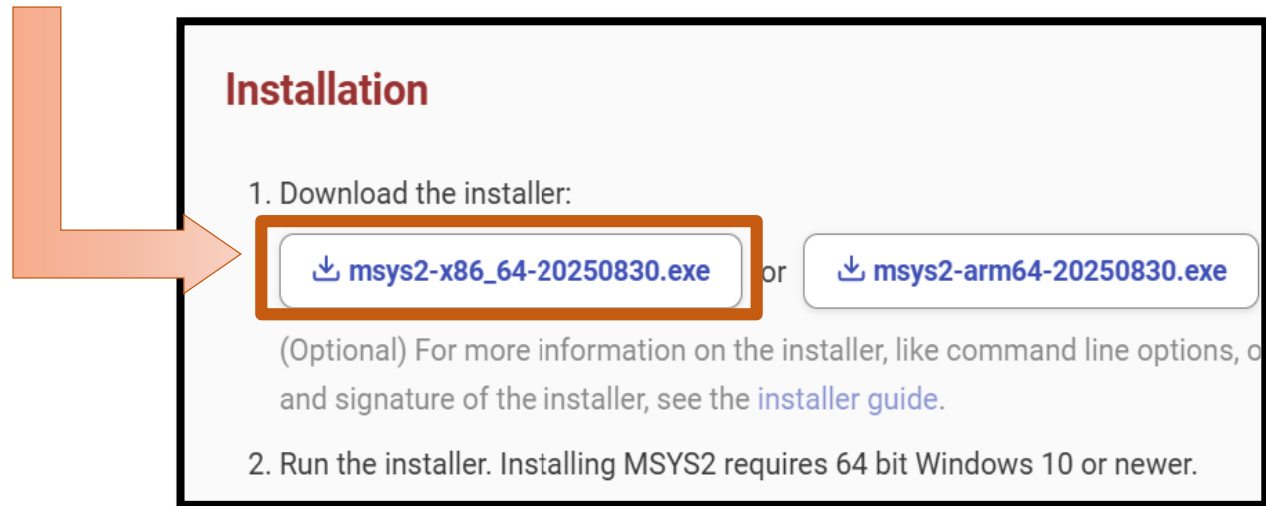
# VSCODE – C 개발환경

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## ◆ MSYS 설치

- <https://www.msys2.org>



**Installation**

1. Download the installer:

[↓ msys2-x86\\_64-20250830.exe](#) or [↓ msys2-arm64-20250830.exe](#)

(Optional) For more information on the installer, like command line options, o and signature of the installer, see the [installer guide](#).

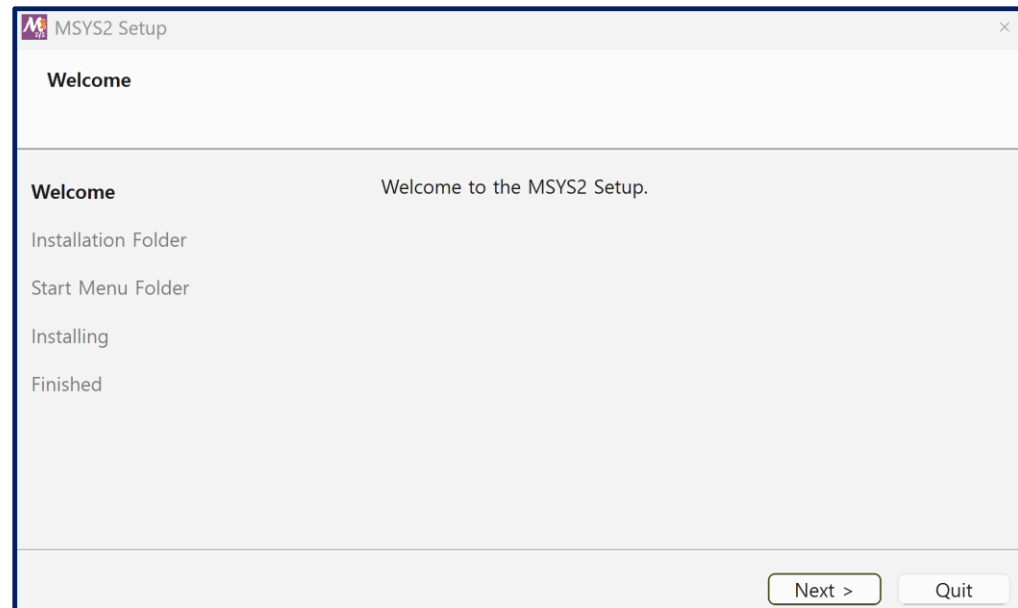
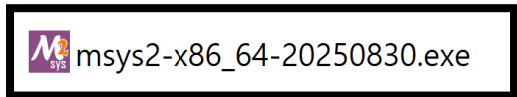
2. Run the installer. Installing MSYS2 requires 64 bit Windows 10 or newer.

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## ◆ MSYS 설치

- 더블 클릭으로 실행

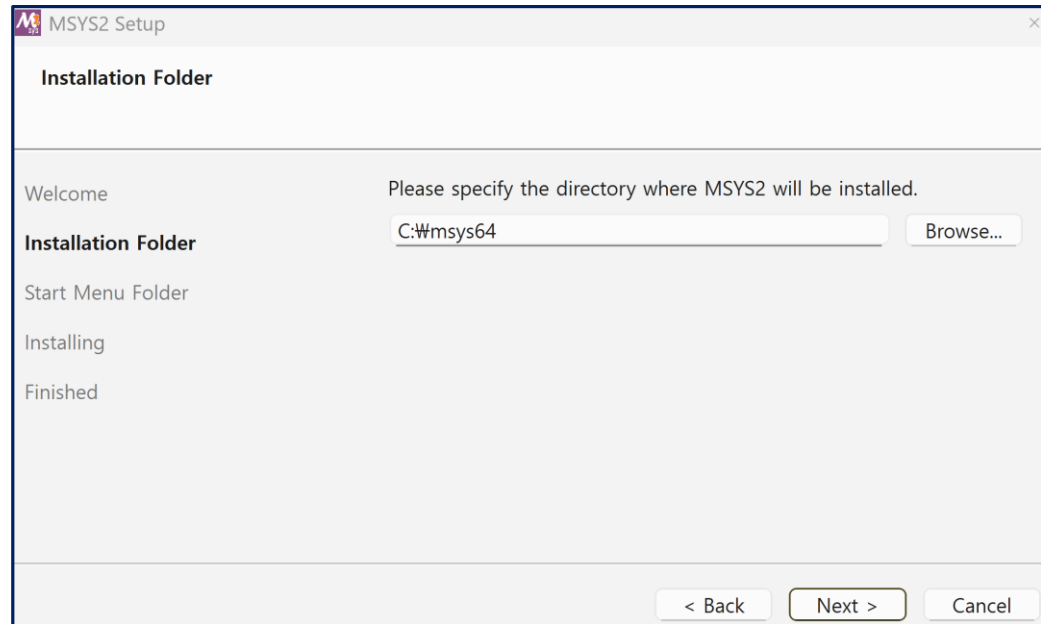


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## ◆ MSYS 설치

- 설치 폴더 설정 : [기] **C:\msys64**

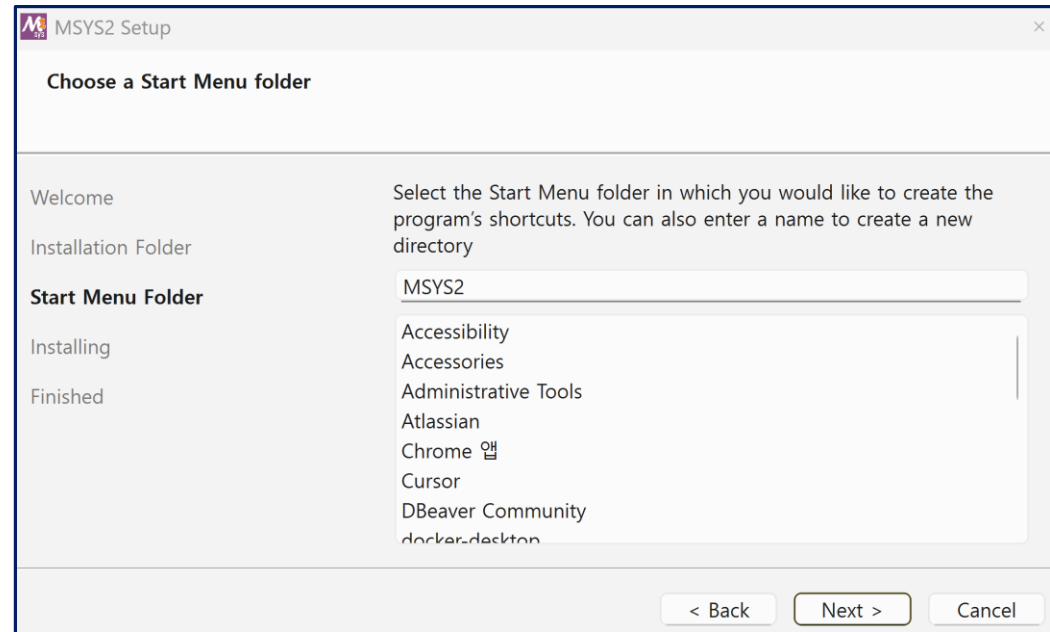


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## ◆ MSYS 설치

- Start Menu Folder 선택

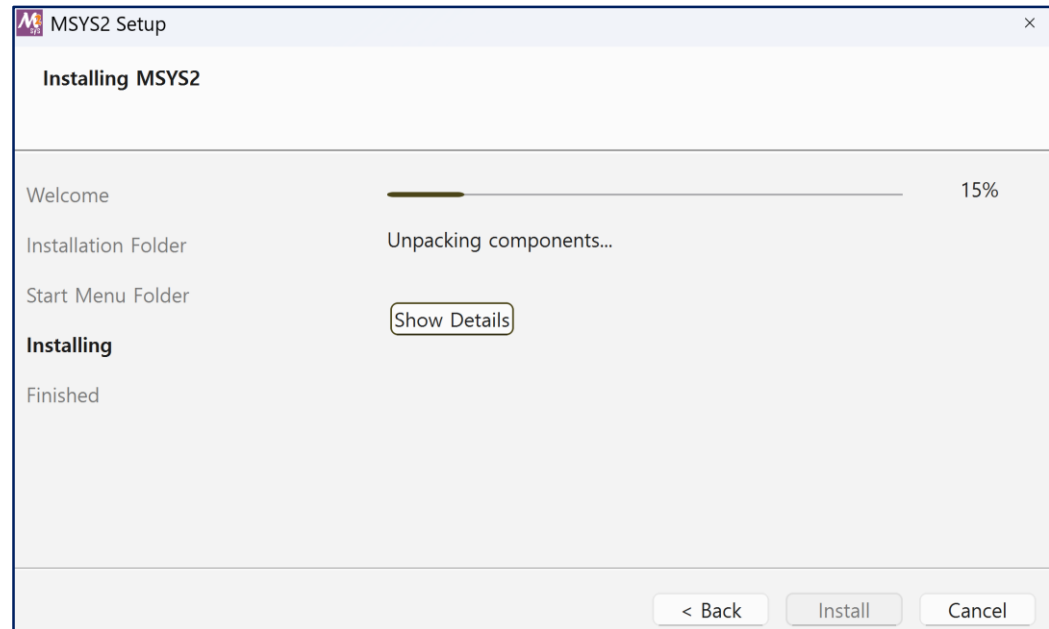


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## ◆ MSYS 설치

### ■ 설치 진행



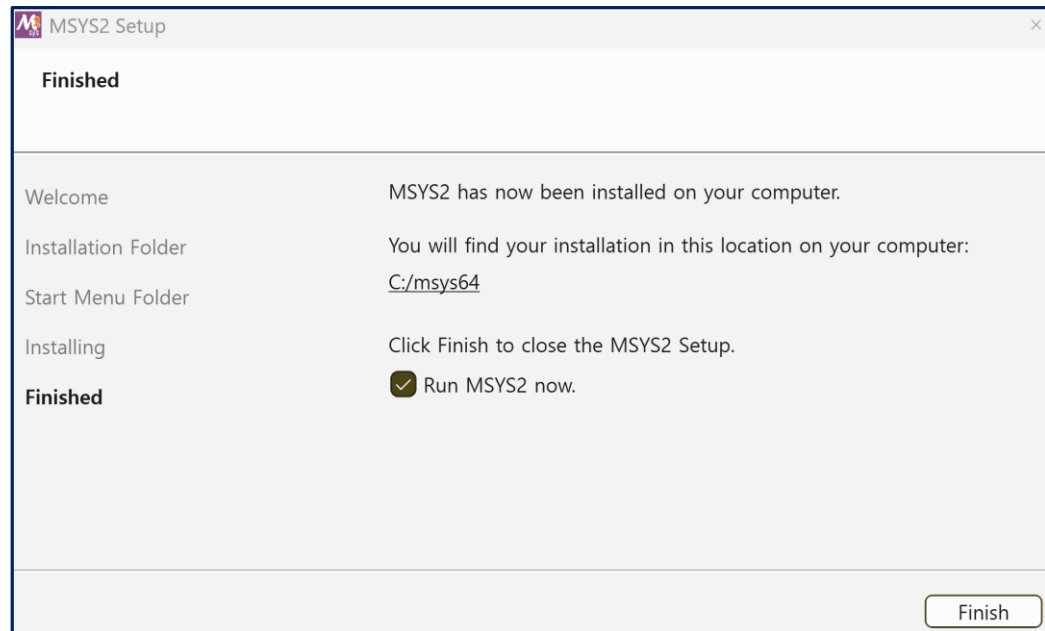


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## ◆ MSYS 설치

### ■ 설치 완료



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## ◆ MSYS 설정

- 패키지 업데이트

명령어 입력 : \$ pacman -Syu

→ 설치 후 자동 종료

```
Anece@DESKTOP-R0NINT1 UCRT64 ~  
# pacman -Syu  
:: synchronizing package databases...  
clangarm64 488.7 KiB 229 KiB/s 00:02 [#####] 100%  
mingw32 125.0 KiB 63.6 KiB/s 00:02 [#####] 100%  
mingw64 470.2 KiB 213 KiB/s 00:02 [#####] 100%  
ucrt64 513.4 KiB 74.4 KiB/s 00:07 [#####] 100%  
clang64 500.5 KiB 71.5 KiB/s 00:07 [#####] 100%  
msys 403.4 KiB 243 KiB/s 00:02 [#####] 100%  
:: Starting core system upgrade...  
warning: terminate other MSYS2 programs before proceeding  
resolving dependencies...  
looking for conflicting packages...  
  
Packages (1) pacman-6.1.0-19  
  
Total Download Size: 6.88 MiB  
Total Installed Size: 44.22 MiB  
Net Upgrade Size: 0.05 MiB  
  
:: Proceed with installation [Y/n] | Y
```

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## ◆ MSYS 설정

### ■ 컴파일 툴 설치

명령어 : `$ pacman -S --needed base-devel`

```
resolving dependencies...
looking for conflicting packages...

>packages (12) binutils-2.45-1 bison-3.8.2-5 diffstat-1.68-1 diffutils-3.12-1 dos2unix-7.5.2-1
                flex-2.6.4-4 m4-1.4.19-2 make-4.4.1-2 patch-2.7.6-3 texinfo-7.2-2
                texinfo-tex-7.2-2 base-devel-2024.11-1

Total Download Size:   9.91 MiB
Total Installed Size: 63.52 MiB

:: Proceed with installation? [Y/n] Y
:: Retrieving packages...
texinfo-7.2-2-x86_64           1473.6 KiB   706 KiB/s 00:02 [#####] 100%
make-4.4.1-2-x86_64           507.6 KiB   201 KiB/s 00:03 [#####] 100%
bison-3.8.2-5-x86_64          777.2 KiB   292 KiB/s 00:03 [#####] 100%
diffutils-3.12-1-x86_64       385.3 KiB   546 KiB/s 00:01 [#####] 100%
m4-1.4.19-2-x86_64            238.1 KiB   449 KiB/s 00:01 [#####] 100%
flex-2.6.4-4-x86_64           303.5 KiB   255 KiB/s 00:01 [#####] 100%
texinfo-tex-7.2-2-x86_64       24.2 KiB    37.9 KiB/s 00:01 [#####] 100%
base-devel-2024.11-1-any      1875.0 B     4.37 KiB/s 00:00 [#####] 100%
dos2unix-7.5.2-1-x86_64       446.5 KiB   67.8 KiB/s 00:07 [#####] 100%
binutils-2.45-1-x86_64         5.7 MiB     762 KiB/s 00:08 [#####] 100%
patch-2.7.6-3-x86_64           96.1 KiB    16.2 KiB/s 00:06 [#####] 100%
diffstat-1.68-1-x86_64        28.9 KiB     5.09 KiB/s 00:06 [#####] 100%
Total (12/12)                  9.9 MiB    1051 KiB/s 00:10 [#####] 100%
(12/12) checking keys in keyring [#####] 100%
(11/12) checking package integrity [#####] 99%
```

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## ◆ MSYS 설정

- 컴파일 툴 설치

명령어 : `$ pacman -S mingw-w64-ucrt-x86_64-gcc mingw-w64-ucrt-x86_64-gdb`

```
Looking for conflicting packages...
Packages (34) mingw-w64-ucrt-x86_64-binutils-2.45-2 mingw-w64-ucrt-x86_64-bzip2-1.0.8-3
mingw-w64-ucrt-x86_64-crt-git-13.0.0.r167.g2e31630bc-1
mingw-w64-ucrt-x86_64-expat-2.7.1-2 mingw-w64-ucrt-x86_64-gcc-libs-15.2.0-8
mingw-w64-ucrt-x86_64-gettext-runtime-0.26-1 mingw-w64-ucrt-x86_64-gmp-6.3.0-2
mingw-w64-ucrt-x86_64-headers-git-13.0.0.r167.g2e31630bc-1
mingw-w64-ucrt-x86_64-isl-0.27-1 mingw-w64-ucrt-x86_64-libffi-3.5.2-1
mingw-w64-ucrt-x86_64-libiconv-1.18-1 mingw-w64-ucrt-x86_64-libsystre-1.0.2-1
mingw-w64-ucrt-x86_64-libtrem-0.9.0-1
mingw-w64-ucrt-x86_64-libwinpthread-13.0.0.r167.g2e31630bc-1
mingw-w64-ucrt-x86_64-mpc-1.3.1-2 mingw-w64-ucrt-x86_64-mpdecimal-4.0.1-1
mingw-w64-ucrt-x86_64-mpfr-4.2.2-1 mingw-w64-ucrt-x86_64-ncurses-6.5.20241228-3
mingw-w64-ucrt-x86_64-openssl-3.5.2-2 mingw-w64-ucrt-x86_64-python-3.12.11-3
mingw-w64-ucrt-x86_64-readline-8.3.001-1 mingw-w64-ucrt-x86_64-sqlite3-3.50.4-1
mingw-w64-ucrt-x86_64-tcl-8.6.16-1 mingw-w64-ucrt-x86_64-termcap-1.3.1-7
mingw-w64-ucrt-x86_64-tk-8.6.16-1 mingw-w64-ucrt-x86_64-tzdata-2025b-2
mingw-w64-ucrt-x86_64-windows-default-manifest-6.4-4
mingw-w64-ucrt-x86_64-winpthread-13.0.0.r167.g2e31630bc-1
mingw-w64-ucrt-x86_64-xxhash-0.8.3-1 mingw-w64-ucrt-x86_64-xz-5.8.1-2
mingw-w64-ucrt-x86_64-zlib-1.3.1-1 mingw-w64-ucrt-x86_64-zstd-1.5.7-1
mingw-w64-ucrt-x86_64-gcc-15.2.0-8 mingw-w64-ucrt-x86_64-gdb-16.3-1

Total Download Size: 116.07 MiB
Total Installed Size: 867.95 MiB

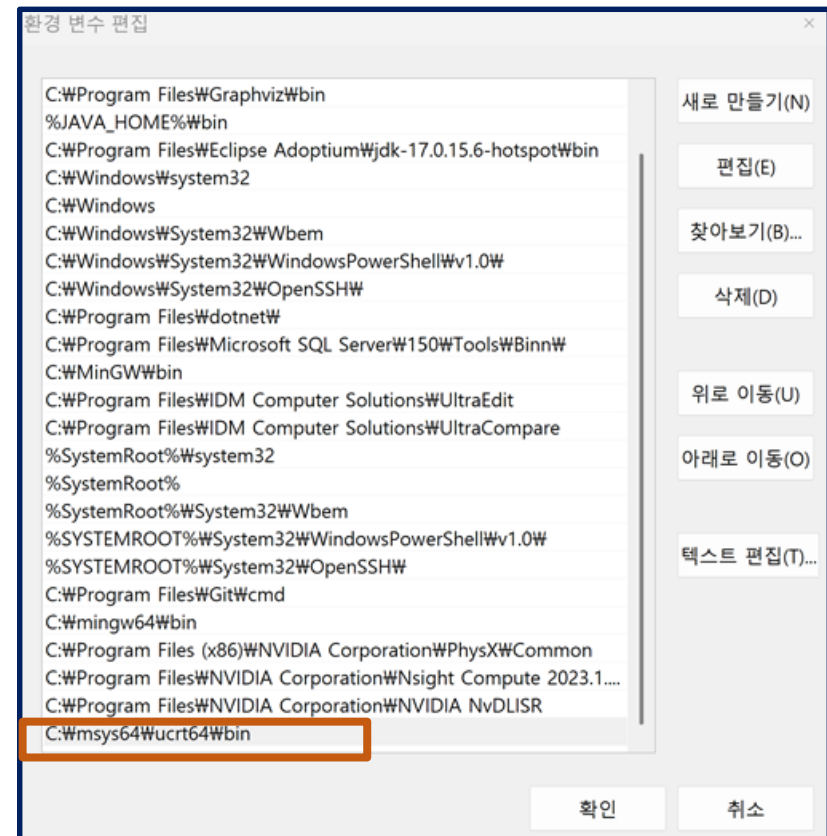
:: Proceed with installation? [Y/n]
```

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## ◆ MSYS 설정

- 환경변수 PATH 추가



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## ◆ VSCODE 설정

### ▪ VSCODE 터미널

- gcc --version, gdb --version 확인

```
D:\KDT\KDT_9_VS>gcc --version
gcc (Rev8, Built by MSYS2 project) 15.2.0
Copyright (C) 2025 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.
here is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

```
D:\KDT\KDT_9_VS>gdb --version
GNU gdb (GDB) 16.3
Copyright (C) 2024 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute
```

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## ◆ VSCODE 설정

### ■ 확장팩 설치

- C/C++
- C/C++ Extension Pack



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## ◆ VSCODE 설정

- Settings – 컴파일러 설정

- C\_Cpp.default.compilerPath → MSYS2: C:\msys64\ucrt64\bin\gcc.exe



The screenshot shows the VS Code settings editor with the settings.json file open. The file path is kwon > AppData > Roaming > Code > User > settings.json. The JSON content is as follows:

```
{
  "python.terminal.activateEnvInCurrentTerminal": true,
  "jupyter.enableExtendedPythonKernelCompletions": true,
  "python.languageServer": "Pylance",
  "jupyter.jediEnabled": false,
  "editor.quickSuggestions": {
    "other": true,
    "comments": false,
    "strings": true
  },
  "editor.fontSize": 18,
  "C_Cpp.default.compilerPath": "C:/msys64/ucrt64/bin/gcc.exe"
}
```

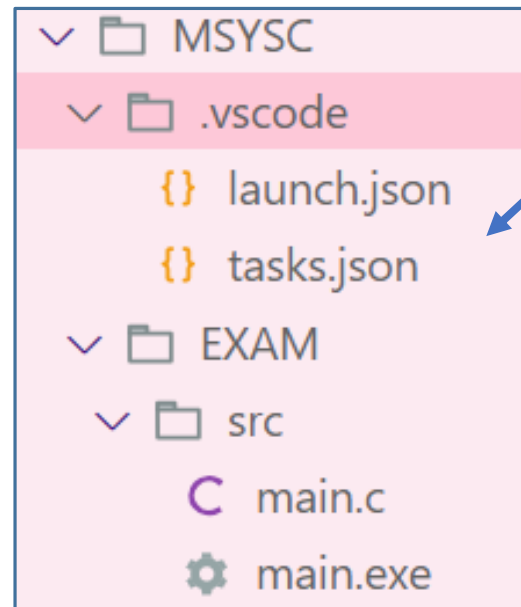


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## ◆ VSCODE 테스트

### ▪ 구조



VSCODE & C/C++  
연동 설정 파일들

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## ◆ VSCODE 테스트

### ▪ main.c 코드 작성

```
#include <stdio.h>

int main(void){

    printf("Hello, World! ");

    return 0 ;

}
```

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## ◆ VSCODE 테스트

### ▪ launch.json

```
{
  "version": "0.2.0",
  "configurations": [
    {
      "name": "Debug (GDB)",
      "type": "cppdbg",
      "request": "launch",
      "program": "${workspaceFolder}/build/app.exe",
      "cwd": "${workspaceFolder}",
      "stopAtEntry": false,
      "externalConsole": true,
      "MIMode": "gdb",
      "miDebuggerPath": "C:/msys64/ucrt64/bin/gdb.exe",
      "setupCommands": [
        {
          "description": "Enable pretty-printing",
          "text": "-enable-pretty-printing",
          "ignoreFailures": true
        }
      ],
      "preLaunchTask": "gcc build"
    }
  ]
}
```

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## ◆ VSCODE 테스트

### ■ tasks.json

```
{
  "version": "2.0.0",
  "tasks": [
    {
      "label": "gcc build",
      "type": "shell",
      "command": "gcc",
      "args": [
        "-g",
        "-O0",
        "-Wall",
        "-Wextra",
        "-std=c17",
        "${workspaceFolder}/src/main.c",
        "-o",
        "${workspaceFolder}/build/app.exe"
      ],
      "options": {
        "env": {
          "PATH": "C:\\msys64\\ucrt64\\bin;${env:PATH}"
        }
      },
      "group": { "kind": "build", "isDefault": true },
      "problemMatcher": "$gcc"
    }
  ]
}
```

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## ◆ VSCODE 테스트

### ▪ main.c 코드 실행

