

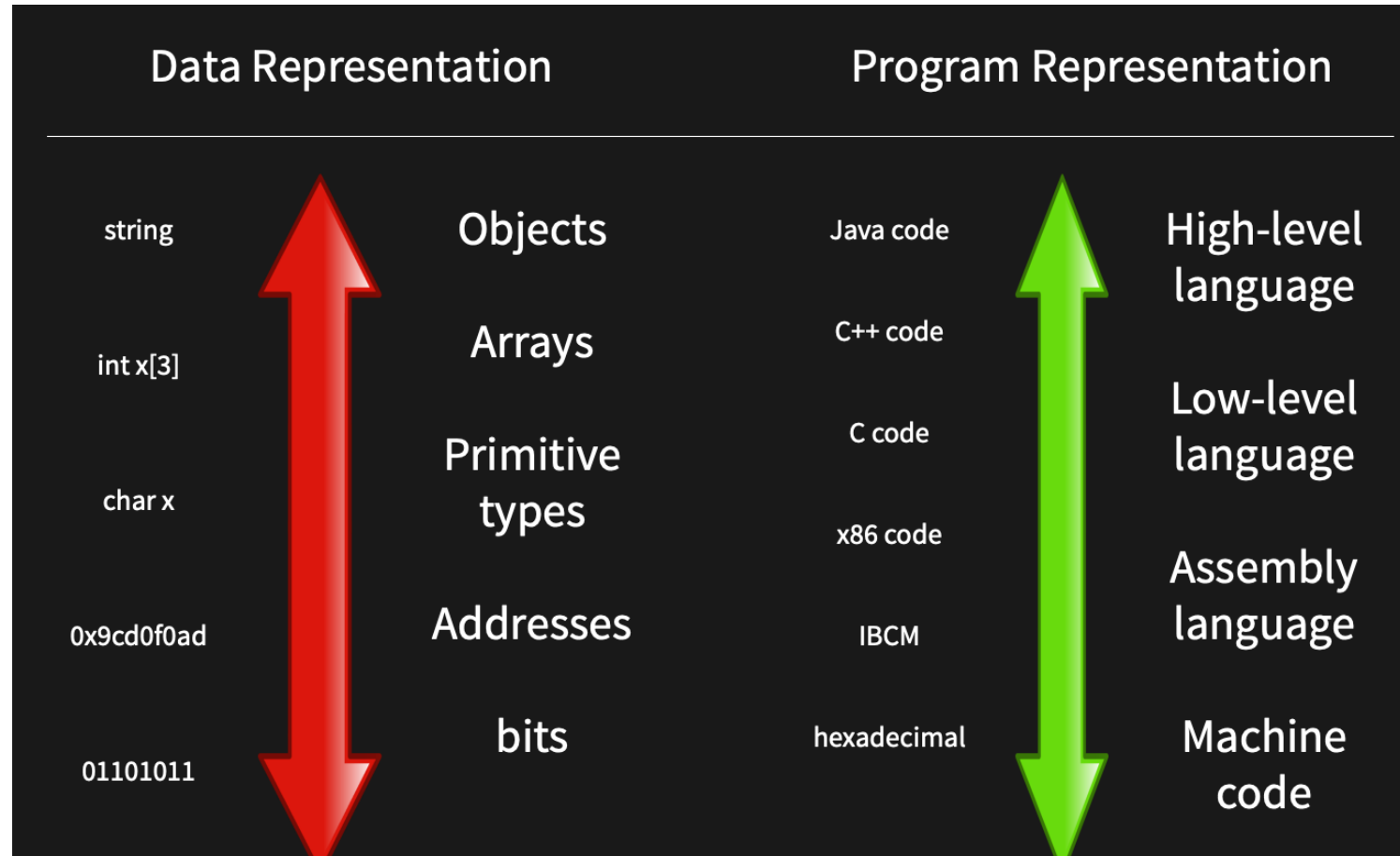
FRA142 Computer Programming II

LAB 0 : Introduction to C++

What is C++ ?

- It's good to learn a second language
- C++ is widely used
 - Can be more efficient
 - More control
- C++ will let us “get under the hood” more
 - Data and program representation in memory
 - Memory allocation

How programming languages work



Setting up C++ environment

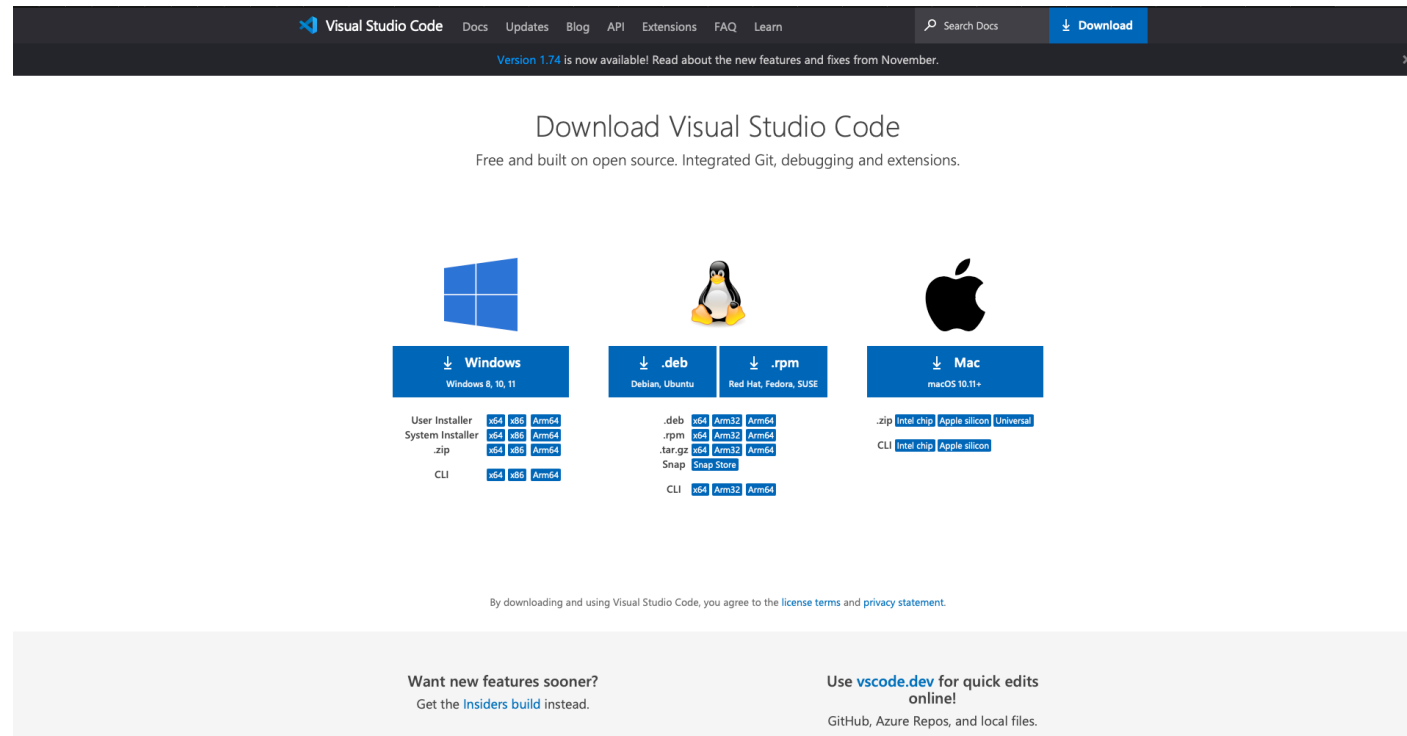
- IDE for C++
- C++ Compiler

IDE for C++



Visual Studio Code

- [VS Code Download Link](#)



The screenshot shows the Visual Studio Code download page. At the top, there's a navigation bar with links for Visual Studio Code, Docs, Updates, Blog, API, Extensions, FAQ, and Learn. A search bar and a 'Download' button are also present. Below the navigation bar, a banner announces 'Version 1.74 is now available! Read about the new features and fixes from November.' The main heading is 'Download Visual Studio Code', followed by the text 'Free and built on open source. Integrated Git, debugging and extensions.' The page is divided into three main sections for Windows, Linux, and Mac. Each section lists various download methods and their supported architectures.

Windows (Windows 8, 10, 11)

- User Installer: x64, x86, Arm64
- System Installer: x64, x86, Arm64
- .zip: x64, x86, Arm64
- CLI: x64, x86, Arm64

Linux

- .deb** (Debian, Ubuntu): x64, x86, Arm64
- .rpm** (Red Hat, Fedora, SUSE): x64, x86, Arm64
- .deb: x64, x86, Arm64
- .rpm: x64, x86, Arm64
- .tar.gz: x64, x86, Arm64
- Snap: Snap Store
- CLI: x64, x86, Arm64

Mac (macOS 10.11+)

- .zip: intel chip, Apple silicon, Universal
- CLI: intel chip, Apple silicon

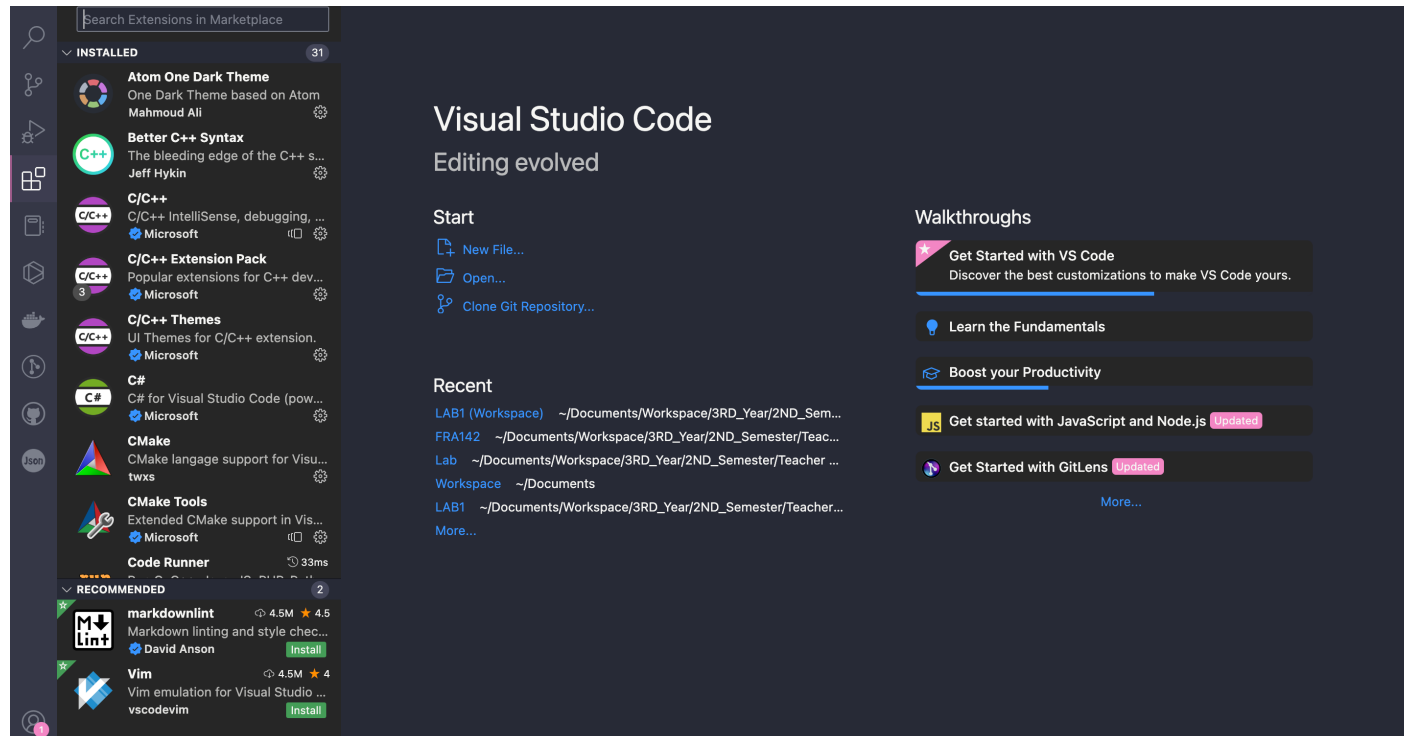
By downloading and using Visual Studio Code, you agree to the [license terms](#) and [privacy statement](#).

Want new features sooner?
Get the [Insiders build](#) instead.

Use [vscode.dev](#) for quick edits online!
GitHub, Azure Repos, and local files.

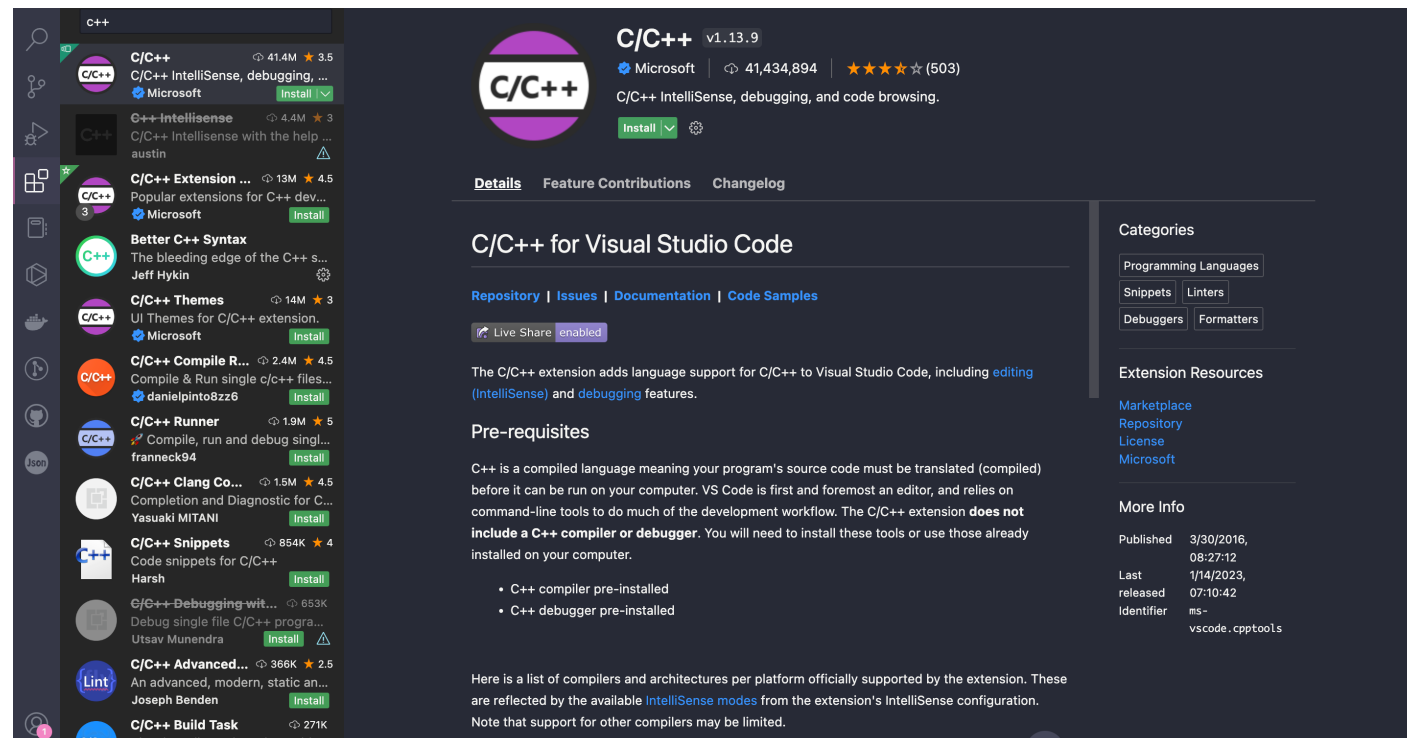
C++ installation

- Extension in VS Code



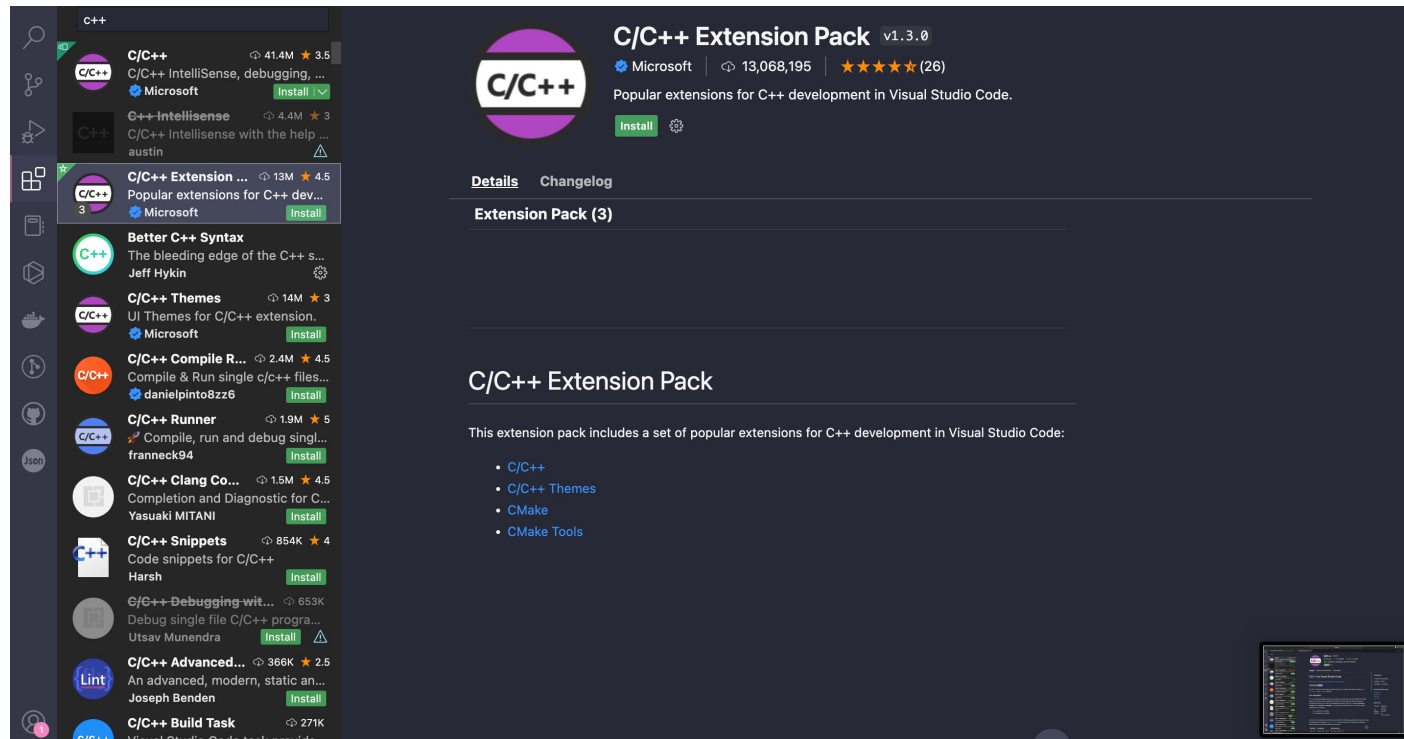
C++ installation

- Extension in VS Code



C++ installation

- Extension in VS Code



C++ Compiler

- GNU Framework
 - G++
 - GCC
- LLVM Framework
 - Clang++
 - clang

C++ Compiler

- [MinGW Download Link](#)



C++ Compiler

- Release Version

Release versions	
UCRT runtime	
<ul style="list-style-type: none">• GCC 12.2.0 + LLVM/Clang/LLD/LLDB 15.0.7 + MinGW-w64 10.0.0 (UCRT) - release 4 (LATEST)<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 12.1.0 + LLVM/Clang/LLD/LLDB 14.0.6 + MinGW-w64 10.0.0 (UCRT) - release 3<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 11.3.0 + LLVM/Clang/LLD/LLDB 14.0.3 + MinGW-w64 10.0.0 (UCRT) - release 3<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 11.2.0 + MinGW-w64 10.0.0 (UCRT) - release 1<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive• GCC 11.2.0 + LLVM/Clang/LLD/LLDB 14.0.0 + MinGW-w64 9.0.0 (UCRT) - release 7<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive	
MSVCRT runtime	
<ul style="list-style-type: none">• GCC 12.2.0 + LLVM/Clang/LLD/LLDB 15.0.7 + MinGW-w64 10.0.0 (MSVCRT) - release 4 (LATEST)<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 12.1.0 + LLVM/Clang/LLD/LLDB 14.0.6 + MinGW-w64 10.0.0 (MSVCRT) - release 3<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 11.3.0 + LLVM/Clang/LLD/LLDB 14.0.3 + MinGW-w64 10.0.0 (MSVCRT) - release 3<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 11.2.0 + MinGW-w64 10.0.0 (MSVCRT) - release 1<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive• GCC 11.2.0 + LLVM/Clang/LLD/LLDB 14.0.0 + MinGW-w64 9.0.0 (MSVCRT) - release 7<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 10.4.0 + MinGW-w64 10.0.0 (MSVCRT) - release 1<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 10.3.0 + LLVM/Clang/LLD/LLDB 12.0.0 + MinGW-w64 9.0.0 (MSVCRT) - release 2<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive - without LLVM/Clang/LLD/LLDB: 7-Zip archive* Zip archive• GCC 9.5.0 + MinGW-w64 10.0.0 (MSVCRT) - release 1<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive• GCC 8.5.0 + MinGW-w64 9.0.0 (MSVCRT) - release 1<ul style="list-style-type: none">◦ Win32: 7-Zip archive* Zip archive◦ Win64: 7-Zip archive* Zip archive• GCC 7.5.0 + MinGW-w64 7.0.0 (MSVCRT) - release 1<ul style="list-style-type: none">◦ Win32: 7-Zip archive*◦ Win64: 7-Zip archive*	