

# **FRA142 Computer Programming II**

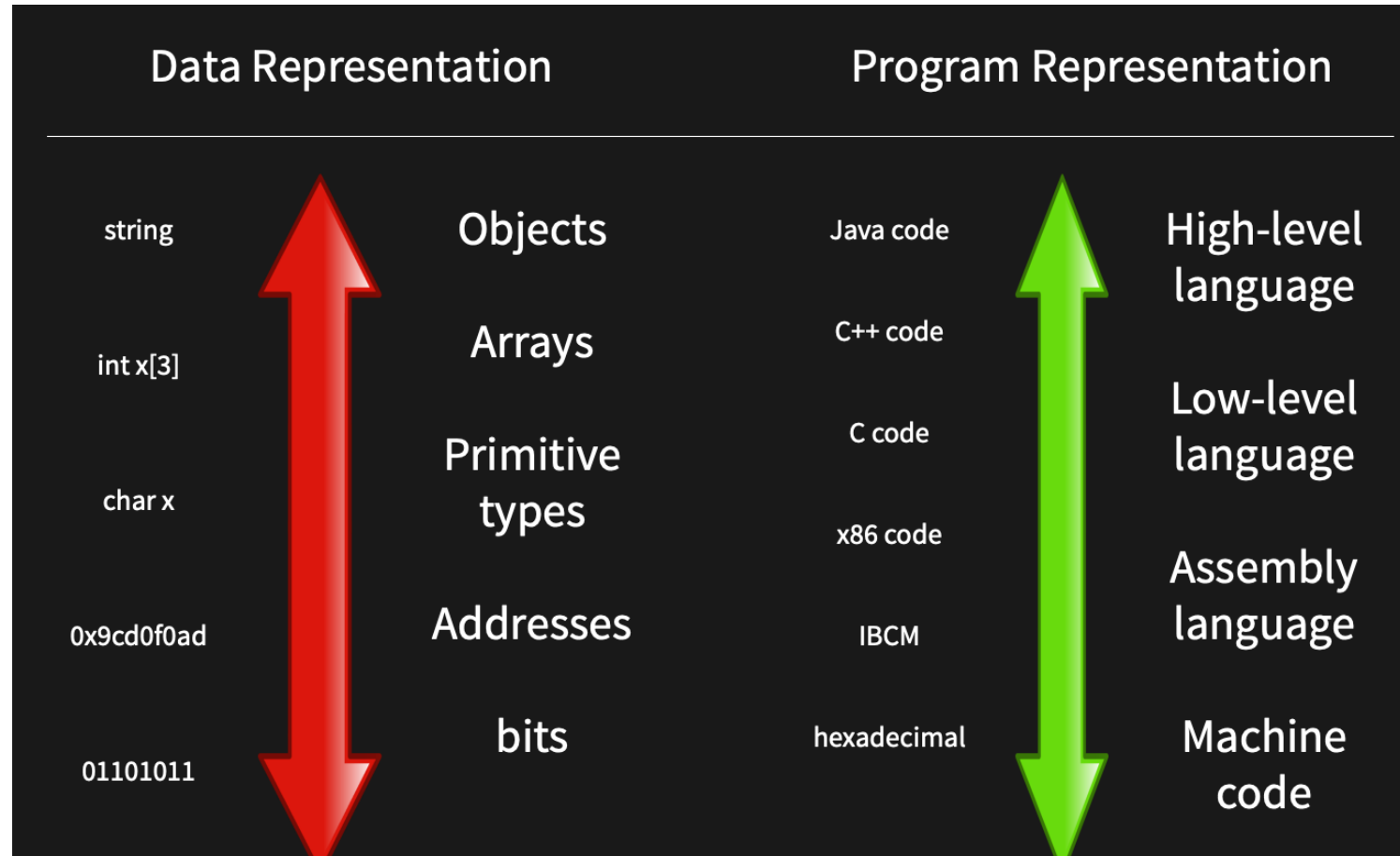
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**LAB 0 : Introduction to C++**

# 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](#)

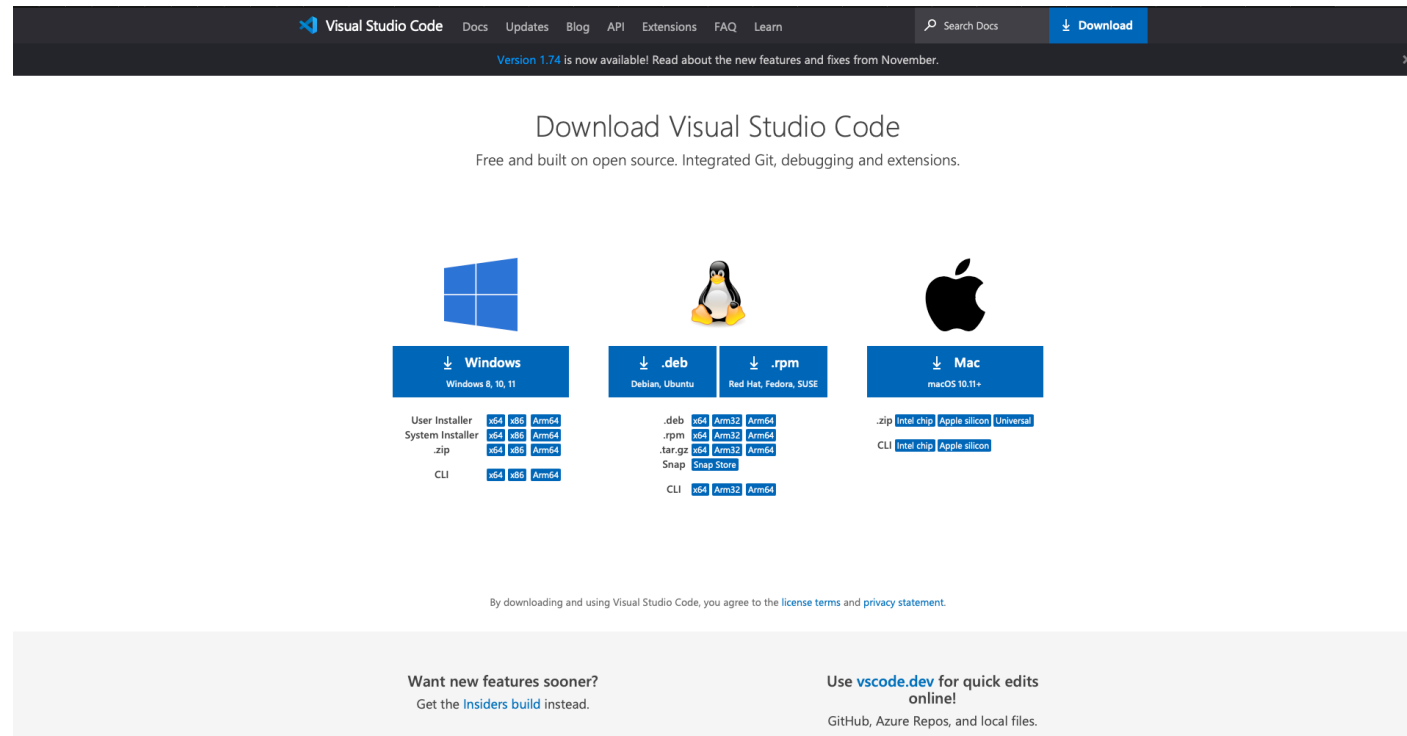
The screenshot shows the Visual Studio Code download page. At the top, there's a navigation bar with links for Visual Studio Code, Docs, Updates, Blog, API, Extensions, FAQ, and Learn. A search bar and a 'Download' button are also present. Below the navigation bar, a banner announces 'Version 1.74 is 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. The Windows section includes User Installer, System Installer, .zip, and CLI. The Linux section includes .deb, .rpm, .tar.gz, Snap, and CLI. The Mac section includes .zip and CLI. At the bottom, there's a footer with links to 'Want new features sooner?' and 'Use vscode.dev for quick edits online!'.

Visual Studio Code Docs Updates Blog API Extensions FAQ Learn Search Docs Download

Version 1.74 is now available! Read about the new features and fixes from November.

## Download Visual Studio Code


Free and built on open source. Integrated Git, debugging and extensions.



### Windows

Windows 8, 10, 11


User Installer [x64](#) [x86](#) [Arm64](#)  
System Installer [x64](#) [x86](#) [Arm64](#)  
.zip [x64](#) [x86](#) [Arm64](#)  
CLI [x64](#) [x86](#) [Arm64](#)



### Linux

Debian, Ubuntu Red Hat, Fedora, SUSE

.deb [x64](#) [Arm32](#) [Arm64](#)  
.rpm [x64](#) [Arm32](#) [Arm64](#)  
.tar.gz [x64](#) [Arm32](#) [Arm64](#)  
Snap [Snap Store](#)  
CLI [x64](#) [Arm32](#) [Arm64](#)



### Mac

macOS 10.11+

.zip [Intel chip](#) [Apple silicon](#) [Universal](#)  
CLI [Intel chip](#) [Apple silicon](#)

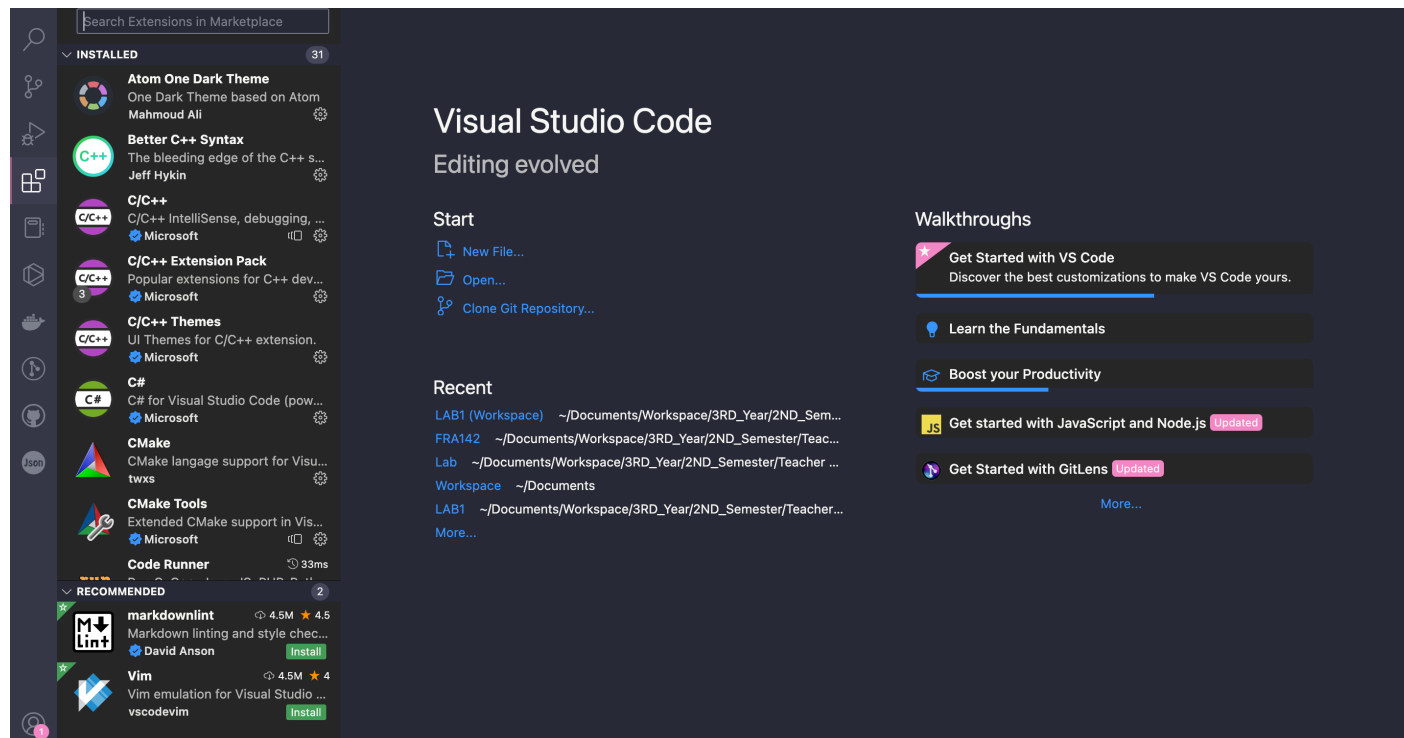
By downloading and using Visual Studio Code, you agree to the [license terms](#) and [privacy statement](#).

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

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

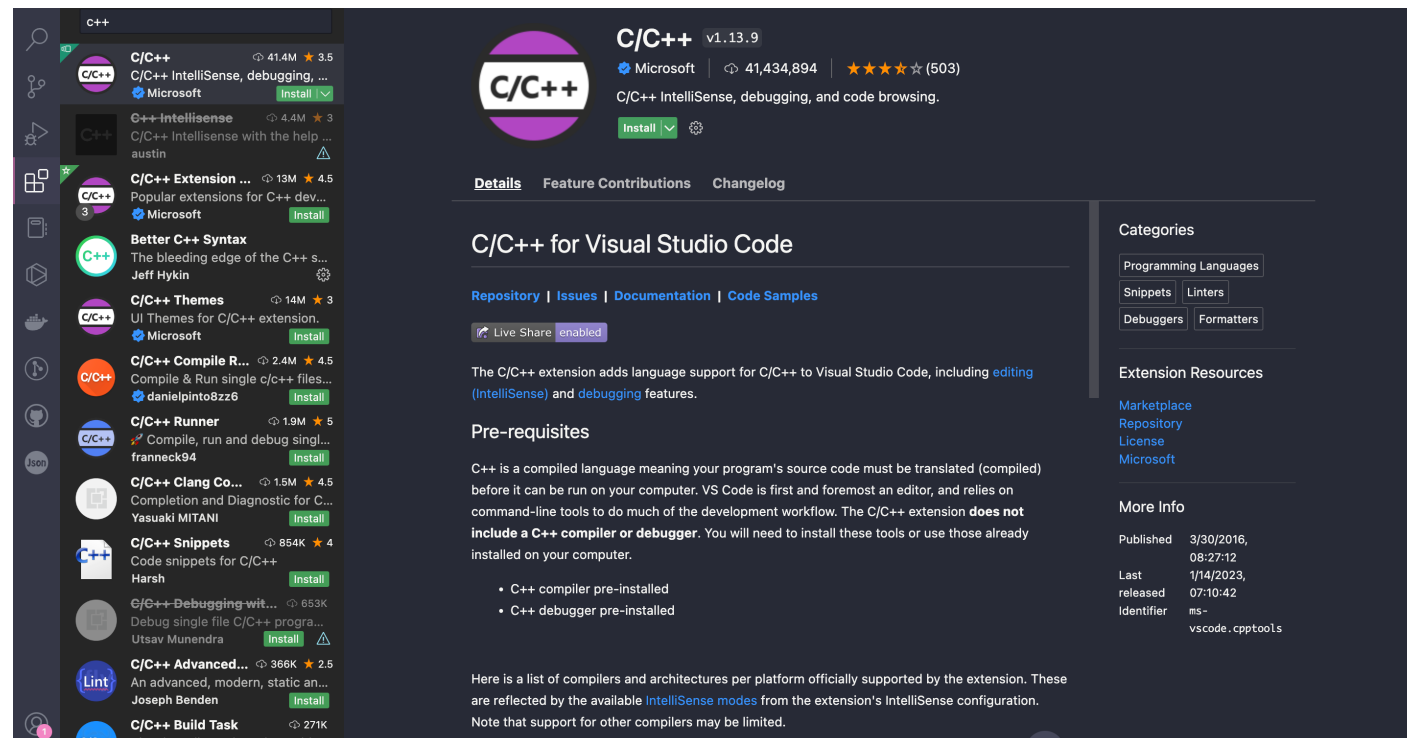
# C++ Extension

- Extension in VS Code



# C++ Extension

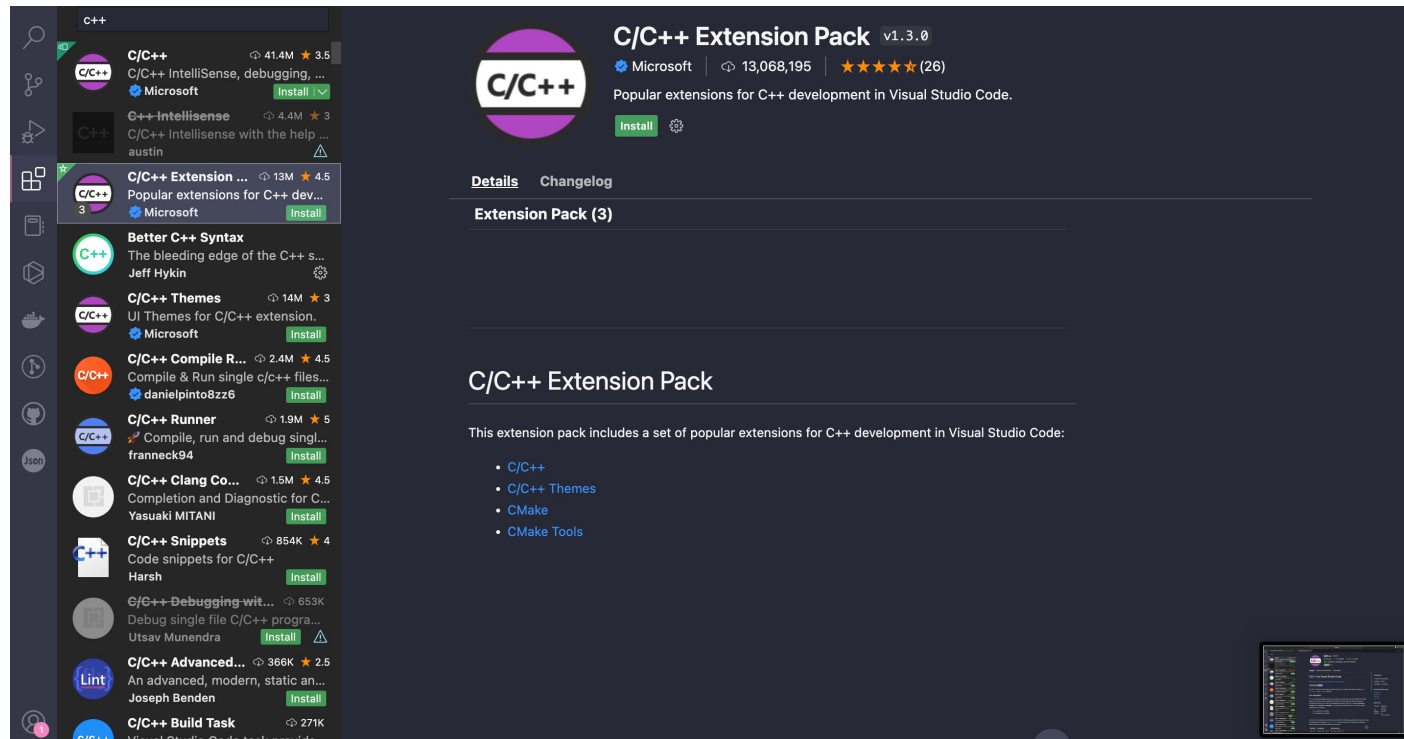
- Extension in VS Code





# C++ Extension

- 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"><li>• GCC 12.2.0 + LLVM/Clang/LLD/LLDB 15.0.7 + MinGW-w64 10.0.0 (UCRT) - release 4 (<b>LATEST</b>)<ul style="list-style-type: none"><li>◦ Win32: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li><li>◦ Win64: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li></ul></li><li>• 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"><li>◦ Win32: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li><li>◦ Win64: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li></ul></li><li>• 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"><li>◦ Win32: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li><li>◦ Win64: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li></ul></li><li>• GCC 11.2.0 + MinGW-w64 10.0.0 (UCRT) - release 1<ul style="list-style-type: none"><li>◦ Win32: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li><li>◦ Win64: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li></ul></li><li>• 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"><li>◦ Win32: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li><li>◦ Win64: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a> - without LLVM/Clang/LLD/LLDB: <a href="#">7-Zip archive*</a>   <a href="#">Zip archive</a></li></ul></li></ul>	
MSVCRT runtime	
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