

Getting Started Guide for Cmajor 1.0.0

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1 Installation in Windows

1.1 Prerequisites

Note: You must uninstall any previous Cmajor version before installing this version (1.0.0).

It is also recommended that you delete the %APPDATA%\Cmajor directory before installing this version because configuration files and system library files have been changed.

- Download and install MinGW-w64 GCC:

<http://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/installer/mingw-w64-installer.exe/download>

Installation settings for my system (64-bit Windows):

- Version 5.1.0
- Architecture: x86_64
- Threads: **posix**
- Exception: sjlj
- Build revision: 0

Installation settings for 32-bit Windows:

- Version 5.1.0
- Architecture: i686
- Threads: **posix**
- Exception: sjlj
- Build revision: 0

Note: Threads setting must be “posix”.

After installation insert the bin-directory to the **PATH** environment variable. In my system this is

C:\Program Files\mingw-w64\x86_64-5.1.0-posix-sjlj-rt_v4-rev0\mingw64\bin directory.

- Download and install Visual C++ Redistributable for Visual Studio 2015 RC:

<http://www.microsoft.com/en-us/download/details.aspx?id=46881>, or 64-bit: http://sourceforge.net/projects/cmajor/files/1.0.0/vcredist_x64.exe/download or 32-bit: http://sourceforge.net/projects/cmajor/files/1.0.0/vcredist_x86.exe/download

1.2 Cmajor Installation

- Download and run **cmajor-1.0.0-win-x86-setup.exe** (for 32-bit Windows) or **cmajor-1.0.0-win-x64-setup.exe** (for 64-bit Windows).
- Cmajor is installed by default to `C:\Program Files\Cmajor` directory (under 32-bit Windows) or to `C:\Program Files (x86)\Cmajor` directory (32-bit and 64-bit versions under 64-bit Windows).

Note: The x64 version is also installed by default under `C:\Program Files (x86)` directory although the programs are genuinely 64-bit versions). This is due to restrictions of InstallShield Limited Edition.

- The setup adds `C:\Program Files\Cmajor\bin` directory or `C:\Program Files (x86)\Cmajor\bin` directory to your system's **PATH** environment variable, so the Cmajor programs can be executed from any directory from the command prompt without specifying full paths.
- The setup also adds a **CM_LIBRARY_PATH** environment variable and sets it to contain a path to the Cmajor System Library directory that is `%APPDATA%\Cmajor\system`. If you need to modify the **CM_LIBRARY_PATH** environment variable, you can find it from the Advanced System Settings pane in the System Control Panel.
In my computer the `%APPDATA%` points actually to the `C:\Users\Seppo\AppData\Roaming\` directory. The **AppData** folder is hidden by default. To see it you will have to modify the settings in the *Folder Options* Control Panel.
- The setup adds an icon to **Cmajor Development Environment** to the desktop.
- After installation you have to build the Cmajor System Library.

1.3 Building the Cmajor System Library

- Option 1: using batch file:
 - Open command prompt and change to Cmajor system directory by issuing command `cd %APPDATA%\Cmajor\system`.
 - Run **build.bat**. This builds the Cmajor System Library for each backend (LLVM/C) and configuration (debug/release).
 - Now the Cmajor system is ready for building user projects.
- Option 2: using IDE:
 - Start **Cmajor Development Environment**.
 - Open the File|Built-in Projects|System Library project.
 - Run Build|Rebuild Solution command for the debug configuration.
 - Select **release** configuration from the configuration combo box and run Build|Rebuild Solution command for the **release** configuration.

- Select **debug** configuration from the configuration combo box and **C** backend from the backend combo box and run **Build|Rebuild Solution** command for the **C** backend and the **debug** configuration.
- Select **release** configuration from the configuration combo box and run **Build|Rebuild Solution** command for the **C** backend and for the **release** configuration.
- Now the Cmajor system is ready for building user projects.

Note: If you are updating from previous Cmajor version, it is important to issue the **rebuild** command (not just build command), because System Library directories are not cleared when uninstalling Cmajor.

1.4 Troubleshooting

- **library reference 'system.cml' not found.**

You have to build the System Library for the used configuration (debug/release) and backend (LLVM/C) first.

- **Cannot start program because api-ms-win-crt-runtime-l1-1-0.dll is missing.**

You must install Visual C++ Redistributable for Visual Studio 2015 RC.

<http://www.smartftp.com/support/kb/the-program-cant-start-because-api-ms-win-crt-runtime-l1-1-0-dll-is-missing/>

- **gcc is not recognized as an internal or external command, operable program or batch file.**

or **'ar' is not recognized as an internal or external command, operable program or batch file.**

or **Cannot start llc.exe because libgcc_s_sjlj-1.dll is missing.**

The bin directory of mingw-w64

(in my machine

C:\Program Files\mingw-w64\x86_64-5.1.0-posix-sjlj-rt_v4-rev0\mingw64\bin)

must be in the PATH environment variable.

- **undefined reference to 'WinMain' collect2.exe: error: ld returned 1 exit status**

You have probably 32-bit Cmajor and 64-bit MinGW-w64's gcc. Both must be either 32-bit or 64-bit.

- Build seems to succeed but program does not work, or other mysterious error.

Try **rebuild** command (-R option) or **clean** and then **build**.

- IDE messes up things.

Try using the command line compiler (cmc.exe).

- How to generate 32-bit executables in a 64-bit system.

Use 32-bit MinGW-w64 (i686) and 32-bit Cmajor.

2 Installation in Linux

2.1 Prerequisites

- GCC
Must be recent enough to compile C++11 code.
- Download, build and install Boost (<http://www.boost.org/>). At minimum you will need to build and install the **filesystem** and **iostreams** libraries:
(./b2 --with-filesystem --with-iostreams install)
- Download, build and install LLVM tools (<http://llvm.org/>). Installation instructions can be found in <http://llvm.org/docs/GettingStarted.html> document.

2.2 Cmajor Installation

- Download and extract **cmajor-1.0.0-src.tar.gz** to some directory here called <cmajor>.
- Change to <cmajor> directory and run `make` and then `[sudo] make install`.
- Set an environment variable `CM_LIBRARY_PATH` to contain path to <cmajor>/system directory. You may want to insert a statement like:
`export CM_LIBRARY_PATH=/path/to/cmajor/system`
into your `.bashrc` script.

2.3 Building the System Library

- Run command `make sys` from <cmajor> directory.
- Now the Cmajor system is ready for building user projects.

2.4 Troubleshooting

- library reference 'system.cml' not found
You have to build the System Library for the used configuration (debug/release) and backend (LLVM/C) first.
- sh: 1: llc: not found
You have probably not installed LLVM tools.
- Build seems to succeed but program does not work, or other mysterious error.
Try **rebuild** command (-R option) or **clean** and then **build**.
- Ubuntu Document Viewer does not show PDF documents included in Cmajor.
At least **okular** shows them beautifully.