

## Intro to ROOT

*Thursday 16 May 2024 15:00 (2 hours)*

A tutorial on programming with ROOT!

ROOT is a c/c++ environment developed at CERN to provide tools for manipulating, analysing and displaying high energy physics data. It includes a lot of advanced systems.

This will be an introduction to basic routines to simulate some data, process it and display useful graphs. There will be a short presentation, followed by tutorial exercises. It will be very helpful if everyone has the possibility to run ROOT on their own laptop.

ROOT install instructions:

There are many ways to get ROOT. There are lots more details here <https://root.cern/install/>, so if the below doesn't work for you check out the info there. It will be quicker to get the pre-compiled binaries, but if that doesn't work for whatever reason you can try building from source.

The first thing to do is make sure you have all the things ROOT depends on. A list of these, with instructions for different operating systems, can be found here: <https://root.cern/install/dependencies/>

MacOS:

Install homebrew <https://brew.sh>

Install XCode from the App Store

In a terminal, type: `brew install root`

`cd root`

`source /usr/local/Cellar/root/6.26.06_2/bin/thisroot.sh` (maybe the version and/or location are different)

Unix:

Get the precompiled binaries for your system from here: <https://root.cern/releases/release-62802/>

`tar xvf root_v6.28.02.Linux-centos8-x86_64-gcc8.5.tar`

`source root/bin/thisroot.sh`

More detailed walk through <https://www.youtube.com/watch?v=QItrmchEQWE> (he builds from source but you can do this with the precompiled tar files)

Windows:

I think you should have access to Windows Subsystem for Linux or similar

It will probably be easiest to use the above Unix instructions within that

Then install Xming <https://sourceforge.net/projects/xming/>

type: `export DISPLAY="localhost:0"`

More detailed walk through <https://www.youtube.com/watch?v=pmfM4Zq6OQU> (he builds from source but you can do this with the precompiled tar files)

(Alternative) Building from Source:

Once you have the dependencies, get the source file here <https://root.cern/releases/release-62802/>

`cd root`

`./configure --disable-castor --disable-rfio --disable-x11 --disable-gfal --disable-ldap` (these disabled options are all things I've found problems with on various systems, and we won't need them for the simple examples/project)

`make`

`source bin/thisroot.sh`

To check it's worked, type `root`. The terminal prompt should now be `root [0]`. If so, it seems root is installed ok! Now try `TCanvas c1`, if a blank window pops up, the graphics are all working too and you are good to go :)

If that all sounds like gobbledigook, please do not worry!! Just let us know, and we will try to bring extra laptops with ROOT pre-installed, and/or we will spend some tutorial time on the installation process.

If you're having problems but are keen, there are many resources you can use online. <https://root.cern/install/> is the place to start but there are countless guides, videos, and forums online. Someone will have encountered your problem before, it's working out what to google which can be tricky! Hopefully this is enough to get you started and point you in the direction of where to find info for your specific setup.

Good luck! And to reiterate, if you can't get root installed, it won't completely preclude you from taking part in the tutorial

**Author:** GROS, Philippe

**Presenters:** COQUILLAT, Jean-Marie (Queen's University, Canada); GROS, Philippe

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