

Homework. 1: Build System

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To do this homework you will need to download the files from e-Campus. All the needed files are in the **homework_1.zip** file.

Once you have forked <https://gitlab.igg.uni-bonn.de/teaching/cpp-homeworks> and cloned your own repository extract the **homework_1.zip** archive into **cpp-homework/homework_1** folder:

```
$ git clone https://gitlab.igg.uni-bonn.de/<YOUR_USER_NAME>/cpp-homeworks
$ cd cpp-homeworks/homework_1
$ mv ~/Downloads/homework_1.zip . # or replace ~/Downloads with your path
$ unzip homework_1.zip && rm homework_1.zip
```

Once you successfully extracted the files, your working directory should look like the following:

```
|-- homework_1
|  |-- app
|  |   |-- main.cpp
|  |-- data
|  |   |-- pointcloud.ply
|  |-- my_viewer
|  |   |-- my_viewer.cpp
|  |   |-- my_viewer.hpp
|  |-- CMakeLists.txt
|  |-- .gitignore
```

Homework Folder Description

- In **my_viewer**, we provide a custom library that helps you visualize a PointCloud using Open3D Library
- In **app**, there is an executable code which uses the above library to visualize a PointCloud file input by the user

A Install Open3D

This section will help you install Open3D on your system for this homework

1. Download Open3D binaries here:
<https://github.com/is1-org/Open3D/releases>
2. Extract the downloaded 'tar' file to your homework folder, rename the folder as simply 'open3d'

The following line: `find_package(Open3D REQUIRED HINTS ${PROJECT_SOURCE_DIR}/open3d/lib/cmake)` in your **CMakeLists.txt** will direct the build system to locate Open3D within the project folder.

B Write Build System Generator using CMake

NOTE: CMake is always evolving and changing, this means that when searching for online documentation you should always check which version of the documentation you are reading, otherwise you will struggle a lot. On **Ubuntu 22.04** it's version **3.22.1**, this means that this is the manual you should read: <https://cmake.org/cmake/help/v3.22/>

In this exercise you need to provide as many **CMakeLists.txt** files as you think are necessary, just putting the right files in your repository and making sure that everything builds properly.

B.1 Hints

HINT 1: use `add_subdirectory()` command to add nested **CMakeLists.txt** to the project

HINT 2: use `Open3D::Open3D` as the name of the Open3D target to link your library against

HINT 3: use `set_target_properties(main PROPERTIES RUNTIME_OUTPUT_DIRECTORY "${PROJECT_SOURCE_DIR}")` to install the executable to the project directory's root

B.2 How to Build

1. `cmake -Bbuild .`
2. `cmake --build build`

C Visualize a real PointCloud

Once the project is successfully compiled, and an executable is generated, you can visualize the beautiful pointcloud in the `pointcloud.ply` file provided in the `data` folder.