

# Installing deal.II and PRISMS-CPFE on WSL (Windows Subsystem for Linux - Ubuntu 18.04)

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1. Install C, C++, Fortran compilers and Python interpreter

```
sudo apt install build-essential
```

```
sudo apt install gfortran
```

```
sudo apt install python
```

2. Install **OpenMPI**

```
sudo apt install openmpi-bin libopenmpi-dev
```

3. Install **BLAS/LAPACK**

```
sudo apt install libblas-dev liblapack-dev
```

4. As a prerequisite for **P4EST**, first download and install the **zlib** package

```
sudo apt install zlib1g-dev
```

5. Create the following directories

```
cd ~ ; mkdir p4est_files ; mkdir p4est_install ; cd p4est_files
```

6. Download the **P4EST** tarball and setup script

```
wget http://p4est.github.io/release/p4est-2.2.tar.gz
```

```
wget https://www.dealii.org/current/external-libs/p4est-setup.sh
```

7. Install **P4EST** using setup script

```
chmod u+x p4est-setup.sh
```

```
./p4est-setup.sh p4est-2.2.tar.gz ~/p4est_install
```

8. Once installed without errors, set the environment variable pointing to the **P4EST** installation directory

```
export P4EST_DIR=$HOME/p4est_install
```

9. Alternatively, **PETSC** can be installed manually via the following set of commands

```
cd ~  
  
wget http://ftp.mcs.anl.gov/pub/petsc/release-snapshots/petsc-3.12.1.tar.gz  
  
tar -xzf petsc-3.12.1.tar.gz  
  
cd petsc-3.12.1  
  
./configure PETSC_ARCH=arch-opt --with-mpi=1 --with-x=0 --with-debugging=0 --download-hypre=1  
  
make PETSC_DIR=$HOME/petsc-3.12.1 PETSC_ARCH=arch-opt all  
make PETSC_DIR=$HOME/petsc-3.12.1 PETSC_ARCH=arch-opt check  
export PETSC_DIR=$HOME/petsc-3.12.1  
export PETSC_ARCH=arch-opt
```

10. Now you are ready to compile and install **deal.II** with the following commands.

```
cd ~  
  
git clone https://github.com/dealii/dealii.git  
  
mkdir dealii_install ; mkdir dealii_build ; cd dealii_build  
  
cmake -DDEAL_II_WITH_MPI=ON -DDEAL_II_WITH_P4EST=ON -  
DEAL_II_WITH_PETSC=ON -DDEAL_II_WITH_LAPACK=ON -  
DCMAKE_INSTALL_PREFIX=/PATH/TO/DEALII/INSTALLATION ~/dealii
```

11. Once compiled, install and test **deal.II**

```
make -j8 install ; make -j8 test
```

12. Add the **deal.II** installation directory to path

```
cd /PATH/TO/DEALII/INSTALLATION ; export DEAL_II_DIR=`pwd`
```

13. To define the environment variable permanently add the following line to `~/.bashrc`, save and exit, and then type **source .bashrc** on the command line

```
export DEAL_II_DIR=/PATH/TO/DEALII/INSTALLATION
```

14. Download the PRISMS-CPFE code

```
cd ~  
git clone https://github.com/prisms-center/plasticity.git  
cd plasticity
```

15. Compile the code

```
cmake CMakeLists.txt  
make -j8  
cd applications/crystalPlasticity  
cmake .  
make -j8 release
```