

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

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1. Ensure that you have the GNU Fortran compiler, which can be installed as follows

```
sudo apt install gfortran
```

2. Install **OpenMPI** as follows

```
sudo apt install openmpi-bin
```

3. Install **BLAS** as follows

```
sudo apt install libblas3
```

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

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

5. Then 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 -xzvf 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 -
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
```