Installation of MLIP and ARTn

This is a PDF document that explains step by step how to install MLIP-2 and ARTn it contains screenshots for detailed explanation.

Note: The commands to execute are after the sign $

MLIP-2 Installation

The instructions can be found in the next link Home · Wiki · Alexander Shapeev / MLIP-2 Tutorials · GitLab

1. Make a directory with the name mlip-2 using:
   mkdir mlip_2
2. Go to the directory and clone the mlip-2 gitlab repository:
   $ cd mlip_2
   $ git clone https://gitlab.com/ashapeev/mlip-2.git

```
[oupc@cedar2 mlip_2]$ git clone https://gitlab.com/ashapeev/mlip-2.git
Cloning into 'mlip-2'...
remote: Enumerating objects: 2352, done.
remote: Counting objects: 100% (96/96), done.
remote: Compressing objects: 100% (51/51), done.
remote: Total 2352 (delta 58), reused 75 (delta 45), pack-reused 2256 (from 1)
Receiving objects: 100% (2352/2352), 47.39 MiB | 8.84 MiB/s, done.
Resolving deltas: 100% (1185/1185), done.
Updating files: 100% (400/400), done.
```

3. Then in the same directory clone the interface mlip-2 repository:
   $ git clone https://gitlab.com/ashapeev/interface-lammps-mlip-2.git

```
[oupc@cedar2 mlip_2]$ git clone https://gitlab.com/ashapeev/interface-lammps-mlip-2.git
Cloning into 'interface-lammps-mlip-2'...
remote: Enumerating objects: 101, done.
remote: Counting objects: 100% (77/77), done.
remote: Compressing objects: 100% (70/70), done.
remote: Total 101 (delta 38), reused 13 (delta 7), pack-reused 24 (from 1)
Receiving objects: 100% (101/101), 30.98 KiB | 47.00 KiB/s, done.
Resolving deltas: 100% (43/43), done.
```

4. As the last step clone the lammps repository in the same directory:
   $ git clone -b stable https://github.com/lammps/lammps.git mylammps

```
[oupc@cedar2 mlip_2]$ git clone -b stable https://github.com/lammps/lammps.git mylammps
Cloning into 'mylammps'...
remote: Enumerating objects: 432526, done.
remote: Counting objects: 100% (2211/2211), done.
remote: Compressing objects: 100% (501/501), done.
remote: Total 432526 (delta 2068), reused 1710 (delta 1710), pack-reused 430315 (from 3)
Receiving objects: 100% (432526/432526), 794.80 MiB | 21.73 MiB/s, done.
Resolving deltas: 100% (355738/355738), done.
Updating files: 100% (13885/13885), done.
```

5. Then go to mylammps directory, and then go to the src directory:
   $ cd mylammps/src/
6. Install the next packages using the next commands:
   $ make yes-EXTRA-COMPUTE
   $ make yes-kspace
   $ make yes-manybody
   $ make yes-plugin
   $ make yes-replica

7. Go to the interface directory and change the next line of the file install.sh:
   $ cd ../../interface-lammps-mlip-2/
   $ vi install.sh

```
#!/bin/sh

LAMMPS_PATH=$1
TARGET=$2
curdir=$(pwd)

if [ ! -f "lib_mlip_interface.a" ]; then echo Error: copy lib_mlip_interface.a to this directory.; echo
LIP root folder"; exit 1; fi
if [ ! -d "$LAMMPS_PATH/src" ]; then echo Error: run ./install.sh \<path-to-lammps\> \<lammps-target\>;

./preinstall.sh $1


cd $LAMMPS_PATH/src
make mpi-stubs
make $TARGET -lgfortran #intel_cpu_intelmpi
cd $curdir
cp $LAMMPS_PATH/src/lmp_$TARGET .
```

   Change it for (to edit the document press i)

   make mode=shared $TARGET -lgfortran #intel_cpu_intelmpi

```
#!/bin/sh

LAMMPS_PATH=$1
TARGET=$2
curdir=$(pwd)

if [ ! -f "lib_mlip_interface.a" ]; then echo Error: copy lib_mli
LIP root folder"; exit 1; fi
if [ ! -d "$LAMMPS_PATH/src" ]; then echo Error: run ./install.sh

./preinstall.sh $1


cd $LAMMPS_PATH/src
make mpi-stubs
make mode=shared $TARGET -lgfortran #intel_cpu_intelmpi
cd $curdir
cp $LAMMPS_PATH/src/lmp_$TARGET .
~
```

   Exit and save the changes pressing esc and then :wq

8. For the next step go to the mlip-2 directory and executed the next commads:
   $ cd ../mlip-2
   $ ./configure
   $ make mlp

```
[oupc@cedar2 mlip-2]$ make mlip
gcc -O3  -I./cblas -fPIC -MMD   -c ./cblas/cblas_daxpy.c -o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_daxpy.c.o
gcc -O3  -I./cblas -fPIC -MMD   -c ./cblas/cblas_dgemm.c -o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_dgemm.c.o
gcc -O3  -I./cblas -fPIC -MMD   -c ./cblas/cblas_dgemv.c -o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_dgemv.c.o
gcc -O3  -I./cblas -fPIC -MMD   -c ./cblas/cblas_dger.c -o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_dger.c.o
gcc -O3  -I./cblas -fPIC -MMD   -c ./cblas/cblas_dswap.c -o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_dswap.c.o
gcc -O3  -I./cblas -fPIC -MMD   -c ./cblas/cblas_idamax.c -o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_idamax.c.o
gfortran -O3  -fPIC -c ./cblas/daxpy.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/daxpy.f.o
gfortran -O3  -fPIC -c ./cblas/dgemm.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/dgemm.f.o
gfortran -O3  -fPIC -c ./cblas/dgemv.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/dgemv.f.o
gfortran -O3  -fPIC -c ./cblas/dger.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/dger.f.o
gfortran -O3  -fPIC -c ./cblas/dswap.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/dswap.f.o
gfortran -O3  -fPIC -c ./cblas/idamax.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/idamax.f.o
gfortran -O3  -fPIC -c ./cblas/idamaxsub.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/idamaxsub.f.o
gfortran -O3  -fPIC -c ./cblas/lsame.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/lsame.f.o
gfortran -O3  -fPIC -c ./cblas/xerbla.f -o /home/oupc/mlip_2/mlip-2/obj/cblas/xerbla.f.o
ar -rs lib/lib_mlip_cblas.a /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_daxpy.c.o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_dgemm.c.o /home/oupc/mlip_2/mlip-2/ob
j/cblas/cblas_dgemv.c.o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_dger.c.o /home/oupc/mlip_2/mlip-2/obj/cblas/cblas_dswap.c.o /home/oupc/mlip_2/mlip-2/obj/cbl
as/cblas_idamax.c.o /home/oupc/mlip_2/mlip-2/obj/cblas/daxpy.f.o /home/oupc/mlip_2/mlip-2/obj/cblas/dgemm.f.o /home/oupc/mlip_2/mlip-2/obj/cblas/dgemv.f.o /h
ome/oupc/mlip_2/mlip-2/obj/cblas/dger.f.o /home/oupc/mlip_2/mlip-2/obj/cblas/dswap.f.o /home/oupc/mlip_2/mlip-2/obj/cblas/idamax.f.o /home/oupc/mlip_2/mlip-2
/obj/cblas/idamaxsub.f.o /home/oupc/mlip_2/mlip-2/obj/cblas/lsame.f.o /home/oupc/mlip_2/mlip-2/obj/cblas/xerbla.f.o
ar: creating lib/lib_mlip_cblas.a
mpicxx -O3  -I./cblas -MMD  -DMLIP_MPI -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/common/bfgs.cpp -o /home/oupc/mlip_2/mlip-2/obj/mpi/common/bfgs.
cpp.o
mpicxx -O3  -I./cblas -MMD  -DMLIP_MPI -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/common/stdafx.cpp -o /home/oupc/mlip_2/mlip-2/obj/mpi/common/std
afx.cpp.o
mpicxx -O3  -I./cblas -MMD  -DMLIP_MPI -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/common/utils.cpp -o /home/oupc/mlip_2/mlip-2/obj/mpi/common/util
s.cpp.o
/home/oupc/mlip_2/mlip-2/src/common/utils.cpp: In function 'void OutputString(const char*, const char*)':
/home/oupc/mlip_2/mlip-2/src/common/utils.cpp:67:40: warning: format not a string literal and no format arguments [-Wformat-security]
   67 |                                 fprintf(stdout, psz_str);
      |                                         ~~~~~~~^~~~~~~~
/home/oupc/mlip_2/mlip-2/src/common/utils.cpp:70:40: warning: format not a string literal and no format arguments [-Wformat-security]
   70 |                                 fprintf(file, psz_str);
      |                                         ~~~~~~~^~~~~~~~
mpicxx -O3  -I./cblas -MMD  -DMLIP_MPI -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/drivers/basic_drivers.cpp -o /home/oupc/mlip_2/mlip-2/obj/mpi/dr
ivers/basic_drivers.cpp.o
mpicxx -O3  -I./cblas -MMD  -DMLIP_MPI -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/drivers/relaxation.cpp -o /home/oupc/mlip_2/mlip-2/obj/mpi/drive
rs/relaxation.cpp.o
mpicxx -O3  -I./cblas -MMD  -DMLIP_MPI -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/active_learning.cpp -o /home/oupc/mlip_2/mlip-2/obj/mpi/active_l
```

9. When the command above finishes execute:
   $ make libinterface

```
[oupc@cedar2 mlip-2]$ make libinterface
gfortran -O3  -fPIC -c ./cblas/daxpy.f -o /home/oupc/mlip_2/mlip-2/obj/ser/daxpy.f.o
gfortran -O3  -fPIC -c ./cblas/dgemm.f -o /home/oupc/mlip_2/mlip-2/obj/ser/dgemm.f.o
gfortran -O3  -fPIC -c ./cblas/dgemv.f -o /home/oupc/mlip_2/mlip-2/obj/ser/dgemv.f.o
gfortran -O3  -fPIC -c ./cblas/dger.f -o /home/oupc/mlip_2/mlip-2/obj/ser/dger.f.o
gfortran -O3  -fPIC -c ./cblas/dswap.f -o /home/oupc/mlip_2/mlip-2/obj/ser/dswap.f.o
gfortran -O3  -fPIC -c ./cblas/idamax.f -o /home/oupc/mlip_2/mlip-2/obj/ser/idamax.f.o
gfortran -O3  -fPIC -c ./cblas/idamaxsub.f -o /home/oupc/mlip_2/mlip-2/obj/ser/idamaxsub.f.o
gfortran -O3  -fPIC -c ./cblas/lsame.f -o /home/oupc/mlip_2/mlip-2/obj/ser/lsame.f.o
gfortran -O3  -fPIC -c ./cblas/xerbla.f -o /home/oupc/mlip_2/mlip-2/obj/ser/xerbla.f.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/common/bfgs.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/common/bfgs.cp
p.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/common/stdafx.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/common/stdaf
x.cpp.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/common/utils.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/common/utils.
cpp.o
/home/oupc/mlip_2/mlip-2/src/common/utils.cpp: In function 'void OutputString(const char*, const char*)':
/home/oupc/mlip_2/mlip-2/src/common/utils.cpp:67:40: warning: format not a string literal and no format arguments [-Wformat-security]
   67 |                                 fprintf(stdout, psz_str);
      |                                         ~~~~~~~^~~~~~~~
/home/oupc/mlip_2/mlip-2/src/common/utils.cpp:70:40: warning: format not a string literal and no format arguments [-Wformat-security]
   70 |                                 fprintf(file, psz_str);
      |                                         ~~~~~~~^~~~~~~~
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/drivers/basic_drivers.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/driv
ers/basic_drivers.cpp.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/drivers/relaxation.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/drivers
/relaxation.cpp.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/active_learning.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/active_lea
rning.cpp.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/basic_mlip.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/basic_mlip.cpp.
o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/basic_potentials.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/basic_pot
entials.cpp.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/basic_trainer.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/basic_traine
r.cpp.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/configuration.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/configuratio
n.cpp.o
g++ -O3  -I./cblas -fPIC -MMD  -fPIC -std=c++11 -DMLIP_DEV -c /home/oupc/mlip_2/mlip-2/src/error_monitor.cpp -o /home/oupc/mlip_2/mlip-2/obj/ser/error_monito
r.cpp.o
```


10. Copy lib_mlip_interface.a in the interface-lammps-mlip-2 directory:
    $ cp lib/lib_mlip_interface.a ../interface-lammps-mlip-2/
11. Go to interface-lammps-mlip-2 directory and execute install.sh:
    $ cd ../ interface-lammps-mlip-2/
    $ ./install.sh ../mylammps mpi

```
[oupc@cedar2 interface-lammps-mlip-2]$ ./install.sh ../mylammps mpi
/home/oupc/mlip_2/interface-lammps-mlip-2
Uninstalling package user-mlip
Installing package user-mlip
make[1]: Entering directory '/home/oupc/mlip_2/mylammps/src/STUBS'
rm -f *.o libmpi_stubs.a
make[1]: Leaving directory '/home/oupc/mlip_2/mylammps/src/STUBS'
make[1]: Entering directory '/home/oupc/mlip_2/mylammps/src/STUBS'
g++ -O -fPIC -I.  -c mpi.cpp
ar rs libmpi_stubs.a mpi.o
ar: creating libmpi_stubs.a
make[1]: Leaving directory '/home/oupc/mlip_2/mylammps/src/STUBS'
Gathering installed package information (may take a little while)
make[1]: Entering directory '/home/oupc/mlip_2/mylammps/src'
Gathering git version information
make[1]: Leaving directory '/home/oupc/mlip_2/mylammps/src'
Compiling LAMMPS for machine mpi
make[1]: Entering directory '/home/oupc/mlip_2/mylammps/src/Obj_shared_mpi'
cc -O -o fastdep.exe ../DEPEND/fastdep.c
make[1]: Leaving directory '/home/oupc/mlip_2/mylammps/src/Obj_shared_mpi'
make[1]: Entering directory '/home/oupc/mlip_2/mylammps/src/Obj_shared_mpi'
mpicxx -g -O3  -fPIC -DLAMMPS_GZIP -DLAMMPS_MEMALIGN=64   -I../../lib/mlip  -DMPICH_SKIP_MPICXX -DOMPI_SKIP_MPICXX=1    -lgfortran -DLMP_PLUGIN  -c ../main.c
pp
mpicxx -g -O3  -fPIC -DLAMMPS_GZIP -DLAMMPS_MEMALIGN=64   -I../../lib/mlip  -DMPICH_SKIP_MPICXX -DOMPI_SKIP_MPICXX=1    -lgfortran -DLMP_PLUGIN  -c ../angle.
cpp
```

This is the last step, so now you are able to use MLIP-2.

ARTn installation

For better details you can go to this page [Installation — plugin-ARTn v0.1 documentation]

1. For the first step you need to clone the ARTn repository:
   $ git clone https://gitlab.com/mammasmias/artn-plugin.git

```
[oupc@cedar5 ~]$ git clone https://gitlab.com/mammasmias/artn-plugin.git
Cloning into 'artn-plugin'...
remote: Enumerating objects: 17549, done.
remote: Counting objects: 100% (1931/1931), done.
remote: Compressing objects: 100% (1211/1211), done.
remote: Total 17549 (delta 1255), reused 1025 (delta 708), pack-reused 15618 (from 1)
Receiving objects: 100% (17549/17549), 112.22 MiB | 25.21 MiB/s, done.
Resolving deltas: 100% (9569/9569), done.
Updating files: 100% (629/629), done.
[oupc@cedar5 ~]$ ls
artn-plugin  mlip_2  scratch
[oupc@cedar5 ~]$
```

2. Then enter the folder artn-plugin make a folder named build and enter to that folder:
   $ cd artn-plugin && mkdir build && cd build
3. Execute the next commands:
   $ cmake .. -DWITH_LAMMPS=yes -DLAMMPS_ROOT=/path/to/lammps

```
[oupc@cedar5 build]$ cmake .. -DWITH_LAMMPS=yes -DLAMMPS_ROOT=/home/oupc/mlip_2/mylammps/
-- The CXX compiler identification is GNU 12.3.1
-- The C compiler identification is GNU 12.3.1
-- The Fortran compiler identification is GNU 12.3.1
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Check for working CXX compiler: /cvmfs/soft.computecanada.ca/gentoo/2023/x86-64-v3/usr/x86_64-pc-linux-gnu/gcc-bin/12/c++ - skipped
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working C compiler: /cvmfs/soft.computecanada.ca/gentoo/2023/x86-64-v3/usr/x86_64-pc-linux-gnu/gcc-bin/12/gcc - skipped
-- Detecting C compile features
-- Detecting C compile features - done
-- Detecting Fortran compiler ABI info
-- Detecting Fortran compiler ABI info - done
-- Check for working Fortran compiler: /cvmfs/soft.computecanada.ca/gentoo/2023/x86-64-v3/usr/x86_64-pc-linux-gnu/gcc-bin/12/gfortran - skipped
-- Setting the build type to "RelWithDebInfo" as none was specified.
-- Looking for Fortran sgemm
-- Looking for Fortran sgemm - not found
-- Performing Test CMAKE_HAVE_LIBC_PTHREAD
-- Performing Test CMAKE_HAVE_LIBC_PTHREAD - Success
-- Found Threads: TRUE
-- Looking for Fortran sgemm
-- Looking for Fortran sgemm - found
```

   $ cmake --build . --target artn -j16

```
[oupc@cedar5 build]$ cmake --build . --target artn -j16
[  1%] Building Fortran object CMakeFiles/artn.dir/src/precision.f90.o
[  3%] Building Fortran object CMakeFiles/artn.dir/src/artn_info.f90.o
[  4%] Building Fortran object CMakeFiles/artn.dir/src/artn_debug.f90.o
[  7%] Building CXX object CMakeFiles/artn.dir/Files_LAMMPS/artnplugin.cpp.o
[  7%] Building CXX object CMakeFiles/artn.dir/Files_LAMMPS/fix_artn.cpp.o
[ 10%] Building Fortran object CMakeFiles/artn.dir/src/m_tools.f90.o
[ 10%] Building Fortran object CMakeFiles/artn.dir/src/m_option.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/units.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/string_tools.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/compute_delr.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/sum_force.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/pbc.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/diag.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/center.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/permute.f90.o
[ 25%] Building Fortran object CMakeFiles/artn.dir/src/make_filename.f90.o
```

4. Go to the previous folder and execute the next command:
   $ cd ..
   $ ./configure --with-lammps LAMMPS_PATH=/home/oupc/mlip_2/mylammps/

```
[oupc@cedar5 build]$ cd ..
[oupc@cedar5 artn-plugin]$ ./configure --with-lammps LAMMPS_PATH=/home/oupc/mlip_2/mylammps/
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
>> host x86_64-pc-linux-gnu
>> host_cpu x86_64
>> host_vendor pc
>> host_os linux-gnu
>> build x86_64-pc-linux-gnu
>> build_cpu x86_64
>> build_vendor pc
>> build_os linux-gnu

-----------------------------------
   Searching system architecture
-----------------------------------
checking ARCH... x86_64
>> arch x86_64
try_f90  gfortran f90 ifx ifort nvfortran pgf90 nagfor
try_mpif90  mpif90 mpifort mpiifx mpiifort
try_cc  mpicxx gcc
try_cxx  mpicxx gcc
```

5. For the last step compile lmplib

```
[oupc@cedar5 artn-plugin]$ make lmplib
( cd src && make && cd - )
make[1]: Entering directory '/home/oupc/artn-plugin/src'
Getting version info from git
gfortran -JObj -IObj -fPIC -c -g -O0 -funroll-loops dgeev.f -o Obj/dgeev.o
gfortran -JObj -IObj -c -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interface -Wimplici
=f2008 -ffree-line-length-512  -fPIC -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interf
pedantic -std=f2008 -ffree-line-length-512  -fPIC -cpp -funroll-loops  artn_info.f90 -o Obj/artn_info.o
gfortran -JObj -IObj -c -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interface -Wimplici
=f2008 -ffree-line-length-512  -fPIC -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interf
pedantic -std=f2008 -ffree-line-length-512  -fPIC -cpp -funroll-loops  precision.f90 -o Obj/precision.o
gfortran -JObj -IObj -c -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interface -Wimplici
=f2008 -ffree-line-length-512  -fPIC -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interf
pedantic -std=f2008 -ffree-line-length-512  -fPIC -cpp -funroll-loops  m_tools.f90 -o Obj/m_tools.o
gfortran -JObj -IObj -c -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interface -Wimplici
=f2008 -ffree-line-length-512  -fPIC -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interf
pedantic -std=f2008 -ffree-line-length-512  -fPIC -cpp -funroll-loops  units.f90 -o Obj/units.o
gfortran -JObj -IObj -c -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interface -Wimplici
=f2008 -ffree-line-length-512  -fPIC -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interf
pedantic -std=f2008 -ffree-line-length-512  -fPIC -cpp -funroll-loops  m_artn_data.f90 -o Obj/m_artn_data.o
gfortran -JObj -IObj -c -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interface -Wimplici
=f2008 -ffree-line-length-512  -fPIC -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interf
pedantic -std=f2008 -ffree-line-length-512  -fPIC -cpp -funroll-loops  m_error.f90 -o Obj/m_error.o
gfortran -JObj -IObj -c -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interface -Wimplici
=f2008 -ffree-line-length-512  -fPIC -g -O2 -fcheck=bounds -Wunused -Wall -Wconversion-extra -Wextra -Wimplicit-interf
pedantic -std=f2008 -ffree-line-length-512  -fPIC -cpp -funroll-loops  string_tools.f90 -o Obj/string_tools.o
string_tools.f90:32:44:

   32 |     character(len=:), allocatable :: ctmp(:)
      |                                            ^
Warning: '.ctmp' is used uninitialized [-Wuninitialized]
string_tools.f90:109:26:

  109 |   end subroutine read_line
      |                          ^
```

You finish the installation now you are able to use ARTn