INCA HowTo -- Debug
18 sept 2012

Script_output

```
########################################
#      ANOTHER GREAT SIMULATION      #
########################################
 First part : pre-run
########################################
#     DIR BEFORE RUN EXECUTION       #
########################################
 Second part :  run
########################################
#      DIR AFTER RUN EXECUTION       #
########################################
 Third part :  post_run
```

During a simulation we can see two types of bug :

- **The simulation crash**
- The simulation finish well, but the output are wrong

What can I do when a simulation crash (Titane – Curie)

1) Recompile without optimisation and with debug option :

- For LMDZ and INCA you need to change config/LMDZORINCA/Makefile

```
aer_lmdz9695:
	(cd ../../modeles/INCA3; ./makeinca_fcm -chimie AER -debug -parallel mpi -resol
96x95x19 -arch $(FCM_ARCH); (...) )
#	(cd ../../modeles/LMDZ; ./makelmdz_fcm (...) ce0l ; cp
bin/ce0l_96x95x19_phylmd_para_inca.e ../../bin/create_etat0_limit.e ; )
	(cd ../../modeles/LMDZ; ./makelmdz_fcm -cpp ORCHIDEE_NOOPENMP -debug -d
96x95x19 -chimie INCA -v true -parallel mpi  -arch $(FCM_ARCH) gcm ; (...)  )
```

- For ORCHIDEE you need to change util/AA_make.gdef

```
#-Q- titane  F_O = -DCPP_PARA -O3  -p -g -traceback $(F_D) $(F_P) -I$(MODDIR)
-module $(MODDIR)
```

Warning : after this second modification you need to recreate all the Makefile and recompile. Don't forget to change config/LMDZORINCA/Makefile after the command ins_make

```
cd util; ./ins_make; cd ../config/LMDZORINCA/ ; gmake clean; gmake
```

2) Recompile for checking array overflow

- For LMDZ and INCA you need to modify arch configuration : LMDZ(INCA)/arch/arch-X64_TITANE.fcm or arch-X64_CURIE.fcm

```
%DEBUG_FFLAGS        -p -g -traceback  -check bounds
```

- For ORCHIDEE you need to modify AA_make.gdef

```
#-Q- titane  F_O = -DCPP_PARA -p -g -traceback  -check bounds  $(F_D) $(F_P) -I$
(MODDIR) -module $(MODDIR)
```

As previously remember to recreate all the Makefiles and recompile.

Autopsy on error files

- Debug/***_out_execution_error → Lmdz (+ Inca3)
- Debug/***_inca_out → Inca4
- Debug/***_out_orchidee → Orchidee

Questions :

- Is there any error message ? If you don't understand it : use google !!

- Is there a line number ? For which file ?

Warning : the line number correspond to the pre-process file and not to the original file. You can found pre-process files here :

- modeles/INCA3/config/ppsrc/
- modeles/LMDZ/libo/.../.config/ppsrc/

Ex: Orchidee_output with check bounds

```
forrtl: severe (408): fort: (2): Subscript #1 of the array NEIGHBOURS has value 1 which is greater
than the upper bound of 0

Image              PC                Routine            Line        Source
gcm.e              000000000180B6ED  Unknown               Unknown  Unknown
gcm.e              000000000180A1F5  Unknown               Unknown  Unknown
gcm.e              00000000017B45D9  Unknown               Unknown  Unknown
gcm.e              000000000176A9EF  Unknown               Unknown  Unknown
gcm.e              000000000176ADF2  Unknown               Unknown  Unknown
gcm.e              0000000000F43E96  surf_land_orchide     694  surf_land_orchidee_noopenmp_mod.f90
gcm.e              0000000000F3A852  surf_land_orchide     318  surf_land_orchidee_noopenmp_mod.f90
gcm.e              0000000000F359E9  surf_land_mod_mp_         127  surf_land_mod.f90
gcm.e              0000000000E7D0EE  pbl_surface_mod_m         819  pbl_surface_mod.f90
gcm.e              0000000000667FE7  physiq_                  3221  physiq.f
gcm.e              000000000054D5DC  calfis_p_                 753  calfis_p.f
gcm.e              00000000004AB316  leapfrog_p_              1021  leapfrog_p.f
gcm.e              0000000000451CCE  MAIN__                    759  gcm.f
gcm.e              000000000044F7FC  Unknown               Unknown  Unknown
libc.so.6          0000003F1021D974  Unknown               Unknown  Unknown
gcm.e              000000000044F6C9  Unknown               Unknown  Unknown
--------------------------------------------------------------------------
```

Several reflex

- Relaunch to check if it's not a computer problem
- Add print for understanding the problem
- Disconnect a part of the code (orchidee – radiativ etc...)
- If it's a problem with input file (like « open » or « read »), check this file : does it exist ? Does it full or empty ? ....
- Where can you check input files ?
  - ➔ In Script_Output file (« ls » just before the execution)
  - ➔ In running directory : $SCRATCHDIR/RUN_DIR/n°Id job/...

In all cases, before doing anything : read the code and look for a solution