CMS software tutorial (part 3)

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- **Summary of the last session.**
  - where do we find the examples on the web/afs
  - let‘s repeat the ntuple example
- **A ROOT example**
  - how do we let scram know about external software.
  - the root example
- **running cmgen and cmsim**

Where do we find slides, examples etc.

On the web
http://computing.fnal.gov/cms/hans/tutorial

in afs space
/afs/fnal/files/expwww/computing/home/cms/html/hans/tutorial

we will make use of this files in this tutorial session.
For the reference manual (class diagrams etc.) and user guide have a look at:
http://cmsdoc.cern.ch/orca/

The ntuple example

```
cd /data/wenzel                                   ! change to point to where you want to have it
cp /afs/fnal/files/expwww/computing/home/cms/html/hans/tutorial/Rootexamples/environment/cms.csh .
source cms.csh                                    ! set up the environment
scram list ORCA
scram project ORCA ORCA_4_5_3
cd ORCA_4_5_3/src
ls ../.SCRAM/ToolFiles/
project ORCA
cvs co Examples/Tutorial
cd Examples/Tutorial/
scram b shared
scram b bin
eval ‘scram runtime –csh‘
more /data/wenzel/ORCA_4_5_3/config/Runtime
more .orcarc
oocheckams
oocheckls
cp /afs/fnal/files/expwww/computing/home/cms/html/hans/tutorial/Ntupleexamples/dbreading.env .
more dbreading.env
eval ‘scram runtime –csh dbreading.env ‘
ExTutNtuple
ls
```

The ROOT example

In the last tutorial we learned how to make scram aware of external libraries like ROOT

cd ORCA_4_5_2/.SCRAM/ToolFiles

create a file

root_3.1.6

Then type:

scram setup tool root file:/data/wenzel/ORCA_4_5_3/.SCRAM/ToolFiles/root_3.1.6

Note as in the example above you have to specify the complete path to the file describing the the tool!!! A relative path doesn't work!!!

At Fermilab root is now included as default in ORCA_4_5_3 so we don't have to mess with the scram configuration. But as of now this is only true for ORCA_4_5_3 at FNAL.

The ROOT example(cont.)

Make sure you execute the ntuple example first! In the following we use the environment set up by the ntuple example!

```
# make sure we are in the tutorial directory:

cd /data/wenzel/ORCA_4_5_3/src/Examples/Tutorial

# copy the necessary files over:

cp /afs/fnal/files/expwww/computing/home/cms/html/hans/tutorial/Rootexamples/src/BuildFile .
cp /afs/fnal/files/expwww/computing/home/cms/html/hans/tutorial/Rootexamples/src/ExRoot.cpp .
cp /afs/fnal/files/expwww/computing/home/cms/html/hans/tutorial/Rootexamples/src/ExSimpleCaloAnalysis_Root.cc .
cd interface
cp/afs/fnal/files/expwww/computing/home/cms/html/hans/tutorial/Rootexamples/src/interface/ExSimpleCaloAnalysis_Root.h .
cd ..

# build the executable:

scram b shared
scram b bin
eval ` scram runtime -csh`
rehash
eval ` scram runtime -csh dbreading.env`
ExRoot
ls

# now let's look at the result using root
root            ! start a root session
TBrowser b      ! will start a graphical browser to analyze the data
```

The ROOT example(cont.)

What did we need?

3 Files in the source area:

```
BuildFile
ExRoot.cpp
ExSimpleCaloAnalysis_Root.cc
```

1 File in the src/interface area:

```
ExSimpleCaloAnalysis_Root.h
```

Let's look at the files!

But we only used a very basic ROOT example. We just translated the ntuple example into root. We haven't really gained much but the knowledge how to do it. The example didn't involve storing your own root classes (objects) and store them in a root file. While this tutorial is not about root I will make some examples available (next session) which demonstrate some of the more advanced features of root and c++. You can judge if we actually gained something.

How to run cmgen and cmsim (back to Fortran)

Basically the procedure is described on

http://computing.fnal.gov/cms/Monitor/cms_production.html

anonymous access to our cvs repository:

cvs –d :pserver:anonymous@cdcvs.fnal.gov:/cvs/cd_read_only login

When prompted for a password, type

anoncvs

Let’s try to check out cms_production package. Just type

cvs –d :pserver:anonymous@cdcvs.fnal.gov:/cvs/cd_read_only checkout cms_production

then change to the newly created directory

cd cms_production

The following automatically generated web page shows the contents of the cvs repository.

http://cdcvs.fnal.gov/cgi–bin/public–cvs/cvsweb–public.cgi/cms_production

How to run cmgen and cmsim (back to Fortran)

```
cd /data/wenzel
source /afs/fnal.gov/files/code/cms/setup/cshrc          ! setup for cms software
cmsim cms120                                             ! setup cms120
cvs –d :pserver:anonymous@cdcvs.fnal.gov:/cvs/cd_read_only login
anoncvs                                                  ! passwd
cvs –d :pserver:anonymous@cdcvs.fnal.gov:/cvs/cd_read_only checkout cms_production
cd cms_production
cd src
cmsbuild120                                  ! create cmsim execuatble cms120.exe
kine_make_ntpl_pyt_120.com cms120            ! create generator executable
cd ..                                        ! back to the cms_production root directory
scripts/setup.csh jetsmet jm_minbias 2 3 800001 800000 800000 1 cms120
kine_make_ntpl_pyt_cms120.exe cms120.exe
cd Projects/jm_minbias/pending
mv ../scripts/* .
jm_minbias_800001.run > & ../output/jm_minbias_800001.out &
jm_minbias_800002.run > & ../output/jm_minbias_800002.out &
```

How to run cmgen and cmsim (back to Fortran)

```
cd /data/wenzel/cms_production
cd src/cmsim_single/
cmsbuild120
ls ../../bin
cd ../..                                             ! back to the cms_production root directory
scripts/setup.csh jetsmet jm_ele_pt30_eta5 2 3 800001 800000 800000 1 cms120 none cms120_single.exe
cd Projects/jm_ele_pt30_eta5/pending
mv ../scripts/* .
jm_ele_pt30_eta5_800001.run > & ../output/jm_ele_pt30_eta5_800001.out &
jm_ele_pt30_eta5_800002.run > & ../output/jm_ele_pt30_eta5_800002.out &
```

What‘s next

- analyze the pythia output using root
  http://home.fnal.gov/~leer/simple_analysis.html
- proceed to the end zone

  - creating an objectivity federation
  - OOHit formatting
  - OODigis
- A more sophisticated ROOT example.