

AlexeyBoldyrev - 2016-02-16

## shell

- Find by name:

```
find . -name "filename"
```

- Find the word `foo` in files recursively:

```
grep -r "foo" .
```

- Rename `sample.root` to `2HDM_800.root` recursively:

```
find . -iname "*sample.root*" -exec rename sample.root 2HDM_800.root '{}' \;
```

- Compare two files including line permutations

```
diff <(sort file1) <(sort file2)
```

- Display 2nd line of the file

```
awk 'NR==2' file.txt
```

- Display 19th line from the end of the file

```
awk -v n=$n '{x[NR%19]=$0}END{print x[(NR+1)%19]}' file.txt
```

## ROOT tips

### Draw over sum

- `nominal_Loose->Draw("Sum$(jet_pt)","nJets==6",")"`

### Get list of branches

- `root -l file.root`
- `nominal->MakeClass()`

### Open a root file, then Print() and Scan() it.

```
{
  TFile f("wp.root" );
  TTree *t = f.Get( "A0physics" );
  t->Print();
  t->Scan( "EVT", "passIso==1&&wLJ==1" );
}
```

### Example:

```
physics->Scan("EventNumber:el_n:mu_n:tau_n:trk_n:jet_n:mcevt_weight:mc_n", "EventNumber==10441484")
```

### How to check duplicate events in a TTree?

```
root[0] myTree->SetScanField(0);
root[1] myTree->Scan("eventNb:runNb:LS:zVtx:Reco_QQ_4mom.M()"); >tree.log
$ wc -l tree.log
$ sort -u tree.log | wc -l
```

If the tree has duplicated events, both `wc -l` will not give same number of lines.

### Draw variables with a selection using GUI

- Mouse right click on the your **Tree** of "Files" panel/tab. Select **StartViewer**
- Drag and drop your *variable* into **X**:
- Drag and drop your *cut variable* into **Scissors**
- Mouse right click on the **Scissors**. Select **EditExpression** and put desired *selection*

### Draw variables from command line

- `TFile *f = new TFile("ttbar.root", "READ");`
- `nominal->Draw("Centrality_all")`
- `nominal->Draw("Centrality_all", "weight_mc>0", "same")`

### Draw normalised variables at the same canvas

```
nominal.Draw("TMVA_NB>>pos", "", "weight_mc==1")
pos->SetLineColor(kRed);
pos.GetYaxis()->SetRange(0.0,0.03)
Double_t scale = 1/pos.Integral()
pos.Scale(scale)
nominal.Draw("TMVA_NB>>neg", "", "weight_mc<0")
Double_t scale2 = 1/neg.Integral()
neg.Scale(scale2)
pos.Draw()
neg->SetLineColor(kBlue);
neg.Draw("same")
c1->SaveAs("ttbb_TMVA_NB_pos_neg.png")
.q
```

### ROOT >6.06 features

<https://root.cern.ch/how/how-quickly-inspect-content-file>

### Special variables

- `Alt$(primary, alternate)` : return the value of "primary" if it is available for the current iteration otherwise return the value of "alternate". For example, with `arr1[3]` and `arr2[2]`
- `Entry$` : return the current entry number (same as `TTree::GetReadEntry()`)
- `LocalEntry$` : return the current entry number in the current tree of a chain (same as `GetTree()->GetReadEntry()`)
- `Entries$` : return the total number of entries (same as `TTree::GetEntries()`)
- `Length$` : return the total number of element of this formula for this entry (same as `TTreeFormula::GetNdata()`)
- `Iteration$` : return the current iteration over this formula for this entry (i.e. varies from 0 to `Length$`).
- `Length$(formula)` : return the total number of element of the formula given as a parameter.
- `Sum$(formula)` : return the sum of the value of the elements of the formula given as a parameter. For example the mean for all the elements in one entry can be calculated with:  
`Sum$(formula)/Length$(formula)`

### Root Commands and Examples:

- <http://home.fnal.gov/~apana/roottips.html>
- [http://www.ifm.umich.mx/~villasen/MiniTallerHAWC\\_ROOT/RootBasicTutorial.html](http://www.ifm.umich.mx/~villasen/MiniTallerHAWC_ROOT/RootBasicTutorial.html)

## GRID tools

- Setup rucio

```
setupATLAS
lsetup rucio
voms-proxy-init -voms atlas
```

- List files:

```
rucio list-dids user.boldyrev.*02-09-1_output.root
```

- Download datasets or files:

```
rucio download user.boldyrev.*02-09-1_output.root
```

- Download single file:

For example, to download the file DAOD\_TOPQ1.06850222.\_000001.pool.root.1 of the dataset rucio download

mc15\_13TeV.410000.PowhegPythiaEvtGen\_P2012\_ttbar\_hdamp172p5\_nonallhad.merge.DAOD\_TOPQ1.e3698\_s26 do the following:

```
rucio download mc15_13TeV:DAOD_TOPQ1.06850222._000001.pool.root.1
```

or

```
rucio download --nrandom 1 mc15_13TeV:mc15_13TeV.343367.aMcAtNloPythia8EvtGen_A14_NNPDF23_NNPDF30
```

- Find which dataset to which a file belongs

```
setupATLAS
lsetup rucio
rucio list-file-replicas mc15_13TeV:DAOD_TOPQ1.07174728._000001.pool.root.1
rucio list-file-replicas mc15_13TeV:DAOD_TOPQ1.06405917._000001.pool.root.1
```

- Example download procedure

```
directory_download="/data/wbm/ATL-TAS/ATL-TAS-2015-150/records/2015-11-20T1645Z"
mkdir -p "${directory_download}"
cd "${directory_download}"
setupATLAS
localSetupRucioClients
voms-proxy-init -voms atlas
rucio list-dids user.aknue.*p2425.02-03-30-01-largeR25ns_newGRL_output.root
rucio download user.aknue.*p2425.02-03-30-01-largeR25ns_newGRL_output.root
```

## SVN

- <http://svnbook.red-bean.com/>
- `svn co svn+ssh://boldyrev@svn.cern.ch/repos/atlasinst/Institutes/UdineICTP/package package`
- `svn co svn+ssh://boldyrev@svn.cern.ch/repos/atlasphys-exo/Physics/Exotic/HQT/FourTopsLJets/Run2/Mo trunk`

### To update or commit:

```
svn update [files]
svn commit [files] -m 'comments'
```

- To create a new project:  
[https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/SoftwareDevelopmentWorkBookSVN#How\\_to\\_imp](https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/SoftwareDevelopmentWorkBookSVN#How_to_imp)
- To tag a version:  
[https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/SoftwareDevelopmentWorkBookSVN#How\\_to\\_Con](https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/SoftwareDevelopmentWorkBookSVN#How_to_Con)
- To manage access rights: <https://atlas-svnadmin.cern.ch/repository/>

### Other useful SVN commands:

- to setup our group svn: `export SVNROOT=svn+ssh://svn.cern.ch/repos/atlasinst/Institutes/UdineICTP`
- to get a package: `svn co $SVNROOT/< Package > Package`
- to update: `svn update`
- to commit changes: `svn commit [] -m "< description >"`
- `svn info` (info about files)
- `svn log --limit 3` (last 3 log entries)
- `svn status -u` (shows if file is out-of-date w.r.t. repository with \* in 8th column)
- `svn resolve --accept working sandwich.txt` (After manual edit of file to resolve conflict by hand using working copy)
- `svn propset svn:keywords "Date Author Rev"` (then add fixed width tags \$Rev:: \$ )
- `svn propedit svn:ignore .` (then add filenames and wildcard patterns to list of files to ignore for directory ".")
- `svn log -v -r HEAD:BASE` (shows log entries between your base version and the head version. -v option is verbose = shows which files changed)
- `svnadmin create RepositoryName` (cd to directory where you want the repo first!)
- `svnadmin dump /path/to/repository > repository-name.dmp` (export entire repository to a file)
- `svnadmin load --force-uuid repository-name< repository-name.dmp` (import entire repository from a file)
- `svnadmin recover /path/to/repository` (makes repository self-consistent again - use if you get errors)
- `svn diff --diff-cmd /usr/bin/diff -x "-B -b"` (use your own diff command and pass args into it)
- `svn status -v -N` (list each files status and which revision it was last modified, do not recurse into subdirs (-N) )

### SVN Twiki:

- <https://twiki.cern.ch/twiki/bin/viewauth/Atlas/SoftwareDevelopmentWorkBookSVN>
- <https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/SoftwareDevelopmentWorkBook>

## LaTeX

- (l<sub>x</sub>plus) `export PATH=/afs/cern.ch/sw/XML/texlive/latest/bin/x86_64-linux:$PATH`
- spell-check: `ispell -d british -t file.tex`

## PDF tricks

- Insert blank page after every page (useful for slides review)

```
#!/bin/bash
```

```
if [ $# -ne 1 ]
then
  echo "Usage example: ./bashscript src.pdf"
  exit $E_BADARGS
else
  NUM=$(pdftk $1 dump_data | grep 'NumberOfPages' | awk '{split($0,a," "); print a[2]}')
  COMMSTR=' '

  for i in $(seq 1 $NUM);
  do
    COMMSTR="$COMMSTR A$i B1 "
  done
  $(echo "" | ps2pdf -sPAPERSIZE=a4 - pageblanche.pdf)
  $(pdftk A=$1 B=pageblanche.pdf cat $COMMSTR output 'mod_'$1)
  (pdfnup 'mod_'$1 --nup 1x1 --landscape --outfile 'print_'$1)
  $(rm pageblanche.pdf && rm 'mod_'$1)
fi
```

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