Exercícios ROOT/C++.

1) The root file *TTree_example.root* contains an ntuple with simulated data from the ATLAS experiment at CERN. Open the file using a ROOT TBrowser, open the graphical editor to plot a histogram of the variable dRBB. Using the graphical editor, change the histogram to make it look nicer: colour and with of the lines, logarithmic scale, change the size of the fonts, … Save the plot in a png file using the graphical editor.

2) With the help of the ROOT reference guide (www.root.cern.ch), write down a program that opens the file *TTree_example.root*, creates a pointer to access the Tree and does the following:
   a. Print the content of the TTree in the screen.
   b. Create 4 histograms to plot the following variables: mu_pt, el_pt, met_phi, mTV.
   c. Fill the histograms using the data from the TTree and store them in an output root file.
   d. Draw the histograms of mu_pt and el_pt in the same TCanvas, with different line colours and save the results on a png file.
   e. Print in the screen the number of entries of the TTree and also the number of entries of the met_phi histogram.

3) Open the file *ntuple_WHln125_teste.root* and look at its contents using a TBrowser. Create an analysis structure to loop on this Three using the following commands:

```
TFile *f = new TFile("ntuple_WHln125_teste.root")  // open the file
f.ls() //olhar para o conteúdo
OneLeptonMu.MakeClass("AnalysisClass") //create analysis class
```

   a. `Open` AnalysisClass.C and follow the instructions to run over all the events of the Three.
   b. In the function Loop create a histogram at the begining, fill it with the transverse momentum of the lepton (variable called pTL) following the example:

```
if (fChain == 0) return;

Long64_t nentries = fChain->GetEntriesFast();

// Crie aqui os seus histogramas:

TH1F *h1 = new TH1F("h1","Teste", 100, 0., 300.);
h1->SetXTitle("b-jet transverse momentum (GeV)");
h1->SetLineColor(4);

Long64_t nbytes = 0, nb = 0;
for (Long64_t jentry=0; jentry<nentries;jentry++) {
   Long64_t ientry = LoadTree(jentry);
   if (ientry < 0) break;
   nb = fChain->GetEntry(jentry);   nbytes += nb;
   // if (Cut(ientry) < 0) continue;

   //Preenche o histograma com a variável pTB1, evento a evento:
   h1->Fill( (pTB1/1000.) );
}

h1->Draw();
}
```