



ROOT - user interface to ROOT

- ✓ User class methods of general interest can be placed available in a *Computational Physics library* - collaborative work!
The user has to link its C++ program with this library to get access to the class methods there implemented
- ✓ In order to provide an easy user interface to graphics displays using ROOT I made a starting class interface
- ✓ *cFCgraphics class* that provides access to ROOT in a easy way

cFCgraphics.h

```
#ifndef __CFCG__
#define __CFCG__

#include <string>
using namespace std;

class TList;
class TApplication;

class cFCgraphics {
public:
    cFCgraphics();
    ~cFCgraphics();
    //create Pad and add objects to it
    TPad* CreatePad(string PadName);
    void AddObject(TObject *obj, string PadName);
    void AddObject(TObject *obj, string PadName,
                  string sopt);
    void DrawPad(string PadName);
    void DumpPad(string PadName);
    (...)
```

cFCgraphics.h

```
(...)
//add objects to Canvas
void AddObject(TObject *obj=NULL );
void ListObjects();
void Draw(string sopt="all");
int GetNumberOfListEntries();
void Print(string); //save to file

// clear objects
void Clear();

private:
    TApplication *gMyRootApp;
    TList *L, *Ltmp; //list of ROOT objects
    map<string,TPad*> Mpad;
    map<string,TPad*>::iterator itMpad;
    TCanvas* fCanvas;
    static int Ncanvas;
};
#endif
```



ROOT - user interface to ROOT (cont.)

cFCgraphics.C

```
#include <TROOT.h>
#include <TGFrame.h> //gClient
#include <TCanvas.h>
#include <TPad.h>
#include <TSystem.h>
#include <TList.h>
#include <TApplication.h>
#include <TVirtualX.h>
#include <TFl.h>

#include <iostream>
using namespace std;
#include "cFCgraphics.h"

cFCgraphics::cFCgraphics () {
    L = new TList(); //create TList
    //create application
    int argc = 0;
    char **argv = NULL;
    gMyRootApp = new TApplication("Comput Phys Application", &argc, argv);
}

cFCgraphics::~cFCgraphics () {
    delete gMyRootApp;
    delete L;
}
```



ROOT - user interface to ROOT (cont.)

cFCgraphics.C (cont.)

```
void cFCgraphics::AddObject(TObject *obj) {
    if (obj) {
        L->Add(obj);
        cout << Form("[cFCgraphics::AddObject] %s added.. .(Total nb objects=%d)\n", obj->GetName(), GetNumber
    }
}

void cFCgraphics::ListObjects() {
    TListIter next(L);
    TObject *to;
    cout << Form("[cFCgraphics::ListObjects] (Total nb objects=%d)\n", GetNumberOfListEntries());
    while ((to=next())) {
        cout<< Form("----> %s \n",to->GetName());
    }
    cout<< endl;
}
```



ROOT - user interface to ROOT (cont.)

cFCgraphics.C (cont.)

```
void cFCgraphics::Draw(string sopt) {
    cout<< Form("[cFCgraphics::Draw] Drawing objects...[%s]\n",sopt.c_str());
    //new canvas
    TCanvas *fCanvas = new TCanvas(Form("FC_canvas_%s",sopt.c_str()), Form("Canvas - %s", sopt.c_str()), 900, 700);
    //all or only one object
    if (sopt == "all") {
        // ... get number of list entries
        int count = GetNumberOfListEntries();
        int nlines = count/3;
        int ncolus = count%3;
        if (nlines==0) {
            fCanvas->Divide(ncolus,nlines+1);
        } else {
            fCanvas->Divide(3,nlines+1);
        }
    }
    TListIter next(L);
    TObject *to;
    int n = 0;
    while ((to=next())) {
        n++;
        fCanvas->cd(n);
        to->Draw();
    }
} else {
    TObject *o = L->FindObject(sopt.c_str());
    if (o) o->Draw();
}
fCanvas->Update();
fCanvas->SaveAs(Form("FC_canvas_%s",sopt.c_str()));
gMyRootApp->Run(kTRUE);
}
```



ROOT - user interface to ROOT (cont.)

cFCgraphics.C (cont.)

```
int cFCgraphics::GetNumberOfListEntries() {
    TListIter next(L);
    TObject *to;
    int count=0;
    while ((to=next())) {count++;}
    return count;
}
```



ROOT - user interface to ROOT (cont.)

The following C++ program adds four ROOT graphics objects to the *cFCgraphics* class to display them.

main program: Rgraphics.C

using class cFCgraphics

```
// F Barao (FC, Jul 2014)
// g++ -o Rgraphics.exe \
// Rgraphics.C cFCgraphics.C

#include <cmath> //exp
#include <cstdlib> // for atof(3)
#include <iostream>
using namespace std;
#include <TF1.h> //ROOT TF1
#include "cFCgraphics.h" //my class

int main(int argc, const char* argv[]) {
    cFCgraphics gr;
    TF1 *f1 = new TF1("FCsinx","sin(x)", 0., 10.);
    gr.AddObject(f1);
    gr.AddObject(new TF1("FCexp","exp(x)", 0., 10.));
    gr.AddObject(new TF1("FCsinxx","sin(x)/x", 0., 10.));
    gr.AddObject(new TF1("FClogx","log(x)", 0., 10.));
    gr.ListObjects(); // list user stored objects
    gr.Draw(); // draw user objects
    gr.Print("Rgraphics.eps"); // save objects
    return 0;
}
```

