

New ROOT Interfaces

Extending THist

Axel Naumann

2016-03-23

Old / New Comparison

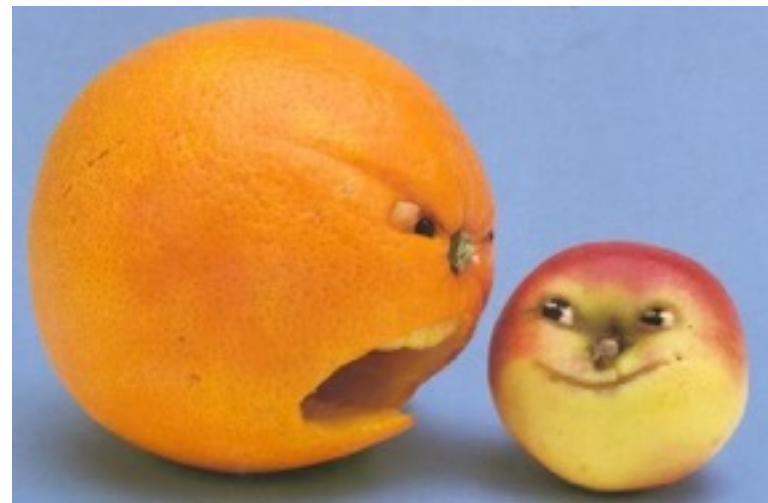
- At root.cern.ch/root-7
 - please comment
- What would you like to see?
 - challenge interfaces
 - reality check

THist News

- Changed the innards, again: THist<DATA>
 - where DATA is e.g.
THistDataContent<1, float>,
THistDataUncertainty<2, double>,
THistDataMoments<3, int>
- Bin content close to whatever other bin data
- Iteration now on single entity

Add(THist&, const THist&)

- ROOT 6 implementation > 100 lines



- (though

)

- Now, apply lambda to all bins:

```
auto add = [fillTo, to](const FromCoord_t& x,  
                        FromWeight_t c) {  
    (toImpl->*fillFuncTo)(x, c);  
};  
from.ApplyXC(add);
```

THistImpl::Apply

- Iterates over bins (soon possibly using THistView)
- Abstracting out bin iteration, ranges etc
- Add() is free function
 - i.e. same simplicity holds for your fancy histogram operation

THist Design

- THist: coordinates, forwards to THistImpl
- THistImpl: translate coordinate to bin index (axes)
- THistData...<DIM, PRECISION, STORAGE>:
provides DIM-dimensional storage for PRECISION
data

Extending THist

- Disclaimer: expert use.
- THistData...<DIM, PRECISION, STORAGE>:
using template template arg STORAGE
 - default: vector
- Can now “naturally” implement sparse storage, lazy allocation, buffer / TTree backend (*), TGraph (*), moments-based data storage
 - (*): ignoring axes

Next Steps

- Danilo working on unique_ptr I/O
 - write a THist using new I/O interfaces!
- Profiling of THist operations using current design