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PROPOSED LHCb coding convention: Access to MonteCarlo truth

Proof of concept available: 11th September 2000
Presentation: LHCb week in Milano
Deadline for comments: 16th October 2000
Implementation: Gaudi release 6, Brunel v2

Background

During the code reviews that took place in the spring, it became clear that various approaches are possible to implement navigation from reconstructed simulated data back to the MonteCarlo truth information. The different approaches all have their advantages and disadvantages, it is premature, and may be even not possible, to recommend a unique approach.

In order to shield the code from the implementation details of the navigation procedure, and to provide a uniform interface to the user code, it has been decided to implement a set of Gaudi Tools, called *associators*, to perform the navigation. As long as the corresponding associator has been implemented, the user can navigate between any two arbitrary classes with the same interface. An added advantage of this approach is that the implementation of the navigation can be modified at a later date without affecting the reconstruction and analysis algorithms: only the associators would need to be modified.

Another important constraint is that reconstruction code should treat simulated data in an identical way to real data. All knowledge about the MonteCarlo should be confined to components that can be, optionally, executed when processing MonteCarlo data, but which do not affect the reconstruction algorithms.

Implementation

A proof of concept *associator* is currently being designed. It is hoped to have an example implementation by the beginning of September.

Proposal

Finally, it is recommended that associations between raw/reconstructed data and MC truth be done only in dedicated *monitor* algorithms which are well separated from the reconstruction or analysis code, and which can of course be different depending on whether one is analysing real or simulated data.

Provided the proof of concept implementation is satisfactory, following rules are proposed for Brunel:

1. All navigation between reconstructed data or digitisation output ("raw") data and MC truth must be done via *associator* tools.

2. The reconstruction code must not assume any knowledge of how the navigation is implemented. In particular, objects in which the navigation is implemented by a MC derived class inheriting from a "real data" base class may be accessed by the reconstruction algorithms only via their "real data" base class.

3. All comparisons with MC truth should be done inside dedicated *monitor* algorithms that are separate from the reconstruction/analysis algorithms. Monitor algorithms can also be used as a temporary measure to implement "cheating" algorithms in cases where the corresponding reconstruction algorithms have not yet been implemented.

If the Brunel sub-detector contacts agree, rules 1 and 2 will become mandatory as soon as the associator concept has been demonstrated. Rule 3 will be mandatory from Brunel v2.