

An analysis object factory

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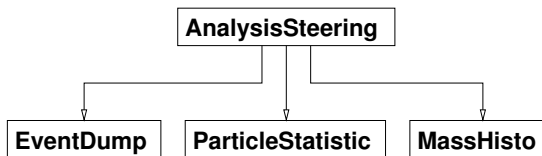
Università di Padova

“Object oriented programming and C++” course

The “analysis factory”

The creation of `EventDump`, `ParticleStatistic` and `MassHisto` objects is delegated to a class `AnalysisFactory` object.

- All analyzers derive from the common `AnalysisSteering` interface.
- The concrete analyzers must be known by the objects creating them.



Requirements

- We want avoid an explicit dependence of `AnalysisFactory` on the concrete analyzers.
- We want avoid the need of modifying `AnalysisFactory` when new analyzers are available.

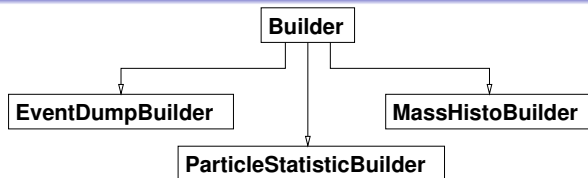
In this way the flexibility of the system is significantly improved.

Analysis builder

We create a `Builder` interface, with a virtual function `create` returning a pointer to `AnalysisSteering`.

- It's not a "Builder" in the sense used in the pattern with the same name.
- It's more similar to an "Abstract Factory".
- A concrete builder, e.g. `EventDumpBuilder`:
 - is a class deriving from `Builder`,
 - implements `create` to return a concrete analyzer, e.g. `EventDump`.
- In an analogous way:
 - `MassHistoBuilder` creates a `MassHisto`,
 - `ParticleStatisticBuilder` creates a `ParticleStatistic`.
- `AnalysisFactory` holds a list of pointers to `Builders`.

Builder list fill



How do we create the Builders and fill the list of their pointers in AnalysisFactory ?

- In AnalysisFactory we provide a static function taking a pointer to Builder as parameter, and saving it in the list.
- In the constructor of Builder that function is called giving this as parameter.
- We create static concrete Builders, so that:
 - they're created at the execution start,
 - when they're created, the Builder constructor is run,
 - they're automatically registered in the list.

Builder names

We want to decide at runtime which analyzers are to be created and run.

- In `AnalysisFactory` we store pointers to `Builder` into a `std::map`, using `std::strings` as key.
- Each `Builder` is identified by its name.
- The function `create` in `AnalysisFactory` selects only `Builders` whose name is given in the command line, and runs their `create` function.