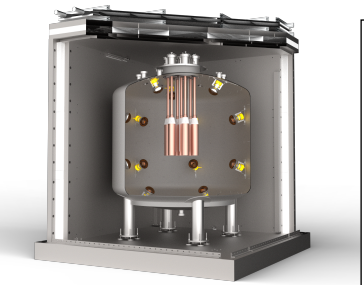
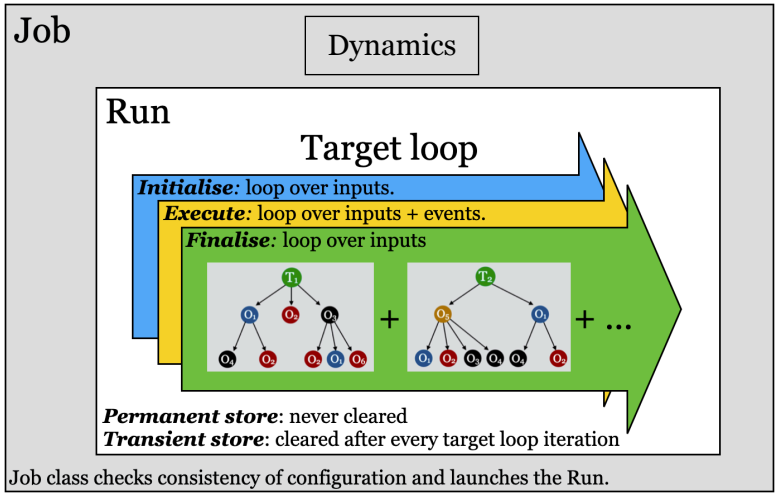
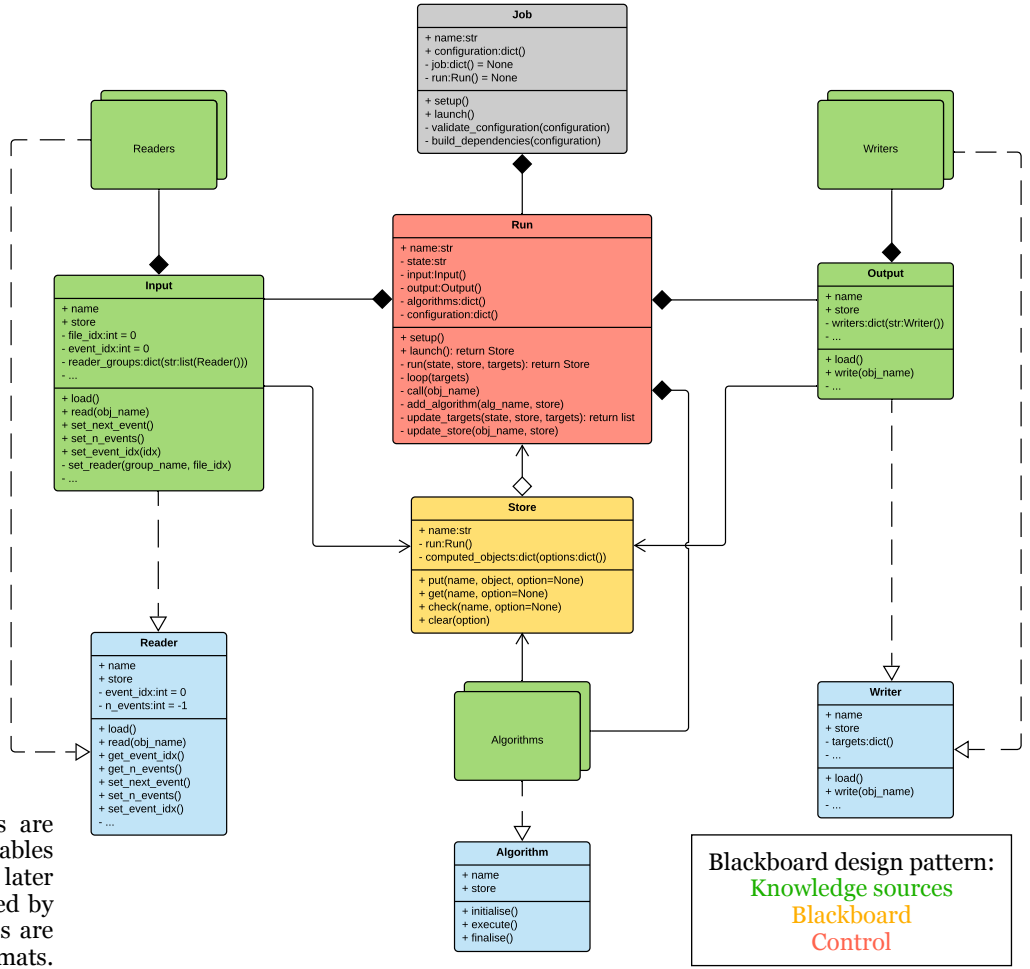
Pyrate: a novel system for data transformation, reconstruction and analysis



Developed entirely in python for the SABRE dark matter direct detection experiment (~20 analysers). About 50 channels.

- **Data transformation**: *e.g.* binary to ROOT.
- **Event reconstruction**: Event building, calibrations, waveform digitisation for MC etc.
- **Data analysis**: event selection, event weighting, plotting.





"Target" objects are resolved in three states where dependencies on other objects are resolved dynamically. A **lightweight and efficient** workflow is achieved where variables are shared using a Store element and are only computed once in the run and retrieved later as needed. Input, Output and Algorithm classes access the Store. Objects are computed by Algorithms only as needed and configured using .yaml files. The Input/Output classes are composed of many Readers/Writers for individual files supporting a variety of formats.

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