

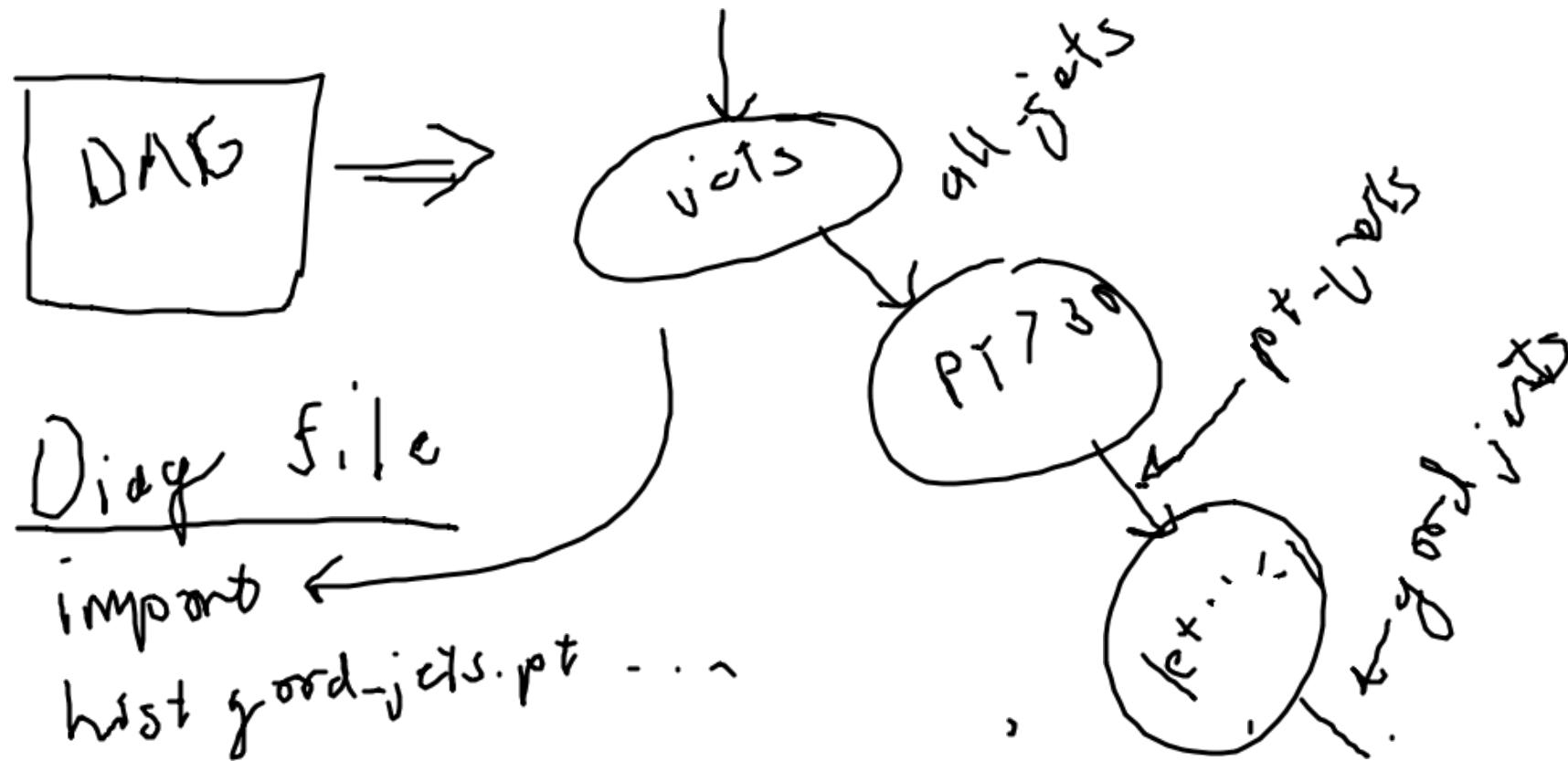
histogram
specification

Event
Processing

fitting
(stat inference)

Workflow
management

Analysis
System



Objects

- Things with properties

- jets, muons
- towers, tracks

- ℓ_i

- new $W \rightarrow$

- ~~not histo?~~

- composite objects (W)



+ : obj , obj

means

make a new obj
with properties

both obj have
that have a +
defined



Regions "A":

$$A \cup B$$

$$A \cap B$$

region $A_1 P_{A_1} \{$
region $A_2 P_{A_2} \}$

}

- Language: regions, selections, etc.
 $p_T^{\text{jet}} > 300 \rightarrow .\text{PT}$
- Vocabulary: p_T (adaptor) not just a configuration?
- Schema: what is a jet?
- Implicit vs. explicit, for loops
and/or typing
- " parallelism
- What type of Polymorphism?
- Functional Programming?

Event Processing

New syntax vs. embedded DSL ?

Separate
CMSSW \rightarrow ART

$\Delta \eta = \eta_1 - \eta_2$
 $\Delta \phi = \phi_1 - \phi_2$
if (...) swap $\Delta \phi$
return $(\Delta \phi^2 + \Delta \eta^2)$

Select cut1
Select cut2

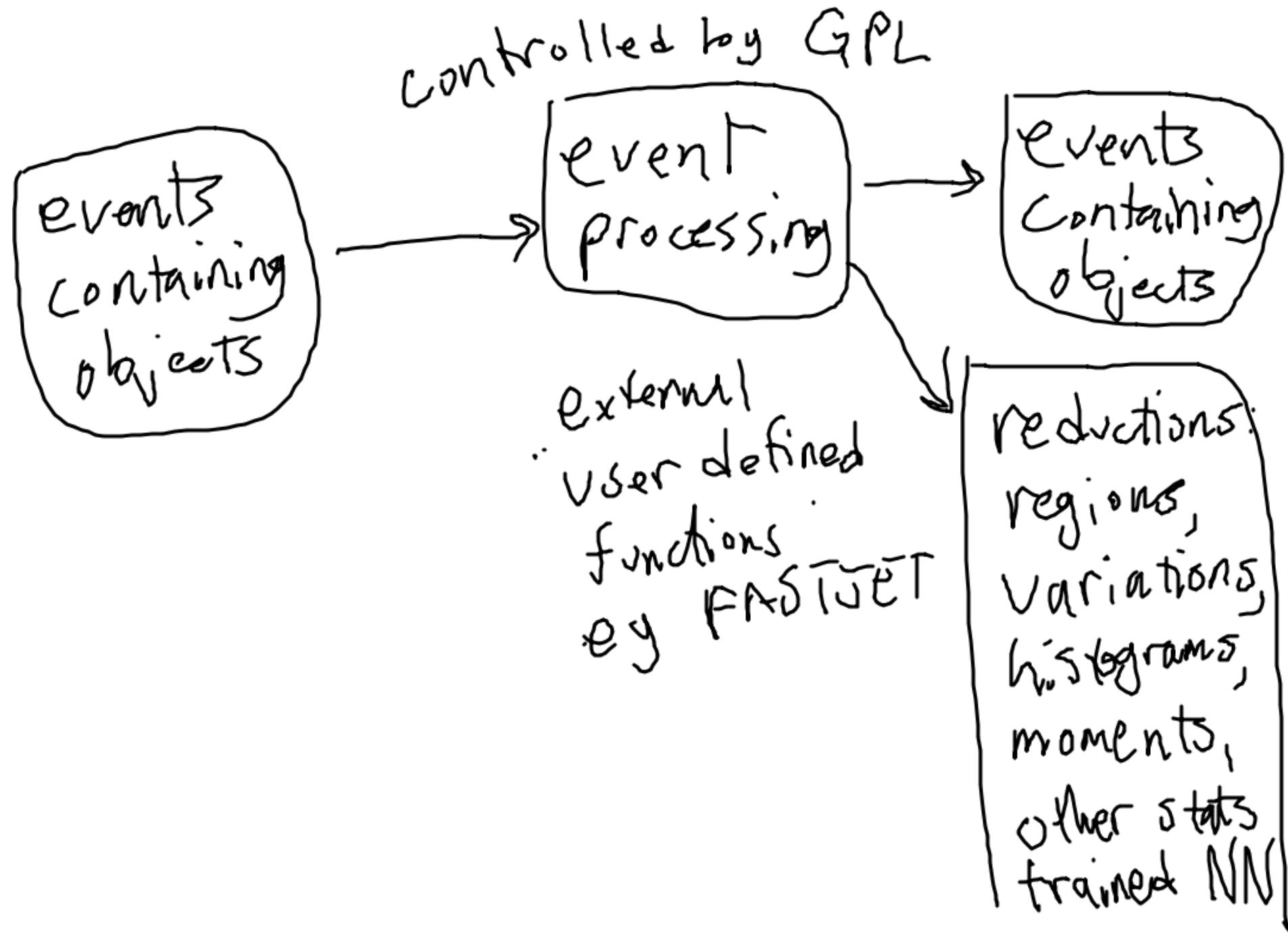
VS select cut1 & cut2

which controls?

Makefile / ~~RDataFrame~~ : outside

SQL : both

regex : inside (usually)



~~region~~: predicate used to
select (objects? events?)

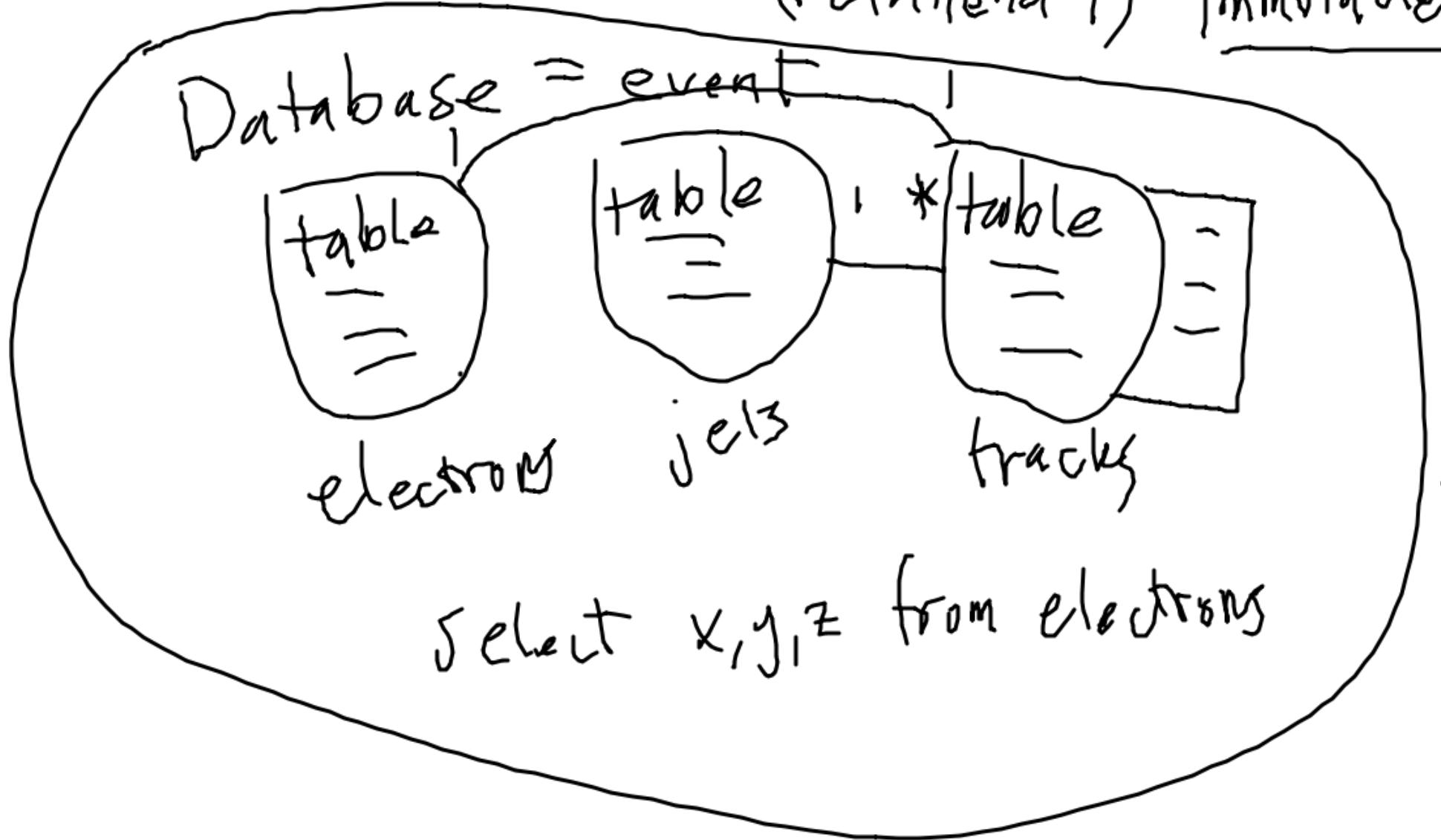
~~predicate~~ \rightarrow cut, selection

region: a set of events selected by a
predicate

histograms in region
~~region~~: {event \rightarrow ^{histories} calculated from a set of
events (statistics, histograms)}

regions: plural

Data types and indexing (relational) immutable?



Leptogluarks ($e + j \neq t$)

from electrons cross join jets

Z boson

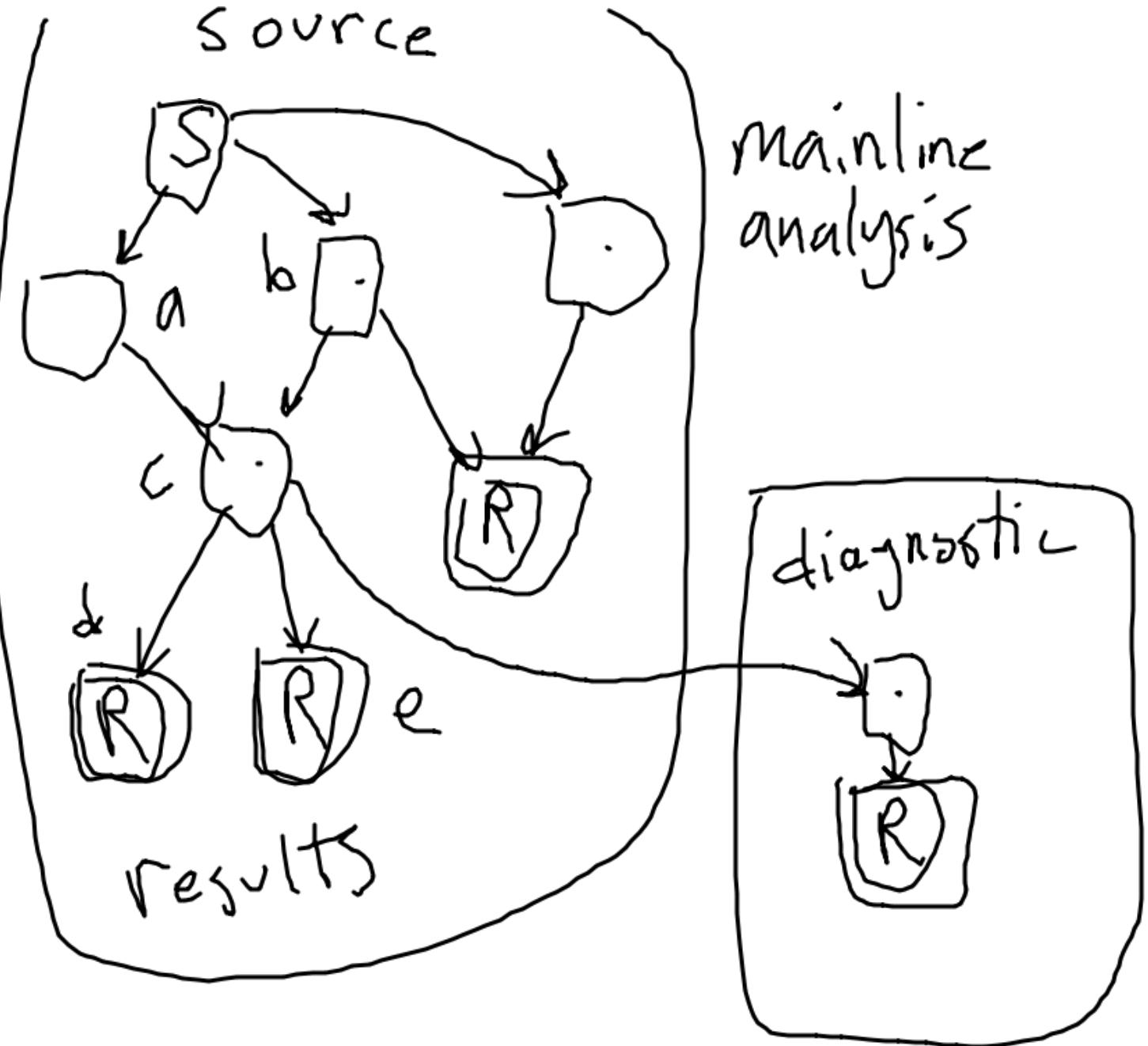
from self join electrons

jagged array

logically: $\begin{bmatrix} \begin{bmatrix} 1.1 & 2.2 & 3.3 \end{bmatrix} \end{bmatrix} \begin{bmatrix} \begin{bmatrix} 4.4 & 5.5 \end{bmatrix} \end{bmatrix}$

physically: $\begin{bmatrix} 1.1 & 2.2 & 3.3 & 4.4 & 5.5 \\ 0 & 3 & 3 & 5 \end{bmatrix}$

DAG



Typing

numbers

booleans

"objects" (structs)

lists

structural:

does the type

have the right fields?

external

function:

argument types

→ result type

Nominal typing:

does the type have the
right name?

Points

x y z

Vectors

x y z

Coordinate transform

libraries?