



The Code Time

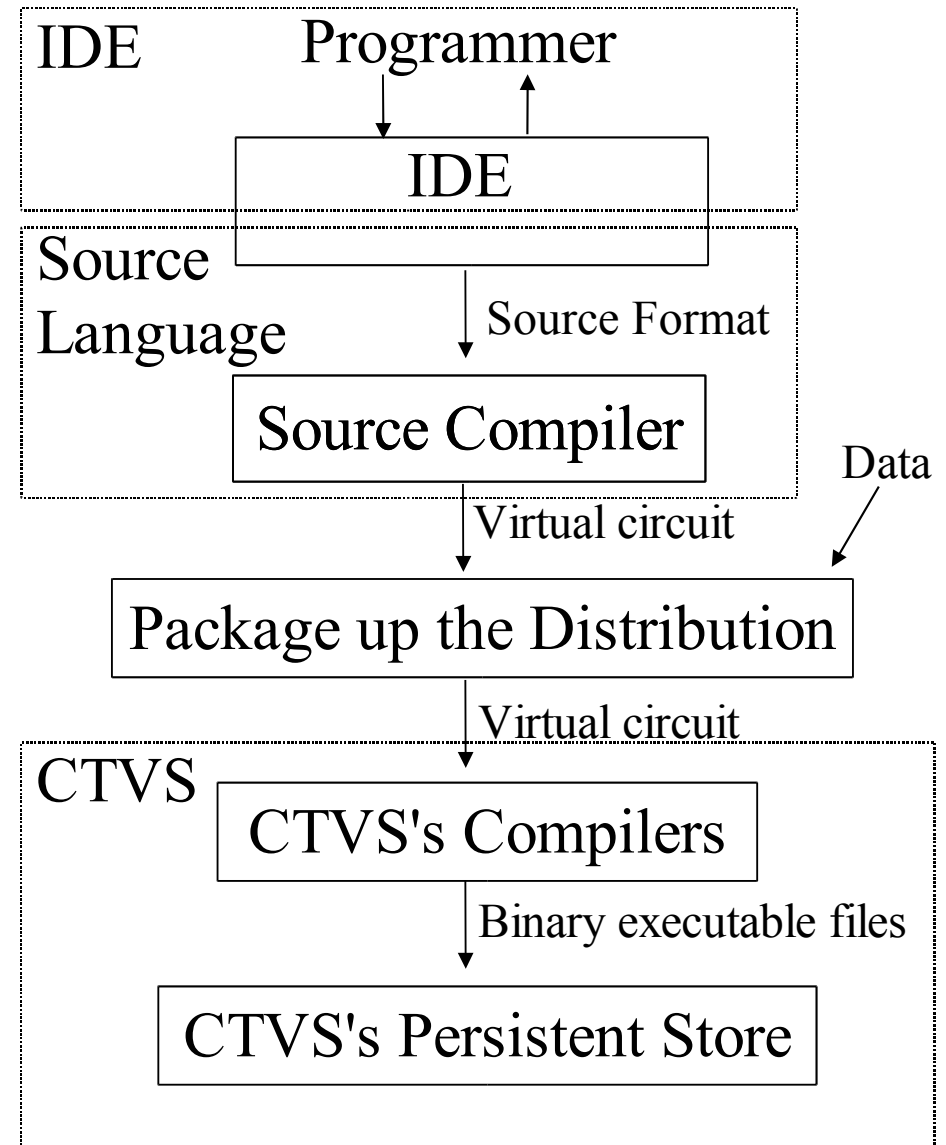
Parallel Programming Platform

By

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Code Time Platform Summary

- 3 elements in platform-- IDE, Lang, Virt Server
- Virt Serv ==> Write once run anywhere
- Persistent storage + cmds in VS ==> 2nd set of compilers ==> Effic. write once run anywhere
- Choice of Virt Ckt format key ==> Must enable compilers on wide array of HW + effic. on each
- One compiled image, ANY granular. of parallel
 - Ex: dual-thd Pentium, 10 workstations networked, 160,000 processor Blue Gene



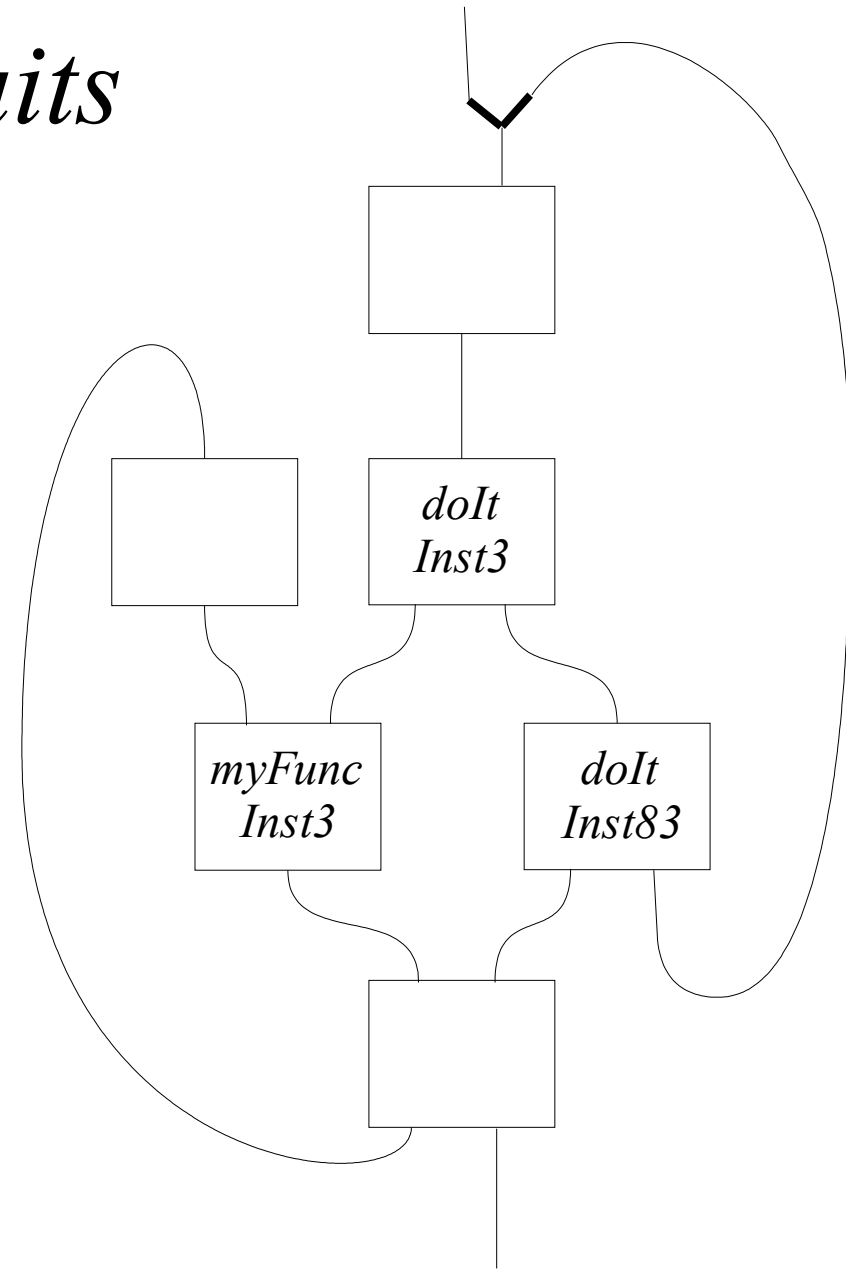
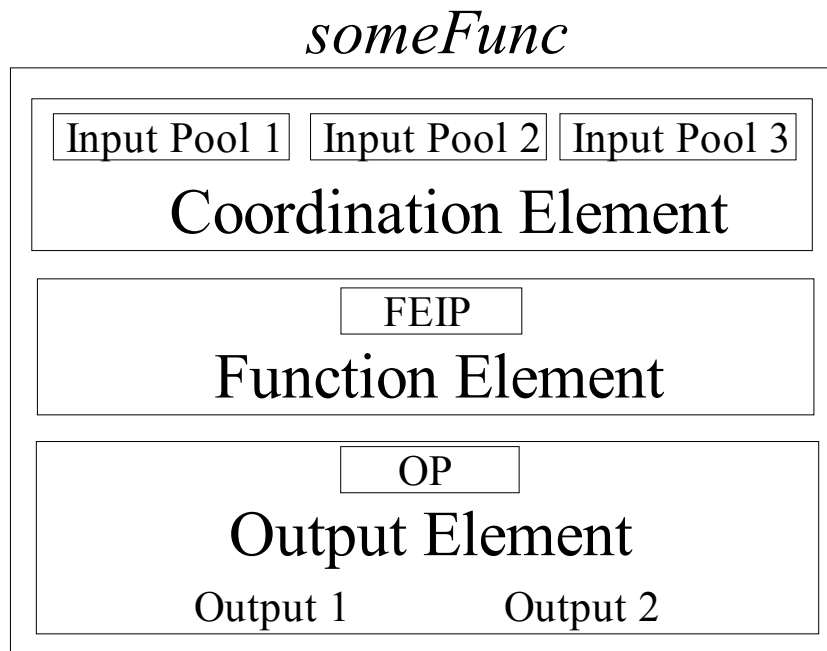


Virtual Circuit Format Is the Key

- Success rests on ease of writing a circuit-compiler for “any” HW
- Virtual-circuit format has to have these properties:
 - The code is invariant to the number of animators
 - Code can be easily split across multiple machines (task-units)
 - Data easily grouped to machines (task-units)
- The semantics must also allow a highly efficient binary
 - call-by-value rather than call-by-name
 - Memory behavior is exposed (data-structures are explicit)
 - Gives details of **how** operations spec'd in code to be done
 - Allows exposing in source language, for programmer

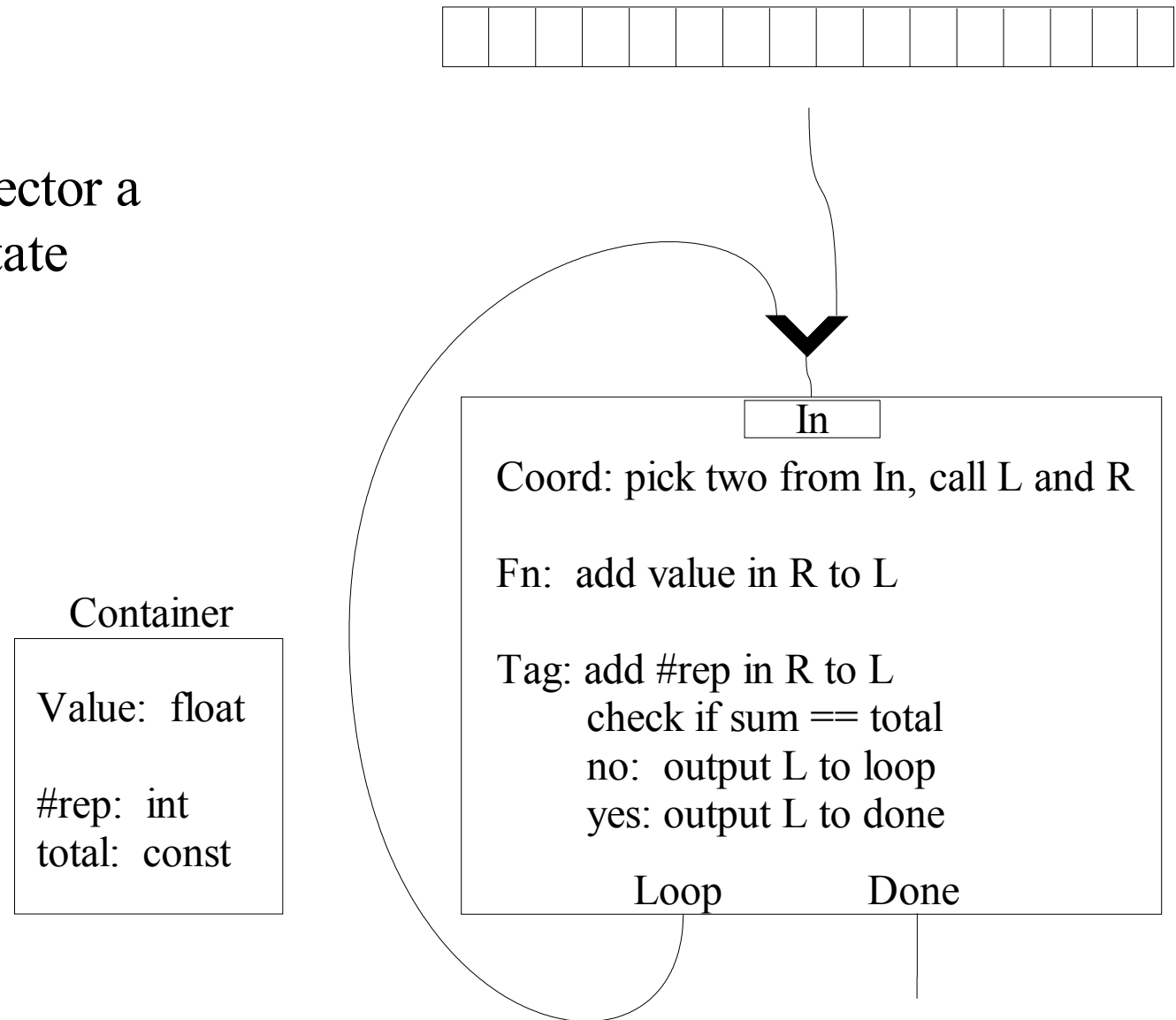
Code Time Circuits

- Function-Units connected by wires
- Coord-elem, func-elem, output-elem



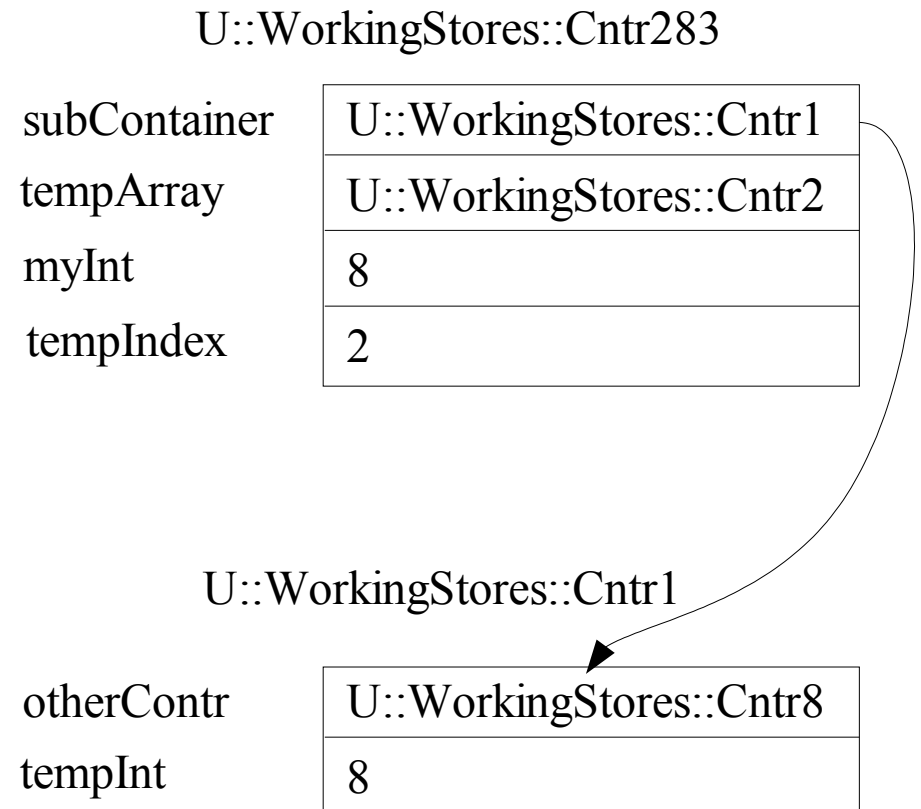
Example Program

- Vector reduction
- Each element of vector a separate control-state

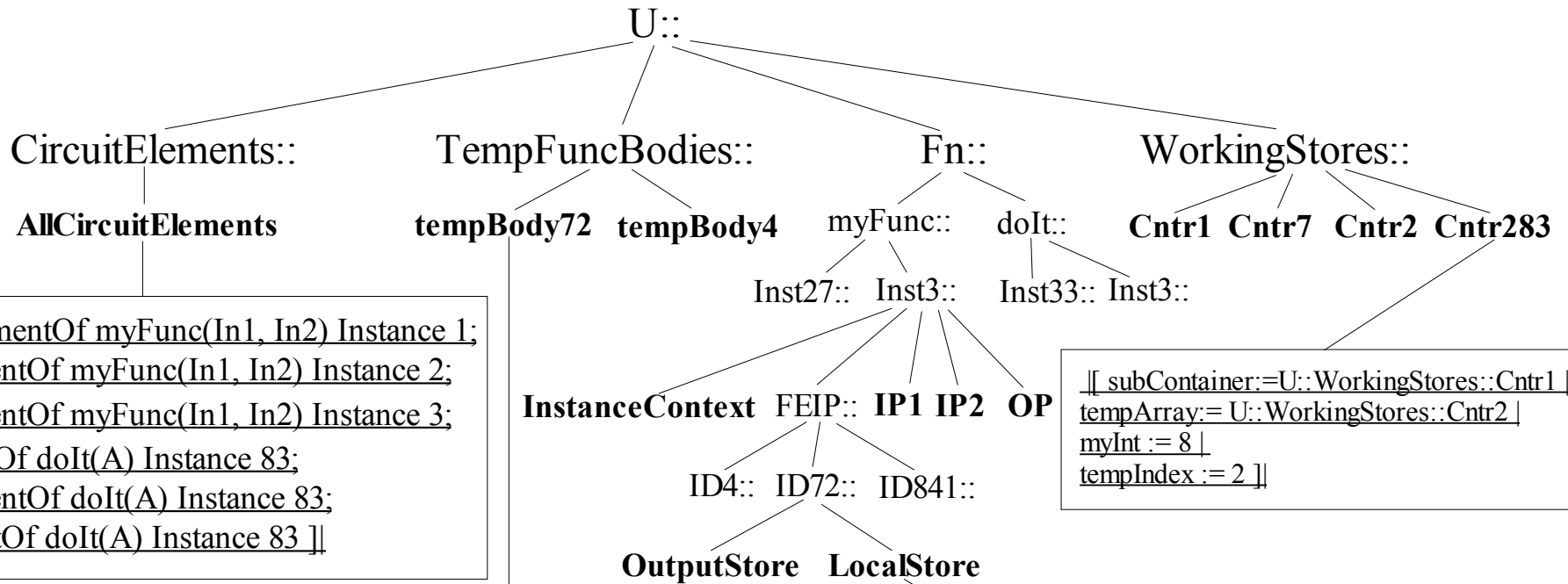


Containers

- Container = Virtual Addr Space
- Has a structure
- Addr = elemOf Struc
- Data moves inside cont
- Association to another container
- Lives in Universal Store
- Repr. as syntax-string



The Universal Store (Uber Store)



```

[[ FunctionElementOf myFunc(In1, In2) Instance 1;
FunctionElementOf myFunc(In1, In2) Instance 2;
FunctionElementOf myFunc(In1, In2) Instance 3;
CoordElementOf doIt(A) Instance 83;
FunctionElementOf doIt(A) Instance 83;
OutputElementOf doIt(A) Instance 83 ]]
  
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```

[[ subContainer:=U::WorkingStores::Cntr1 |
tempArray:= U::WorkingStores::Cntr2 |
myInt := 8 |
tempIndex := 2 ]]
  
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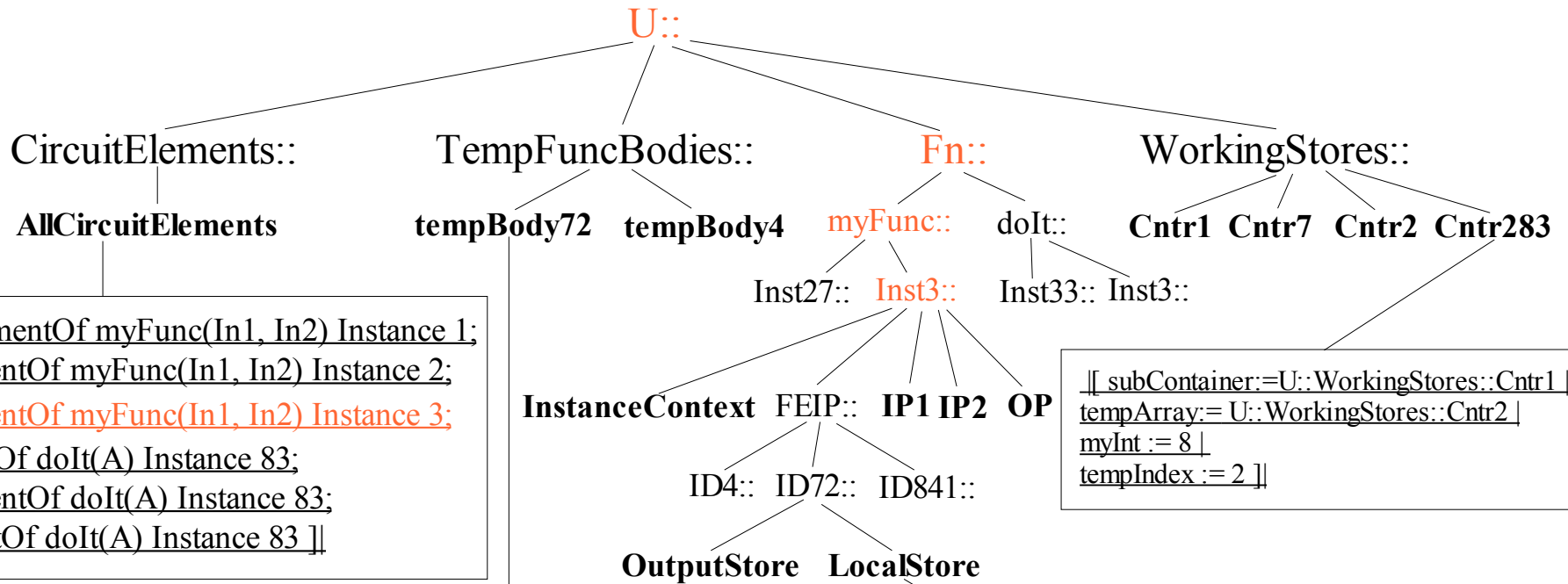
[[ tempArray d=c In1.subContainer.dataArray;
In1.myInt m=c tempArray[ In1.tempIndex ];
In1.myInt m+= In2.graphNode[ In2.i ].weight;
In2.i += 1 ]]
  
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[[ In1:=U::WorkingStores::Cntr283 |
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...=t foo]] U::TempFuncBodies::tempBody1[[tempArray d=c ... In2.i += 1]] U::T...

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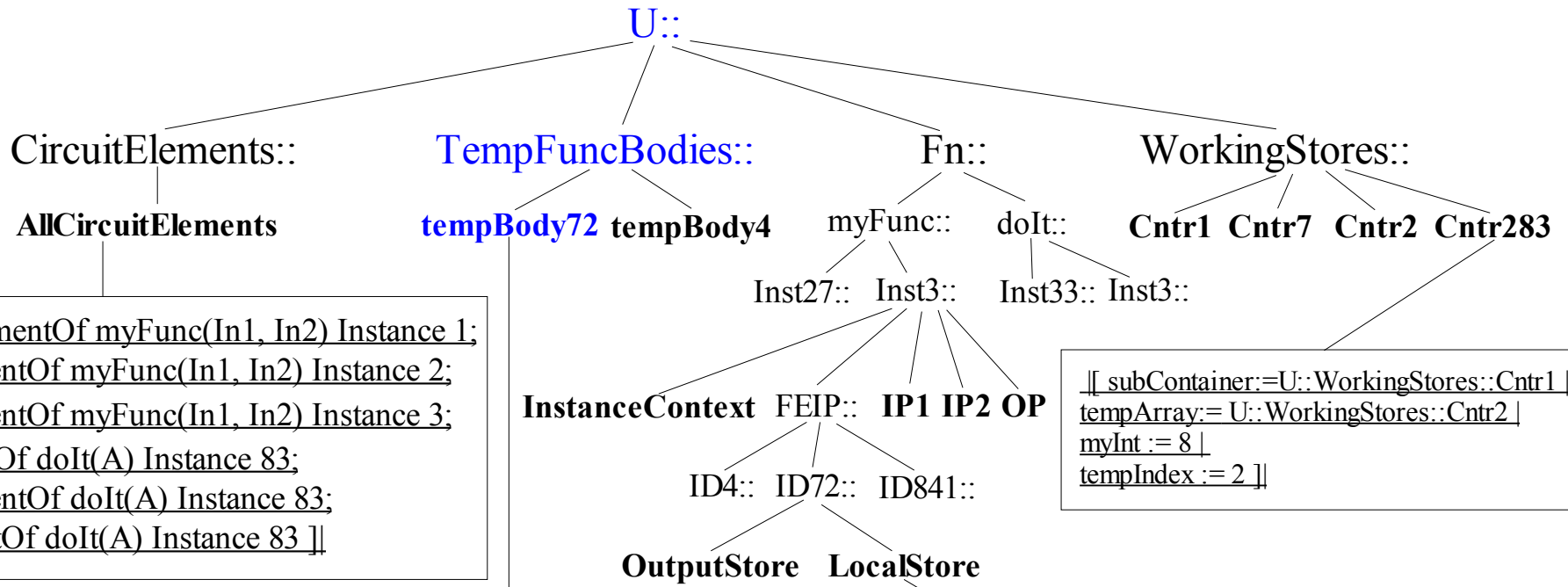
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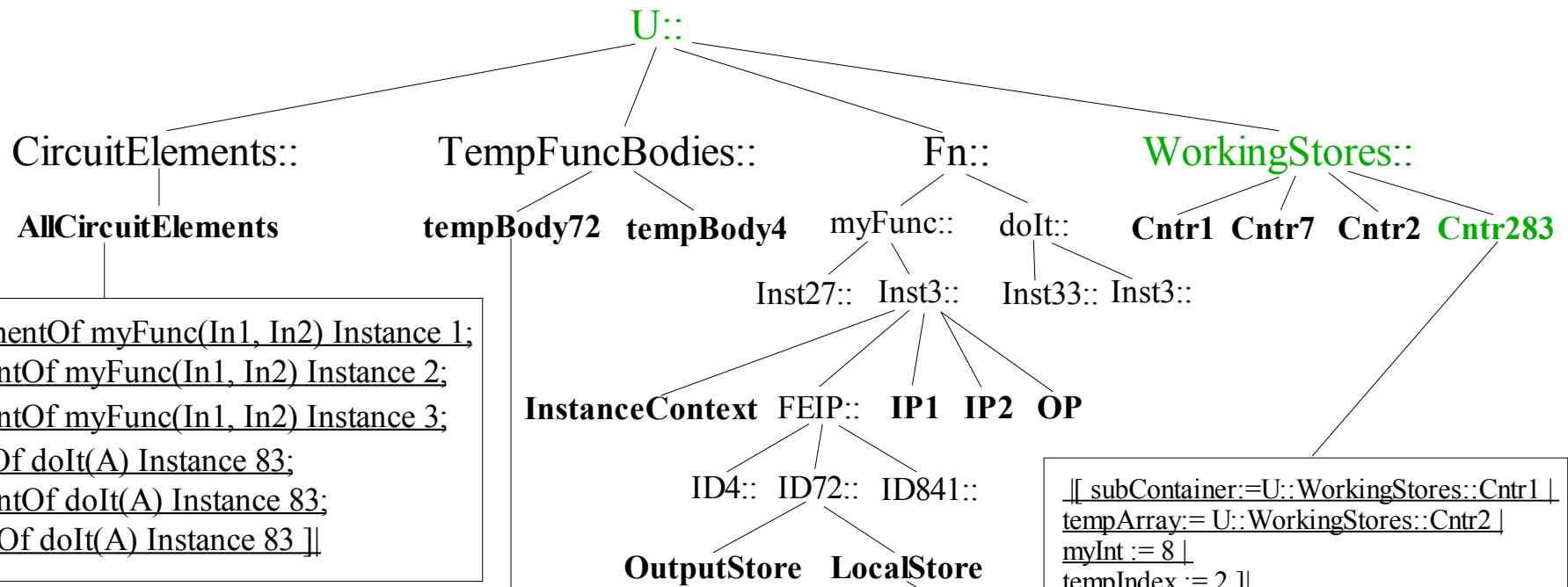
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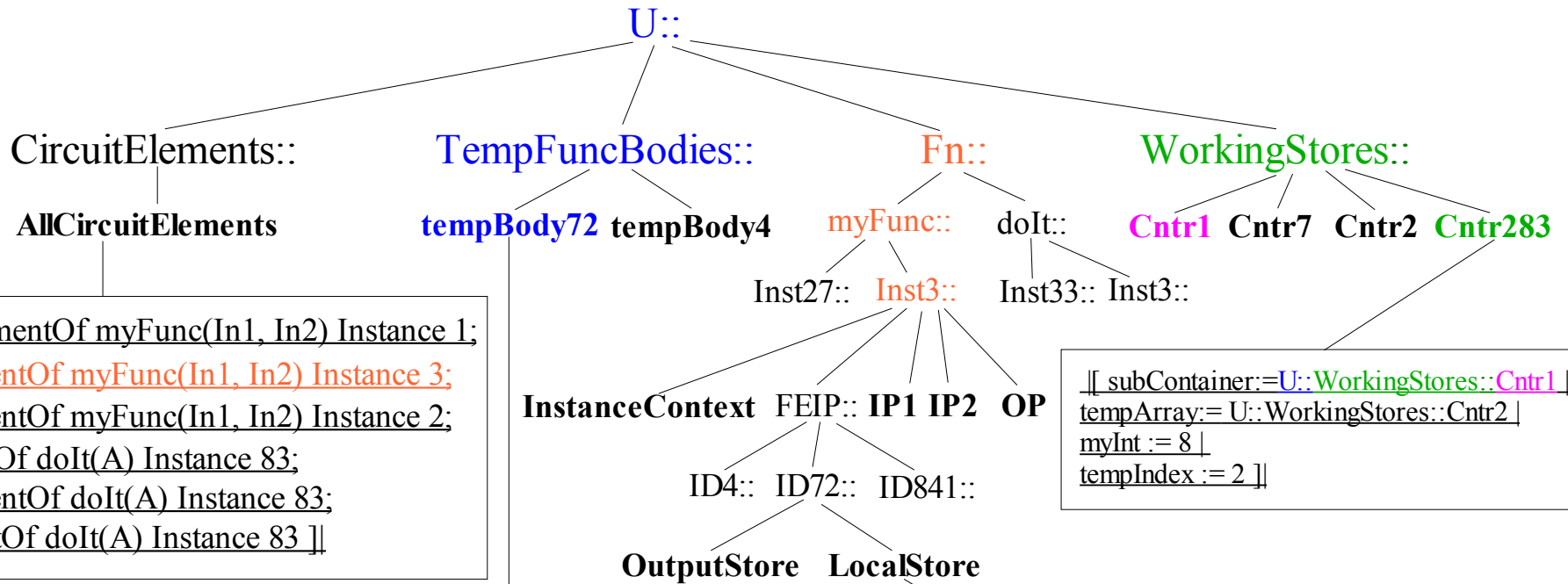
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