SSA-Interpreter

UE Abstrakte Maschinen 201X

Peter Neubauer

2015-05-19

New Compiler2 Pass

- ParserPass
- VerifierPass
- SSAConstructionPass
- LoopPass
- DominatorPass
- ScheduleEarlyPass
- ScheduleLatePass
- ScheduleClickPass
- InterpreterPass
- BasicBlockSchedulingPass
- MachineInstructionSchedulingPass
- LinearScanAllocatorPass
- RegisterAllocatorPass
- CodeGenPass

Features

- Interpretiert SSA-Programme
- Instructions: add, sub, load, if, switch, ...
- GoTo, Return
- PHI Nodes
- Basic Types: byte, int, char, double, ...
- Method Arguments
- Not Supported: Invoke

Simple test: branch

```
static long branch(long n) {
  if (n < 1)
    n = 2;
  else
    n = 3;
  return n;
}
```

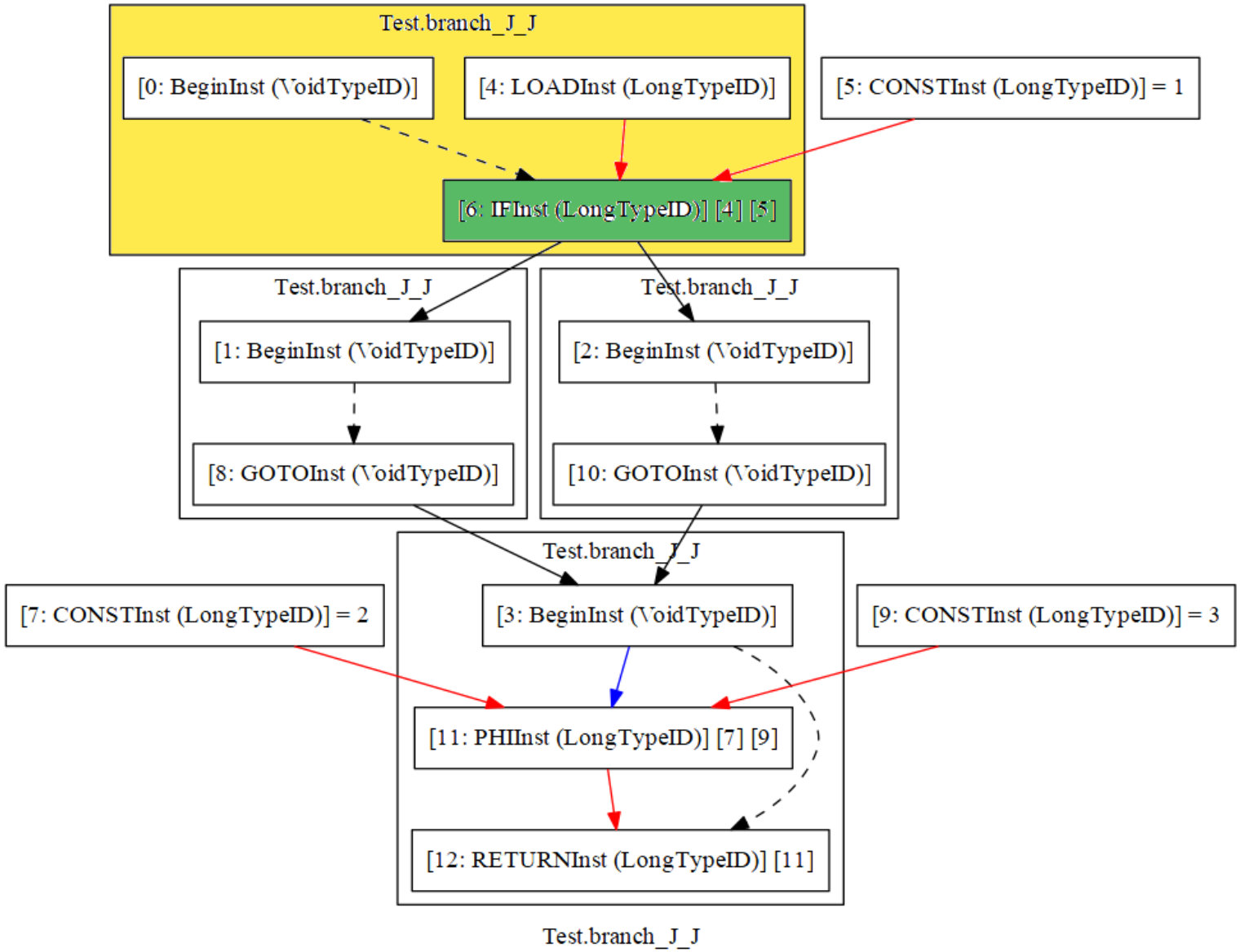
Invocation

```
cacao -XX:CompileMethod=branch -Xbootclasspath/a:.
-XX:DebugName=compiler2/interpreter/InterpreterPass
-XX:+DebugPrefix -XX:+DebugCompiler2 -XX:DebugVerbose=3
-XX:+InterpreterPass -XX:SsaInterpreterArgs="(1)" Test cacao
```

Output

```
[peter@ad-pc run]$ ./my-run.sh
compiler2/interpreter/InterpreterPass Enter Method branch
compiler2/interpreter/InterpreterPass     Arguments: (1)
compiler2/interpreter/InterpreterPass Run BasicBlock (0)
compiler2/interpreter/InterpreterPass Find Successor
compiler2/interpreter/InterpreterPass Run BasicBlock (2)
compiler2/interpreter/InterpreterPass Find Successor
compiler2/interpreter/InterpreterPass Run BasicBlock (3)
compiler2/interpreter/InterpreterPass Eval 1 Reverse Dependencies
compiler2/interpreter/InterpreterPass Find Successor
compiler2/interpreter/InterpreterPass Method result = 3
[peter@ad-pc run]$
```

Illustration



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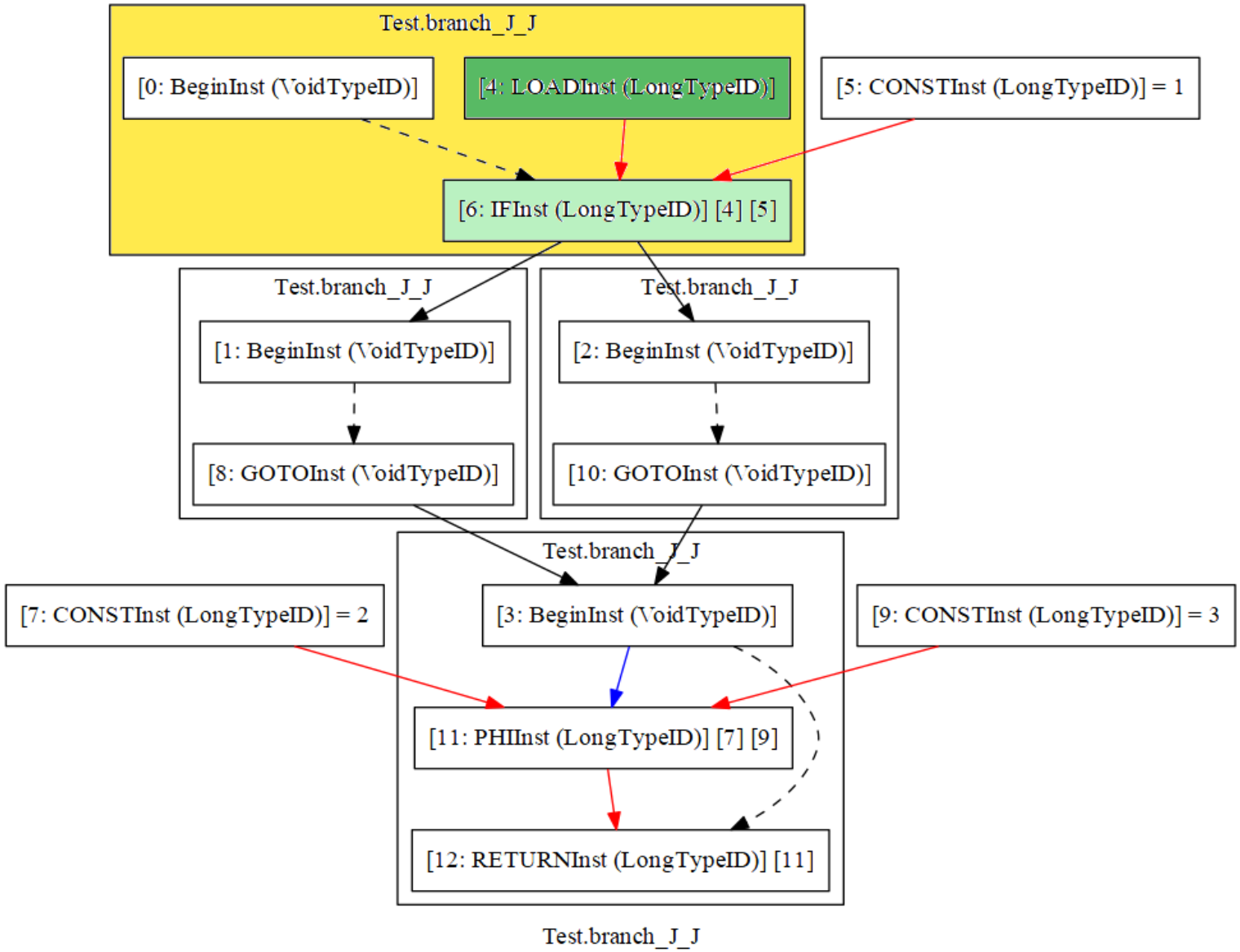

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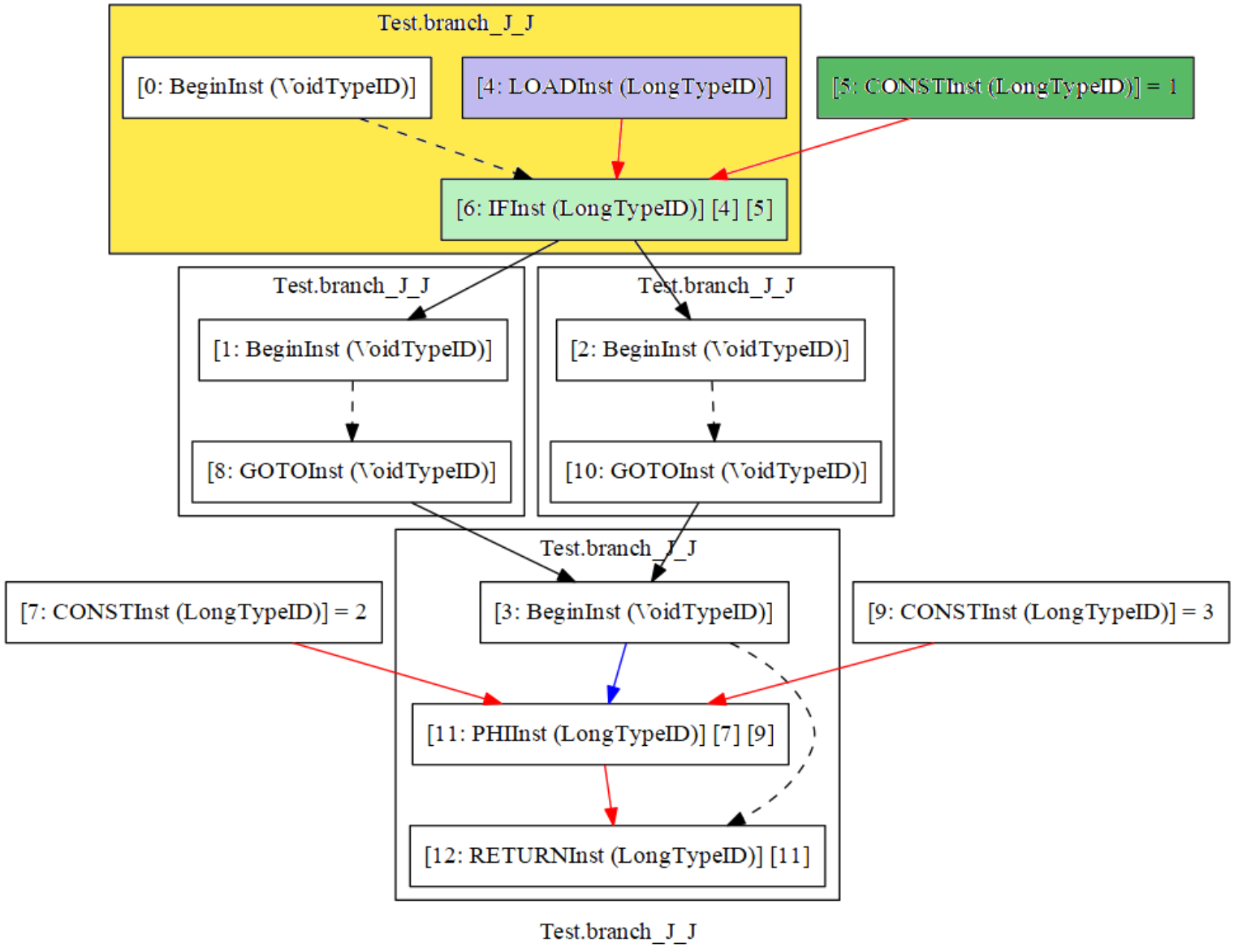

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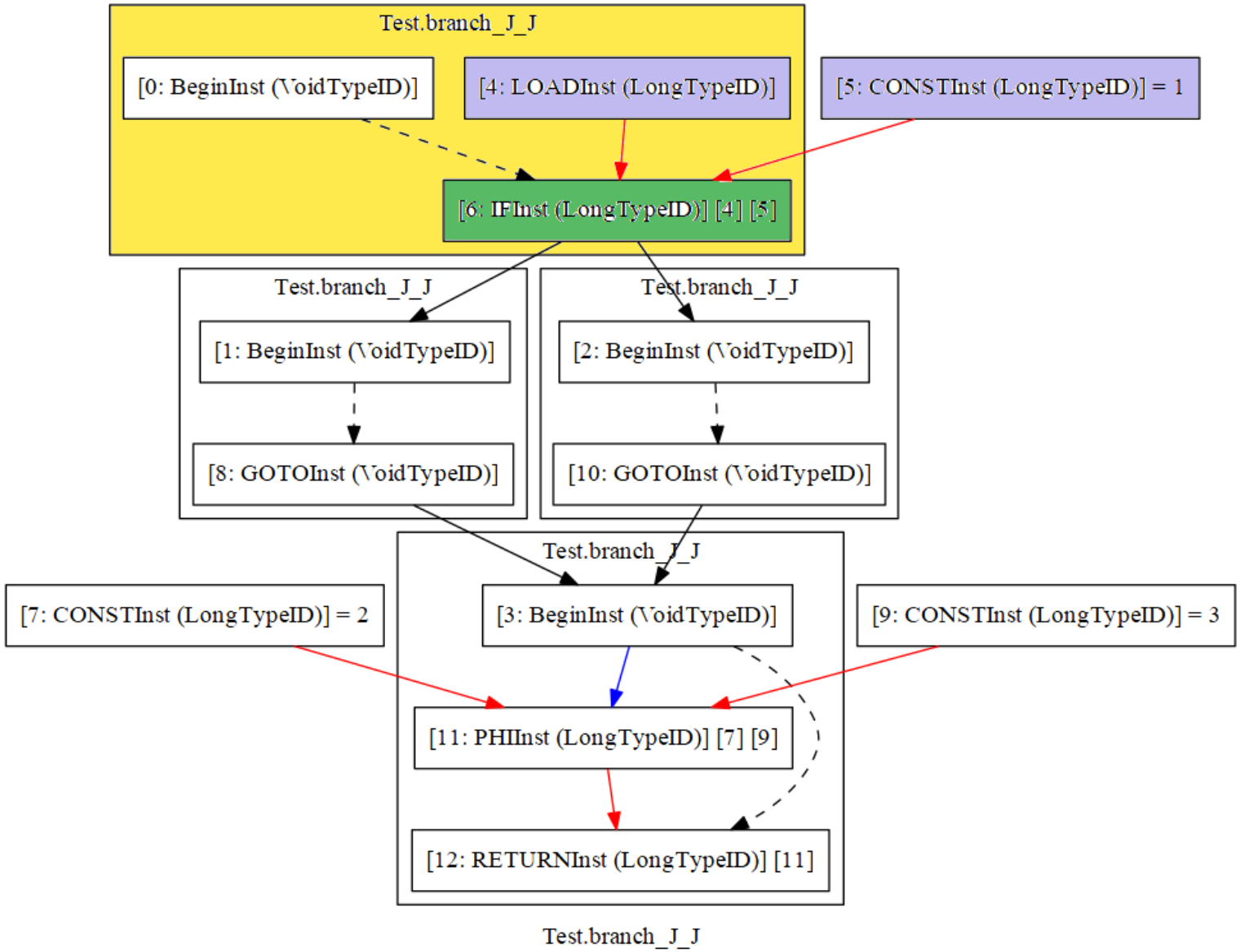

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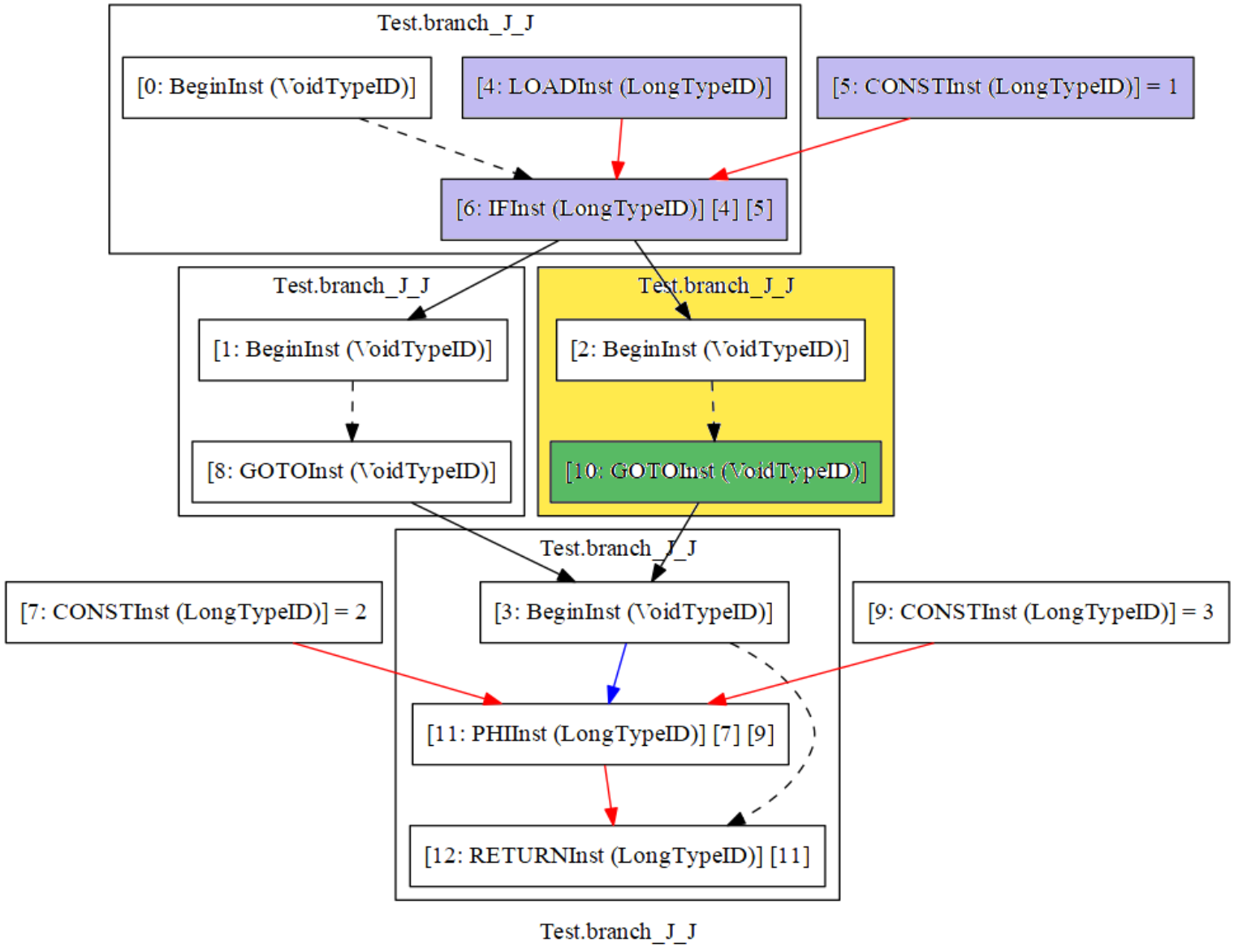

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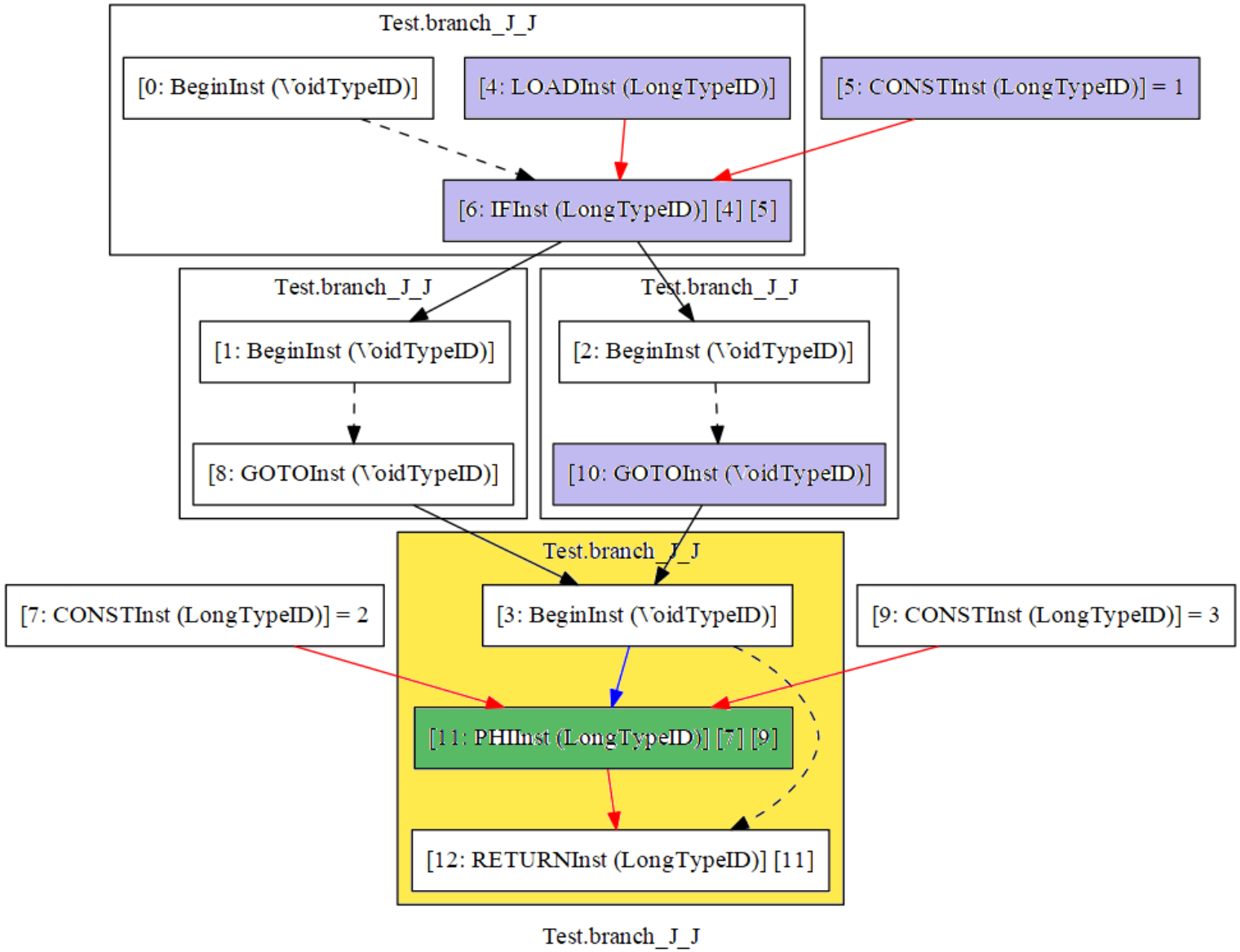

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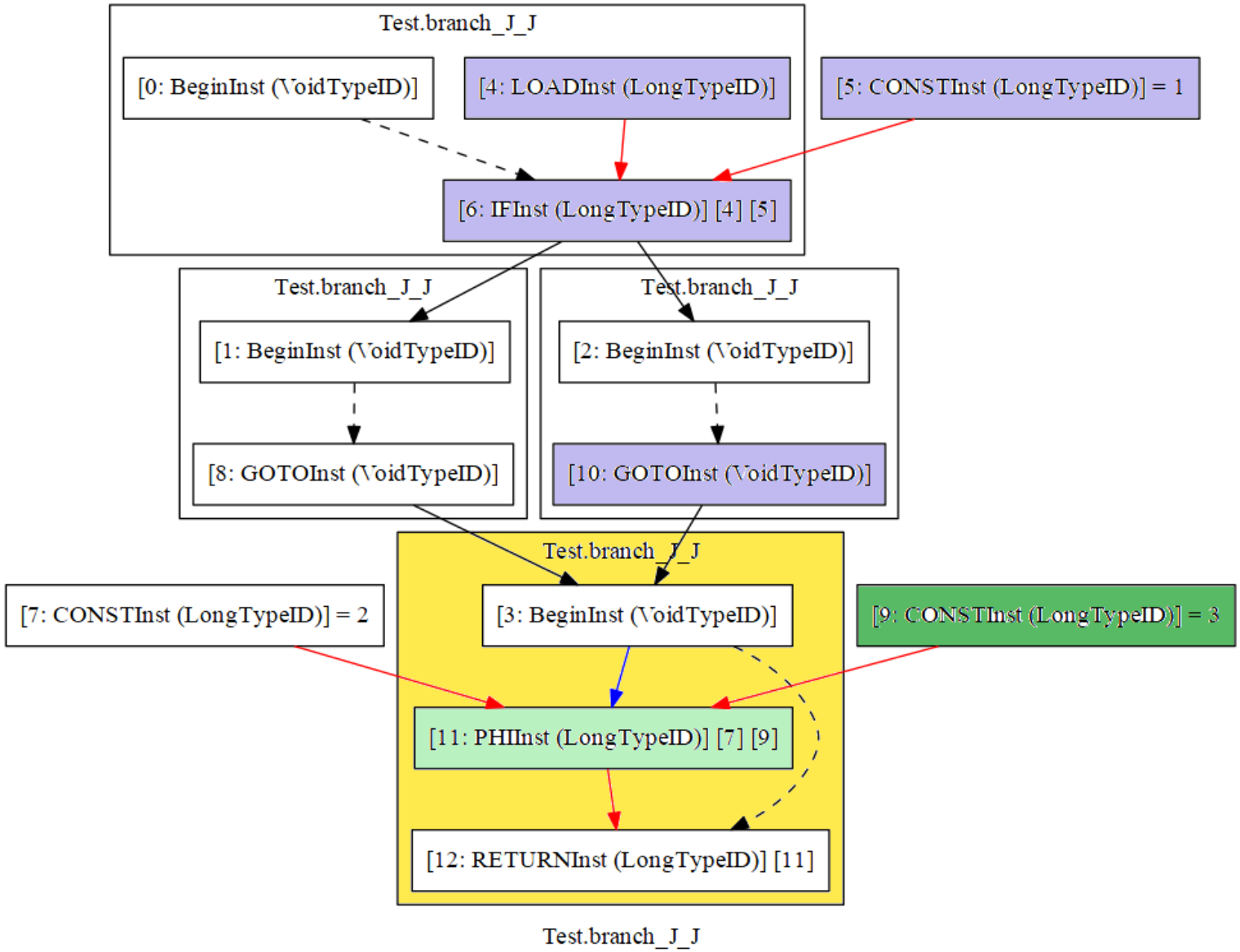

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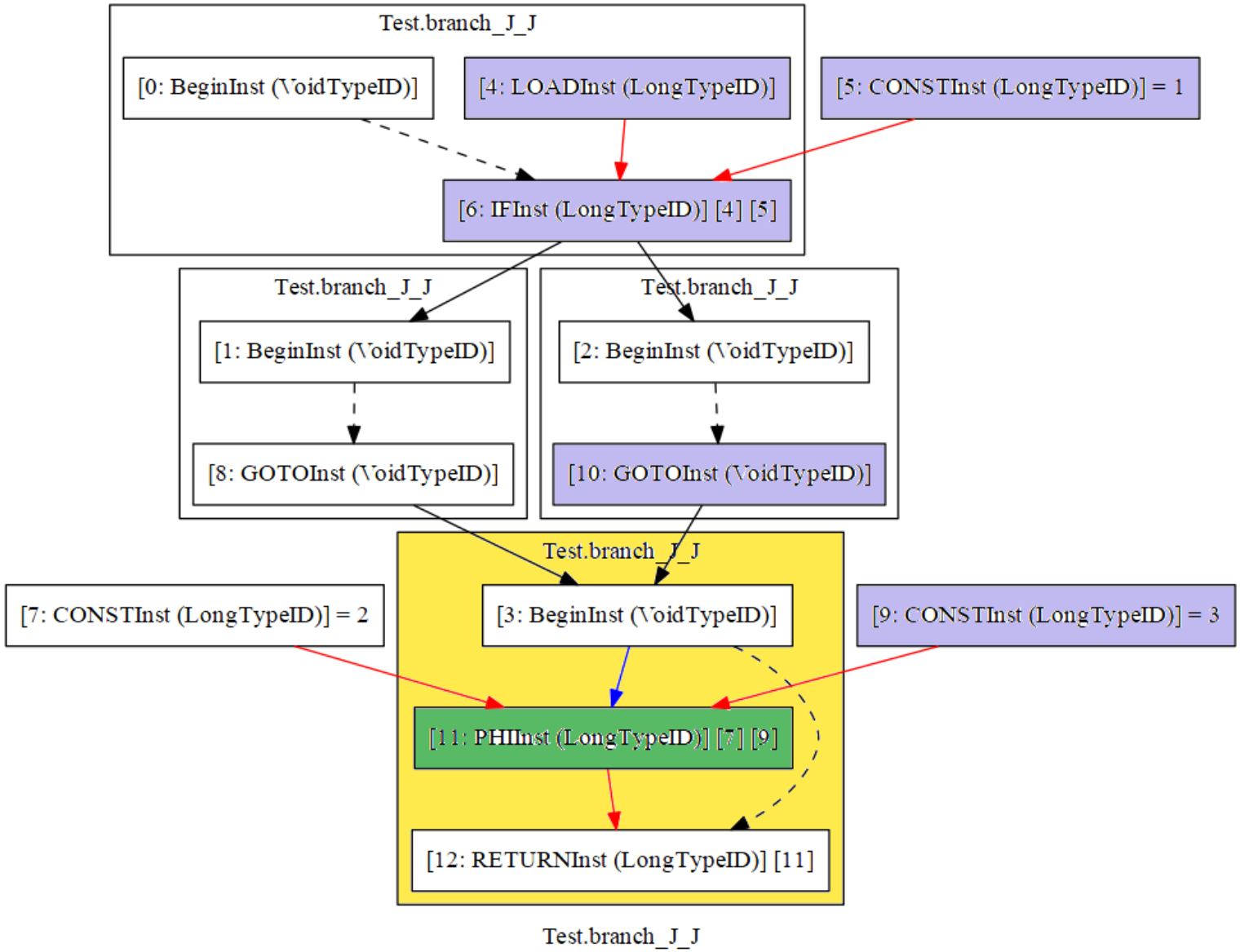

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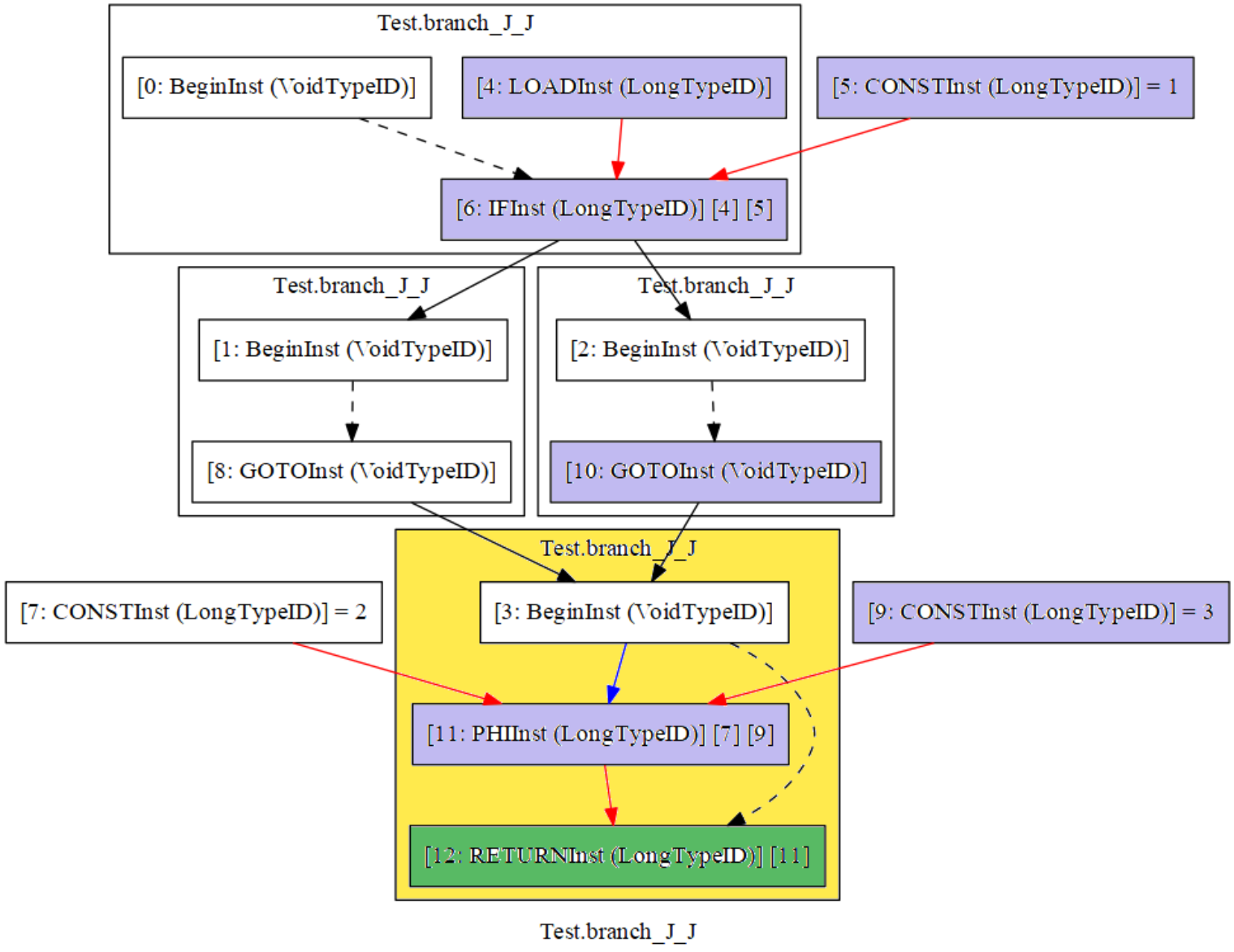

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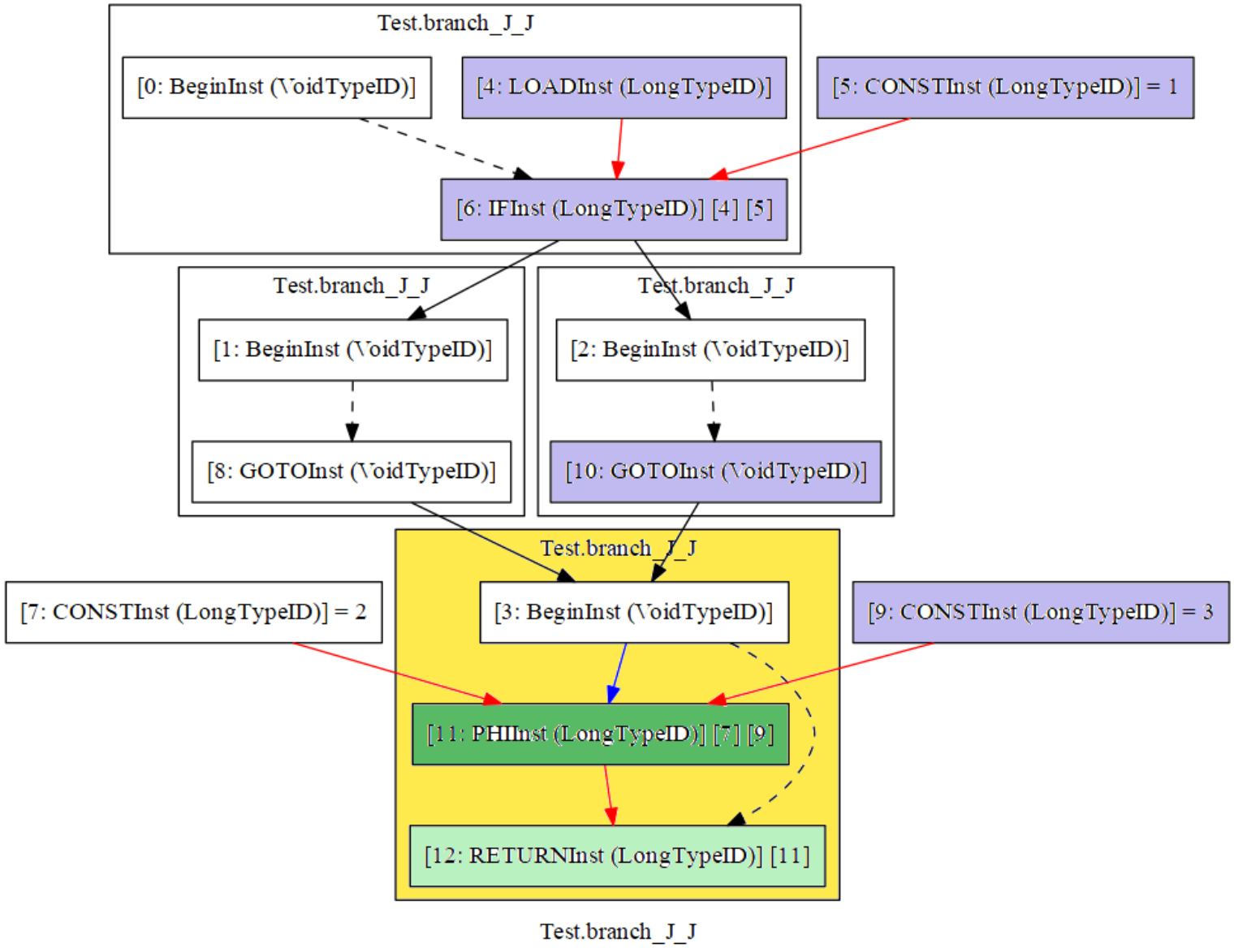

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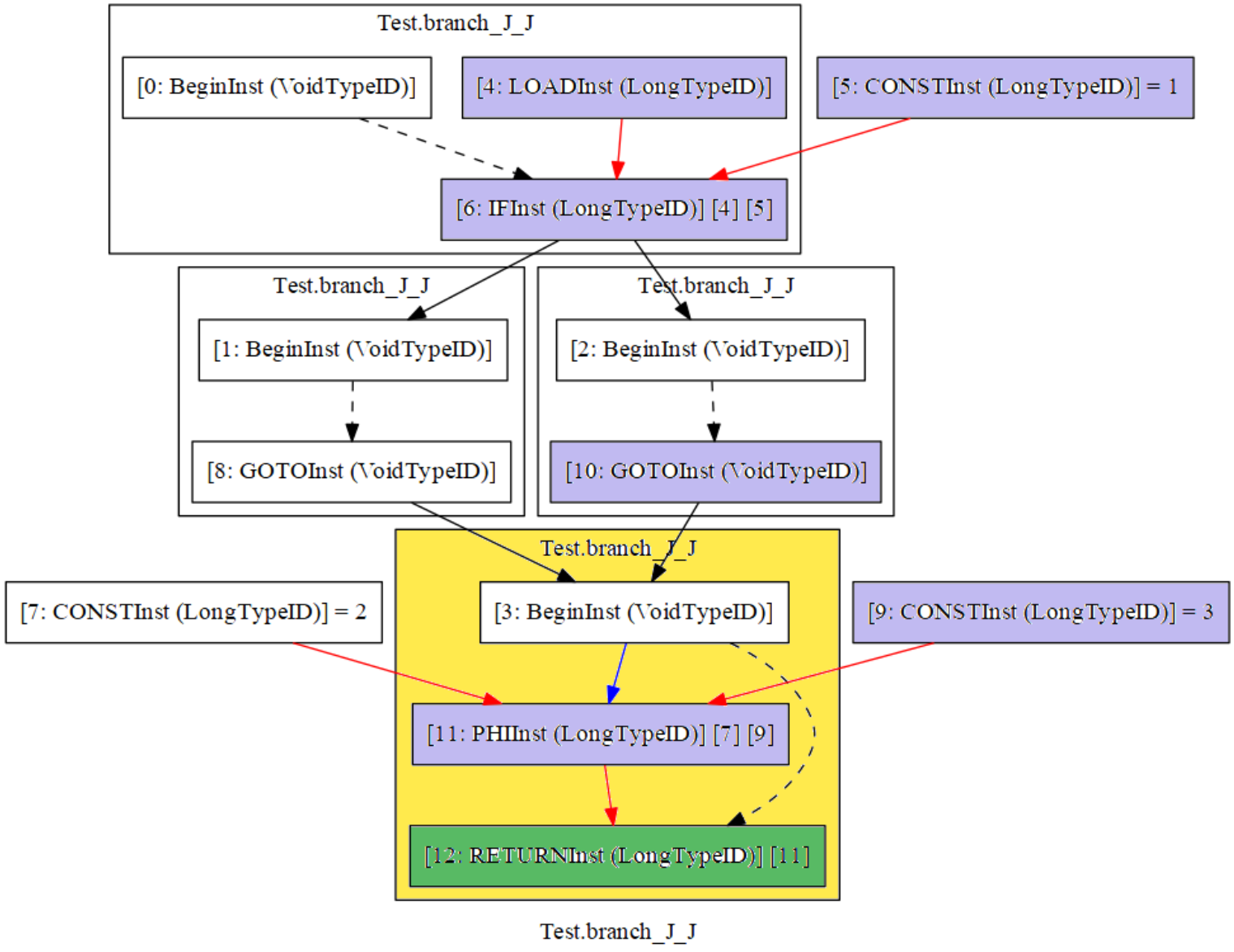
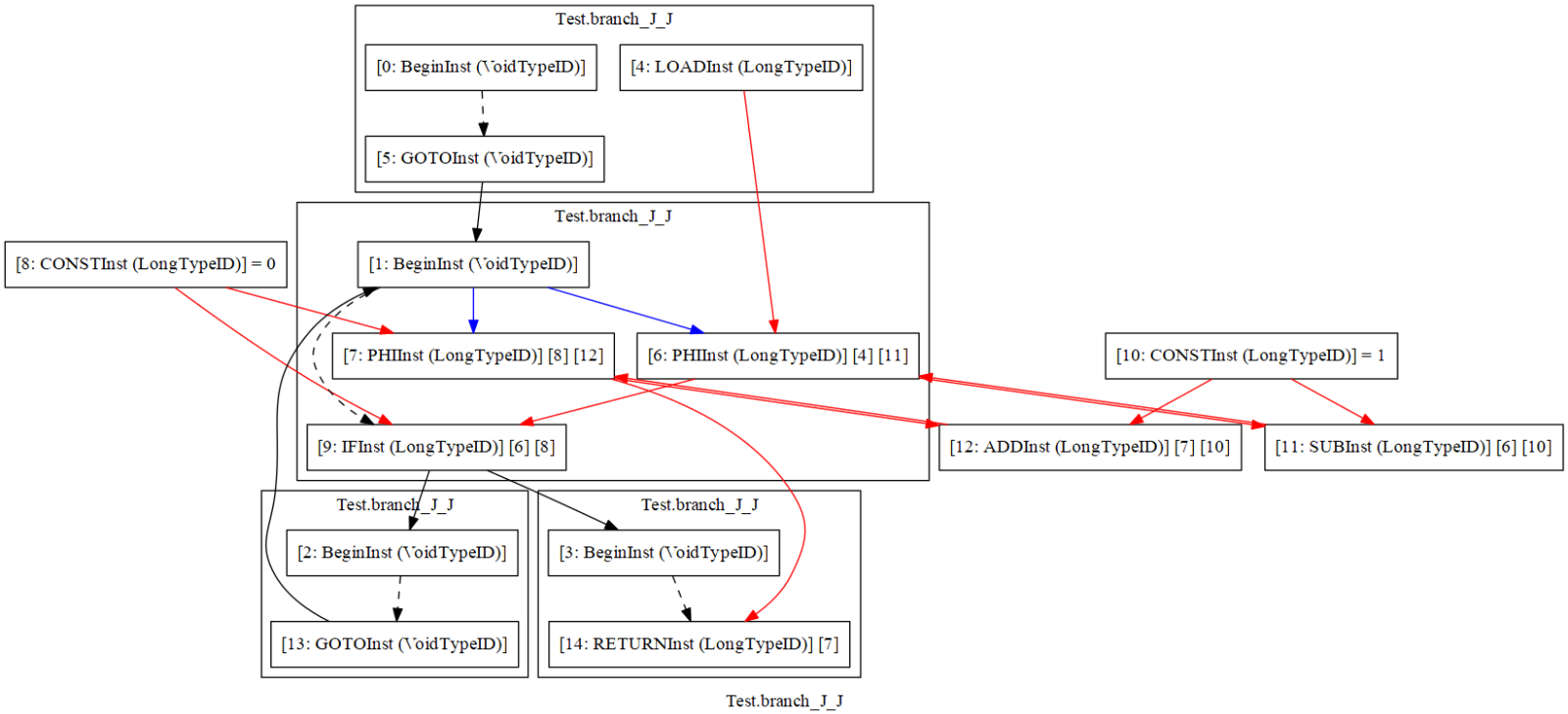


Demo

cacao -XX:DebugName=compiler2/interpreter/InterpreterPass
-XX:+InterpreterPass -XX:+CountdownGenPass
-XX:SsaInterpreterArgs="(3)" [...] Test cacao

PHI Nodes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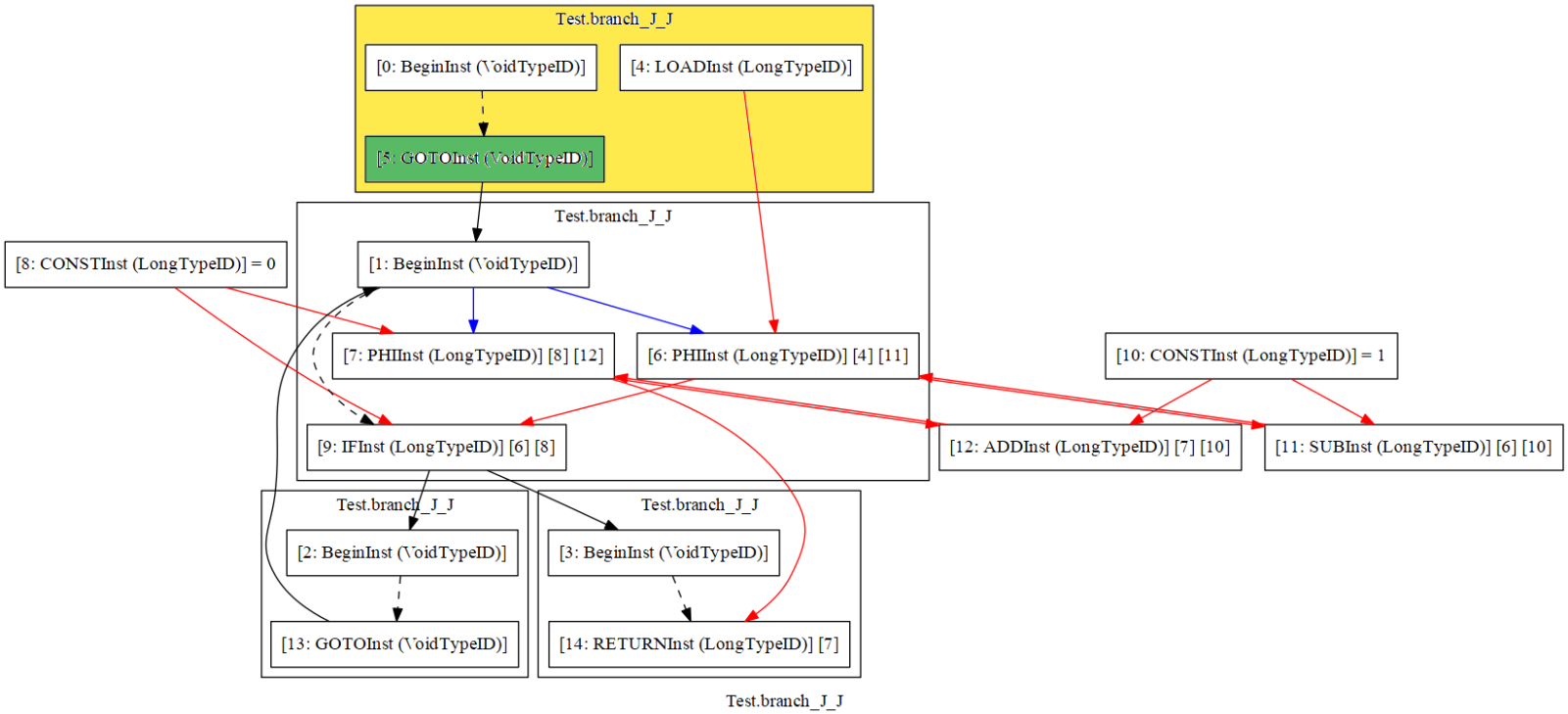
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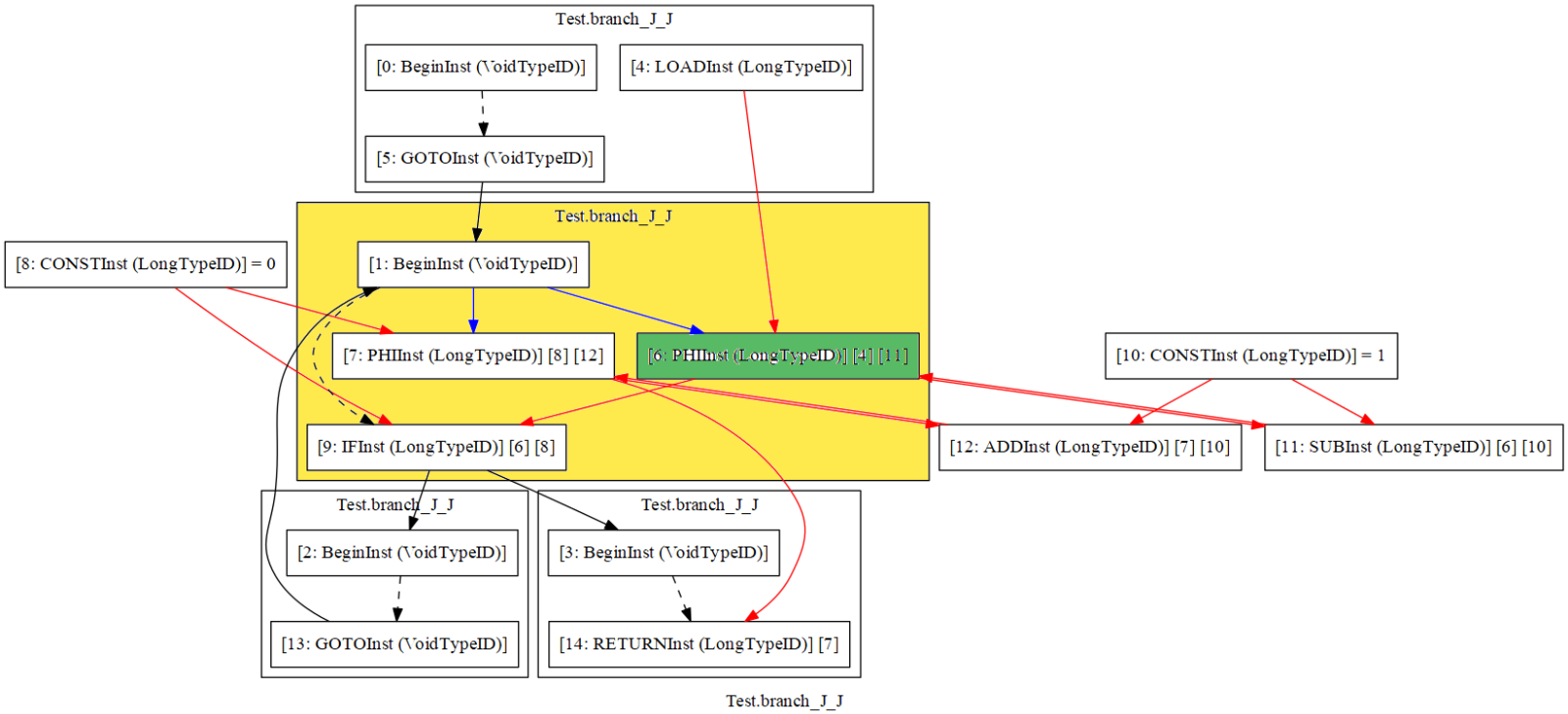
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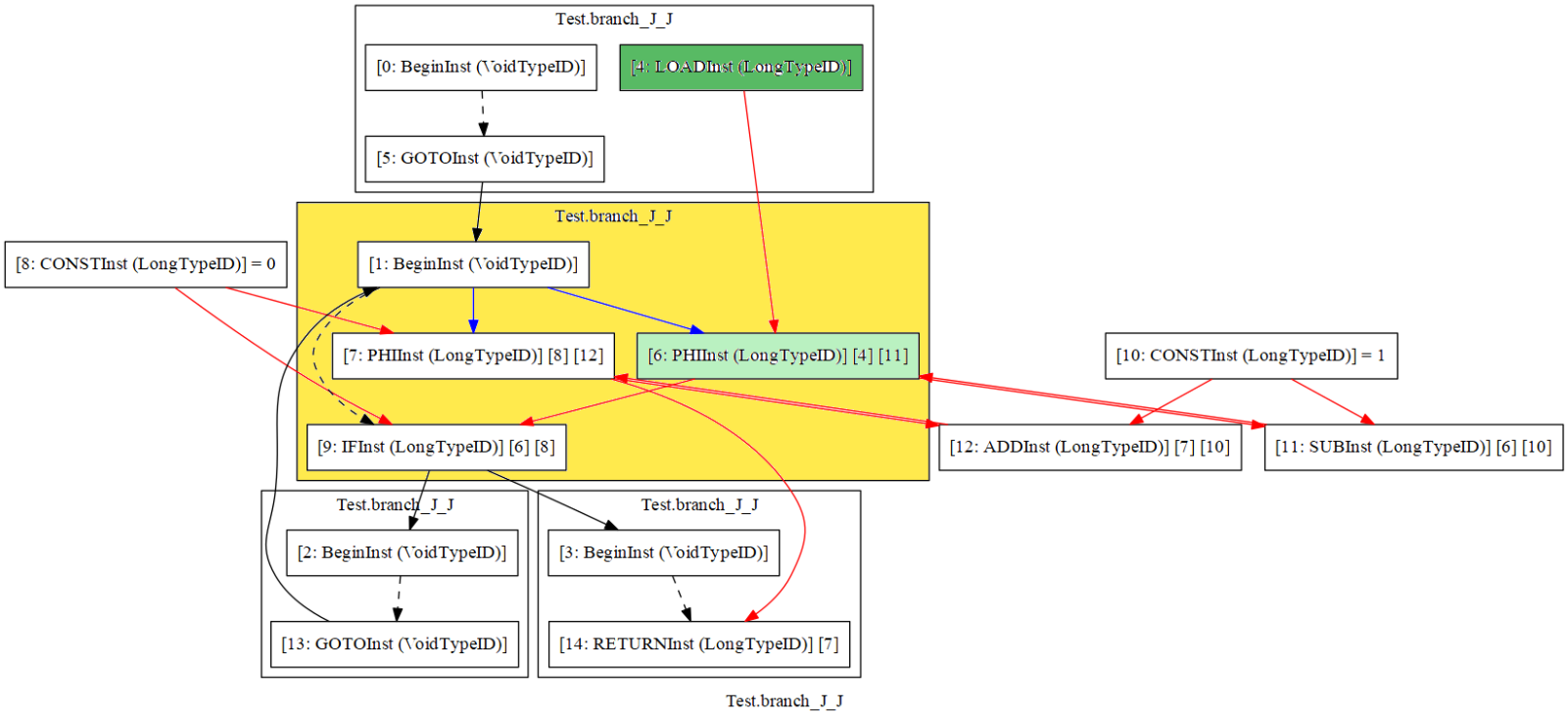
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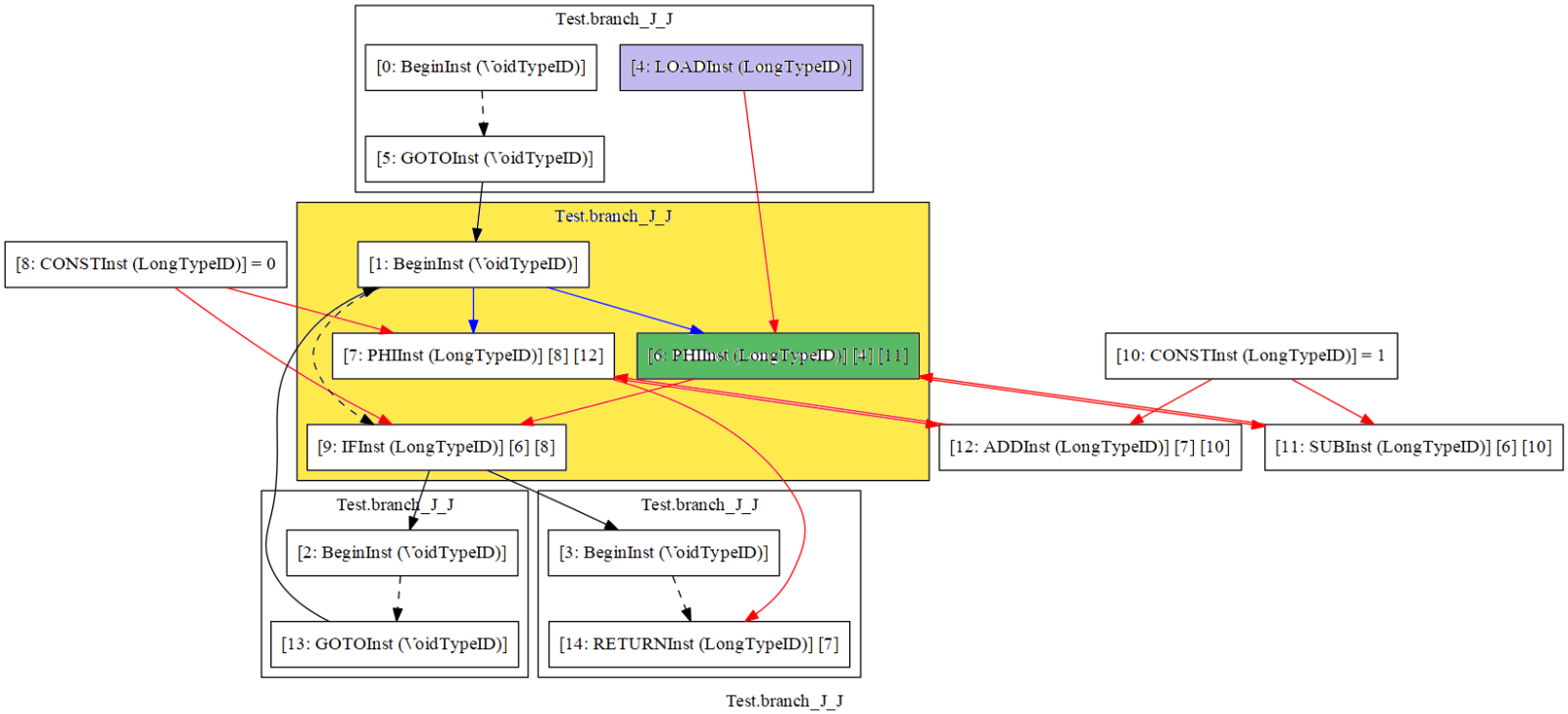
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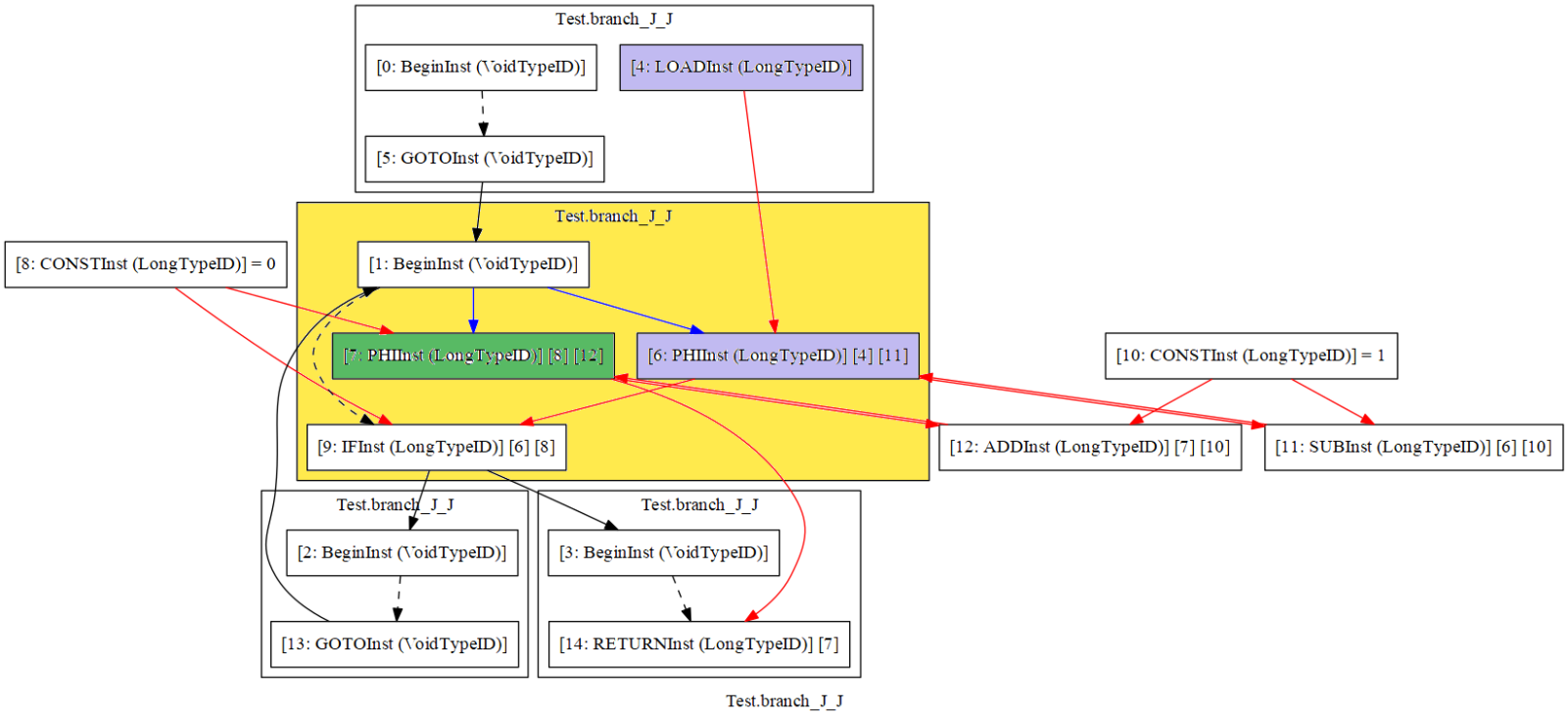
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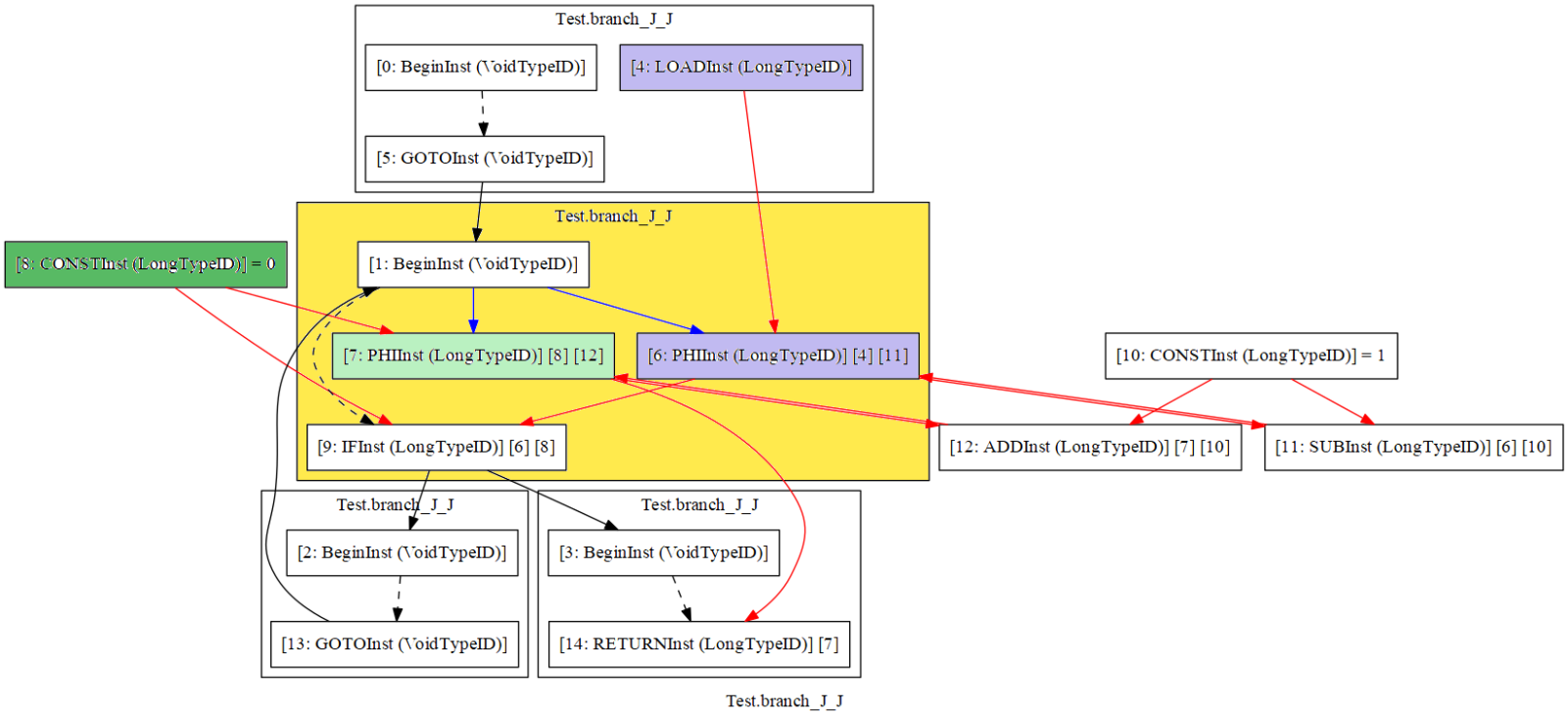
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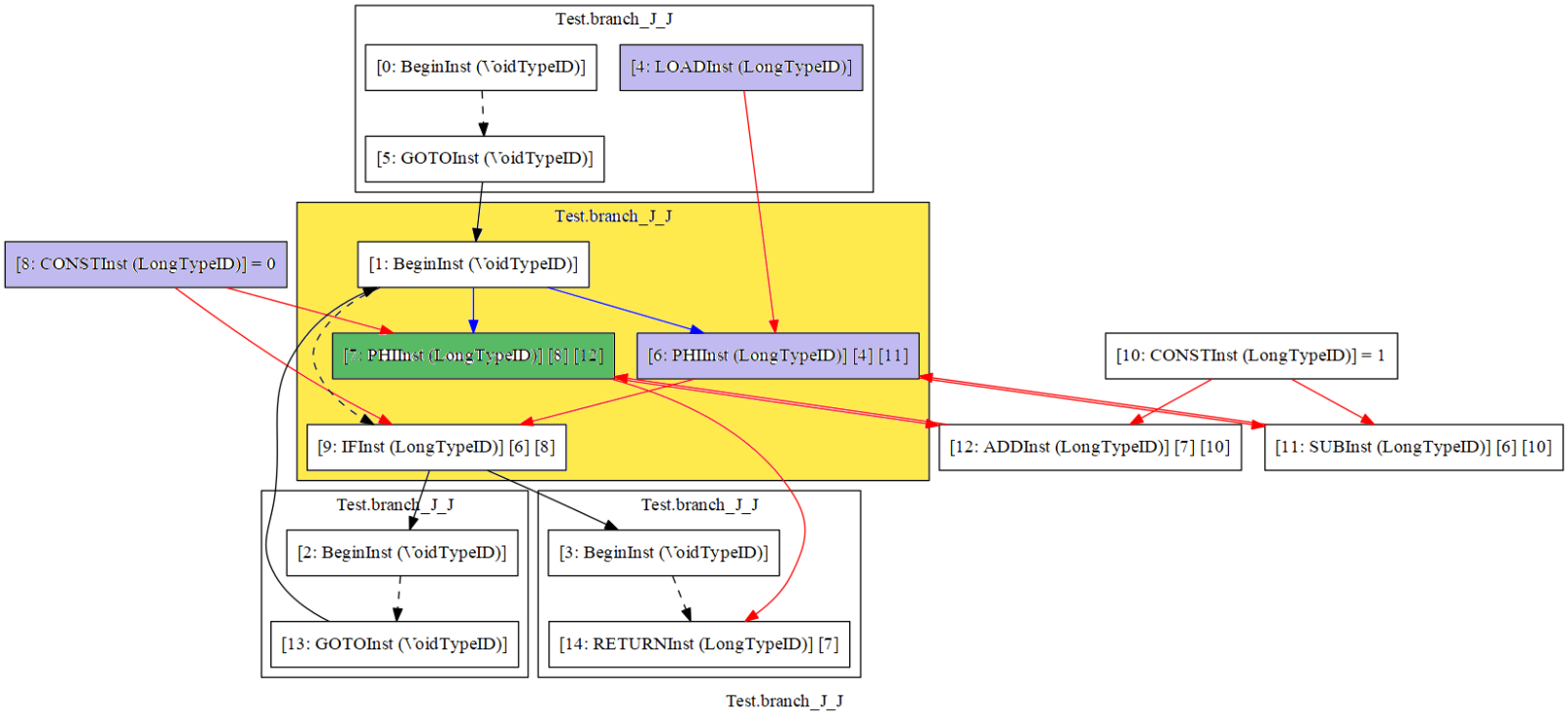
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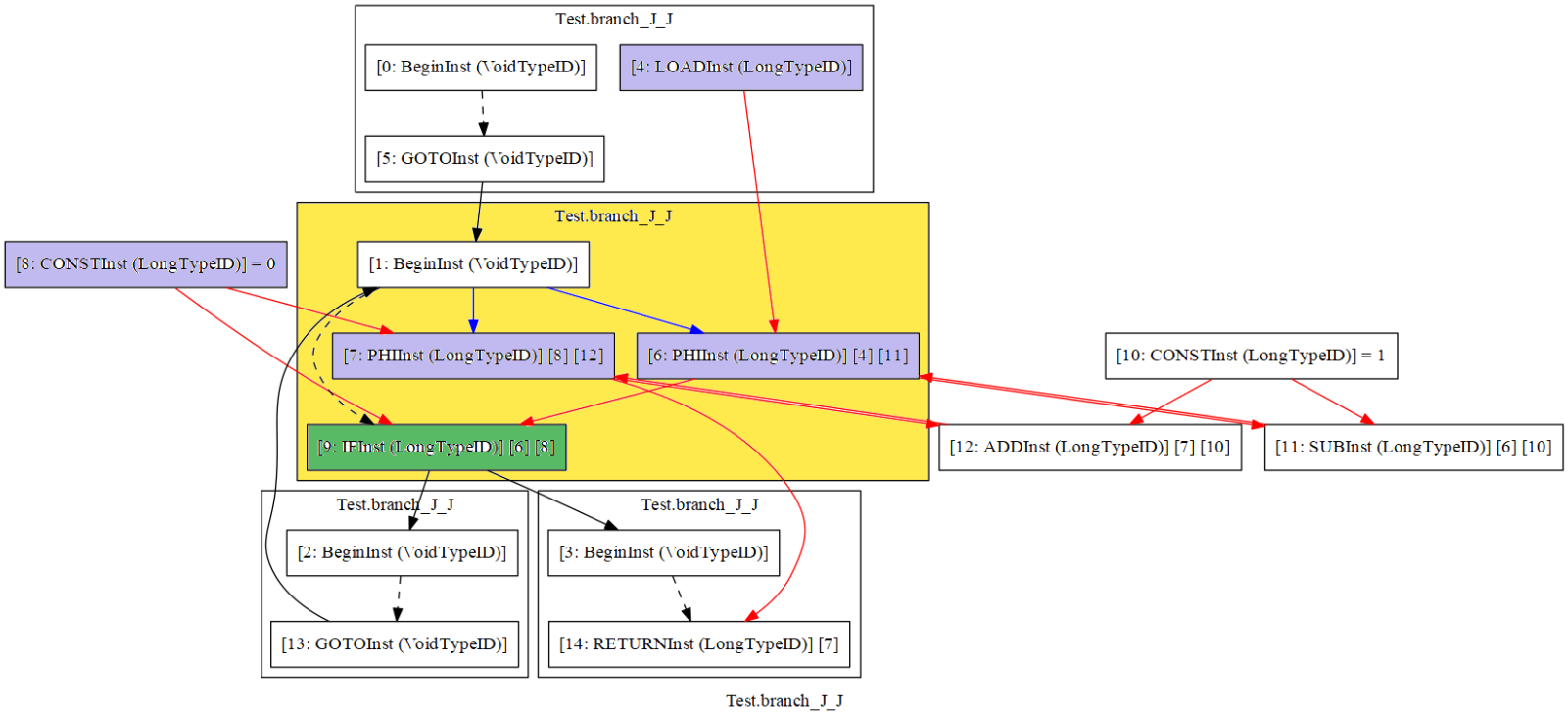
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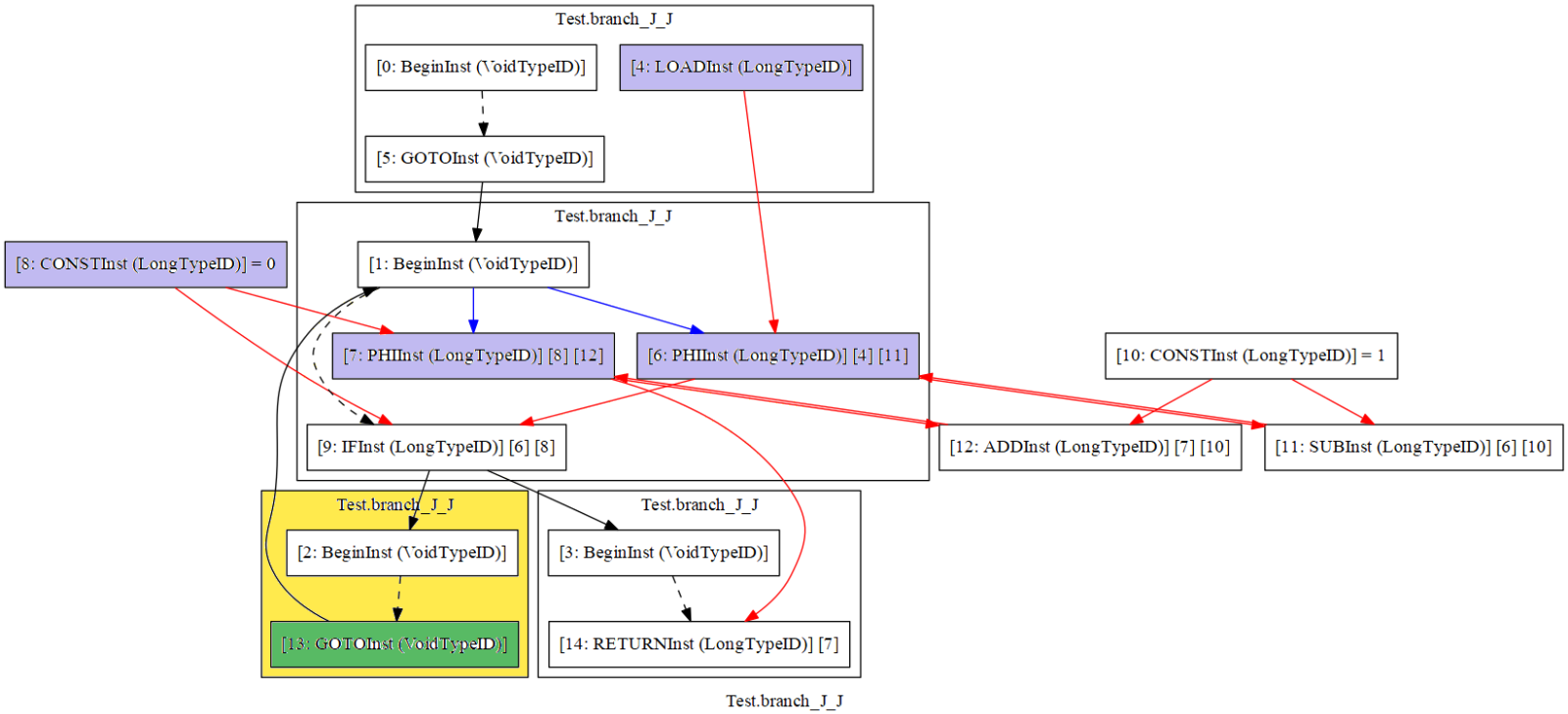
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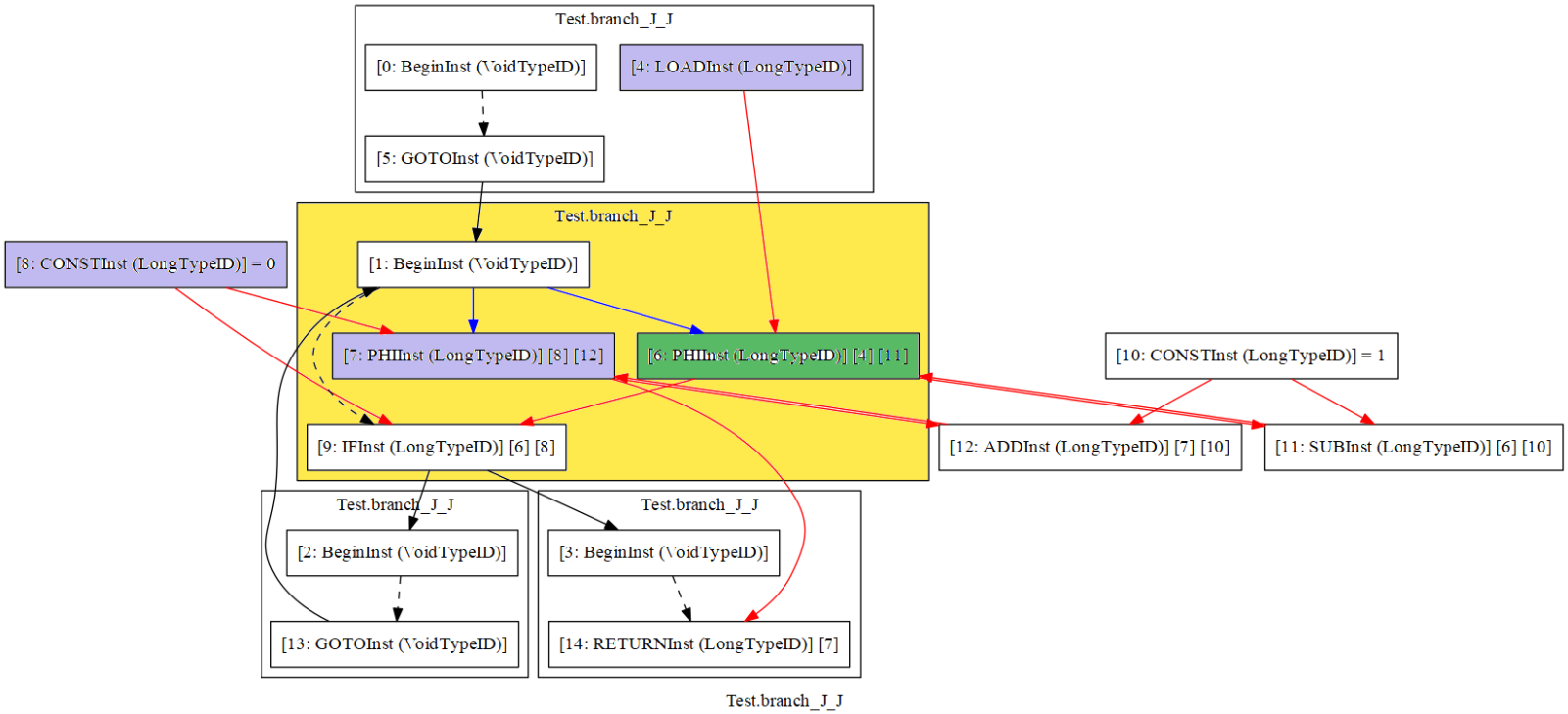
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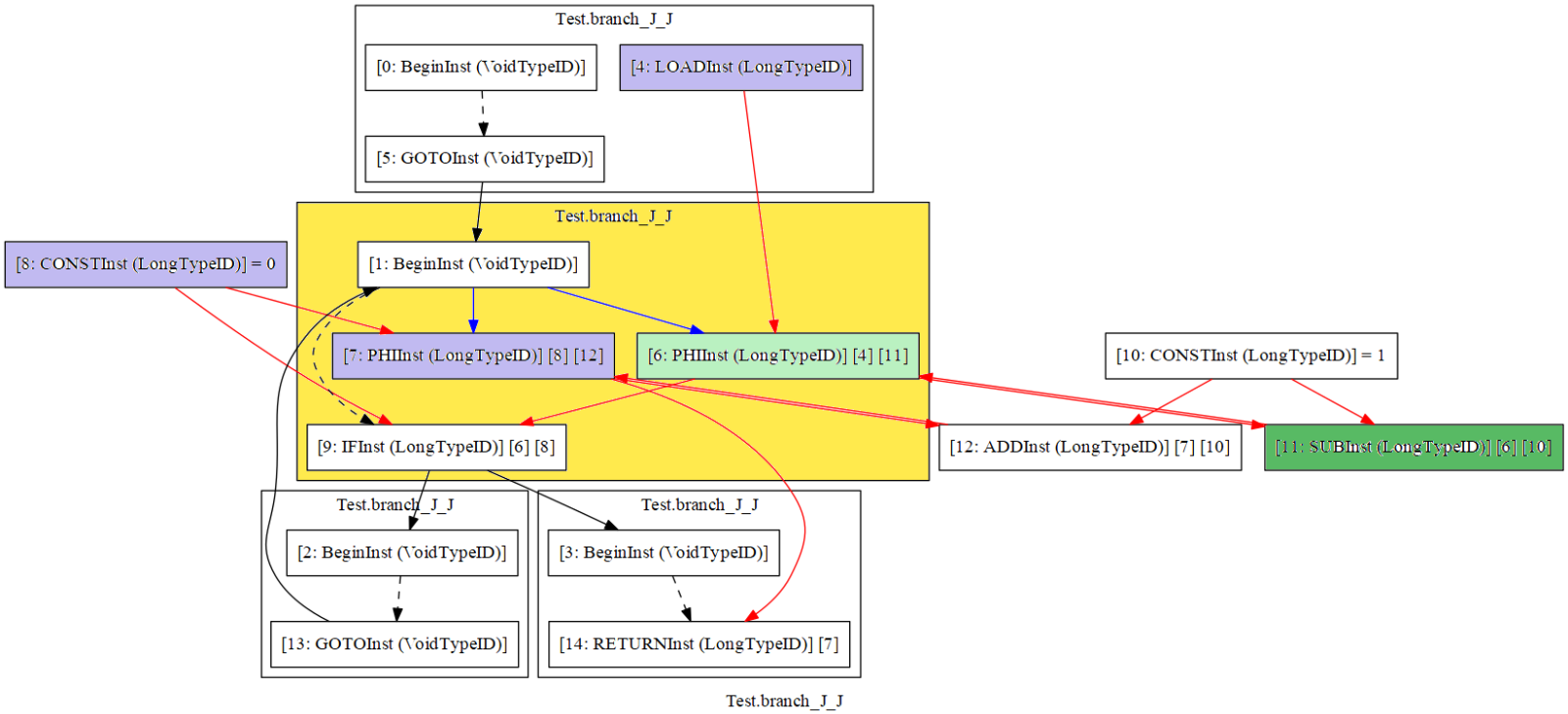
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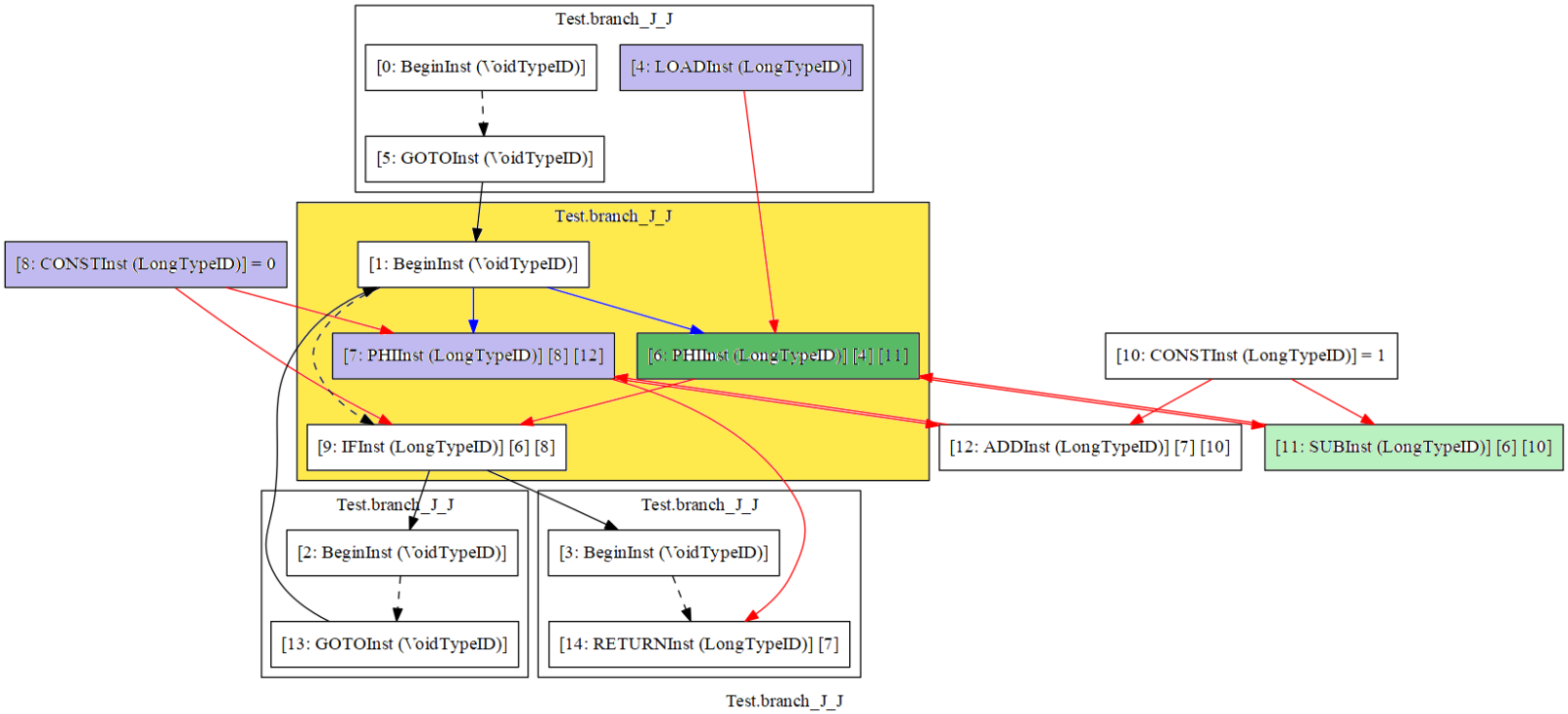
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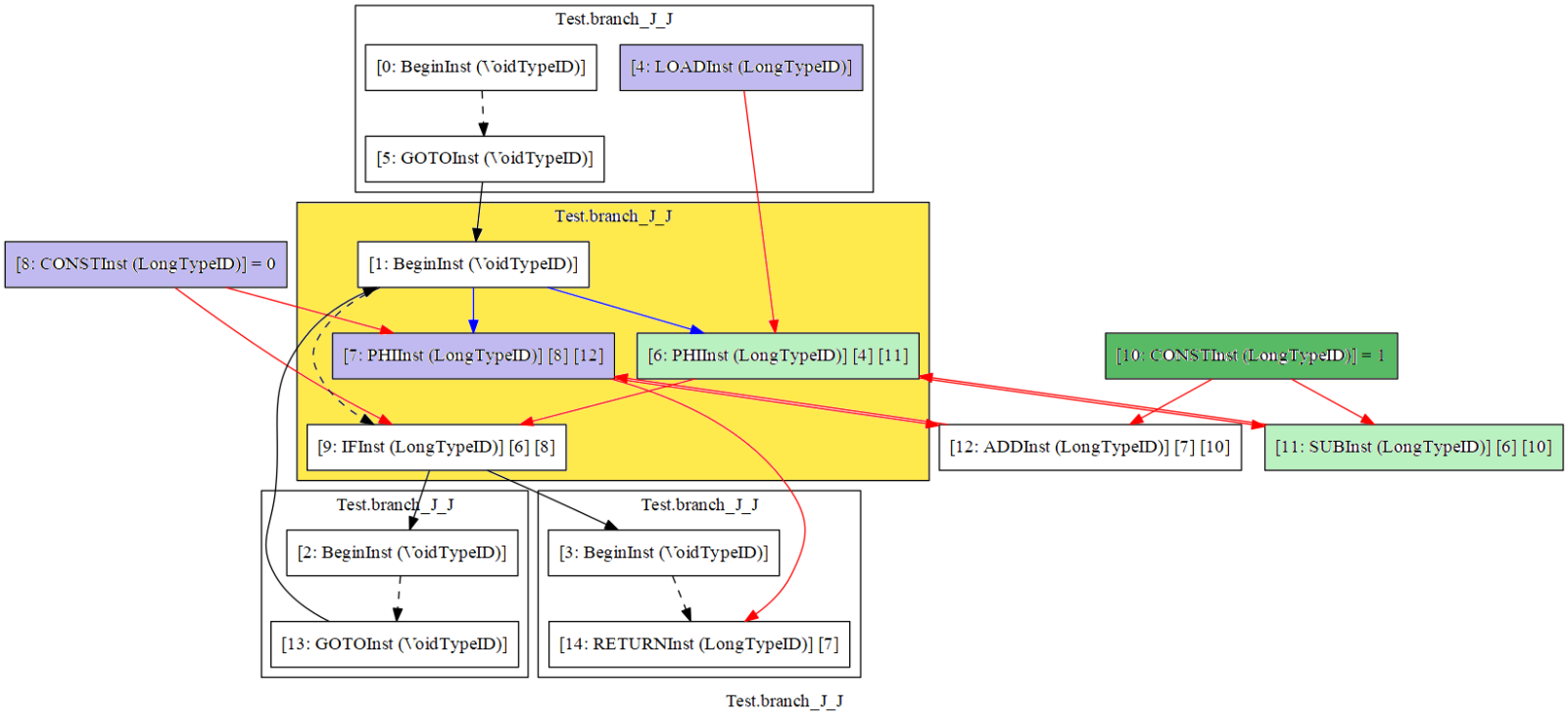
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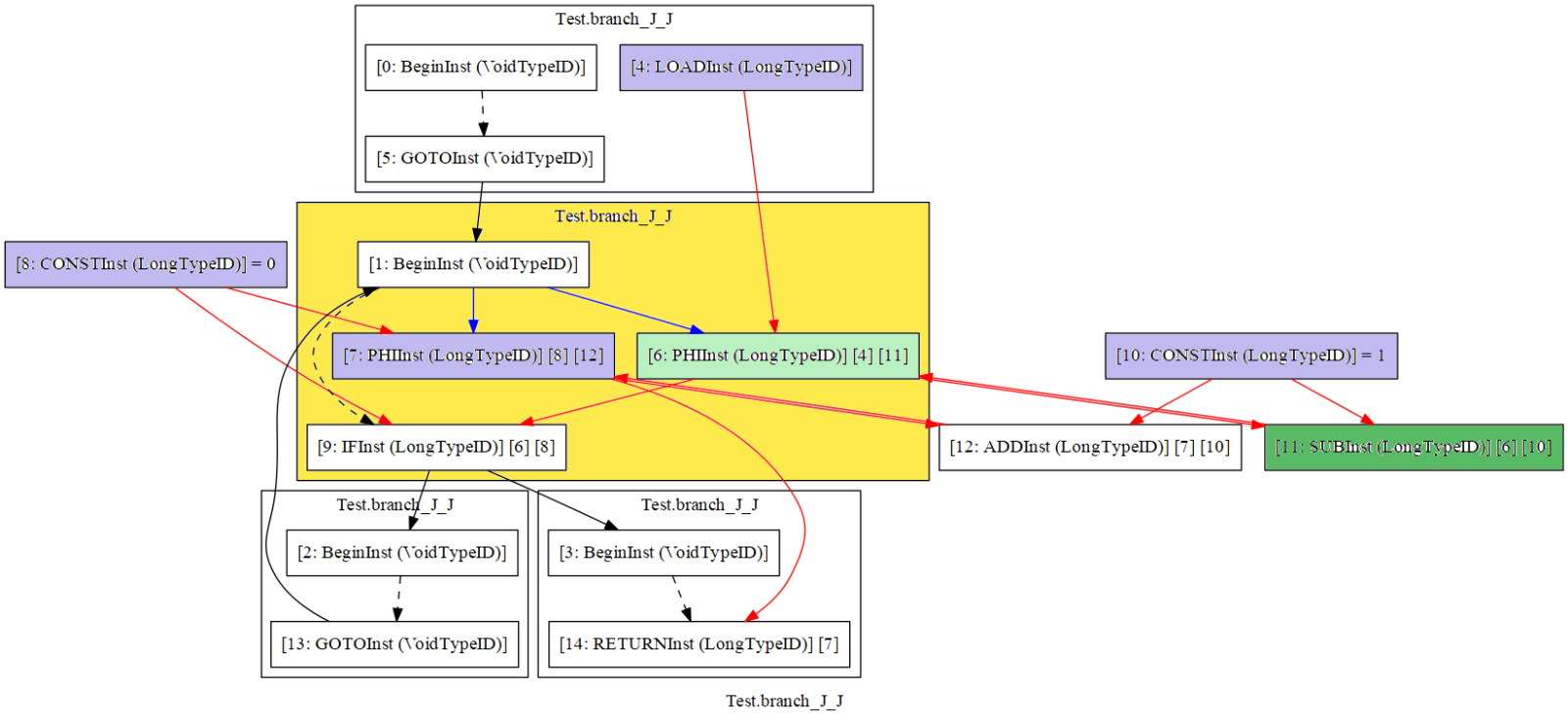
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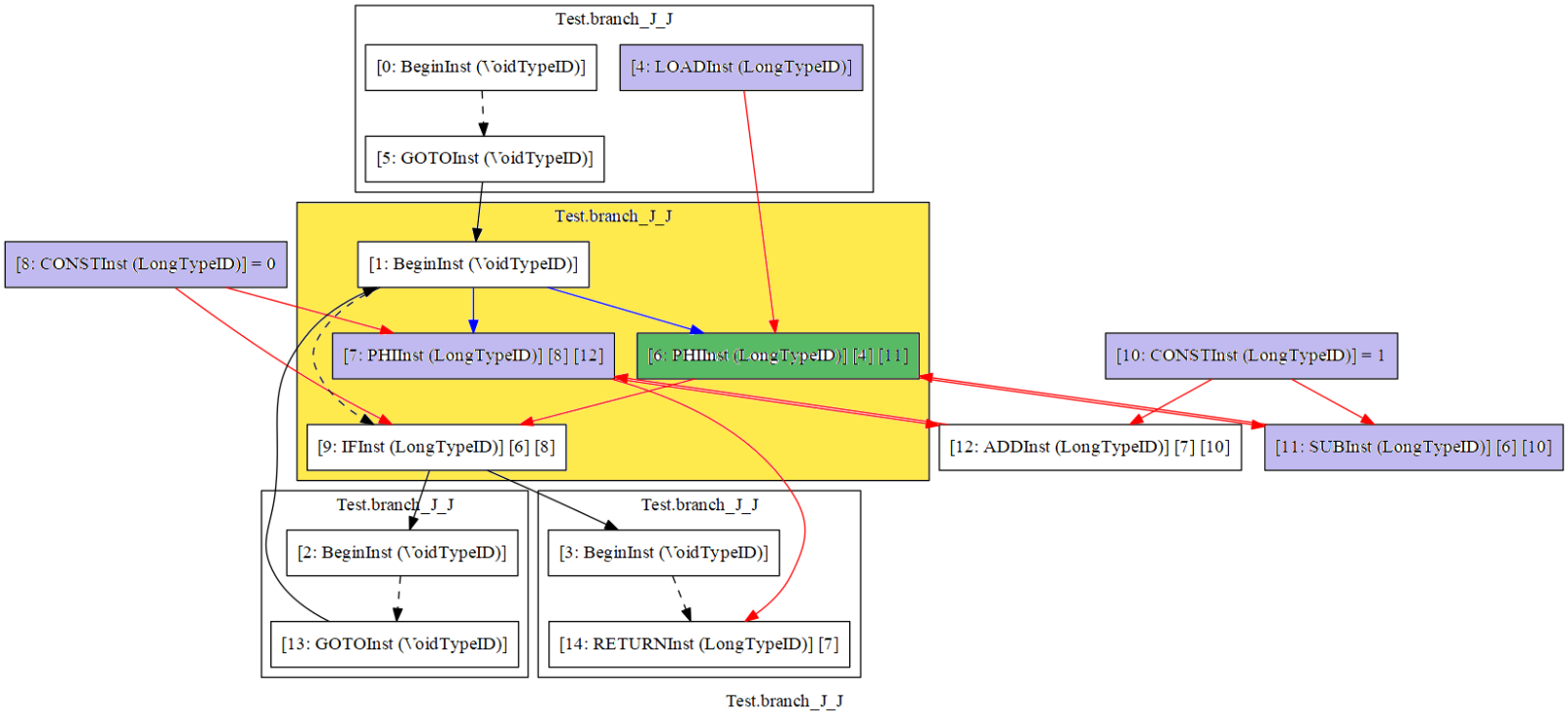
PHI Nodes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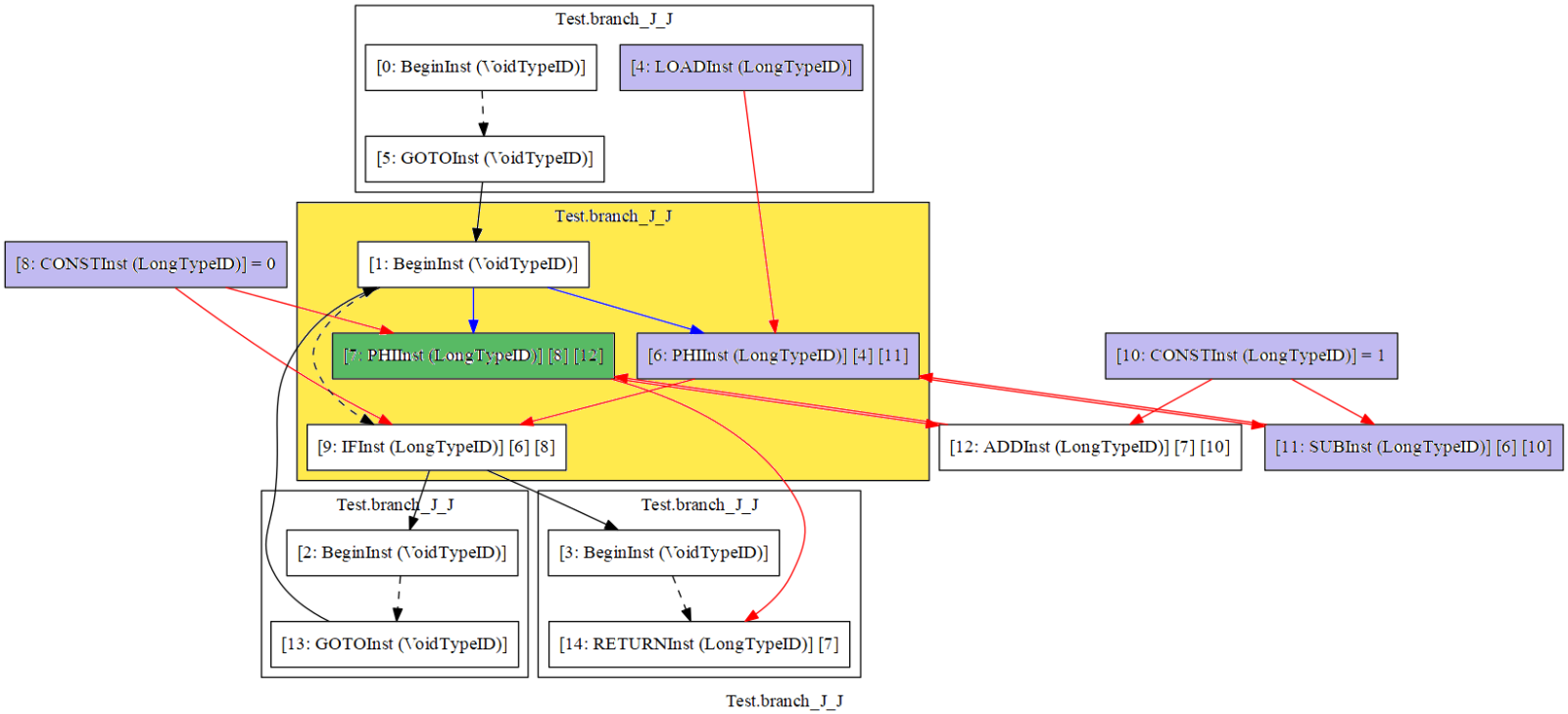
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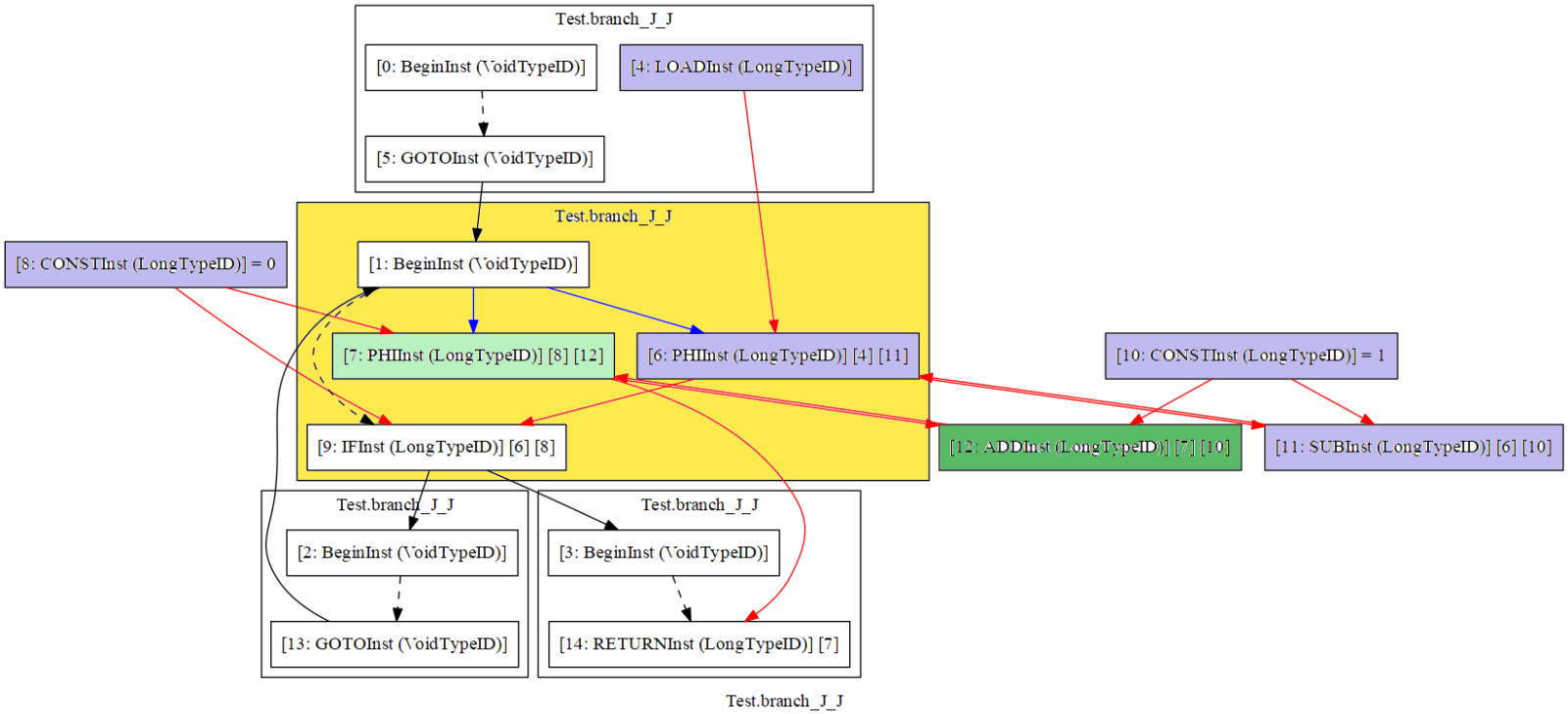
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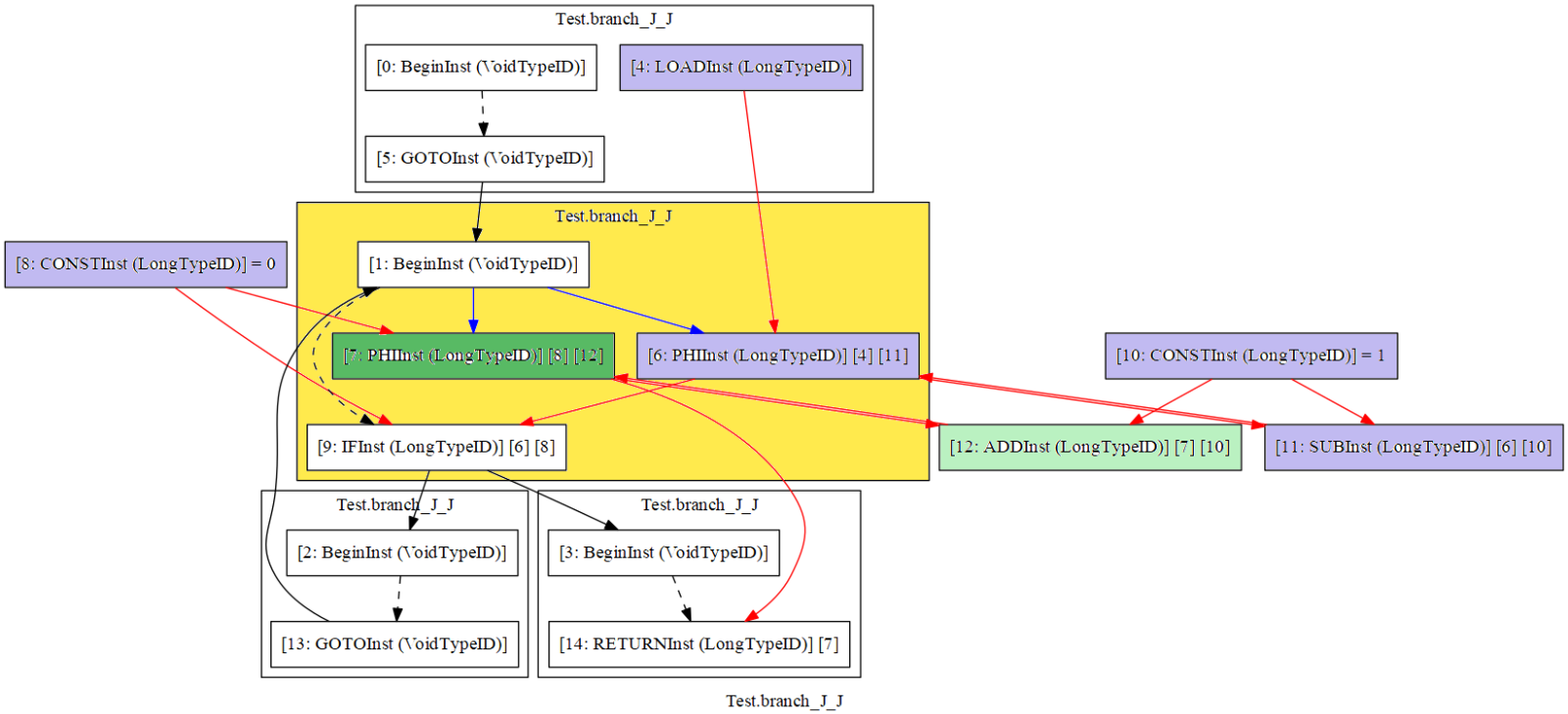
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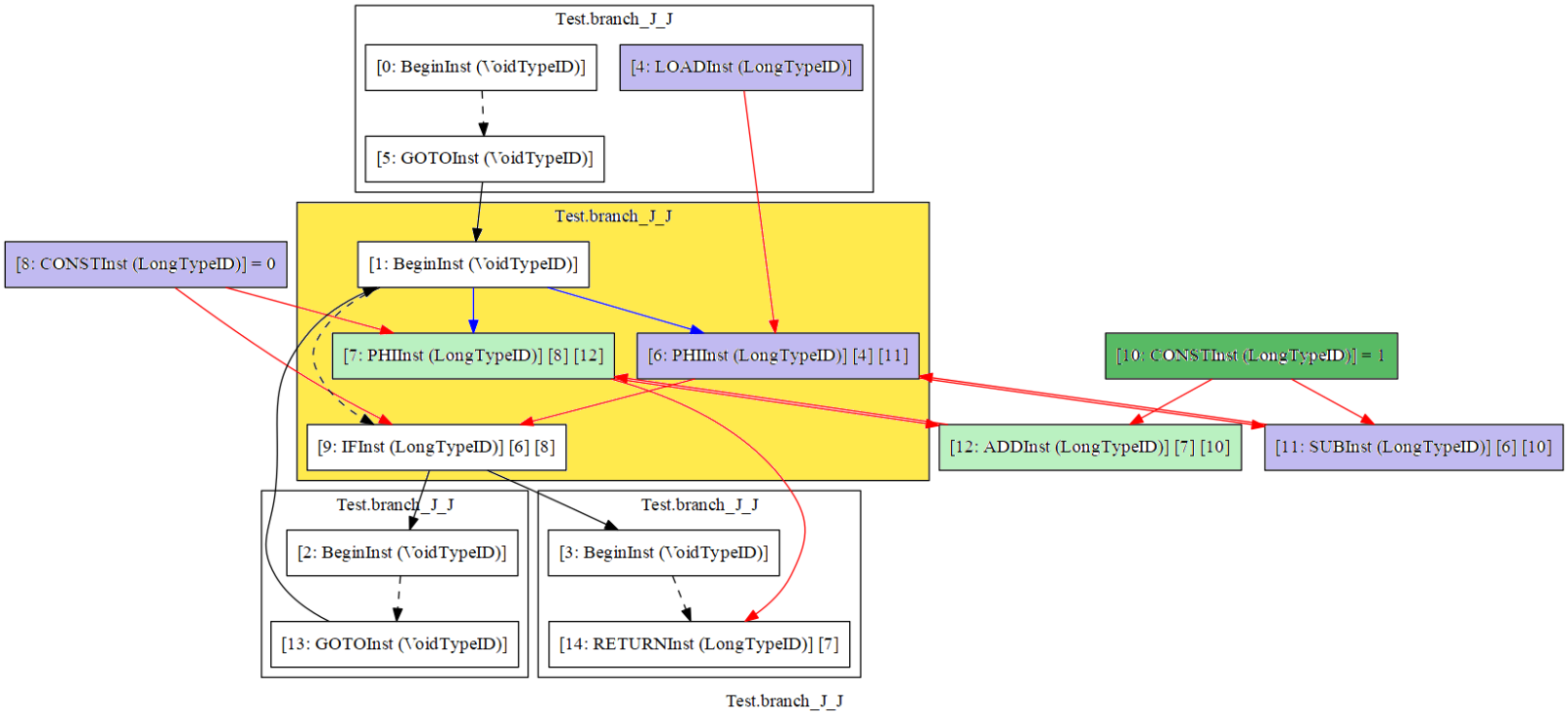
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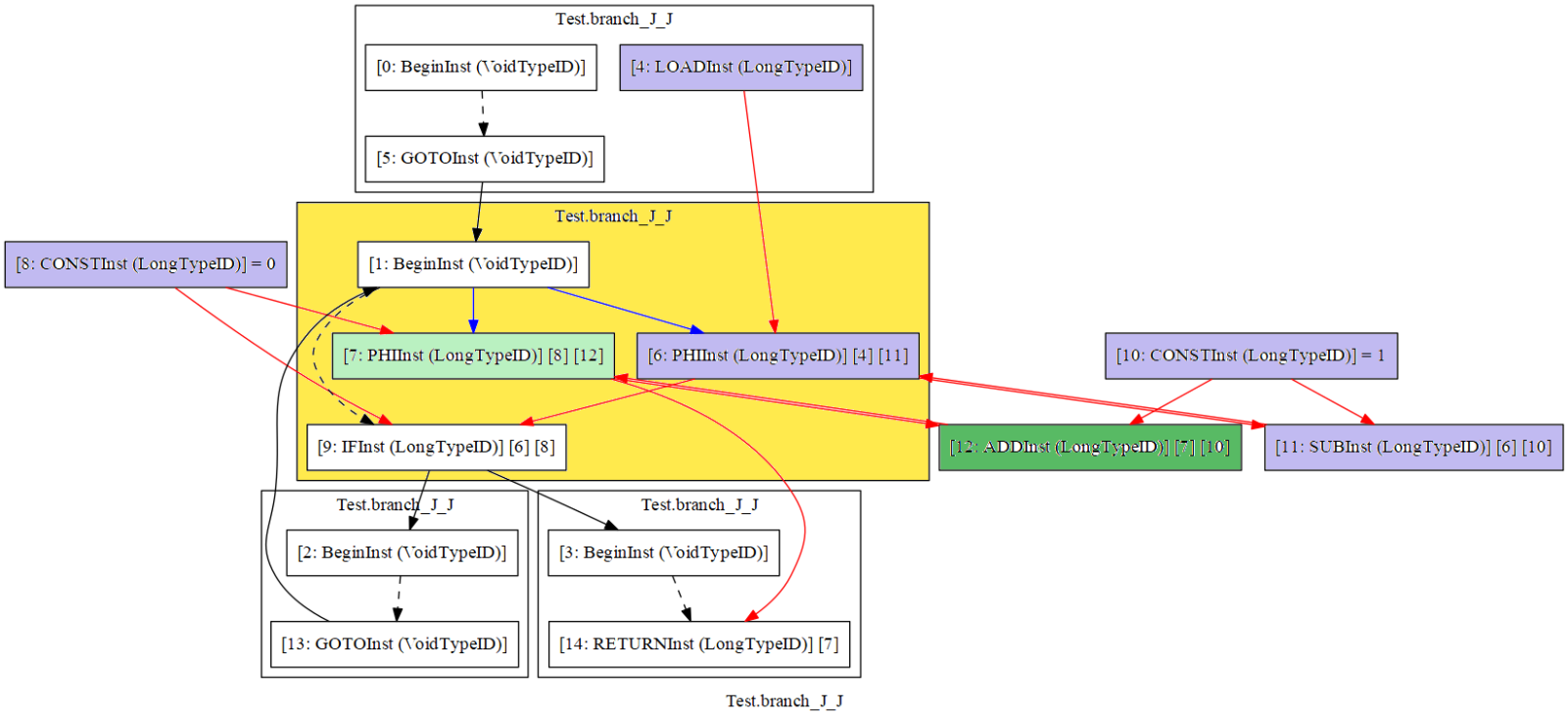
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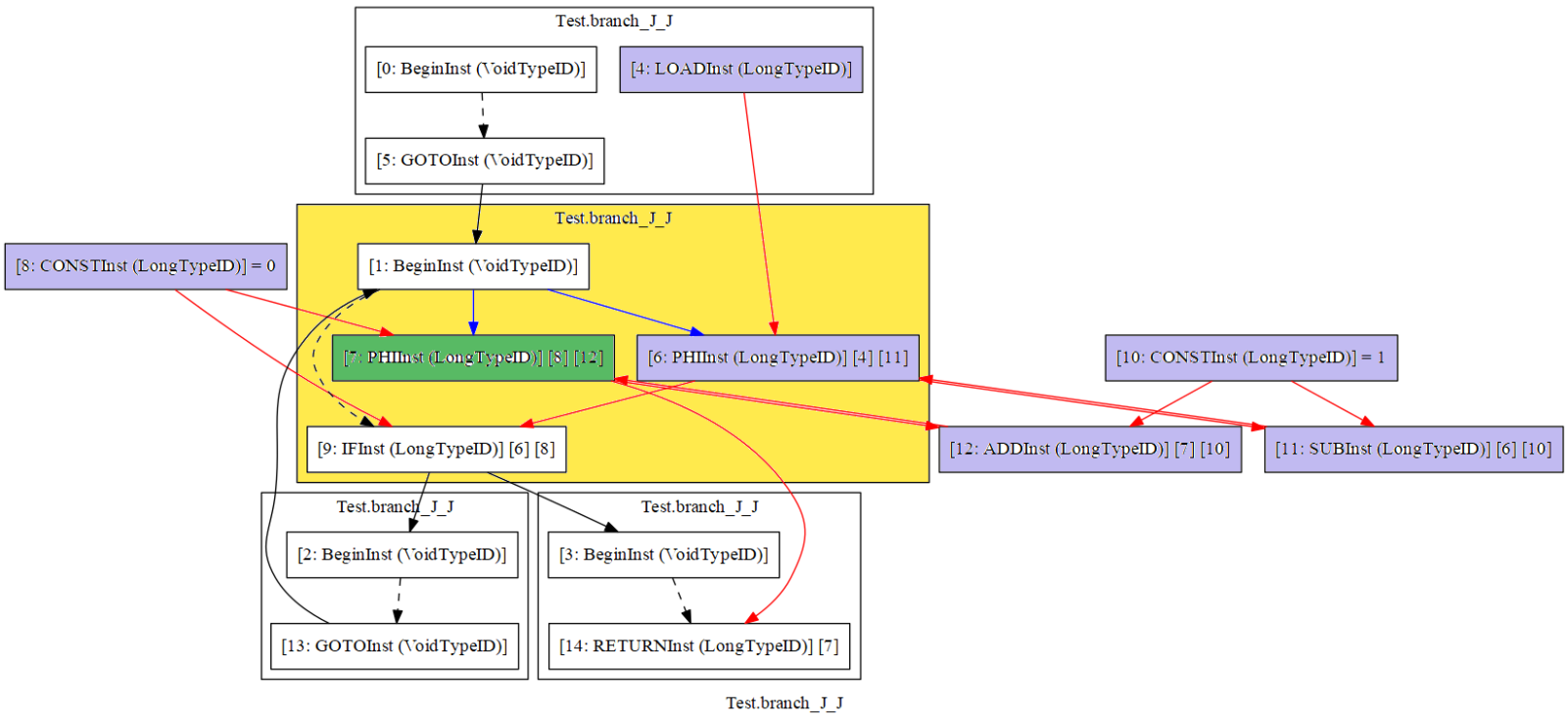
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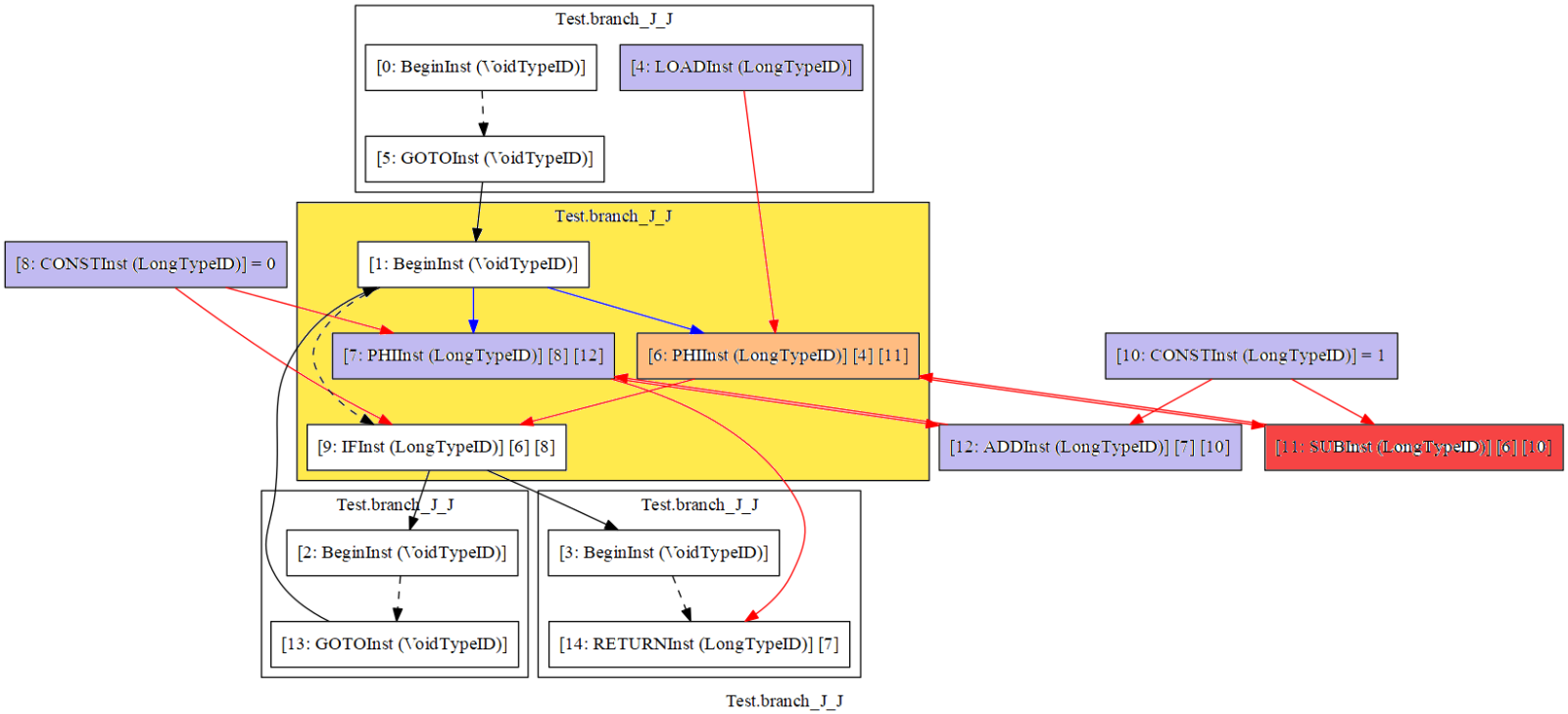
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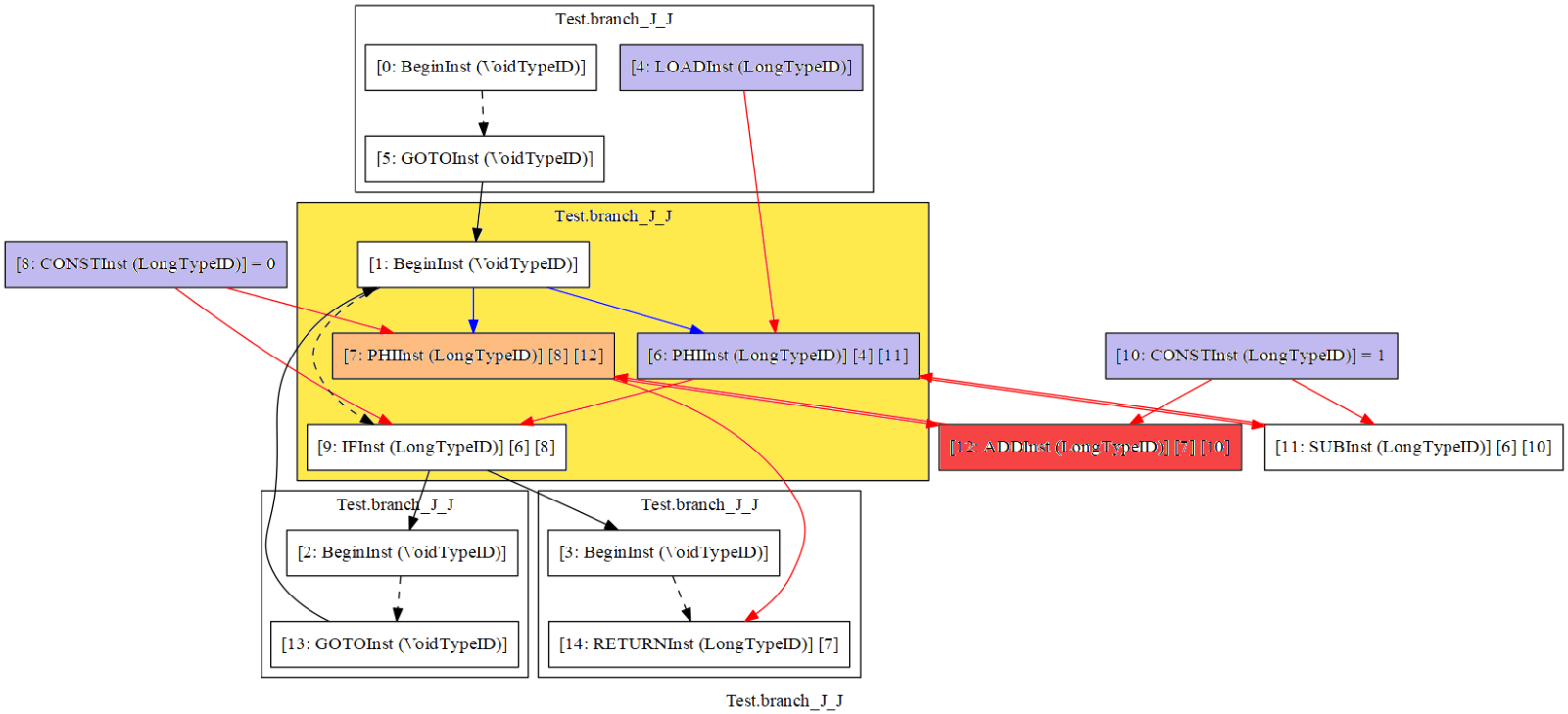
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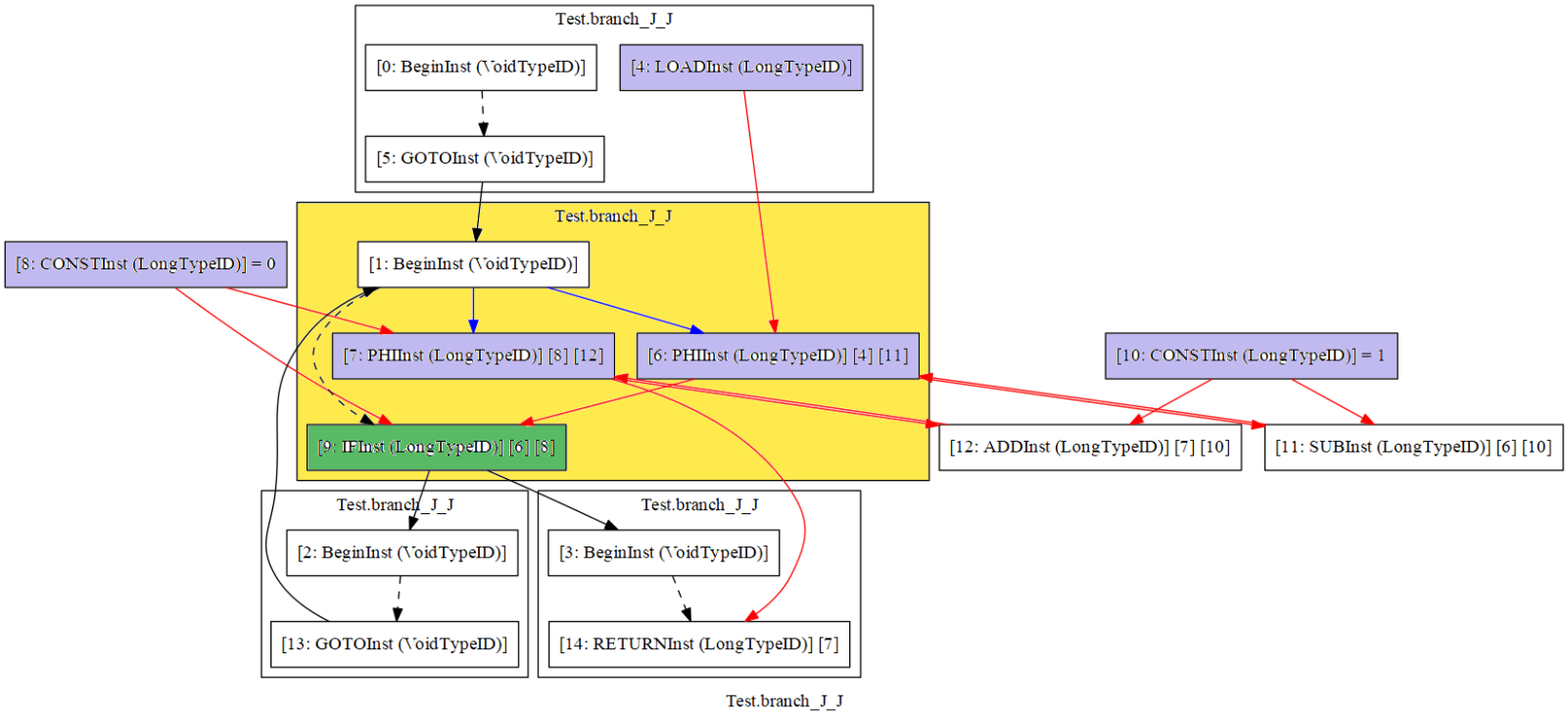
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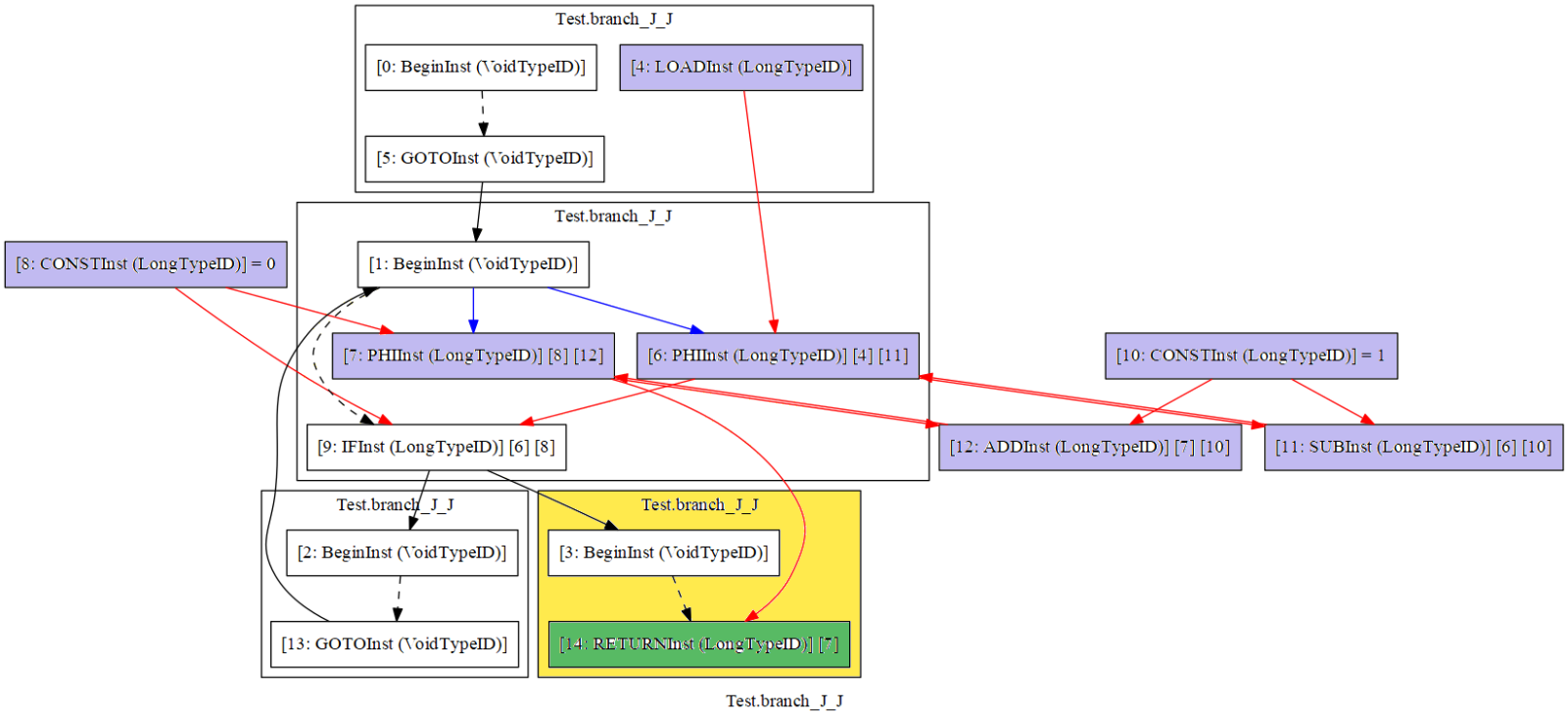
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Future

- Invoke Methods
- Debugging
- Live-Visualisierung
- Assertions, Automated Testing