Assignment 2

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Assignment 2: Control-Dependence

Context-Sensitive ICFG Traversal

- You will be using what you have learned about ICFG and context-sensitive graph traversal.
- **Goal**: implement a context-sensitive graph traversal on ICFG and print **feasible** paths from a source node to a sink node on the graph

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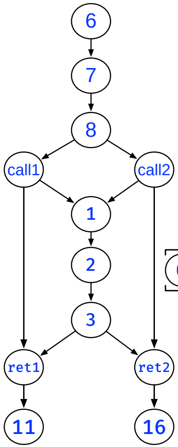
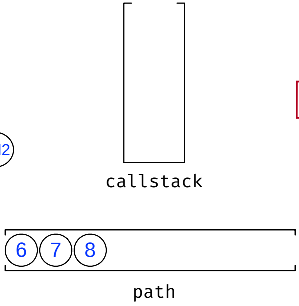
- **Goal**: implement a context-sensitive graph traversal on ICFG and print **feasible** paths from a source node to a sink node on the graph
- **Specification and code template**:
  `https://github.com/SVF-tools/SVF-Teaching/wiki/Assignment-2`
- **SVF CPP API**
  `https://github.com/SVF-tools/SVF-Teaching/wiki/SVF-CPP-API`

Context-Sensitive Control-Dependence

Obtaining a path from node 6 to node 11 on ICFG





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Context-Sensitive Control-Dependence

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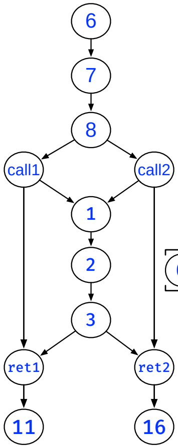

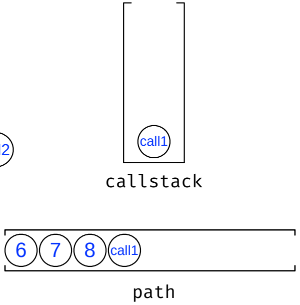

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Context-Sensitive Control-Dependence

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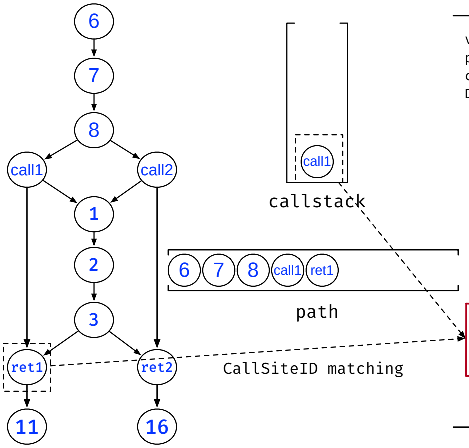

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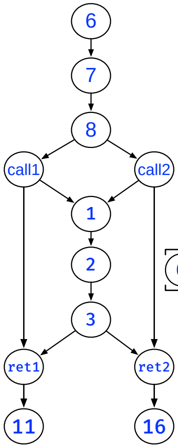
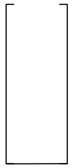
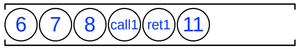




callstack



path

feasible path:
6→7→8→call1→ret1→11

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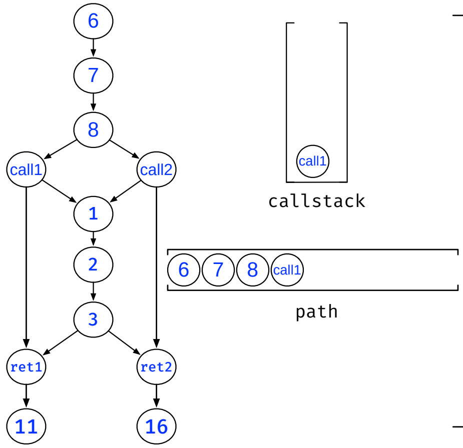
Context-Sensitive Control-Dependence

Obtaining a path from node 6 to node 11 on ICFG



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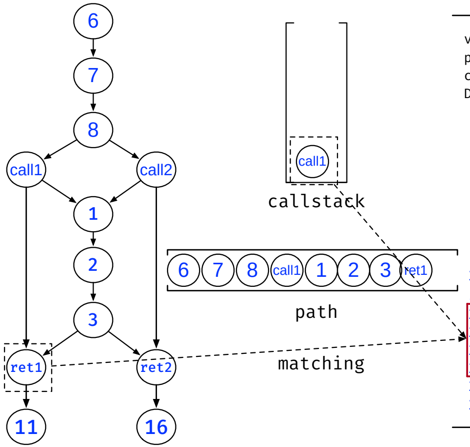

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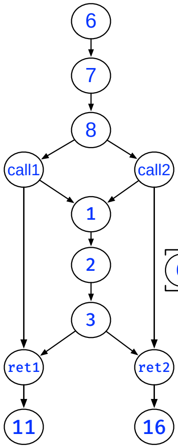

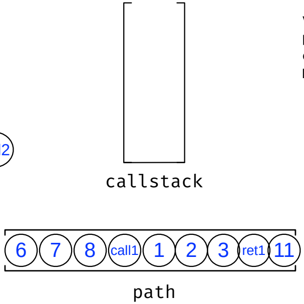

ICFG path:
6→7→8→call1→1→2→3→ret1→11

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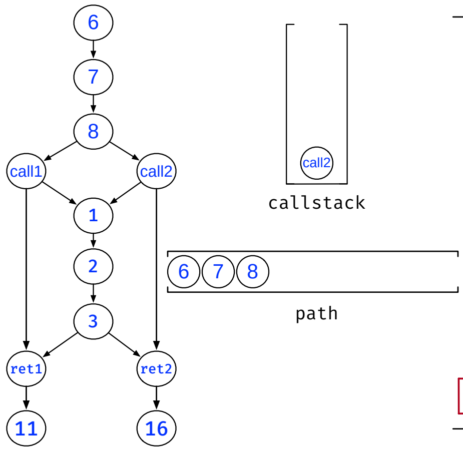

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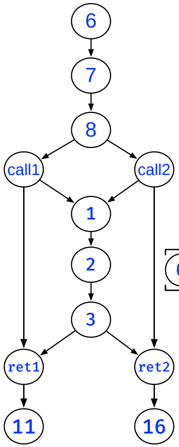

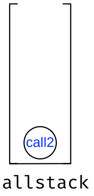

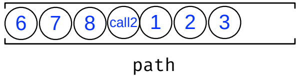

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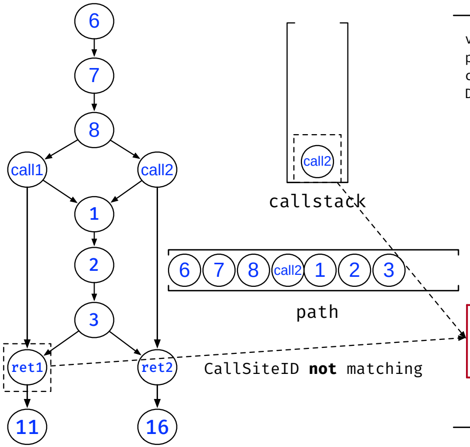

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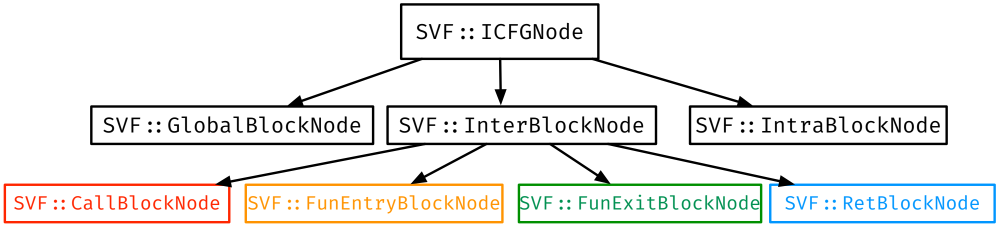
ICFG Node and Edge Classes



https://github.com/SVF-tools/SVF/blob/master/include/Graphs/ICFGNode.h

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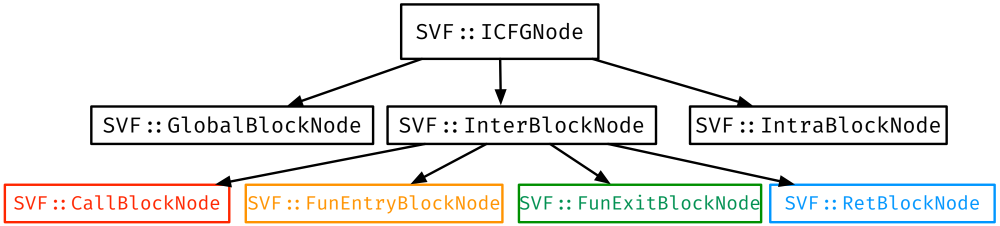

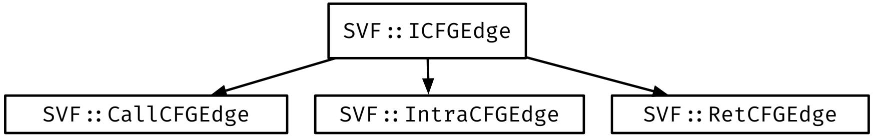

https://github.com/SVF-tools/SVF/blob/master/include/Graphs/ICFGEdge.h

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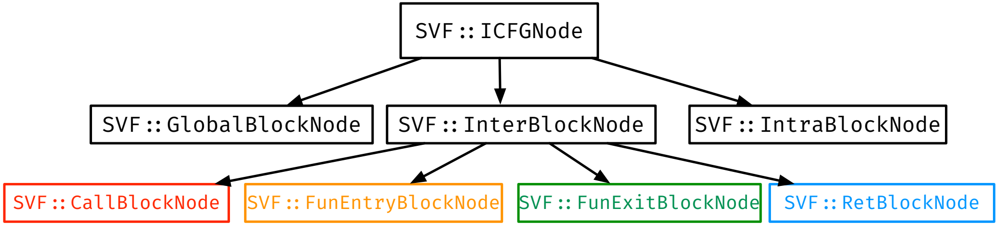

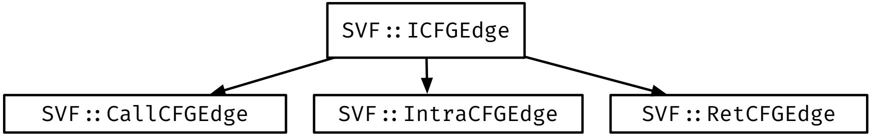

https://github.com/svf-tools/SVF/wiki/Analyze-a-Simple-C-Program#4-interprocedural-control-flow-graph

`cast` and `dyn_cast`

- C++ Inheritance: see slides in Week 2:.
- Casting a **parent** class pointer to pointer of a **Child** type:
  - `SVFUtil::cast`
    - Casting a pointer or reference to an instance of a specified class. This casting fails and abort the program if the object or reference is not the specified class at runtime.
  - `SVFUtil::dyn_cast`
    - ”checking cast” operation. It checks to see if the operand is of the specified type, and if so, returns a pointer to it (this operator does not work with references). If the operand is not of the correct type, a null pointer is returned.
    - works very much like the dynamic_cast<> operator in C++, and should be used in the same circumstances.
- Example: Accessing the attributes of the child class via casting.
  - `RetBlockNode* retNode = SVFUtil::cast<RetBlockNode>(ICFGNode);`
  - `CallCFGEdge* callEdge = SVFUtil::dyn_cast<CallCFGEdge>(ICFGEdge);`