Advanced
T⚙pics
in
C⚙mpilers

InvariantsManager

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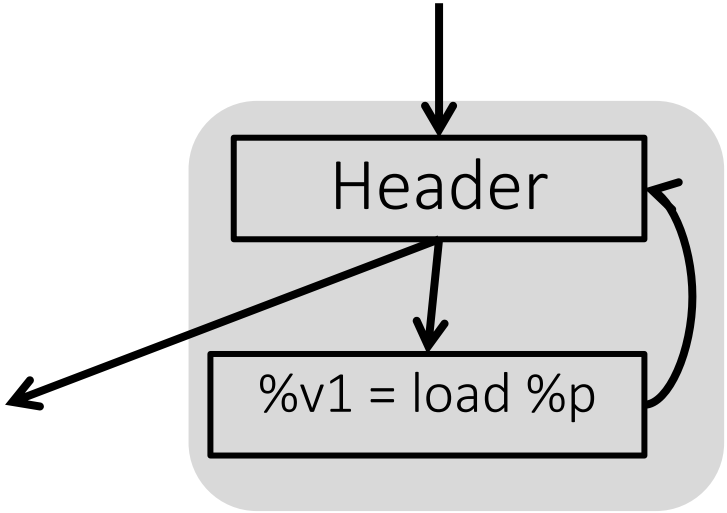
Outline

- What is it and why NOELLE provides it

- Checking invariants

InvariantsManager

- It captures the computation within a loop that are loop invariants for that loop



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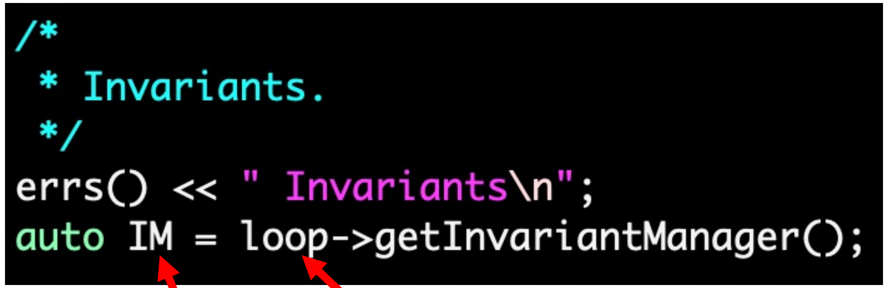
Checking invariants

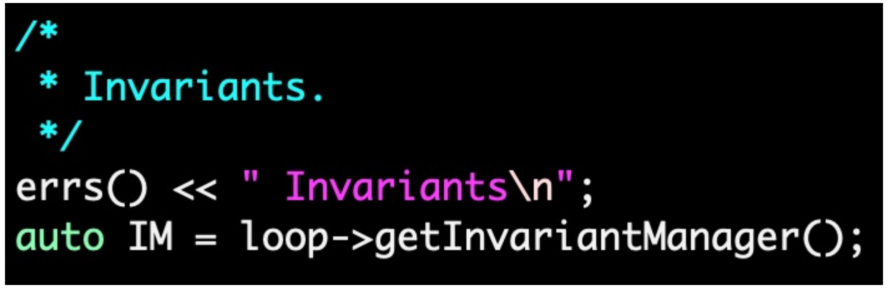


```
/*
 * Invariants.
 */
errs() << " Invariants\n";
auto IM = loop->getInvariantManager();
```

Instance of the class llvm::noelle::LoopDependenceInfo

Instance of the class llvm::noelle::InvariantManager

Checking invariants



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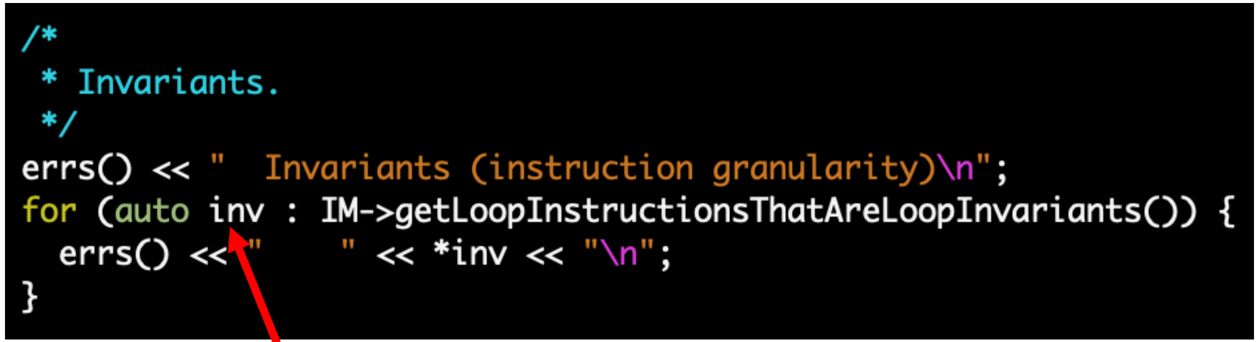
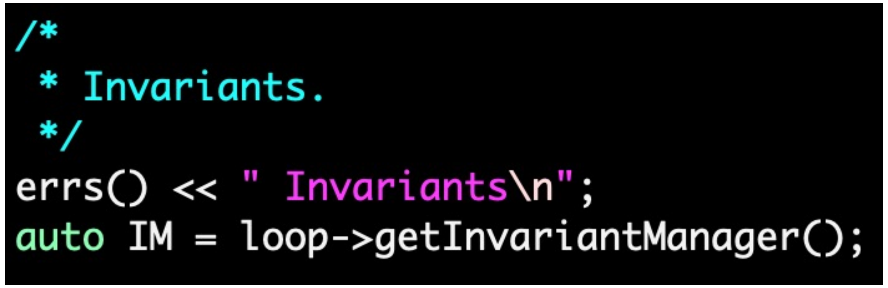


```
/*
 * Invariants.
 */
errs() << "  Invariants (instruction granularity)\n";
for (auto inv : IM->getLoopInstructionsThatAreLoopInvariants()) {
  errs() << "      " << *inv << "\n";
}
```

Instance of the class llvm::Instruction

Checking invariants



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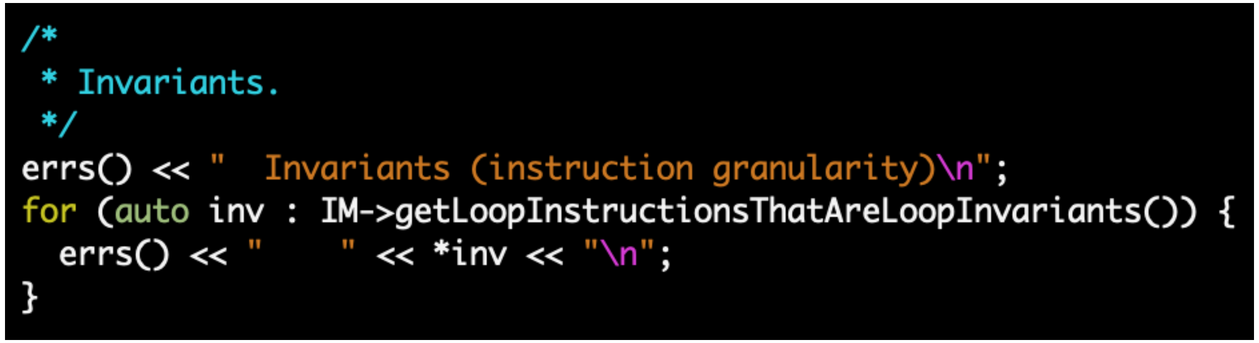

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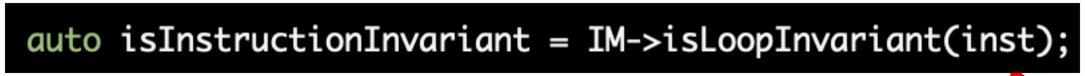
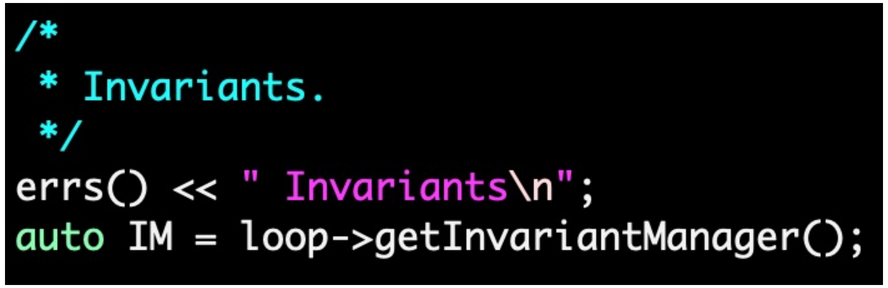


```
auto isInstructionInvariant = IM->isLoopInvariant(inst);
```

Instance of the class llvm::Instruction

Checking invariants



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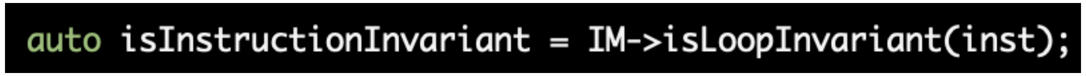

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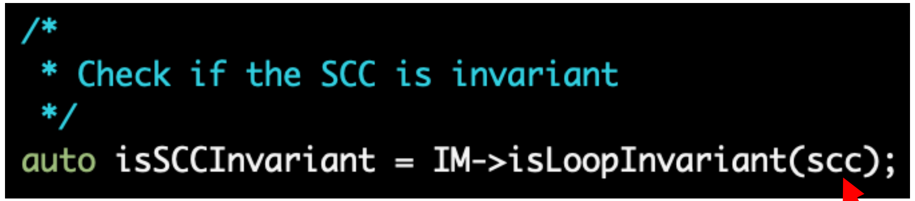

```
/*
 * Check if the SCC is invariant
 */
auto isSCCInvariant = IM->isLoopInvariant(scc);
```

Instance of the class llvm::noelle::SCC

Always have faith in your ability

Success will come your way eventually

Best of luck!