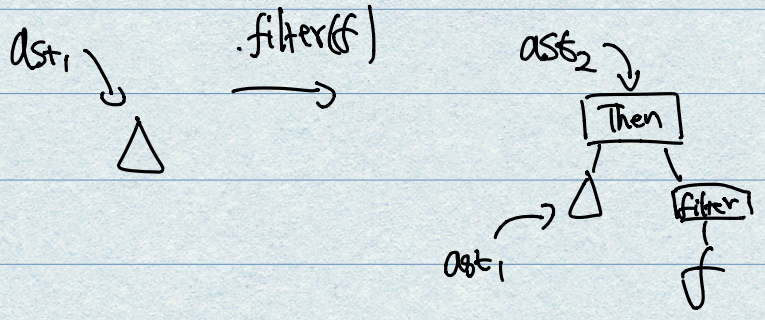
Lecture #5.

Implementation of fluent AST construction.

Q.apply(Math.sqrt)..... filter(f)

ast1



Adjust for call chaining

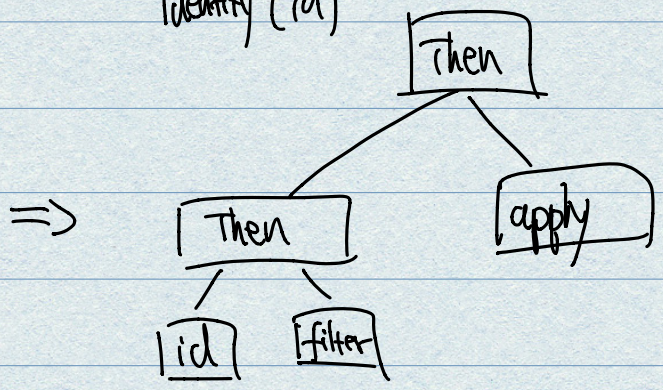
Q.filter(f).apply(g)

↑

query

↓

Identity (id)



Q has a type of ASTNode (subtype IdNode)

Optimization.

inefficiency of 'q.filter(f).count()'

① stores the data ② two iterations.

ThenNode(ThenNode(x, FilterNode(f)), count)

→ ThenNode(x, countIf(f))

"tree rewrite rule".

Optimization traversal order.

- Bottom up / Top down ?
- post-order optimization

  1 → left child

  2 → right child

  3 → this node

(Lecture #5)

Global Optimization,

- control flow.
- multiple execution paths
- Control Flow Graph.

=> · Global Flow Analysis

· Constant propagation

· Liveness analysis (eleminate redundant stmts)

Local Optimization.

· Basic block: code sequence with no jumps

· Basic block optimization:

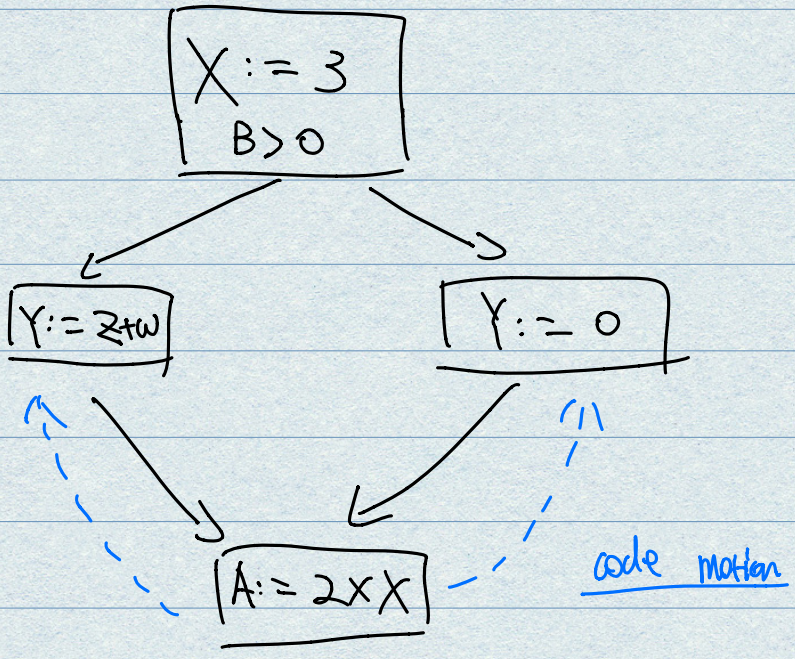
- Constant propagation.
- Dead code elimination.

- etc

$X := 3$

$Y := Z \times W$

$Q := X + Y$



To Replace a use of x by a constant k.

→ every path to the use of x

the last assignment to x is $x := k$.

Global Analysis

- The optimization depends on the property Prop at a particular point in program execution.

{ Prop is definitely true

don't know whether Prop is true.