

### Algorithm for Local Value Numbering

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for  $j = 1$  to  $|\text{Basic Block}|$  do
   $I = \text{the } j^{\text{th}} \text{ instruction in block}$ 
   $\text{applySubsume}(I)$ 
   $l = \text{l-value}(I)$ 
  if  $I$  is an iLDI instruction {
     $r = \text{valnum}(\text{r-value}(I))$ 
     $\text{setvalnum}(l, r)$ 
  } else if  $I$  is a move instruction {
     $r = \text{valnum}(\text{r-value}(I))$ 
     $\text{removeSubsume}(l)$ 
     $\text{setvalnum}(l, r)$ 
    if  $\text{isConstant}(r)$ 
      change  $I$  to an iLDI instruction
  } else
     $\text{subsume}(l, \text{r-value}(I))$ 
  } else {
     $r_1 = \text{valnum}(r_1\text{-value}(I))$ 
     $r_2 = \text{valnum}(r_2\text{-value}(I))$ 
     $op = \text{operator}(I)$ 
    if  $\text{isConstant}(r_1) \wedge \text{isConstant}(r_2)$  {
       $v = r_1 op r_2$ 
      change  $I$  to an iLDI instruction
       $\text{removeSubsume}(l)$ 
       $\text{setvalnum}(l, \text{valnum}(v))$ 
    } else {
      if  $\langle r_1, op, r_2 \rangle$  in expression table {
         $l_t = \text{l-value}(\langle r_1, op, r_2 \rangle)$ 
         $v = \text{valnum}(l_t)$ 
        change  $I$  to a move instruction
         $\text{removeSubsume}(l)$ 
         $\text{setvalnum}(l, v)$ 
         $\text{subsume}(l, l_t)$ 
      } else {
        propagate constants into  $I$ 
         $\text{insert}(\langle r_1, op, r_2 \rangle, l)$ 
         $\text{setvalnum}(l, \text{valnum}(l))$ 
      }
    }
  }
}
enddo

```