Instruction Selection

Unnikrishnan C

a[i]=b+1 , a and i are local variables

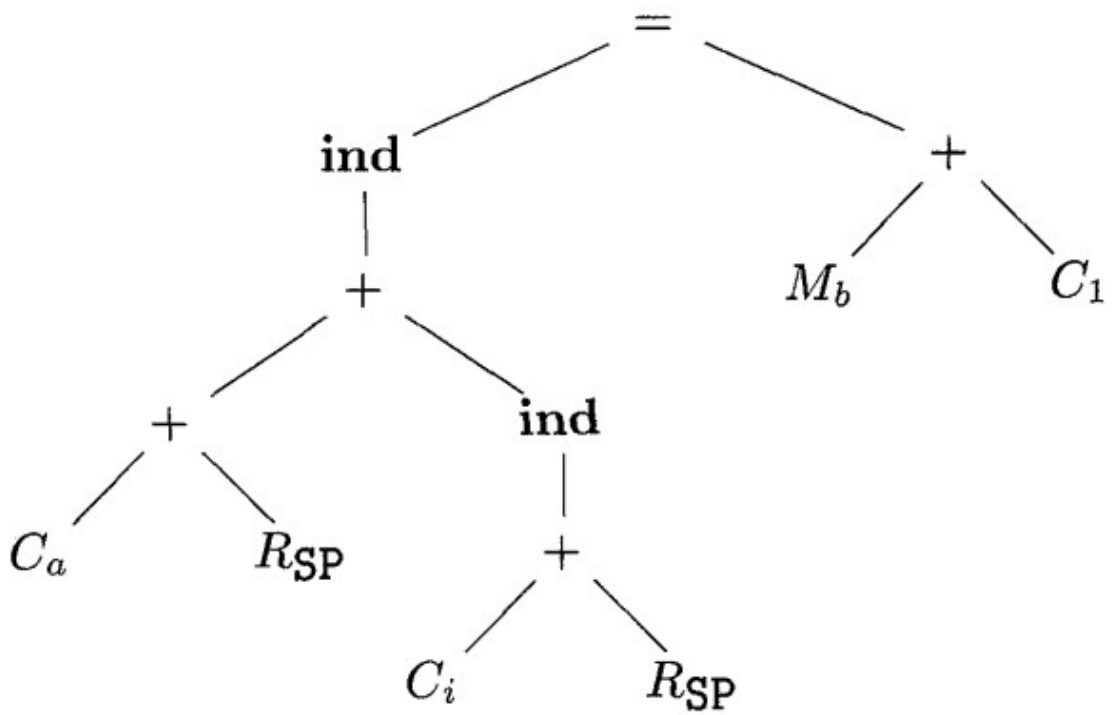


Figure 8.19: Intermediate-code tree for `a[i] = b + 1`

Tree Rewriting rules

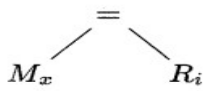
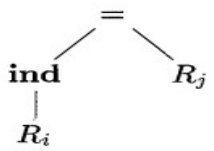
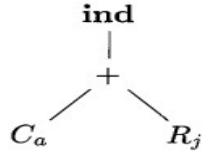
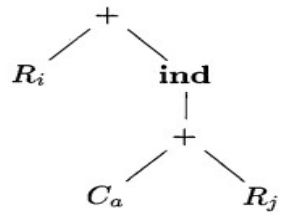
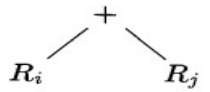
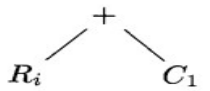
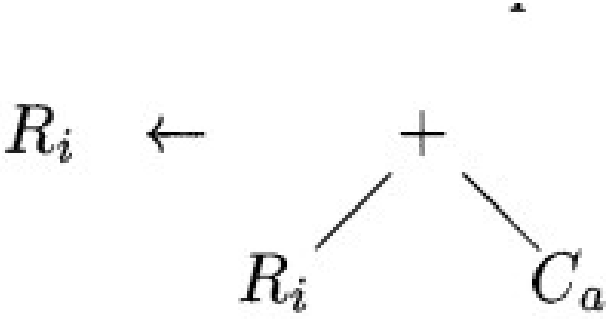
1)	$R_i \leftarrow C_a$	{ LD Ri, #a }
2)	$R_i \leftarrow M_x$	{ LD Ri, x }
3)	$M \leftarrow$ 	{ ST x, Ri }
4)	$M \leftarrow$ 	{ ST *Ri, Rj }
5)	$R_i \leftarrow$ 	{ LD Ri, a(Rj) }
6)	$R_i \leftarrow$ 	{ ADD Ri, Ri, a(Rj) }
7)	$R_i \leftarrow$ 	{ ADD Ri, Ri, Rj }
8)	$R_i \leftarrow$ 	{ INC Ri }

Figure 8.20: Tree-rewriting rules for some target-machine instructions

Proper Instruction Selection




```
{ if (a = 1)
      INC Ri
  else
      ADD Ri, Ri, #a }
```

Ershov Number

tells how many registers are needed to evaluate that node w

1) Label Any leaf by a number 1

2) Label of an interior node with one child is label of its child

3) Label of an interior node with two childs is

(a) max of label of childern if label of childern different

(b) 1+ label of childern, if label of childern same

Ershov Number

```
t1 = a - b
t2 = c + d
t3 = e * t2
t4 = t1 + t3
```

worked out in copy