Compilers

Code Generation Example

Alex Aiken

def sumto(x) = if x = 0 then 0 else x + sumto(x − 1)

Code Generation Ex

def sumto(x) = if x = 0 then 0 else x + sumto(x – 1)

sumto_entry:

```
        move     $fp    $sp
        sw       $ra    0($sp)
        addiu    $sp    $sp -4
        lw       $a0    4($fp)      // load x
        sw       $a0    0($sp)   ←
        addiu    $sp    $sp -4
        li       $a0    0
        lw       $t1    4($sp)   ←
        addiu    $sp    $sp 4
        beq      $a0    $t1 true1
```

false1:

```
        lw   $a0  4($fp)
        sw   $a0  0($sp)
        addiu  $sp  $sp -4
```

```
        sw       $fp  0($sp)
        addiu    $sp  $sp -4
4—[     lw       $a0  4($fp)
        sw       $a0  0($sp)
        addiu    $sp  $sp -4
x-1
1—[     li       $a0  1
        lw       $t1  4($sp)
        sub      $a0  $t1  $a0
        addiu    $sp  $sp  4
        sw       $a0  0($sp)
        addiu    $sp  $sp -4
        jal      sumto_entry
        lw       $t1  4($sp)
        add      $a0  $t1  $a0
        addiu    $sp  $sp  4
        b        endif1
true1:    li     $a0  0
endif1:   lw     $ra  4($sp)
          addiu  $sp  $sp  12
          lw     $fp  0($sp)
```

          jr $ra ←

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