

Plan for today

Day in the life of a Frag

- how is instruction selection performed on the body?
- how is register allocation performed?
- how are the prologue and epilogue added?

Instruction selection and register allocation

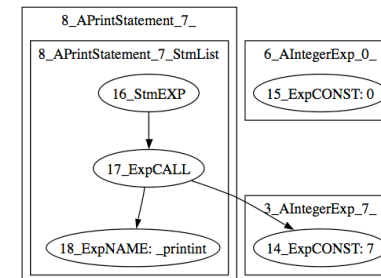
CS453 Lecture

Day in the life of a Frag

1

PrintSeven testing method

```
public int testing() {
    System.out.println(7);
    return 0;
}
```

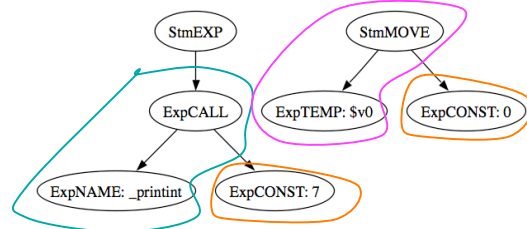


CS453 Lecture

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2

PrintSeven testing, instruction selection



```
# ExpCALL
# ExpCONST
li t36, 7
# push parameter onto stack
sw t36, 0($sp)
subu $sp, $sp, 4
jal _printint
```

```
# ExpCONST
li t37, 0
#StmMOVE(ExpTEMP(t1), e)
move $v0, t37
```

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3

SpillAll

Before spill

```
# ExpCALL
# ExpCONST
li t36, 7
# push parameter onto stack
sw t36, 0($sp)
subu $sp, $sp, 4
jal _printint
```

```
# ExpCONST
li t37, 0
#StmMOVE(ExpTEMP(t1), e)
move $v0, t37
```

After spill

```
# ExpCALL
# ExpCONST
li $t0, 7
sw $t0, -12($fp)
lw $t0, -12($fp)
# push parameter onto stack
sw $t0, 0($sp)
subu $sp, $sp, 4
jal _printint
```

```
# ExpCONST
li $t0, 0
sw $t0, -16($fp)
lw $t0, -16($fp)
#StmMOVE(ExpTEMP(t1), e)
move $v0, $t0
```

Frag

4

Prologue and Epilogue

Prologue

```
.text
Foo_testing:
Foo_testing_frameSize=20
Foo_testing_paramsNregsaves=12
    sw $ra, 0($sp)
    subu $sp, $sp, 4
    sw $fp, 0($sp)
    subu $sp, $sp, 4
    addu $fp, $sp, Foo_testing_paramsNregsaves
    subu $sp, $fp, Foo_testing_frameSize

    ... # spilled instructions for body
```

Epilogue

```
# epilogue
done2:
    lw $ra, -4($fp)
    move $t0, $fp
    lw $fp, -8($fp)
    move $fp, $sp
    jr $ra
```