

## 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

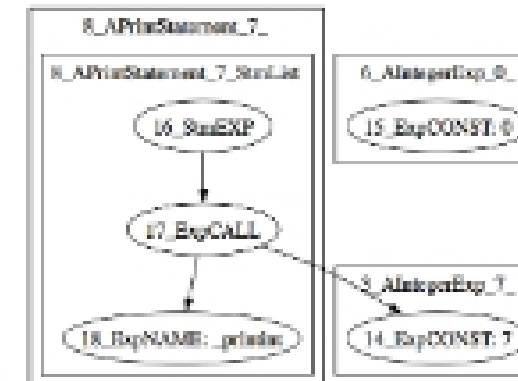
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## PrintSeven testing method

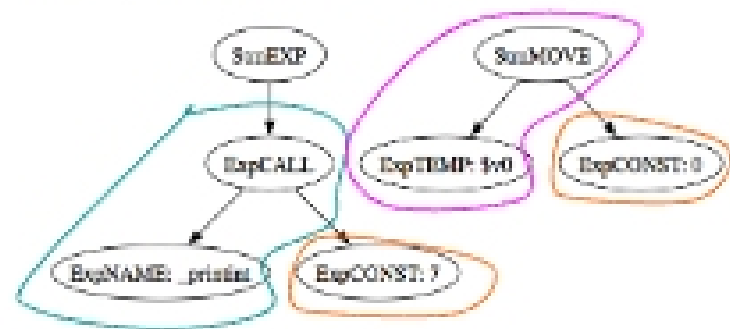
```
public int testing() {
    System.out.println(7);
    return 0;
}
```



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## PrintSeven testing, instruction selection



```
# ExpCALL
# ExpCONST
li t36, 7
# push parameter onto stack
mv t36, 0(xsp)
subu xsp, xsp, 4
jal _println
```

```
# ExpCONST
li t37, 0
#setMOVE(ExpTEMP(t1), #)
move r0, t37
```

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## SpillAll

### Before spill

```
# ExpCALL
# ExpCONST
li t36, 7
# push parameter onto stack
mv t36, 0(xsp)
subu xsp, xsp, 4
jal _println
```

```
# ExpCONST
li t37, 0
#setMOVE(ExpTEMP(t1), #)
move r0, t37
```

### After spill

```
# ExpCALL
# ExpCONST
li st0, 7
mv st0, -12(xfp)
lr st0, -12(xfp)
# push parameter onto stack
mv st0, 0(xsp)
subu xsp, xsp, 4
jal _println
```

```
# ExpCONST
li st0, 0
mv st0, -16(xfp)
lr st0, -16(xfp)
#setMOVE(ExpTEMP(t1), #)
move r0, st0
```

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## Prologue and Epilogue

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### Prologue

```
.text
foo_testing:
foo_testing_@frame@size@@@
foo_testing_@param@requer@@@
    le rax, 0(%rsp)
    subu %sp, %sp, 4
    le rbp, 0(%rsp)
    subu %sp, %sp, 4
    addu %sp, %sp, foo_testing_@param@requer@@@
    subu %sp, %sp, foo_testing_@frame@size@@@

    ... # spilled instructions for body
```

### Epilogue

```
# epilogue
done2:
    le rax, -4(%rsp)
    move %t0, %fp
    le %fp, -8(%rsp)
    move %fp, %sp
    jr rax
```

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