

Plan for today

Frame layout questions?

Finish example, IR Tree ==> MIPS

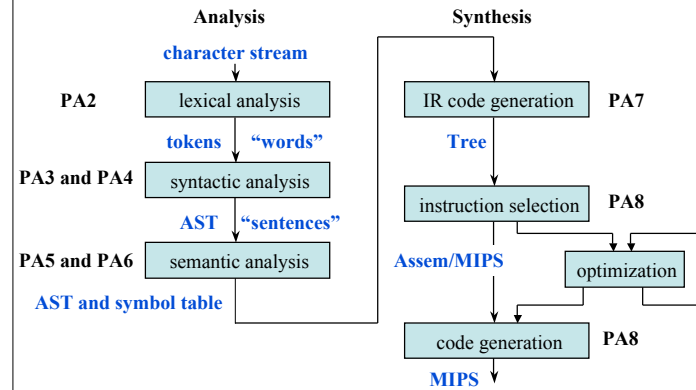
Start translation into IR Tree

CS453 Lecture

Translate Overview

1

Structure of the MiniJava Compiler



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2

Mapping out the stack frame for the funcCall1 example

```

int foo(int x,int y,int *z) {
    int a;
    a = x * y - *z;
    return a;
}
void main() {
    int x;
    x = 2;
    cout << foo(4,5,&x);
    cout << "\n";
}
    
```

```

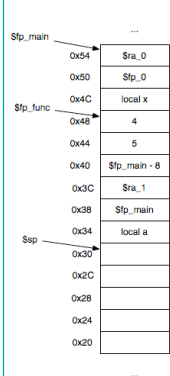
.text
.foo:
sw $ra, 0($sp) #PUSH
subu $sp, $sp, 4
sw $fp, 0($sp) #PUSH
subu $sp, $sp, 4
addu $fp, $sp, 8
subu $sp, $sp, 12
li $t0, 2
sw $t0, -8($fp)
li $t0, 4
sw $t0, 0($sp) #PUSH
subu $sp, $sp, 4
li $t0, 5
sw $t0, 0($sp) #PUSH
subu $sp, $sp, 4
sw $t0, 0($sp) #PUSH
subu $sp, $sp, 4
jal .foo
move $a0, $v0
...
lw $t0, -20($fp)
move $v0, $t0
lw $ra, -12($fp)
move $t0, $fp
lw $fp, -16($fp)
move $sp, $t0
jr $ra
    
```

```

.text
.globl main
main:
sw $ra, 0($sp) #PUSH
subu $sp, $sp, 4
sw $fp, 0($sp) #PUSH
subu $sp, $sp, 4
addu $fp, $sp, 8
subu $sp, $sp, 12
li $t0, 2
sw $t0, -8($fp)
li $t0, 4
sw $t0, 0($sp) #PUSH
subu $sp, $sp, 4
li $t0, 5
sw $t0, 0($sp) #PUSH
subu $sp, $sp, 4
sw $t0, 0($sp) #PUSH
subu $sp, $sp, 4
jal .foo
move $a0, $v0
...
lw $ra, 0($fp)
move $t0, $fp
lw $fp, -4($fp)
move $sp, $t0
jr $ra
    
```

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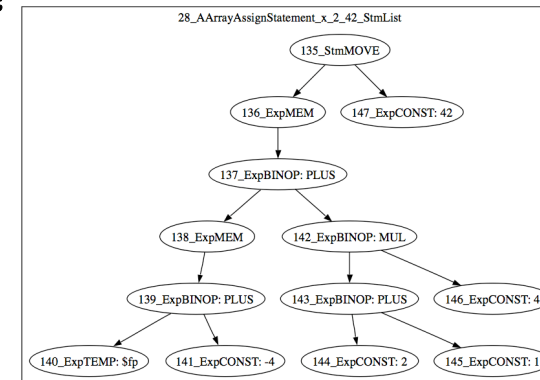
Stack frame for funcCall1.c



return value is put in \$v0
\$sp is set to current \$fp before return

MiniJava Compiler Tree Language (Array Example)

x[2] = 42;



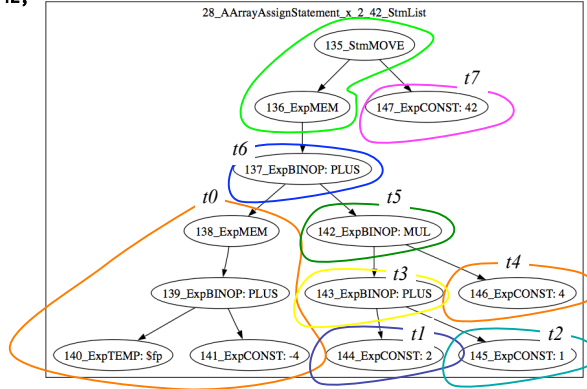
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MiniJava Compiler Tree Language (Array Example)

x[2] = 42;

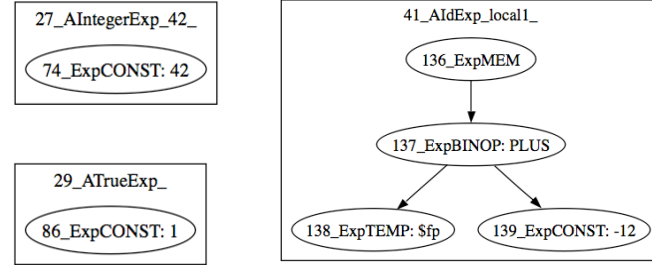


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Translating the AST into Tree.Exp representation

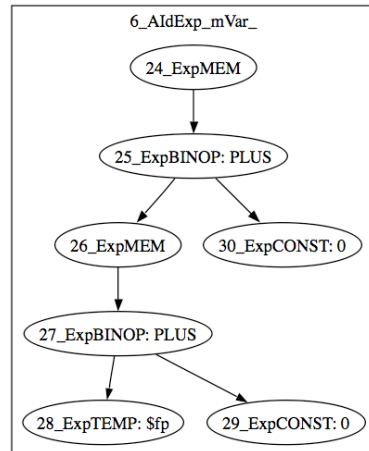


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Member Variables

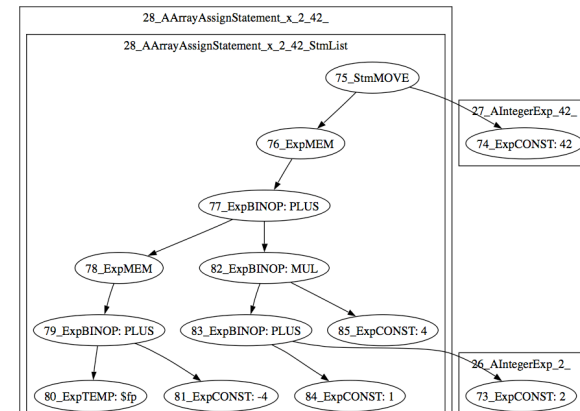


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Translating an array assignment



CS

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