COEN 175L

Phase 6 Part 2

Phase 6: Finish The Compiler

Due on Friday at 11:59pm 3/15/19

Finish Binary Operators

- Arithmetic operators
- Comparison operators
- Logical operators

Recommended Arithmetic Operator Organization

```cpp
void Add::generate() {
    left->generate();
    right->generate();

    if (left->_register == nullptr)
        load(left, FP(left) ? fp_getreg() : getreg());

    cout << "\tadd" << suffix(left) << right << ", " << left << endl;

    assign(right, nullptr);
    assign(result, left->_register);
}

void Multiply::generate() {
    left->generate();
    right->generate();

    if (left->_register == nullptr)
        load(left, FP(left) ? fp_getreg() : getreg());

    cout << "\t" << (FP(_left) ? "mul" : "imul");
    cout << suffix(left) << right << ", " << left << endl;
```

```cpp
void Add::generate() {
    arithmetic(this, _left, _right, "add");
}

void Multiply::generate() {
    arithmetic(this, _left, _right, FP(_left) ? "mul" : "imul");
}

void Divide::generate() {
    if (FP(_left)) arithmetic(this, _left, _right, "div");
    else int_divide(this, _left, _right, eax);
}
```

Do Unary Operators

- Not, Negate, Address, Dereference
- Save Cast for later

Extend Assignment Statement

Handle assignments where left side isn't a dereference

Control Flow

- If/Else
- While
- Return

Cast Operator

```cpp
void Cast::generate() {
    _expr->generate();

    if (_expr->_register == nullptr)
        load(_expr, FP(_expr) ? fp_getreg() : getreg());

    const Type &src = _expr->type(), &dest = _type;
    if (src.size() == 1) {
        /* ... */

    } else if (src.size() == 4) {
        if (dest.size() == 1) {
            assign(this, _expr->_register);
        } else if (dest.size() == 4) {
            assign(this, _expr->_register);
        } else { // dest.size() == 8
            assign(this, fp_getreg());
            cout << "\tcvtsi2sd\t" << _expr << ", " << this << endl;
            assign(_expr, nullptr);
        }

    } else if (src.size() == 8) {
        /* ... */
    }
}
```

Complete Assignment Statement

- Handle case where left side is a dereference

Phase 5 Modifications Are Required

- Assignment, Call, etc.

Slides: /home/kvelcich/public/COEN175/phase6part2_slides.pdf