Day 30 (Fri 04/08)

- exercise 29 review
- day 30 recap questions
- exercise 30

Announcements/reminders

- "Midterm Project Contributions" survey on Gradescope
  - **must** be submitted this evening by 11pm

- HW6 due Wednesday 4/13 by 11pm
  - written homework, late submissions not allowed

Exercise 29

Overloading the output stream insertion operator for the Complex class

```
// in complex.h (in the Complex class definition)
friend std::ostream &operator<<(std::ostream &out, const Complex &c);

// in complex.cpp
std::ostream &operator<<(std::ostream &out, const Complex &c) {
  out << c.rel << " + " << c.img << "i";
  return out;
}
```

Exercise 29

Copy constructor and assignment operator

```
// in complex.cpp

Complex::Complex(const Complex& rhs)
  : rel(rhs.rel), img(rhs.img) {
}

Complex &Complex::operator=(const Complex& rhs) {
  if (this != &rhs) {
    rel = rhs.rel;
    img = rhs.img;
  }
  return *this;
}
```

Exercise 29

Overloaded operators for arithmetic, in complex.h. Note that these really should be defined as const member functions, since they don't modify the left hand object.

```
Complex operator+(const Complex& rhs) const;
Complex operator-(const Complex& rhs) const;
Complex operator*(const Complex& rhs) const;
Complex operator*(const float& rhs) const;
Complex operator/(const Complex& rhs) const;
```

Exercise 29

Implementations of arithmetic operators in complex.cpp

```
Complex Complex::operator+(const Complex& rhs) const {
  Complex sum(rel+rhs.rel, img+rhs.img);
  return sum;
}

Complex Complex::operator-(const Complex& rhs) const {
  return *this + (rhs * -1.0f);
}
```

Exercise 29