C++ idioms

- What happens with the statement `myDay = d;`?
  - assignment is memberwise unless operator `=` overloaded
  - copy constructor used in passing parameters by value
- If you need one of: destructor, assignment operator, copy constructor, you need all of them
  - heuristic only: managing resources other than memory
  - preventing objects from being copied
  - what about non-copyable state, e.g., stream
- In assignment operator, watch for self-assignment
- Study implementation of string/vector

copy constructor

- Used for “first-time” creation
  ```cpp
date d(1,1,2000);
date copy(d);
```
- Used for pass-by-value
  ```cpp
doStuff(date d);
  doStuff(first);
```
- what about use of `myLength` in code as opposed to `length()`?

```
template <class Item>
tvector(const tvector<Item> & vec)
  // preconditions: Item supports assignment
  // postcondition: return copy of vec
  {
    // allocate storage
    myList = new Item[myLength=vec.myLength];
    assert(myList != 0);
    // copy elements
    for(int k = 0; k < vec.myLength; k++)
      { myList[k] = vec.myList[k];
    }
  }
```
Assignment operator

- We want to have deep copy when assigning as well as when we copy
  Object x(23, 4);
  Object y;
  y = x;  // assignment operator
  Object z = x;  // copy constructor!!
  z = y = x;  // how does this work?

- Assignment operator returns *this
  - Won’t be const reference return, will be reference
- Assignment operator checks for not assigning to self
  - Can assign to self via aliasing, e.g., pass-by-reference
- Assign to every data member (deep copy as needed)
- See tvector for details

Destructor

- If you need copy constructor, you need assignment operator, and you need destructor
- What is purpose of destructor?
  - Free resources
  - What’s a resource: memory, files, network connections
- When is the destructor called?
  - Automatically when a stack object goes out of scope
  - When you call delete on a heap object
- What’s the problem with this “automatic destruction”?
  - It’s not automatic, it’s fraught with problems getting it right
- What about yahoo and the rolling reboot?