Interfaces and Inheritance

- **What is an interface?**
  - Specification for client classes to implement
  - Methods and constants
  - Name
  - ...

- **When do we use an interface?**
  - Capture commonalities that emerge in development
  - Part of design process
  - When an existing API demands it: ActionListener, ...
  - ...

Software Design
What about Inheritance?

- **What is an abstract base class?**
  - What is an abstract method?
  - When to use it?
  - Factor out common code and data

- **What does protected mean in Java?**
  - Package access
  - Inheritance access

- **Advantages and disadvantages re: interfaces**
  - `implements mammal, oviparousness, ...`
  - `extends reptile`
Carrier, Battleship, Submarine, ..

- What behavior does a ship in battleship have?
- How do we capture this in code?
- What about planning for the future?
What about card games, Freecell?

● **Think about design of freecell and solitaire**
  - What are classes, interfaces, etc.
  - What about model? View?
  - What will be hard, easy?

● **How to decide on interface or inheritance**
  - Will there be common code?
  - When will you know?
Bumper sticker CS

Jon Bentley, More Programming Pearls

Optimization

- The first rule: don’t do it
- The fastest algorithm can frequently be replaced by one that is almost as fast and much easier to understand -- Douglas Jones, U. Iowa
- Premature optimization is the downfall of many programs/designs -- William Wulf, UVA
- The fastest I/O is no I/O, cf. The cheapest, fastest and most reliable components of a system are those that aren’t there -- Nils-Peter Nelson, Gordon Bell
Managing Software

- The first 90% of the code accounts for 90% of the development time, the remaining 10% of the code accounts for the other 90% of the development time -- *Tom Cargill, Bell Labs*
- Plan to throw one away, you will anyhow -- *Fred Brooks*
- If you plan to throw one away, you will throw away two -- *Craig Zerouni*
- Prototyping cuts the work to produce a system by 40% -- *Larry Bernstein, Bell Communications*
- Furious activity is no substitute for understanding
- It’s faster to make a four-inch mirror, then a six-inch mirror than to make a six-inch mirror -- *Bill McKeeman*
Writing programs

- Always do the hard part first. If the hard part is impossible, why waste time on the easy part? Once the hard part is done, you’re home free.

- Always do the easy part first. What you think at first is the easy part often turns out to be the hard part. Once the easy part is done, you can concentrate all your efforts on the hard part.

- Whenever possible, steal code