

Information Hiding

- Strategy for implementing abstractions so that programmer using abstraction does not have to know details
- What is necessary:
 - Record structure (struct)
 - Type definition
 - Functions on type
- Can be done with procedures

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Encapsulation

- Prevent access to internal information of abstraction
- Requires language mechanism for enforcement
- Can simulate with separate compilation (*.h,*.c)
- Provided by classes in C++ (private)

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Example: Dates

- Why bother abstracting dates?
- Scenarios of using dates:
 - Determine when to do self-test
 - Interest computation
 - Forced password update
- What kinds of operations on dates?

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“Procedural” Dates

- Create Date abstraction using only
 - A struct
 - A typedef
 - Functions

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Date “Objects”

- Create Date abstraction using a class

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A C Struct

```
struct EmpLabel {
    char name[NAME_SIZE];
    char id[ID_SIZE];
    short yearsExperience;
    int gender;
    unsigned char dependents;
    unsigned char exemptions;
} f;

typedef struct EmpLabel Employee;
```

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A C++ Class

```
class Employee {  
public:  
    char name[NAME_SIZE];  
    char id[ID_SIZE];  
    short yearsExperience;  
    int gender;  
    unsigned char dependents;  
    unsigned char exemptions;  
};
```

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Good Abstractions

- Good abstractions are good abstractions whether implemented using structs/functions or classes
- Similar design problems in terms of choosing how to organize data and functions

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Why use classes?

- More supportive mechanisms
 - Class interface
 - Constructors/destructors automatically called
 - Localized declaration
 - Encapsulation

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How “Small” A Class?

- A class can hold any data
- Possible to define an Integer class
 - Objects hold ints – unnecessary abstraction
 - Methods often static – class becomes a module, or container of useful functions on ints
- General principle: don’t define class for unneeded abstraction

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