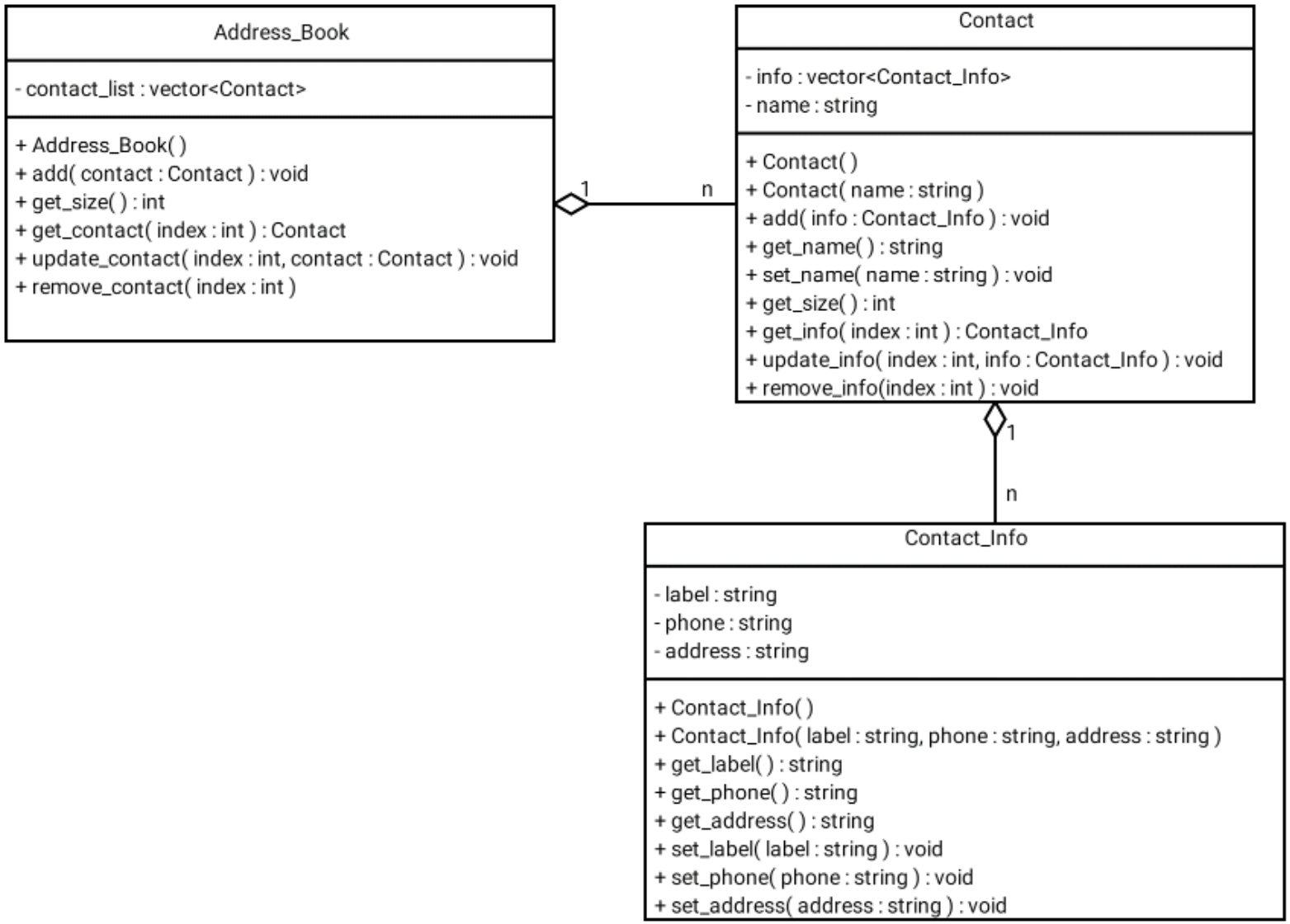
Object Oriented Programming – Implementation

Dr. Robert Lowe

Division of Mathematics and Computer Science
Maryville College

Maryville COLLEGE

Address Book Design



Objects as Function Parameters

Objects as Function Parameters

- We typically pass objects by reference:

```
void load(Address_Book &book);
```

Objects as Function Parameters

- We typically pass objects by reference:
  ```
  void load(Address_Book &book);
  ```
- If an object is not going to be modified by a function, and the function only makes use of `const` functions, we typically use const references:
  ```
  void set_name(const std::string& name);
  ```

Objects as Function Parameters

- We typically pass objects by reference:
  ```
  void load(Address_Book &book);
  ```
- If an object is not going to be modified by a function, and the function only makes use of `const` functions, we typically use const references:
  ```
  void set_name(const std::string& name);
  ```
- The reasons we do this are threefold:

Objects as Function Parameters

- We typically pass objects by reference:
  ```
  void load(Address_Book &book);
  ```
- If an object is not going to be modified by a function, and the function only makes use of `const` functions, we typically use const references:
  ```
  void set_name(const std::string& name);
  ```
- The reasons we do this are threefold:
  - Passing references is more efficient than copying objects.

Objects as Function Parameters

- We typically pass objects by reference:
  ```
  void load(Address_Book &book);
  ```
- If an object is not going to be modified by a function, and the function only makes use of `const` functions, we typically use const references:
  ```
  void set_name(const std::string& name);
  ```
- The reasons we do this are threefold:
  - Passing references is more efficient than copying objects.
  - An object will usually need to maintain state across the function call. (If not, we use `const`).

Objects as Function Parameters

- We typically pass objects by reference:
  ```
  void load(Address_Book &book);
  ```
- If an object is not going to be modified by a function, and the function only makes use of `const` functions, we typically use const references:
  ```
  void set_name(const std::string& name);
  ```
- The reasons we do this are threefold:
  - Passing references is more efficient than copying objects.
  - An object will usually need to maintain state across the function call. (If not, we use `const`).
  - Polymorphism only works on on references and pointers (more on this later)!

Shadowing of Member Variables

```
//set the name of the contact
void Contact::set_name(const std::string& name)
{
    this->name = name;
}
```

Shadowing of Member Variables

```
//set the name of the contact
void Contact::set_name(const std::string& name)
{
    this->name = name;
}
```

- Sometimes we want to name a parameter the same thing as a member variable.

Shadowing of Member Variables

```
//set the name of the contact
void Contact::set_name(const std::string& name)
{
    this->name = name;
}
```

- Sometimes we want to name a parameter the same thing as a member variable.
- We should do this! Inventing other names would make the code less readable.

Shadowing of Member Variables

```
//set the name of the contact
void Contact::set_name(const std::string& name)
{
    this->name = name;
}
```

- Sometimes we want to name a parameter the same thing as a member variable.
- We should do this! Inventing other names would make the code less readable.
- The keyword `this` provides a pointer to the current object.

Shadowing of Member Variables

```
//set the name of the contact
void Contact::set_name(const std::string& name)
{
    this->name = name;
}
```

- Sometimes we want to name a parameter the same thing as a member variable.
- We should do this! Inventing other names would make the code less readable.
- The keyword `this` provides a pointer to the current object.
- We will talk about pointers next semester. For now, we will just use `this` to distinguish the member from the parameter as shown above.

Constructors with Parameters

Constructors with Parameters

- We often want to initialize classes when we create them.

Constructors with Parameters

- We often want to initialize classes when we create them.
- We do this by specifying constructors with parameters.

Constructors with Parameters

- We often want to initialize classes when we create them.
- We do this by specifying constructors with parameters.
- Most of the time, we have a no-argument constructor and one that requires arguments:

Constructors with Parameters

- We often want to initialize classes when we create them.
- We do this by specifying constructors with parameters.
- Most of the time, we have a no-argument constructor and one that requires arguments:
  - `Contact();`

Constructors with Parameters

- We often want to initialize classes when we create them.
- We do this by specifying constructors with parameters.
- Most of the time, we have a no-argument constructor and one that requires arguments:
  - `Contact();`
  - `Contact(std::string name);`

Constructors with Parameters

- We often want to initialize classes when we create them.
- We do this by specifying constructors with parameters.
- Most of the time, we have a no-argument constructor and one that requires arguments:
  - `Contact();`
  - `Contact(std::string name);`
- We use this when we create an object:

```
Contact mom{"Mom"};
```

Lab Activity: Implement the Address Book

1. `mkdir labs/address`
2. `cp examples/21-OOP/* labs/address`
3. Compile the program:
   `g++ main.cpp contact.cpp iofun.cpp -o address`
4. Run the program. Notice how it does very little.
5. Implement the missing classes.
6. Implement the missing functions in main.

Maryville COLLEGE