Programming in C++
Inheritance

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Objectives

Objectives:

- ▶ Understand class inheritance

- ▶ Understand method override

- ▶ Understand polymorphic method

- ▶ Create base classes with C++

- ▶ Create derived classes with C++

- ▶ Use objects of base and derived classes

- ▶ Use polymorphic objects

Class Review

Syntax

```
class CLASS_NAME {
public:
  return_type method_name(param_list);
protected:
  return_type method_name(param_list);
  type data_member;
private:
  type data_member;
};

return_type CLASS_NAME::method_name(param_list) {
  // ...
}
```

Dog Class

Create a `Dog` class with these properties and methods:

- ▶ Each dog has a name.
- ▶ The name can be changed with a `setName()` method.
- ▶ The name can be retrieved with a `getName()` method.
- ▶ Each dog can bark with a `bark()` method, which returns a string.
- ▶ The dog constructor takes a name as a parameter.

Write the class declaration, and implement all methods.

Fish Class

Create a Fish class with these properties and methods:

- ▶ Each fish has a name.

- ▶ The name can be changed with a setName() method.

- ▶ The name can be retrieved with a getName() method.

- ▶ Each fish can gurgle with a gurgle() method, which returns a string.

- ▶ The fish constructor takes a name as a parameter.

Write the class declaration, and implement all methods.

Inheritance

Refactoring

Examine the `Dog` and `Fish` classes.

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Similarities:

- ▶ name data member

- ▶ `getName()` and `setName()`

- ▶ both make sounds

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► What differences exist?

Similarities:

► name data member

► `getName()` and `setName()`

► both make sounds

Differences:

► sounds

Refactoring

Duplication is wasteful in effort, both at code writing time and later during code maintenance.

Refactor into a base class.