Interfaces and Virtual Functions Solutions

Pure virtual function

- What is meant by a "pure virtual member function"?
  - A pure virtual member function has "= 0" instead of a function body
  - It is not implemented in this class, but should be overridden in derived classes

Pure virtual function

- Why are pure virtual functions useful?
  - Pure virtual functions allow the base class to provide an interface to the class hierarchy, without having to provide unnecessary function bodies
- What effect does making a member function pure virtual have?
  - If a class has a pure virtual member function, we cannot instantiate it
  - Every child of this class must implement that member function

Abstract Base Class

- What is an "abstract base class"?
  - An abstract base class contains a pure virtual member function
- What is an abstract base class used for?
  - An abstract base class is used an "interface" to the class hierarchy
  - Its virtual member functions provide all the functionality of the hierarchy
  - The child classes implement these member functions in a way that is appropriate for each concrete class

Abstract Base Class

- Modify your class hierarchy so that the base class is an abstract base class
- Verify that you cannot create objects of this class, or pass it by value
- Verify that a pure virtual member function must be implemented in the child class

Object Slicing

- What is meant by "object slicing?"
  - Object slicing occurs when a derived class object is passed to a function that takes the base class by value
  - The copy constructor for the base class will be used to create the object for the function body
  - Inside the function body, the derived class part of the object appears to have been "sliced off"
- Write a program in which object slicing occurs

Object Slicing

- How does using an abstract base class help with object slicing?
  - An abstract base class can only be passed by reference or by address
  - Object slicing occurs when a base class is passed by value
  - Since an abstract base class cannot be passed by value, object slicing cannot occur with it
- Alter your program to use an abstract base class
- Check that object slicing no longer occurs