QUIZ 8

1. **Describe the concepts *virtual functions* and *dynamic binding.***

   - Virtual Functions
     - Typically, pointer-class determines functions
     - virtual functions; object (not pointer) determines function called
     - Program determines proper (say **draw**) function at run time (dynamically)
     - Treat all shapes generically
     - Declare draw as virtual in base class
     - Override **draw** in each derived class; like redefining, but new function must have same signature
     - Once declared **virtual**, **virtual** in all derived classes; good practice to explicitly declare **virtual**
   - Dynamic binding
     - Choose proper function to call at run time
     - Only occurs off pointer handles; if function called from object, uses that object"s definition
     - Base-class pointer to derived-class object; will call derived-class function

2. **Decsribe the concepts *abstract class* and *concrete class.***

   - Abstract classes
     - Sole purpose: to be a base class (called abstract base classes)
     - Incomplete; derived classes fill in "missing pieces"
     - Cannot make objects from abstract class; however, can have pointers and references
     - Abstract classes not required, but helpful
     - To make a class abstract, Need one or more "pure" virtual functions
     - Regular virtual functions; have implementations, overriding is optional
     - Pure virtual functions; no implementation, must be overridden
   - Concrete classes

– Can instantiate objects
– Implement all functions they define
– Provide specifics