

Instructions: This homework assignment covers the basics of inheritance in C++. The answers may be determined from the CS 2704 notes and lectures and the assigned reading in Stroustrup, which are online at the course website.

OpSCAN forms will be passed out in class and collected in class on Tuesday April 3 or Wednesday April 4. OpSCANS will not be accepted at any other time. Mutilated opscans may be discarded.

1. In OOP, an object of a derived class usually is “larger” (containing more functions and/or more data) than an object of its base class.
 - 1) True
 - 2) False
2. An inheritance hierarchy defines the “has-a” relationships among a collection of classes.
 - 1) True
 - 2) False
3. An object of a _____ class can be treated as an object of its corresponding _____ class.
 - 1) base, derived
 - 2) derived, base
 - 3) Both 1 and 2
 - 4) None of these
4. When an object X of a derived class is assigned, using the default assignment operator, to a variable Y of its corresponding base type:
 - 1) Y has all the data and function members of the derived class.
 - 2) Y has only the data and function members of the base class.
 - 3) an error occurs because this is not an allowed operation.
 - 4) None of these
5. When an object Y of a base class is assigned, using the default assignment operator, to a variable X of a type derived from Y's class:
 - 1) X has all the data and function members of the derived class.
 - 2) X has only the data and function members of the base class.
 - 3) an error occurs because this is not an allowed operation.
 - 4) None of these
6. Suppose that X is a class and that F () is a function that is not a member, or a friend, of X or of any class derived from X. Then, as far as F () is concerned, there is no difference between which of the following access specifiers for members of X?
 - 1) public and private
 - 2) public and protected
 - 3) private and protected
 - 4) public, private and protected
 - 5) None of these
7. Suppose that two classes, X and Y, are derived from a class B. If good OO design criteria have been applied, then the data and function members of B correspond to:
 - 1) all of the attributes and behaviors of X, and all of the attributes and behaviors of Y.
 - 2) the attributes and behaviors of X not found in Y, and the attributes and behaviors of Y not found in X.
 - 3) the attributes and behaviors that are common to both X and Y.
 - 4) attributes and behaviors that are unrelated to both X and Y.
 - 5) None of these.

For questions 8 through 13, assume that `Foo` and `Bar` are C++ classes, and that the class `Bar` is derived, using public inheritance, from the class `Foo`.

8. If `X` is an object of type `Bar`, then the member functions of `X`:
- 1) cannot directly access any of the members of `class Foo`.
 - 2) can directly access only the public members of `class Foo`.
 - 3) can directly access only the public and protected members of `class Foo`.
 - 4) can directly access the public, protected, and private members of `class Foo`.
 - 5) None of these
9. A programmer who wishes to use inheritance to produce a specialized derived class from the class `Foo`, does not need access to the source code for the implementation of `Foo`.
- 1) True
 - 2) False
10. Suppose that an object `X` of type `Bar` is declared. Then:
- 1) no constructor for the base class, `Foo`, will be executed at all.
 - 2) a constructor for the base class, `Foo`, will be executed before any constructor for the derived class, `Bar`.
 - 3) a constructor for the base class, `Foo`, will be executed after any constructor for the derived class, `Bar`.
 - 4) a constructor for the base class, `Foo`, may (or may not) be executed, and that may take place either before or after the execution of a constructor for the derived class, `Bar`.
 - 5) constructors for both classes will be executed at the same time.
 - 6) None of these
11. Suppose that an object `X` of type `Bar` is declared. Then when the lifetime of that object ends:
- 1) the destructor for the base class, `Foo`, will not be executed at all.
 - 2) the destructor for the base class, `Foo`, will be executed before the destructor for the derived class, `Bar`.
 - 3) the destructor for the base class, `Foo`, will be executed after the destructor for the derived class, `Bar`.
 - 4) the destructor for the base class, `Foo`, may (or may not) be executed, and that may take place either before or after the execution of the destructor for the derived class, `Bar`.
 - 5) destructors for both classes will be executed at the same time.
 - 6) None of these
12. It is illegal to declare an object `X` of type `Bar` without first declaring a corresponding object of type `Foo`.
- 1) True
 - 2) False
13. Which of the following is true?
- 1) Public members of `Foo` become public members of `Bar`.
 - 2) Public members of `Foo` become private members of `Bar`.
 - 3) Public members of `Bar` become public members of `Foo`.
 - 4) Public members of `Bar` become private members of `Foo`.
 - 5) 2 and 3 only
 - 6) None of these
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14. Which of the following statements about a class inheritance hierarchy is typically true?
- 1) Each class is more specialized than the one directly above it.
 - 2) Each class is less specialized than the one directly above it.
 - 3) Each class inherits the properties from classes below it.
 - 4) 1 and 3 only
 - 5) 2 and 3 only
 - 6) None of these

19. What is the purpose of the C++ language feature known as a constructor member initializer list?
- 1) To pass parameters from a base class constructor to a derived class constructor.
 - 2) To pass parameters from a derived class constructor to a base class constructor.
 - 3) To construct an object's sub-objects before the rest of the object is constructed.
 - 4) 1 and 3 above
 - 5) 2 and 3 above
 - 6) None of these
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20. In the object-oriented design of an airline passenger reservation program, suppose that “airplane seat”, “aisle seat”, and “window seat” have been identified as classes. Focusing specifically on the aisle seat class, how does it relate to the airplane seat class?
- 1) “aisle seat” exhibits a “has-a” relationship with “airplane seat”.
 - 2) “aisle seat” exhibits a “knows-a” relationship with “airplane seat”.
 - 3) “aisle seat” exhibits an “is-a-kind-of” relationship with “airplane seat”.
 - 4) “aisle seat” and “airplane seat” are independent and unrelated.
 - 5) None of these
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