

1) How does C++ support encapsulation?

C++ supports user created classes and data abstraction. Data can be hidden through being set as public, private, or protected.

2) What is the problem with multiple inheritance and how does C++ solve it?

With multiple inheritance, you may not be able to tell which class or function is being referenced when multiple implementations are available. Ambiguities are solved by namespaces or using explicit qualification. The class should be specified when called in order to disambiguate.

3) What does it mean to be a friend function?

The function is defined outside of the class. They specifically are not member functions. However, they behave like member functions in that they have access to private and protected variables.

4) Why do we use namespace in C++?

Namespaces allow for disambiguation. Multiple classes with the same name may be defined, and using a namespace will specify which implementation is intended. It also defines the scope for the contained code.

5) How are parameters passed into a function in C++?

Parameters are passed by value – the value is copied into memory for the function. It can also be passed by reference – the memory reference is passed and allows for direct access to the variable through its memory location.

6) Why is C++ not considered pure OOP?

Not everything in C++ is a class. Code can be written without a class implementation – as one would do in C, with no objects. It supports many paradigms, so it cannot be purely OOP.

### HW3

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//////////Welcome to the bookstore!//////////
//////////
(0) to quit.
Are you the owner (1) or client(2)? 1
Options: (1) Show Options (2) Display inventory (3) Update a book (0) Quit
2
(1) Title: Lord of the Rings
    Author:Tolkien  ISBN: 1212
    Quantity: 10    Price: $30,200001
(2) Title: The Hobbit
    Author:Tolkien  ISBN: 12
    Quantity: 30    Price: $12,990000
(3) Title: Brave
    Author:kjasdf   ISBN: 213
    Quantity: 2     Price: $29,990000
Options: (1) Show Options (2) Display inventory (3) Update a book (0) Quit
3
Would you like to:
(1) Modify an existing book
(2) Add a new book
(0) Go back
1
(1) Title: Lord of the Rings
    Author:Tolkien  ISBN: 1212
    Quantity: 10    Price: $30,200001
(2) Title: The Hobbit
    Author:Tolkien  ISBN: 12
    Quantity: 30    Price: $12,990000
(3) Title: Brave
    Author:kjasdf   ISBN: 213
    Quantity: 2     Price: $29,990000
which book would you like to modify? (0) to quit.
1
Would you like to modify:
(1)Title
(2)Author
(3)ISBN
(4)Quantity
(5) Price
(0) Go back
5
Current: $30,200001
New: $35,49
Success!
writing
written
(1) Title: Lord of the Rings
    Author:Tolkien  ISBN: 1212
    Quantity: 10    Price: $35,490002
(2) Title: The Hobbit
    Author:Tolkien  ISBN: 12
    Quantity: 30    Price: $12,990000
(3) Title: Brave
    Author:kjasdf   ISBN: 213
    Quantity: 2     Price: $29,990000
which book would you like to modify? (0) to quit.
0
Would you like to:
(1) Modify an existing book
(2) Add a new book
(0) Go back
0
Options: (1) Show Options (2) Display inventory (3) Update a book (0) Quit
1

```

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HW3
////////////////////////////////////
////////Welcome to the bookstore!////////
////////////////////////////////////
(0) to quit.
Are you the owner (1) or client(2)? 2
Hello, are you a (1)new or (2)returning customer? (0) to quit. 1
////////Welcome to the bookstore!////////
////////////////////////////////////
(1) Title: Lord of the Rings
      Author:Tolkien ISBN: 1212
      Quantity: 10    Price: $35.490002
(2) Title: The Hobbit
      Author:Tolkien ISBN: 12
      Quantity: 30    Price: $12.990000
(3) Title: Brave
      Author:kjasdf   ISBN: 213
      Quantity: 2     Price: $29.990000
Options:
(1) Buy a book
(2) Display inventory
(0) Quit
1
(1) Title: Lord of the Rings
      Author:Tolkien ISBN: 1212
      Quantity: 10    Price: $35.490002
(2) Title: The Hobbit
      Author:Tolkien ISBN: 12
      Quantity: 30    Price: $12.990000
(3) Title: Brave
      Author:kjasdf   ISBN: 213
      Quantity: 2     Price: $29.990000
Which book would you like to purchase? (0) to Quit
1
Great, now let's get your info.
Name: Matt
Address: 1234 Sunshine street
Credit card: 139349
Purchase successful!
Invalid input. Please try again.
////////Welcome to the bookstore!////////
////////////////////////////////////
(1) Title: Lord of the Rings
      Author:Tolkien ISBN: 1212
      Quantity: 9     Price: $35.490002
(2) Title: The Hobbit
      Author:Tolkien ISBN: 12
      Quantity: 30    Price: $12.990000
(3) Title: Brave
      Author:kjasdf   ISBN: 213
      Quantity: 2     Price: $29.990000
Options:
(1) Buy a book
(2) Display inventory
(0) Quit
█
```

Valgrind results: no memory leaks

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maskoken@Gandalfbuntu: ~/Dropbox/Documents/COEN171/Homework/HW3/HW3/HW3/bi
0
Options: (1) Show Options (2) Display inventory (3) Update a book (0) Quit
0
(0) to quit.
Are you the (1) Owner or (2) Client? 0
Saving
Saved
==24784==
==24784== HEAP SUMMARY:
==24784==    in use at exit: 72,704 bytes in 1 blocks
==24784==   total heap usage: 27 allocs, 26 frees, 135,899 bytes allocated
==24784==
==24784== LEAK SUMMARY:
==24784==    definitely lost: 0 bytes in 0 blocks
==24784==    indirectly lost: 0 bytes in 0 blocks
==24784==    possibly lost: 0 bytes in 0 blocks
==24784==    still reachable: 72,704 bytes in 1 blocks
==24784==           suppressed: 0 bytes in 0 blocks
==24784== Rerun with --leak-check=full to see details of leaked memory
==24784==
==24784== For counts of detected and suppressed errors, rerun with: -v
==24784== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```