

Homework 2 (20 points)

cs1007 - Object-oriented programming and design in Java
Prof. Shlomo Hershkop
Dept of Computer Science
Columbia University
Spring 2006

Hw Due: Feb 27 11pm (electronically)

You need to submit this homework electronically as a **text** file. Use your cunixID plus readme.txt as the filename. If you include any graphics, only jpg, gif, and png will be accepted (make sure you give them meaningful names example: hw2_q2.jpg). Make sure to refer to them in the text file.

Objective:

1. Get some theory practice with design docs and practice questions.
 2. Practice with your java knowledge.
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1)

- a. Suppose there is an invocation of method A inside of method B, and an invocation of method B inside method C. When C is called, this leads to calling method B which in turn calls method A. Now, suppose method A throws an exception (but doesn't catch it), discuss where the exception can be handled (give all choices).
- b. When would it be a really bad idea to throw an exception?

2) Explain in your own words the following line of java:

```
( ( Integer ) myarraylist . get ( count ) ) . intValue ( ) )
```

3)

- a. In Java, a method call on an object such as x.foo(), is resolved when the program executes, not when it is compiled but at run time to support which behavior?
- b. Now name two situations where the java compiler can determine the exact method to call before the program executes.

4) Consider a website which allows customers to order items from its catalog and pay with a credit card. Draw a UML diagram that shows the relationship between the classes:

- a. Customer
- b. Order
- c. RushOrder
- d. Product
- e. Address
- f. CreditCard

use violet (as demoed in class) to create the UML diagrams, and save a jpg

afterwards.

- 5) Create and document a use case of a customer returning an item which they ordered.
- 6) In the next homework we will be programming a basic Othello game using a GUI front end (search the web if you have never played it).

You might want to sketch out the problem using CRC cards, you don't need to submit this, it will help you with the problem.

- a. Draw a UML diagram between what you think are the main classes in a basic game setup (i.e. basic game between a real user and a computer user).
- 7) Draw a sequence diagram of the opening move (assume the human is black, and black goes first).
- 8) Give a use case of determining which player (black vs white) won the game.
- 9) Describe two strategies for helping the computer choose a move.
Hint: go online to play an Othello game (there are tons of websites), and think about how you are choosing moves.
- 10) The job of the NumberFormat class is to format numbers so that they can be presented to a human reader in a format such as an invoice or table. For example, to format a floating point value with three digit precision and trailing zeroes, you use the following code:

```
NumberFormat formatter = NumberFormat.getNumberInstance();  
formatter.setMinimumFractionDigits(3);  
formatter.setMaximumFractionDigit(3);  
String formattedNumber = formatter.format(x);
```

critique this class. Is it convenient? is it clear? Is it complete? (Hint: How would you format a table of values for that columns line up?)

11) **EXTRA CREDIT:**

Discuss the difference between tail and regular recursion, and give your own example using pseudo code to calculate exponent (x to the y)?

Submission instructions are on the class website.

Hint: Start early