Due: Sunday, Sept 4, 2011 by 11:59 PM

Deliverables:
The following project files must be submitted by the due date and time specified above (see the Lab Guidelines for information on submitting project files).A portion of the lab is due on Wednesday in lab. If the Wednesday portion is not complete, there will be a 5% deduction on your project grade. **<u>Projects sent via e-mail past the deadline at 11:59 PM will not be accepted without a university-approved excuse.</u>**

Files to submit to Web-CAT:
- EcomonicsFormula.java
- GiftBoxes.java

Overview: This week you will be writing two programs. The first will calculate an ecomonics formula called midpoint elasticity. The next will calculate surface area and volume for a rectangular gift box and determine material needs and volume sufficiency for same.

Specifications:
EcomonicsFormula.java

> **Requirements**: Your friend is in an economics class and is having trouble verifying their answers for calculating the midpoint elasticity formula. He has hired you to help him by creating a program that will verify his calculations (he encourages you not to become confused by the concepts; he isn't completely sure what "midpoint elasticty" means either). He **does** know that it uses the inital and ending price of two items and that the result is a percentage. He assures you that he will not try to break your program by dividing by zero.

$$percentage = \left[\frac{Price1_{final} - Price1_{initial}}{\frac{(Price1_{final} + Price1_{initial})}{2}} \right] / \left[\frac{Price2_{final} - Price2_{initial}}{\frac{(Price2_{final} + Price2_{initial})}{2}} \right]$$

- **Design**: The program must have the following format, where "___" represents user input and "____" represents calculated output. All prices must be accepted as integer values (int) and the resulting percentage must be a floating point value (double).

Line #	Output
1	*Prompt user for the final price of item 1 (Price1$_{final}$)*: ___
2	*Prompt user for the initial price of item 1 (Price1$_{initial}$)*: ___
3	
4	*Prompt user for the final price of item 2 (Price1$_{final}$)*: ___
5	*Prompt user for the initial price of item 2 (Price1$_{initial}$)*: ___
6	
7	The midpoint elasticity is _____ %.

> * Replace text in *italics* with your own prompts. Lines 3 and 6 are blank. **Line 7 must be displayed exactly as is (with the underscore replaced by the calculated percentage)**.

- **Code & Test**: All prompts end in a colon and must have a space between the colon and the user input. Prompts must begin with a capital letter and use correct grammar and spelling. Place a space between the percentage result and the % sign on line 7. Test your program against values that you obtain on a calculator (not the interactions pane).

GiftBoxes.java

- **Requirements**: Another friend is starting a gift boxing company. They need a program that will calculate the amount of boxing material (surface area) required for a box (a rectangular prism) given its length, width, and height. They also need the program to tell them how many Styrofoam peanuts they will need given the volume of the gift that they want to send. The two formulas are shown below.

$$material = 2 * length * width + 2 * height * width + 2 * length * height$$
$$volume_{box} = length * width * height$$
$$peanuts = volume_{box} - volume_{gift}$$

If the volume of the gift is greater than the volume of the box, then the program should indicate to the user that the gift is too big for the box rather than displaying the number of peanuts needed.

- **Design**: Your program will behave differently under 2 scenarios, described below.

Scenario 1: The box's volume is greater than or the same as the gift's volume.

Line #	Output
1	*Prompt user for length of box in inches: ___*
2	*Prompt user for width of box in inches: ___*
3	*Prompt user for height of box in inches: ___*
4	*Prompt user for the volume of the gift in cubic inches: ___*
5	
6	The amount of material needed for the box is _____ square inches.
7	The volume of the box is _____ cubic inches.
8	The box will need _____ cubic inches of "peanuts" for shipping.

Scenario 2: The box's volume is not sufficient to hold the gift.

Line #	Output
1	*Prompt user for length of box in inches: ___*
2	*Prompt user for width of box in inches: ___*
3	*Prompt user for height of box in inches: ___*
4	*Prompt user for the volume of the gift in cubic inches: ___*
5	
6	The gift is too large for the box.

* Replace text in *italics* with your own prompts. Line 5 is blank. **Text on lines 6, 7 and 8 of scenario 1 and line 6 of scenario 2 must be displayed exactly as is (with the underscore replaced by the calculated values).** Be sure to include the double quotes in line 8 of scenario 1.

<u>All values should be read and displayed as double values.</u>

- **Code & Test**: All prompts end in a colon and must have a space between the colon and the user input. They should also begin with a capital letter and use correct grammar and spelling. Place a space between results (such as volume) and units (such as cubic inches).

  You should test the following conditions:
    - Volume of box > volume of gift: Falls under scenario 1.
    - Volume of box = volume of gift: Falls under scenario 1, and should require 0.0 cubic inches of peanuts.
    - Volume of box < volume of gift: Falls under scenario 2.