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## EXAM: e01: Midterm 1

ready?	date	points
true	Thu 08/30 09:30AM	100

You may not collaborate on this exam with anyone. If you need to use the restroom, you must leave your cell phone with the exam proctor before leaving the room.

- Write your name at the top of this page **AND EVERY ODD NUMBERED PAGE**.
- Double check that you turned in ALL pages; look for "End of Exam" on the last page.
- This exam is **closed book, closed notes, closed mouth, cell phone off**.
- You are permitted **one sheet of paper** (max size 8.5x11") on which to write notes.
- This sheet will be collected with the exam, and might not be returned.
- Please write your name on your notes sheet.

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- For this question, you need page 1 of [handout A](#) with code for these files: Beverage.java, Edible.java, Food.java, FreeCandy.java and Product.java. These are classes used by a grocery store known as "Trader Bobs".

Some of these methods will compile and run, while others will not.

Indicate, for each method, whether it compiles or not, and if it does compile, the output when invoked. in context of the classes on [handout A](#) and assuming the methods appear inside this class:

```
public class TraderBobs {
    // methods appear here
}
```

a. (4 pts)

```
public static void TB01 () {
    Beverage b1 = new Beverage(89,"Diet Coke",0,12.0);
    System.out.println("b1: " + b1.getCalories());
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

b. (4 pts)

```
public static void TB02 () {
    Product p2 = new Beverage(99,"Coke",150,12.0);
    System.out.println("p2: " + p2.getName());
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

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2. Continued from previous problem...

Some of these methods will compile and run, while others will not.

Indicate, for each method, whether it compiles or not, and if it does compile, the output when invoked. in context of the classes on [handout A](#) and assuming the methods appear inside this class:

```
public class TraderBobs {  
    // methods appear here  
}
```

a. (4 pts)

```
public static void TB03 () {  
    Product p3 = new Beverage(199, "Milk", 130, 6.75);  
    System.out.println("p3: " + p3.getCalories());  
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

b. (4 pts)

```
public static void TB04 () {  
    FreeCandy f4 = new FreeCandy(25);  
    System.out.println("f4: " + f4.getCalories());  
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

c. (4 pts)

```
public static void TB05 () {  
    Edible e5 = new FreeCandy(10);  
    System.out.println("e5: " + e5.getCalories());  
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

d. (4 pts)

```
public static void TB06 () {  
    Edible e6 = new Edible(){  
        public int getCalories(){return 50;}  
    };  
    System.out.println("e6: " + e6.getCalories());  
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

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Some of these methods will compile and run, while others will not.

```
public class TraderBobs {
    // methods appear here
}
```

```
public static void TB07 () {
    Food f7 = new Food(99,"Almonds",100,0.63);
    System.out.println("f7: " + f7.getName());
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

```
public static void TB08 () {
    Edible e8 = new Food(249,"Kind Bar",200,1.4);
    System.out.println("e8: " + e8.getName());
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

```
public static void TB09 () {
    Food f9 = new Food(199,"Gummi Bears",520,5);
    System.out.println("f9: " + f9.getPrice());
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

```
public static void TB10 () {
    Product p10 = new Product(299,"Ziploc Bags");
    System.out.println("p10: " + p10.getPrice());
}
```

Will it compile?	Output when called (only if it compiles)
<input type="checkbox"/> Yes	
<input type="checkbox"/> No	

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4. (15 pts) Refer to the code for the class `Dog` with a `main` that creates some `Dog` objects.

Your job: figure out after which line of `main()` each of the following `Dog` objects is eligible for garbage collection.

If an object is still not eligible for garbage collection when the last line of `main` is reached, write “never”. Each answer should be a line number, or the word `never`.

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```
1 public class Dog {
2
3     private static Dog bestInShow = null;
4     private String name;
5
6     public static void setBestInShow(Dog b) {
7         bestInShow = b;
8     }
9
10    public static Dog getBestInShow() {
11        return bestInShow;
12    }
13
14    public Dog(String name) { this.name = name;}
15
16    public static void main(String [] args) {
17
18        Dog d1 = new Dog("Fido");
19        Dog d2 = new Dog("Ginger");
20        Dog d3 = new Dog("Harry");
21        Dog d4 = new Dog("Izzy");
22        Dog d5 = new Dog("Jack");
23        Dog d6 = d1;
24
25        setBestInShow(d3);
26        d1 = d4;
27        d3 = d6;
28        d1 = null;
29        d2 = null;
30        d3 = null;
31        d4 = null;
32        d5 = null;
33        d6 = null;
34        setBestInShow(null);
35    }
36 }
```

Object	Fill in line here
(a) Fido	
(b) Ginger	
(c) Harry	
(d) Izzy	
(e) Jack	

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5. (10 pts) Given the following program below, determine whether each line of code involves boxing or unboxing, and check the boxes accordingly.

If a line of code involves both, check both boxes. If it involves neither, check neither box.

Points	Line number	Auto-Boxing	Auto-Unboxing
(2 pts)	4	<input type="checkbox"/>	<input type="checkbox"/>
(2 pts)	5	<input type="checkbox"/>	<input type="checkbox"/>
(2 pts)	6	<input type="checkbox"/>	<input type="checkbox"/>
(2 pts)	7	<input type="checkbox"/>	<input type="checkbox"/>
(2 pts)	8	<input type="checkbox"/>	<input type="checkbox"/>

Points	Line number	Auto-Boxing	Auto-Unboxing
(2 pts)	9	<input type="checkbox"/>	<input type="checkbox"/>
(2 pts)	10	<input type="checkbox"/>	<input type="checkbox"/>
(2 pts)	11	<input type="checkbox"/>	<input type="checkbox"/>
(2 pts)	12	<input type="checkbox"/>	<input type="checkbox"/>

```

1 import java.util.ArrayList;
2 public class BoxUnbox {
3     public static void main(String [] args) {
4         ArrayList<Integer> mylist = new ArrayList<Integer>();
5         mylist.add(new Integer(2));
6         mylist.add(1);
7         mylist.set(0,3);
8         int a = mylist.get(0) + mylist.get(1);
9         mylist.add(7);
10        Integer b = mylist.get(2);
11        Integer c = b;
12        Integer d = a + c;
13        System.out.println("a=" + a + " b= " + b + " c=" + c + " d=" + d);
14    }
15 }

```

6. (8 pts)

Working with the same program as in the previous problem: What is the output?

Indicate by filling in the blanks:

a=\_\_\_\_\_ b= \_\_\_\_\_ c=\_\_\_\_\_ d=\_\_\_\_\_

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7. In lecture, we explored how a package called JaCoCo could be used to measure the test-case coverage of a piece of code. Suppose you were asked the two questions below at a job interview. How would you answer?

a. (3 pts) If we hire you, the team you'll be working on is trying to work towards increasing the test-case coverage for the source code of company's products. I want to make sure you understand that that means. What does it mean to work towards increased test-case coverage?

b. (6 pts) I also want to make sure you understand the importance of the task. What are some of the benefits of increased test-case coverage for it's code?

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End of Exam