-30
-12

58/100

Troy Jaffery

CS 162 Hands-On Midterm - No Human Reference

Write the following code for a `Shape` class:

- ❑ Provide an interface `Drawable` with a single method `draw()`
  -3 `Method in the interface not abstract.`
  - ❑ The `draw()` method should just print "Drawing..."

- -5 ❑ Class `Shape` should implement `Comparable` and `Drawable`
  `Shape compareTo() uses Object, recursively calls compareTo()`
  - -6 ❑ Compare the shapes on their area
    No luck

- ❑ Class `Shape` should implement methods as appropriate for a base class, what about fields?
  OK, but area and perimeter fields are declared in the subclasses

- ❑ Provide concrete classes `Rectangle`, `Square`, and `Circle` (is there something special about the `Square` class?) ok

- -1 ❑ Provide appropriate constructors for the various shape classes
  Square only needs one side parameter

- -6 ❑ The classes should be immutable
  No, setName() allows name change, setRadius(), more set()....

- ❑ Provide getter methods for the various properties of the shapes and the shape's type
  OK
  - ❑ Also include area and perimeter getter methods
    Ok

- ❑ Provide appropriate `toString()` methods for your classes. Return the type of the shape and its area and perimeter -3
  The toString() method should NOT have a System.out. Some of toString() could have been in the Shape base class

- ❑ Provide a test class to create a `List` of `Shape` objects and include at least one `Rectangle`, `Square`, and `Circle` object in your list.
  OK

- ❑ Demonstrate the concept of polymorphism with your list of `Shape` objects by printing them (can you use a `Stream`?)
  Ok, no stream

-6 ❑ Demonstrate sorting the list of `Shape` objects
No

❑ **EXTRA**: Demonstrate sorting the list of `Shape` objects on their perimeter using a lambda for the `Comparator`

❑ No

When finished or time is up, zip your project folder and upload the zipped folder into Blackboard / Tests & Quizzes / where you found this document.

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Name Troy Jeffery

CS 162 Written Midterm - No Reference Materials

1. Convert decimal -43 to two's complement binary.

   -43 → 10101011

   64 32 16 8 4 2 1

2. Convert binary 10111001, a two's complement value, to decimal.

   10111001 → -57

   32+16+8+1 40+17 57

   Give the binary value, 8 bits, for the character 'A' and the character 'b'.

   'A' → 1001 'b' → 0010

3. A concrete class that implements a given interface in Java must do what?

   Overide its methods and variables, add implemets X to the class

4. Syntactically what is an abstract class in Java?

   A Class that cannot be created itself, but can parent other classes

5. Give an example of a Java lambda that returns the product of two numbers, just the lamda, given the following:

   BinaryOperator<Integer> x = ~~.Map(x → X · y);~~ ~~X.Stream().map~~(e→e·y)

   (e,y)→

6. Given the Product class outlined below.

```
public class Product {
    private int idNum;
    private int count;
    private int price;
    List<Product> inventory;
    ...
    public int getIdNum() { ... }
    public int getCount() { ... }
    public int getPrice() { ... }
}
```

```
inventory.stream()...
```

and

```
.filter(), .foreach(), .map(), .reduce()
```

Write a code fragment* to print all the ID numbers of any Product objects in the inventory list that have a count less than 100.

```
inventory.stream()
    .filter(e → get(count() < 100)
    .foreach(e → System.out.println(e.getIdNum()))
```

7. What is always the first statement executed in a subclass constructor?

   ~~getting~~ required variables from the superclass using super( )

8. When one class contains another class object, this is referred to as a "has a" relationship. When one class is a subclass of another class, this is referred to as what type of relationship?

   extended from

* Please use the page back, labeled properly, if your answer needs more room.