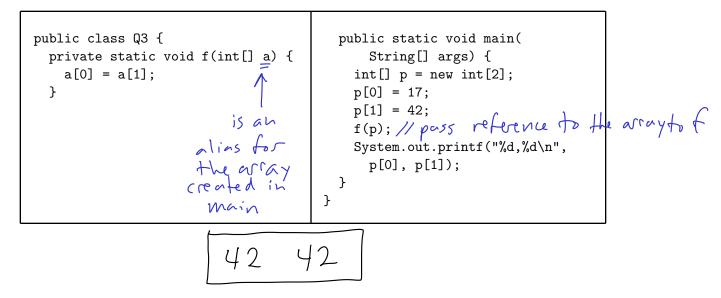
CS 201, Fall 2016 — Sep 28th — Exam 1 Name: \_

Question 1. [5 points] Write code to prompt the user to enter her age, and then based on the age entered, print one of the following messages. If the age is greater than or equal to 18, print "Hooray! You can vote!". If the age is less than 18, print "Too bad, maybe next time".

Solution

**Question 2**. [5 points] What output is printed by the following code (which begins on the left and continues on the right)?

**Question 3**. [5 points] What output is printed by the following code (which begins on the left and continues on the right)?



**Question 4**. [5 points] Complete the following method so that computes and returns the sum of the elements of the array passed as the parameter.

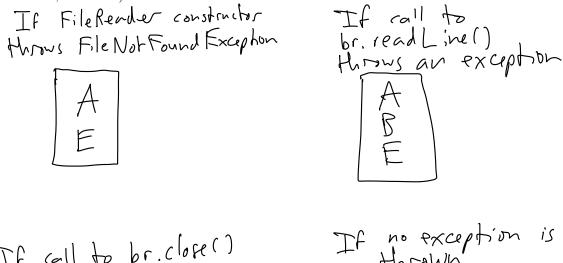
public static double arrSum(double[] arr) {

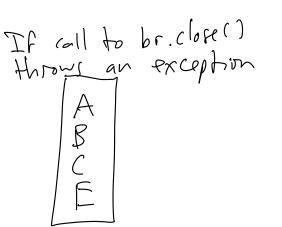
Question 5. [10 points] Consider the following program:

```
public class Q5 {
  public static void main(String[] args) {
    Scanner keyboard = new Scanner(System.in);
    String fileName = keyboard.nextLine();
    System.out.println("A");
    try {
      FileReader fr = new FileReader(fileName);
      BufferedReader br = new BufferedReader(fr);
      System.out.println("B");
      String line = br.readLine();
      System.out.println("C");
      br.close();
      System.out.println("D");
    } catch (IOException e) {
      System.out.println("E");
    }
  }
}
```

Assume that when the program is run, the user will type the name of a file which may or may not exist.

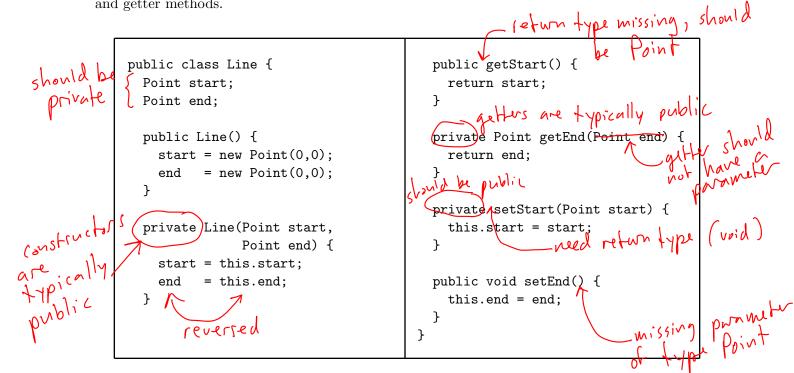
List all of the possible outputs of the program. (Each will be some combination of "A", "B", "C", "D", and "E".)





no exception Hhrown TA B C D is

Question 6. [10 points] Identify, explain, and correct all of the problems with the following class definition, which begins on the left and continues on the right. Assume that Line is a class with two Point objects representing start and end coordinates, and that Point has appropriate constructor and getter methods.



**Question 7**. [10 points] For the Point class shown below, circle the fields and methods that a concrete class Vector extending Point would inherit from Point.

Also, list all the methods that subclass **Vector** has to instantiate to be considered a valid concrete class.

> private methids are NOT inherit public abstract class Point { private int X\_2() { inherited, but not accessible private int x; return x\*x; private int y; } public Point() { private int Y\_2() { x = 0;return y\*y; y = 0;} } public double distFromOrigin() { public Point(int x, int y) { return  $sqrt(X_2() + Y_2());$ this.x = x; } this.y = y; ( per se be cause public abstract double getNormX(); } public int getX() { public abstract double getNormY(); } return x; } public class Vector public int getY() { extends Point { return y; // what methods must } // this class define? }

Vector would need to define concrete implementations of the get Norm X and get Norm Y methods

## Programming Questions

To get started, use a web browser to download the zipfile as specified by your instructor. Import it as an Eclipse project using File  $\rightarrow$  Import...  $\rightarrow$  General  $\rightarrow$  Existing Projects into Workspace  $\rightarrow$  Archive file.

**Important**: You may use the following resources:

- The textbook
- The lecture notes posted on the course web page
- Your previous labs and assignments

Do not open any other files, web pages, etc.

Question 8. [30 points] Complete the Captain class as follows:

- Declare fields named firstName (a String), lastName (a String), gradYear (an int), and shipName (a String).
- Implement 2 constructors the first accepts and sets first name and last name, and initializes the graduation year to 0, and the ship name to null.
- The second constructor accepts and sets all four class fields (first name, last name, graduation year, and ship name.
- Add getter methods for each of the class fields (getFirstName, getLastName, etc.)
- Add setter methods ONLY for graduation year and ship name.
- Add a method that returns the Captain's full name in the form "firstName lastName", i.e. "James Kirk". (There should be exactly one space character between the first and last names.)

Hint: Make sure to use method names that match those specified in the JUnit test cases.

A CaptainTest JUnit test class is provided. Make sure that all of the tests pass.

Question 9. [20 points] Complete the Target class as follows:

- Declare arrows (an array of Points) that stores the arrow locations that hit this Target
- Declare score (a double) that stores the calculated score for the arrows for this Target
- Define a constructor that takes an **array of Points** parameter, which you should store in **arrows**.
- Define a calcScore method that calculates the score for the arrows for this Target. You will need to call calcScore from the constructor to set the score for this Target. The score for the Target is the average distance of all the arrows (Points) in the arrows array from the center of the Target (0,0).

**Hint**: For the calcScore method, calculate the distance between each Point and (0,0) in the arrows array, and sum those distances. Then divide by the number of arrows (Points) in the array. Make sure to use method names that match those specified in the JUnit test cases.

**Hint**: The distance between two points  $(x_1, y_1)$  and  $(x_2, y_2)$  is  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ . In Java you can use the Math.sqrt static method to compute the square root of a double value.

A TargetTest JUnit test class is provided. Make sure that all of the tests pass.

When you are ready to submit your code, export the **CS201\_Exam01** project as a zip file and upload it to the Marmoset server as **exam01**:

## https://cs.ycp.edu/marmoset

**NOTE**: Make sure that you archive the entire project. Also, do not simply accept the default archive file name that shows up in the "To archive file:" drop down box - it will likely be the wrong name.