Lab - Classes and Objects — AP Computer Science A

Fan.java: Make a class `Fan` to represent a fan. This class needs to contain:

- Three constants named `SLOW`, `MEDIUM`, and `FAST` with values 1, 2, and 3 respectively.
- A private `int` named `speed` that specifies the speed of the fan with a default value equal to `SLOW`.
- A private `boolean` data field named `on` that specifies whether the fan is on with a default value equal to `false`.
- A private double data field named `radius` that specifies the radius of the fan with a default value equal to `5`.
- A private string data field named `color` that specifies the color of the fan with a default value equal to `"blue"`.
- The accessor and mutator methods for all four data fields.
- A no-arg constructor that creates a default fan.
- A method named `toString()` the returns a a string description for the fan. If the fan is on, the string needs to include its speed, color, and radius. If the fan is off, the string needs to say it's off, its color, and radius.

Test this class with the program
`FanRunner.java` that is provided by the teacher.

```
mdagler: java FanRunner
The default fan:
fan is off, color: blue, and radius: 5.0

Enter the new fan's radius: 10
Enter the new fan's color: white

Turning the fan on:
Speed: 2, color: white, and radius: 10.0
```

LinearEquation.java: Create a class named `LinearEquation` that solves a 2×2 system of linear equations:

$$\begin{array}{rcrcr} ax & + & by & = & c \\ dx & + & ey & = & f \end{array}$$

using the formulas

$$x = \frac{ce - bf}{ae - bd} \qquad y = \frac{cd - af}{bd - ae}$$

This class needs to contain:

- The private data fields `a`, `b`, `c`, `d`, `e` and `f`.
- A constructor with the arguments for `a`, `b`, `c`, `d`, `e` and `f`.
- Six getter methods for `a`, `b`, `c`, `d`, `e` and `f`.
- A method named `isSolvable()` that returns `true` if $ae - bd \neq 0$.
- Methods `getX()` and `getY()` that returns the solution for the equation.

Test this class with the program `LinearEquationRunner.java` that is provided by the teacher.

```
mrdagler: java LinearEquationRunner
Solving: Ax+By=C
         Dx+Ey=F

Enter the coefficients A B C: 2 3 8
Enter the coefficients D E F: 3 1 5
Solving: 2x + 3y = 8
         3x + 1y = 5
  Ans: (1.0, 2.0)

Enter another equation? [y/n]
y

Solving: Ax+By=C
         Dx+Ey=F

Enter the coefficients A B C: 1 4 7
Enter the coefficients D E F: 2 8 11
Solving: 1x + 4y = 7
         2x + 8y = 11
  The equation has no solution.

Enter another equation? [y/n]
n
```