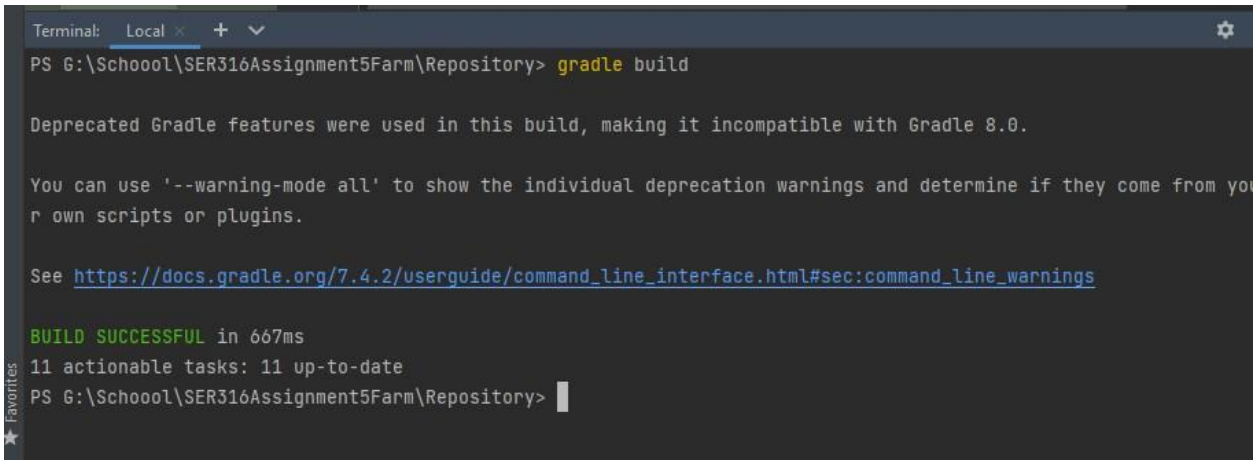
Author: Alper Ozturk

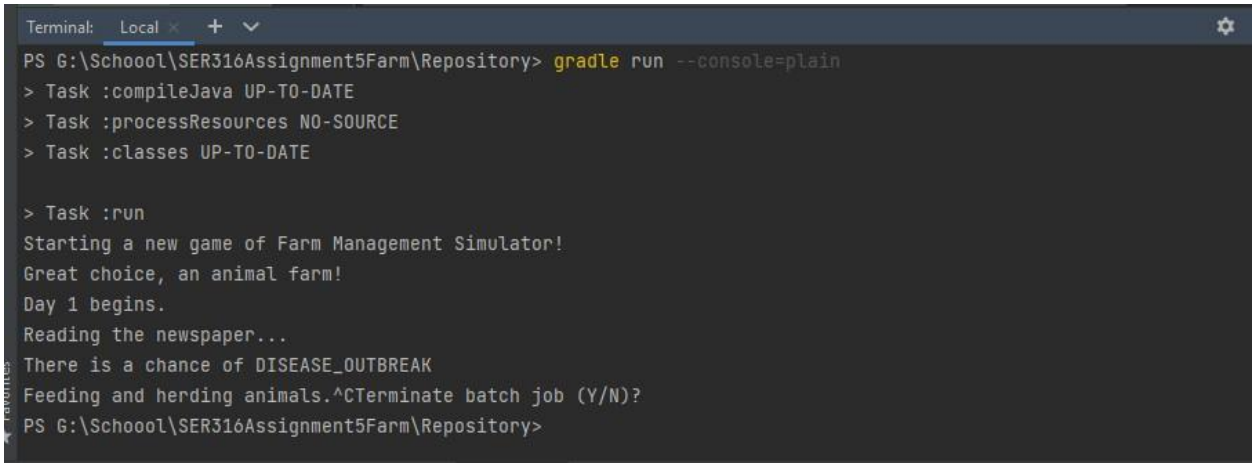
GitHub link: https://github.com/aozturk1/SER316Assignment5Farm

Screencast link: https://youtu.be/xODG3OxB_cQ

Gradle build



Gradle run



CheckStyle

CheckStyle Audit

Designed for use with CheckStyle and Ant.

Summary	
Files	Errors
9	0

Files	
Name	Errors
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\AnimalFarm.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\CropFarm.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\CurrencyManager.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Farm.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\FarmFactory.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Main.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Observer.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Output.java	0
G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Supplier.java	0

File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\AnimalFarm.java	
Error Description	Line

Back to top

File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\CropFarm.java	
Error Description	Line

Back to top

File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\CurrencyManager.java	
Error Description	Line

Back to top

File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Farm.java	
Error Description	Line

Back to top

File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\FarmFactory.java	
Error Description	Line

Back to top

File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Main.java	
Error Description	Line

Back to top

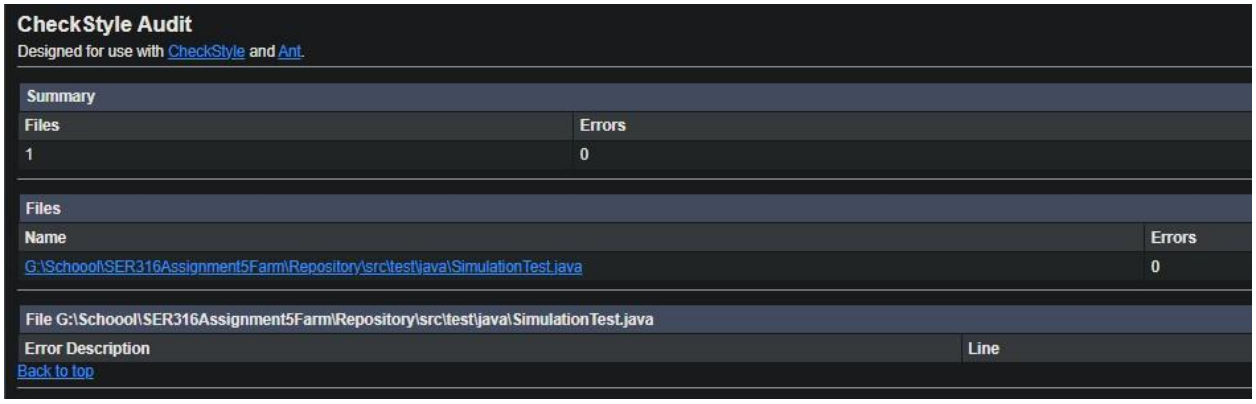
File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Observer.java	
Error Description	Line

Back to top

File G:\Schoool\SER316Assignment5Farm\Repository\src\main\java\Output.java	
Error Description	Line

Back to top

Also CheckStyle



CheckStyle Audit

Designed for use with CheckStyle and Ant.

Summary	
Files	Errors
1	0

Files	
Name	Errors
G:\Schoool\SER316Assignment5Farm\Repository\src\test\java\SimulationTest.java	0

File G:\Schoool\SER316Assignment5Farm\Repository\src\test\java\SimulationTest.java	
Error Description	Line

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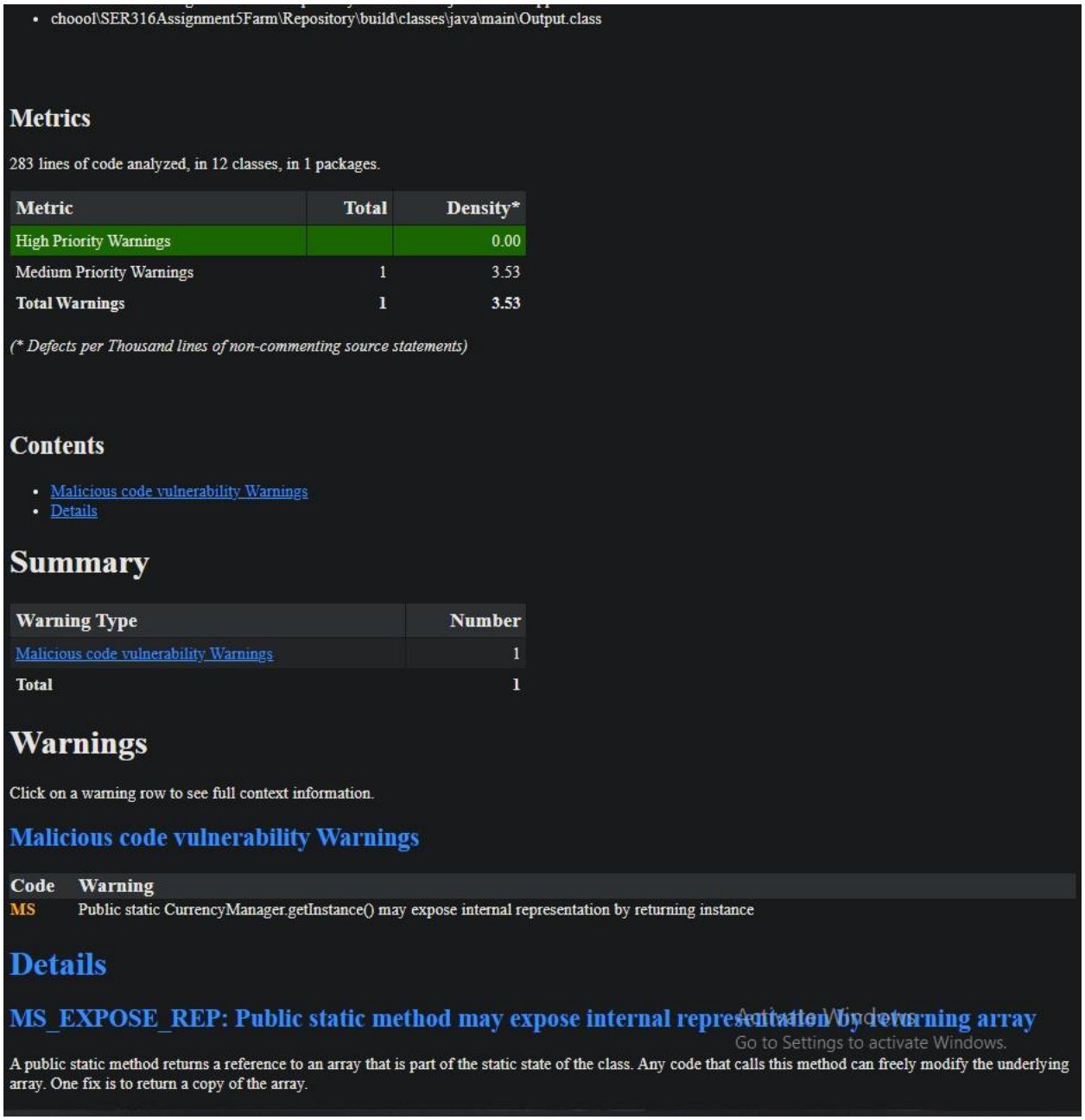
SpotBug

Explanation to 1 bug:
MS was complaining about my CurrencyManager class/method which was a singelton so it has an instantiation with synchronized as well as only way to call it which gets denied if there is already one of it. To fix this, I had to change the structure of the method/class which was unnecessary as synchronization was taking care of the warnings presented below.



- chooo\SER316Assignment5Farm\Repository\build\classes\java\main\Output.class

Metrics

283 lines of code analyzed, in 12 classes, in 1 packages.

Metric	Total	Density*
High Priority Warnings		0.00
Medium Priority Warnings	1	3.53
Total Warnings	**1**	**3.53**

(Defects per Thousand lines of non-commenting source statements)*

Contents

- Malicious code vulnerability Warnings
- Details

Summary

Warning Type	Number
Malicious code vulnerability Warnings	1
Total	**1**

Warnings

Click on a warning row to see full context information.

Malicious code vulnerability Warnings

Code	Warning
MS	Public static CurrencyManager.getInstance() may expose internal representation by returning instance

Details

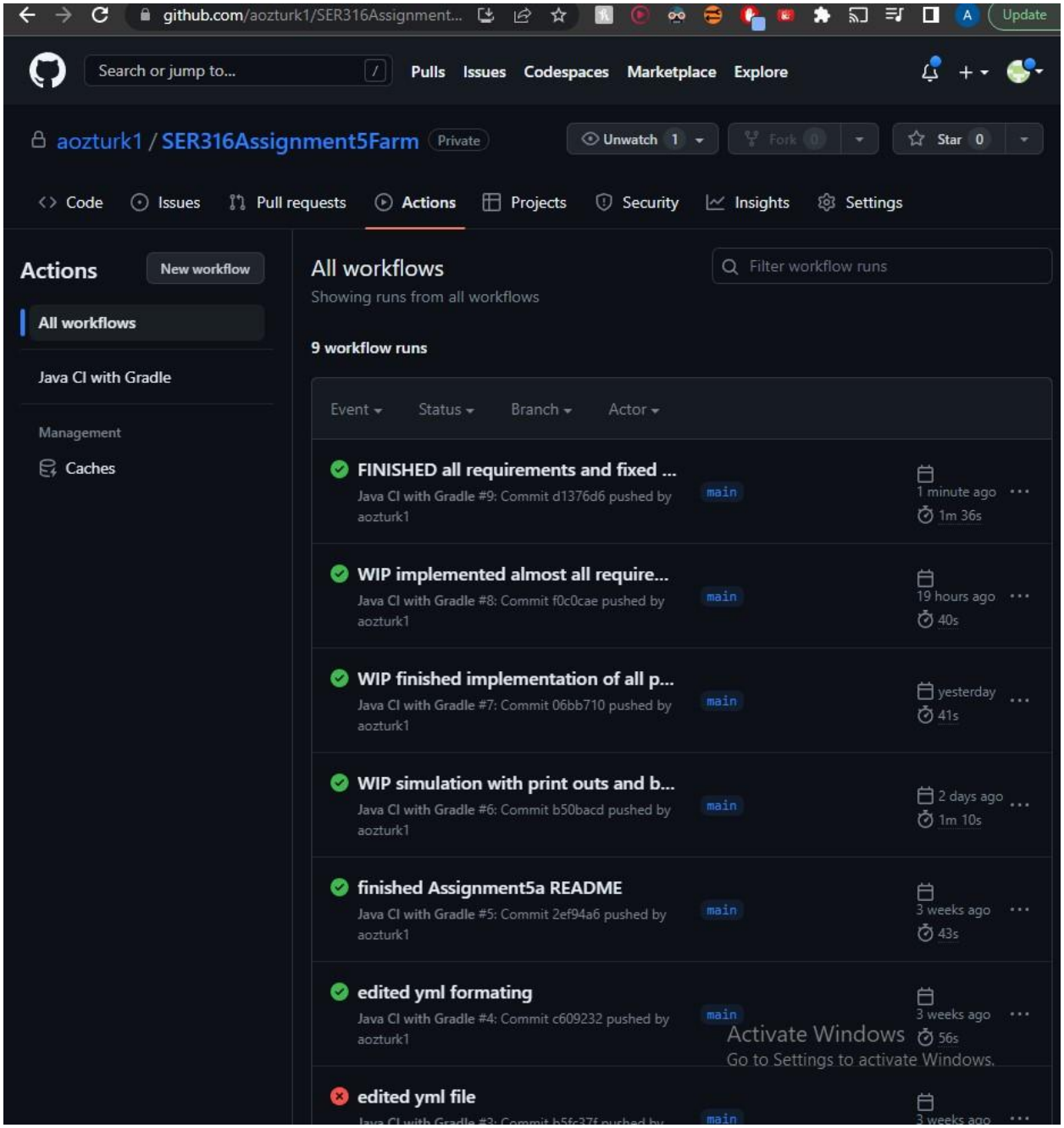
MS_EXPOSE_REP: Public static method may expose internal representation by returning array

A public static method returns a reference to an array that is part of the static state of the class. Any code that calls this method can freely modify the underlying array. One fix is to return a copy of the array.

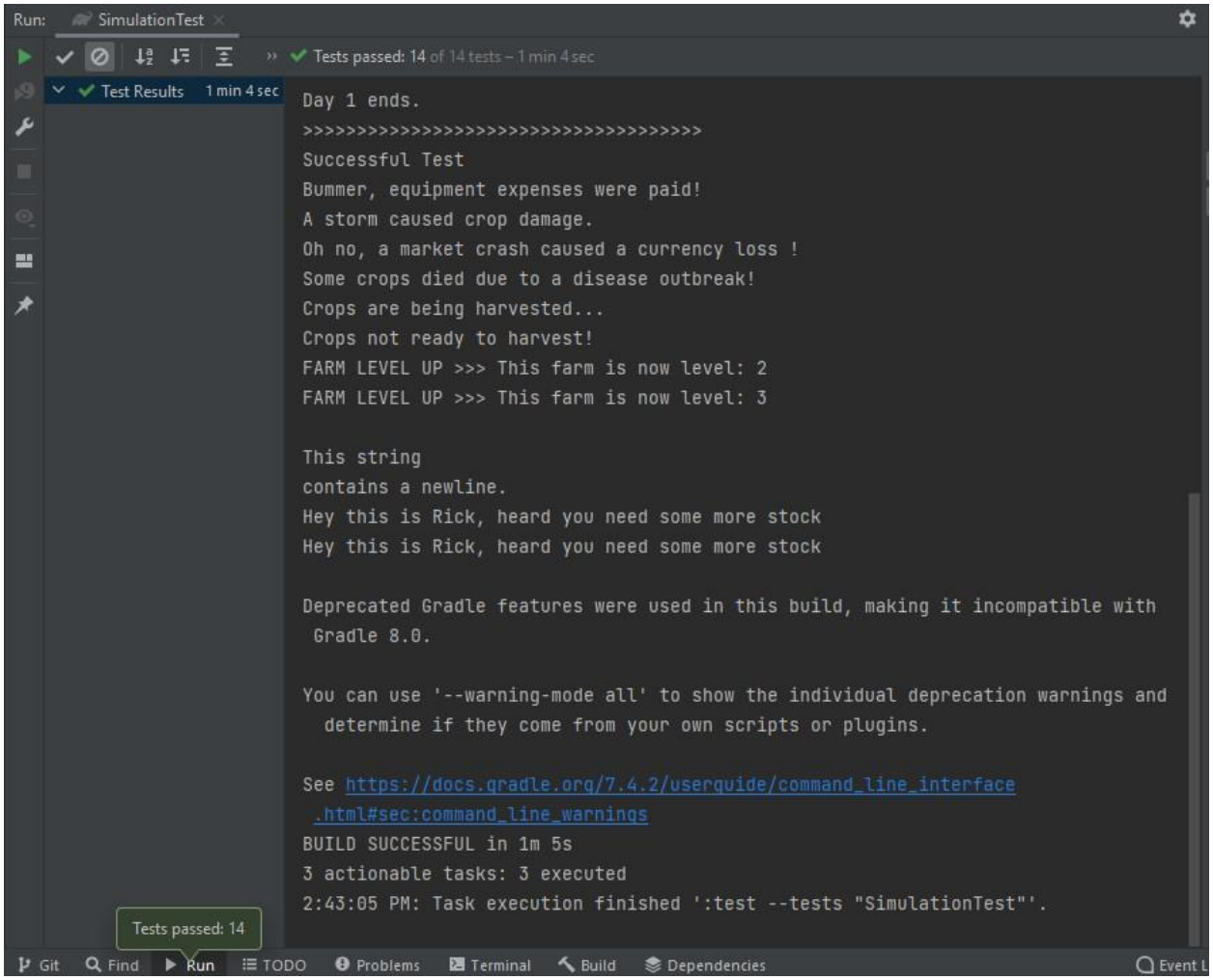
CodeCoverage

CodeCoverage

GitHub Actions



Unit Test Screenshot



Description
A simple farming simulation with multiple design patterns implemented. This is an automated program that simulates a farm with text/command-line outputs.

Design Patterns
3 design patterns from the Gang of Four:

a) Design Pattern: Factory
Requirement:

> "Farms can be of different types, such as an animal farm, a crop farm, a hybrid farm and so on. You can choose to make something up too."

Implementation:

> I used a factory generation to generate the specific types of farms such as Animal and Crop farms.

b) Design Pattern: Observer
Requirement:

"The farmers on your farm are quite tech savvy, so when animals or crops die (or harvested), an automatic message is sent to their supplier notifying them that they need more stock."

Implementation:

Made an Observer class that can be extended to different types of Observers. One observer type that I made was the supplier. The supplies would have a notify message that would be printed out if the farm went below a specific animal or crop number.

c) Design Pattern: Singleton
Requirement:

"Passive currency is earned with each new day (not night). This passive currency income is generated from selling crops or animal products, or both depending on your farm"

Implementation:

In order to manage the passive currency and all other money related things, I decided to use a singleton CurrencyManager class. This class will deal with losing and getting money and can only be had one of because the game is based around one farm manager that manges everything in this world.

How to run the program
Terminal
Please use the following commands:
```
   Run, "gradle run --console=plain"
```

Requirements that I think I fulfilled
-Git workflow
-All Design Patterns
-Checkstyle and Spotbugs included
-GitHub Action setup and passes
-JUNIT included and SimulationTest runs and passes
-Readme and PDF as asked
-Gradle works correctly
-Screencast
-And the following game requirements:
• A new world must start with at least 1 farm.

• Farms can be of different types, such as an animal farm, a crop farm, a hybrid farm and so on. You can choose to make something up too.
• The simulation should run on cycles. A cycle is considered to be of 2 parts - 1 day time and 1 night time.
• Passive currency is earned with each new day (not night). This passive currency income is generated from selling crops or animal products, or both depending on your farm.
• Farms are automatically upgraded once the farm has acquired enough currency. This could mean that the farm is expanded to grant it more land, which allows it to hold greater numbers of farmers, animals, and crops. The upgrade may also increase the passive currency income. In order for the simulation to not run into issues, it might be a nice idea to make sure the farm only upgrades once your farm has acquired 20% (choose any % you like though) more than the cost of an upgrade. So, if an upgrade costs $1000, it will automatically upgrade at $1200 so the farm still has $200.
• Animals reside on farms; it is up to you to decide the total number of animals that your farm(s) will hold. Think of typical farm animals such a cows and pigs, but you can be creative if you wish.
• Animals have a chance to be born every 4 cycles (must have at least 2 for the chance to occur). Alternatively, as an example, you could specify in your simulation that you wish to spend a certain percentage of your total currency every X number of cycles to buy more animals.
• Crops are grown on farms and have a chance to become diseased. When this happens they have a chance to wither and die within the next cycle (day and night), unless treated by a farmer. Crop affinities may help with fighting the disease.
• Crops may be harvested 1 time every 3 cycles.
• The farmers on your farm are quite tech savvy, so when animals or crops die (or harvested), an automatic message is sent to their supplier notifying them that they need more stock.