

Assignment 5 – Design Patterns

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Github Project:

<https://github.com/daraujo87/ser316-dungeonCrawler>

Design Patterns implemented

- **Decorator pattern:** player characters have a base abstract class (PlayerCharacter) which is extended by the various character types or races (Human, Elf, Dwarf). Character classes are added on top of these base types to further customize the character (Warrior, Thief, Wizard).
- **Factory pattern:** factory classes were implemented for creating the three main game entities: player characters, monsters, and floors. The character factory guides the user during character creation, while the other factories are used to create randomized monsters and floors during gameplay.
- **Mediator pattern:** a mediator object (GameRunner) runs and coordinates the whole game. Other game entities notify the mediator of events to be resolved to continue the game loop (combat actions, floor changes, etc).

Requirements Fulfilled

Requirement	Fulfilled?	Comments
You must be able to choose a class for your character (or have it assigned randomly), each class has a different subset of skills or magic. A class would constitute something along the lines of 'fighter', 'mage', 'thief', get creative with it!	Yes	The base character class (PlayerCharacter) uses inheritance to setup character races and a decorator pattern for character classes. The character creation process is coordinated by a character factory class (factory pattern).
You should be able to choose a type for your character (or have it assigned randomly), each race should have one passive skill that gets better after leveling up or that gives them advantage over another. A type would constitute something like, 'orc', 'elf', 'dwarf', 'human'. Perhaps orcs are stronger naturally, perhaps elves are the most nimble and can dodge better, maybe humans have less HP but gain exp at a faster, get creative with it!	Yes	Each of the current races has a different skill custom skill. Humans gain 10% more experience, Dwarves take less damage, and Elves can recover Mana. Each type also has a different base attribute progression on level up.
You should encounter a randomly generated 'small' enemy every floor, a 'medium' enemy every 5 floors, and a 'BOSS' every 10 floors.	Yes	A monster's power level progresses depending on the dungeon level (not every 5 levels). On each 10 th level the monster is powered up into a stronger BOSS version. Monster creation is

		randomized through a monster factory (factory pattern).
Your character should be able to equip items such as a sword, shield, helmet, armor, boots, etc. Your character should be able to equip a minimum of 3 unique item types. You get to decide what happens if you come across a second item type. For example, if you have 3 different swords you have programmed, and you have one equipped and come across another, does it automatically replace the old one? Does it compare stats and pick the better one? What happens if you don't take it? If you only have one sword programmed and you already have one equipped and come across a new one, what happens?	Partially	Characters have a weapon, armor, and accessory slot and there are getters/setters, but items are not implemented on the current version.
After each battle you should have a small chance to find a chest that contains items such as armor/money/potions, or a shop where you can spend your money.	No	Battles only yield experience at the moment.
The shop should sell 3 random objects, weapons, magic scrolls (good for one use), potions (good for one use), instant level up (RARE), get creative with it.	Partially	Shops have been implemented as a type of floor (for both the town level and for wandering merchants found into the dungeon). Shops have inventory, but it's not currently being filled with items.
Potions should never give more Health or Mana than you have as a maximum.	Partially	There are no potions currently implemented, but characters (and monsters) can recover life/mana using abilities and the amount you recover is capped at the current maximum life/mana.
After each floor (and after each possible random encounter with a shop) you should go back to the top floor if your health is below 15%. Going to the top floor gives you back all of your health and mana.	Yes	The player always has the option to continue delving into the dungeon or return to the surface after clearing one level. When the player returns to town, life and mana are fully recovered.
All enemies should get harder for each floor you travel to, for example, an enemy on floor 2 should be much, much weaker than an enemy on floor 48!	Yes	A monster's power level is determined by the number of the current dungeon floor. They are randomized using a monster factory (factory pattern).
The game should run on cycles. A cycle is considered to be 4 parts. Q1, Q2, Q3, and Q4 Each part should last around 3-5 floors have it's own event (use your creativity, here's a few examples to get started) – Q1 - Physical attacks always deal X amount less damage – Q2 - 5% chance to take a second turn in a row (applies to enemies as well – Q3 - gain extra money!	No	There is currently no distinction of the current game cycle. The game changes only as the player progresses into the dungeon and levels up.
Your character should have at minimum: – Stats: Attack, Health, Mana/Other Resource such as cooldown, Defense, and speed. Others can be added.	Yes	Characters have life, mana, physical attack and defense, magical attack and defense, agility

<ul style="list-style-type: none"> – Should have at least 1 skill or magic power they can use – Physical attacks should have a chance to critically strike (double damage) – All attacks should have a chance to fail/miss – Attacks should deal a min damage of 1 		(not currently used), a critical rating, and a list of combat moves. Attacks can't currently miss, but damage has a minimal of 1.
<p>You gain experience from winning battles; at certain thresholds you should be able to choose a skill or magic power to upgrade. For example:</p> <ul style="list-style-type: none"> – Lvl 1: Strike – Lvl 10: Double Strike – Lvl 15: Triple Strike <p>NOTE: Leveling up should only happen when at the top floor. For example, if I have 300 experience and go back to the top floor and I'm level 1 (previous experience cap = 0), if we assume the experience to level up is $10 * 2 * \text{current level} + \text{previous experience cap}$.</p> <p>Example:</p> <ul style="list-style-type: none"> – Level 1, it would be $10 * 2 * 1 + 0$ (since there was no previous level = 20 (300 total exp - 20, so now 280) – Level 2 would be $10 * 2 * 2 + 20 = 60$ (220 remain) Overall, you should level up 3 times with 100 exp left over towards the next level. (JUST AN EXAMPLE, YOU CAN USE YOUR OWN FORMULAS) 	Yes	<p>Players gain experience and can level up at a certain threshold. Level up only happens at the surface level.</p> <p>Skills are granted automatically based on class and level.</p> <p>The amount needed to evolve does not currently changes, but experience granted is computed based on monster level vs player level (stronger characters gain less experience from weaker enemies).</p>
<p>During combat:</p> <ul style="list-style-type: none"> – Attacks and item usage should happen in a turn-based fashion, the participant with the highest speed should go first. – When a participant reaches 0 or less HP, they lose the fight, if the loser is you, you lose an amount of money and go back to the top floor and only gain 20 – During either participant's turn, they can either attack or use a consumable item. 	Yes, partially	<p>Combat happens in turns. The whole game is managed by a mediator object (mediator pattern).</p> <p>Currently, the player always starts (agility not yet implemented).</p> <p>The game ends when the player dies.</p> <p>Items not currently implemented.</p>
<p>Your simulation should include at least 3 temporary status effect and at least 1 permanent status effect that either hinders or helps your character in some way. Status effects could include: poisoned, burned, asleep, paralyzed, strengthened, quickened, crippled, bleeding, cursed, etc.</p>	No	Status effects not currently implemented.

Checkstyle Report

I solved all issues on Checkstyle but these errors regarding the naming format of my packages. I had issues making my project run on Gradle with renamed packages, so I decided to keep these errors in. Alternatively, I could have included exceptions for this, but thought would be better to report them.

CheckStyle Audit

Designed for use with [CheckStyle](#) and [Ant](#).

Summary	
Files	Errors
23	23

Files	
Name	Errors
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/App.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/CharacterClass.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Dwarf.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Elf.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Human.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/PlayerCharacter.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Thief.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Warrior.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Wizard.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/core/GameEntity.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/core/GameRunner.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/core/Mediator.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/CharacterFactory.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/FloorFactory.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/GameEntityFactory.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/MonsterFactory.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/floors/DungeonFloor.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/floors/Floor.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/floors/ShopFloor.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Devil.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Goblinoid.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Monster.java	1
/home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Undead.java	1

File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/App.java	
Error Description	Line
Package name 'ser316.dungeonCrawler' must match pattern '[a-z](\.[a-z][a-z0-9]*)*\$'.	5

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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/CharacterClass.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '[a-z](\.[a-z][a-z0-9]*)*\$'.	1

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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Dwarf.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '[a-z](\.[a-z][a-z0-9]*)*\$'.	1

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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Elf.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '[a-z](\.[a-z][a-z0-9]*)*\$'.	1

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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Human.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/character/Wizard.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.character' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/core/GameEntity.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.core' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/core/GameRunner.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.core' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/core/Mediator.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.core' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/CharacterFactory.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.factories' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/FloorFactory.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.factories' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	2
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/GameEntityFactory.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.factories' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/factories/MonsterFactory.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.factories' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/floors/DungeonFloor.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.floors' must match pattern '^([a-z]+(\.[a-z][a-z0-9]*)*)\$'.	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/floors/Floor.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.floors' must match pattern <code>^[a-z](\.[a-z][a-z0-9]*)*\$</code> .	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/floors/ShopFloor.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.floors' must match pattern <code>^[a-z](\.[a-z][a-z0-9]*)*\$</code> .	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Devil.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.monsters' must match pattern <code>^[a-z](\.[a-z][a-z0-9]*)*\$</code> .	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Goblinoid.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.monsters' must match pattern <code>^[a-z](\.[a-z][a-z0-9]*)*\$</code> .	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Monster.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.monsters' must match pattern <code>^[a-z](\.[a-z][a-z0-9]*)*\$</code> .	1
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File /home/daraujo/SER316/ser316-dungeonCrawler/src/main/java/ser316/dungeonCrawler/monsters/Undead.java	
Error Description	Line
Package name 'ser316.dungeonCrawler.monsters' must match pattern <code>^[a-z](\.[a-z][a-z0-9]*)*\$</code> .	1
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Spotbugs Report

SpotBugs Report**Project Information**

Project: ser316-dungeonCrawler (spotbugsMain)

SpotBugs version: 4.2.2

Code analyzed:

- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/Thief.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/CharacterClass.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/Wizard.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/Human.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/Warrior.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/Dwarf.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/PlayerCharacter.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/character/Elf.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/factories/GameEntityFactory.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/factories/FloorFactory.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/factories/CharacterFactory.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/factories/MonsterFactory.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/App.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/monsters/Devil.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/monsters/Goblinoid.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/monsters/Undead.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/monsters/Monster.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/core/Mediator.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/core/GameRunner.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/core/GameEntity.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/floors/DungeonFloor.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/floors/ShopFloor.class
- /home/daraujo/SER316/ser316-dungeonCrawler/build/classes/java/main/ser316/dungeonCrawler/floors/Floor.class

Metrics

1059 lines of code analyzed, in 23 classes, in 6 packages.

Metric	Total	Density*
High Priority Warnings		0.00
Medium Priority Warnings		0.00
Total Warnings	0	0.00

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

Contents

- [Details](#)

Summary

Warning Type	Number
Total	0

Warnings

Click on a warning row to see full context information.

Details

JUnit Report

Test Summary

27 tests
0 failures
0 ignored
0.977s duration

100%
successful


Packages

Classes



















Package	Tests	Failures	Ignored	Duration	Success rate
ser316.dungeonCrawler	1	0	0	0.014s	100%
ser316.dungeonCrawler.character	9	0	0	0.403s	100%
ser316.dungeonCrawler.core	1	0	0	0.391s	100%
ser316.dungeonCrawler.factories	6	0	0	0.027s	100%
ser316.dungeonCrawler.floors	3	0	0	0.003s	100%
ser316.dungeonCrawler.monsters	7	0	0	0.139s	100%

Generated by [Gradle 6.6.1](#) at Apr 26, 2022, 4:56:49 PM

Jacoco Report

 ser316-dungeonCrawler [Sessions](#)

ser316-dungeonCrawler

Element	Missed Instructions	Cov.	Missed Branches	Cov.	Missed	Cxty	Missed	Lines	Missed	Methods	Missed	Classes
 ser316.dungeonCrawler.core		59%		61%	41	80	73	186	1	13	0	2
 ser316.dungeonCrawler.character		87%		67%	24	128	61	392	3	80	0	8
 ser316.dungeonCrawler.monsters		84%		58%	10	40	28	135	2	23	0	4
 ser316.dungeonCrawler.factories		90%		85%	7	38	7	84	1	12	0	4
 ser316.dungeonCrawler		31%		n/a	1	3	6	8	1	3	0	1
 ser316.dungeonCrawler.floors		99%		100%	1	18	1	37	1	12	0	3
Total	655 of 3,250	79%	100 of 308	67%	84	307	176	842	9	143	0	22

Created with [JaCoCo 0.8.5.201910111838](#)

Screencast

<https://youtu.be/tuqeuJlBdjk>