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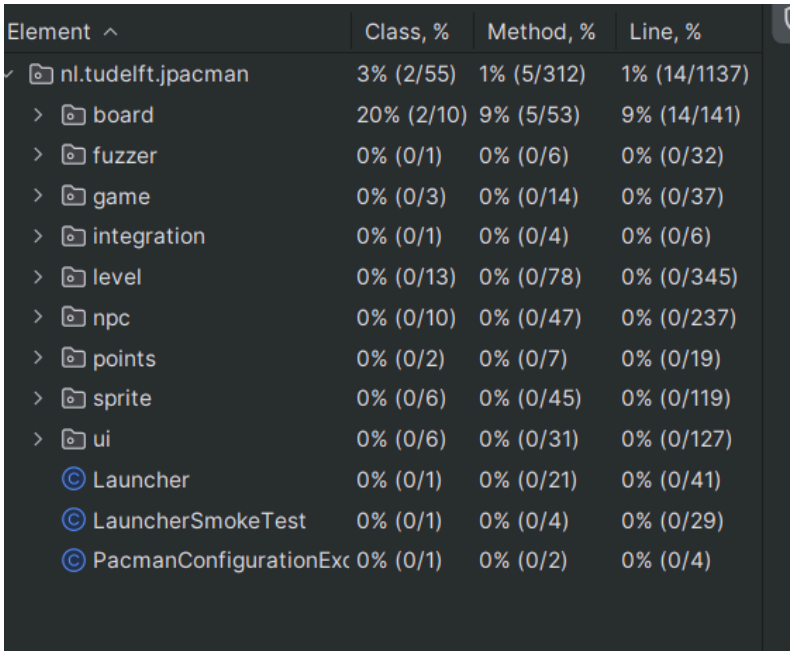
CS 472 - 1001
https://github.com/salazw1/cs472-group4

TASK 1:

Initial Test Coverage: the coverage is not good enough.

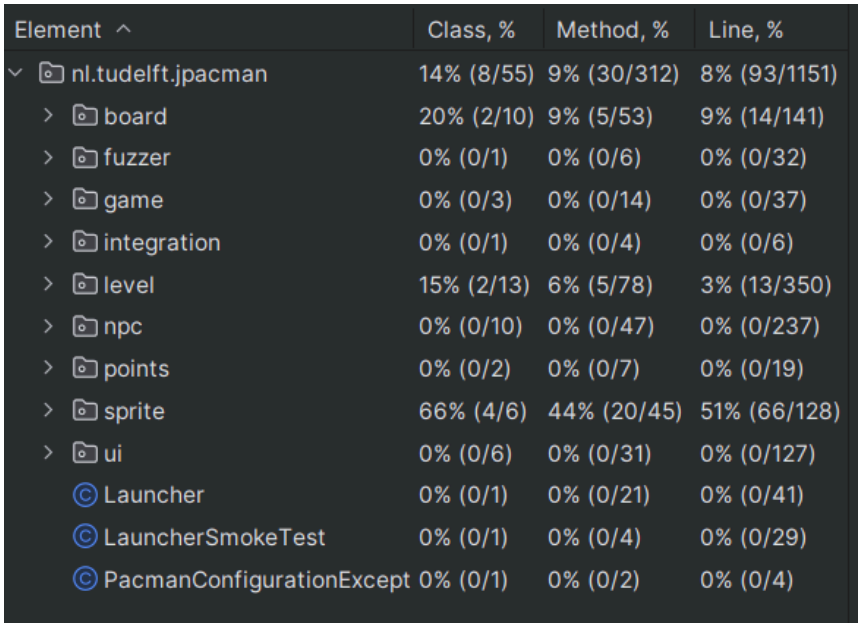
TASK 2 & 2.1:

Before Coverage:



Element	Class, %	Method, %	Line, %
nl.tudelft.jpacman	3% (2/55)	1% (5/312)	1% (14/1137)
board	20% (2/10)	9% (5/53)	9% (14/141)
fuzzer	0% (0/1)	0% (0/6)	0% (0/32)
game	0% (0/3)	0% (0/14)	0% (0/37)
integration	0% (0/1)	0% (0/4)	0% (0/6)
level	0% (0/13)	0% (0/78)	0% (0/345)
npc	0% (0/10)	0% (0/47)	0% (0/237)
points	0% (0/2)	0% (0/7)	0% (0/19)
sprite	0% (0/6)	0% (0/45)	0% (0/119)
ui	0% (0/6)	0% (0/31)	0% (0/127)
Launcher	0% (0/1)	0% (0/21)	0% (0/41)
LauncherSmokeTest	0% (0/1)	0% (0/4)	0% (0/29)
PacmanConfigurationExc	0% (0/1)	0% (0/2)	0% (0/4)

After isAlive() unit test:



Element	Class, %	Method, %	Line, %
nl.tudelft.jpacman	14% (8/55)	9% (30/312)	8% (93/1151)
board	20% (2/10)	9% (5/53)	9% (14/141)
fuzzer	0% (0/1)	0% (0/6)	0% (0/32)
game	0% (0/3)	0% (0/14)	0% (0/37)
integration	0% (0/1)	0% (0/4)	0% (0/6)
level	15% (2/13)	6% (5/78)	3% (13/350)
npc	0% (0/10)	0% (0/47)	0% (0/237)
points	0% (0/2)	0% (0/7)	0% (0/19)
sprite	66% (4/6)	44% (20/45)	51% (66/128)
ui	0% (0/6)	0% (0/31)	0% (0/127)
Launcher	0% (0/1)	0% (0/21)	0% (0/41)
LauncherSmokeTest	0% (0/1)	0% (0/4)	0% (0/29)
PacmanConfigurationExcept	0% (0/1)	0% (0/2)	0% (0/4)

After first test:

Element	Class, %	Method, %	Line, %
nl.tudelft.jpacman	16% (9/55)	9% (31/312)	8% (94/115...
PacmanConfigurationException	0% (0/1)	0% (0/2)	0% (0/4)
LauncherSmokeTest	0% (0/1)	0% (0/4)	0% (0/29)
Launcher	0% (0/1)	0% (0/21)	0% (0/41)
ui	0% (0/6)	0% (0/31)	0% (0/127)
sprite	66% (4/6)	44% (20/45)	51% (66/12...
points	0% (0/2)	0% (0/7)	0% (0/19)
npc	0% (0/10)	0% (0/47)	0% (0/237)
level	15% (2/13)	6% (5/78)	3% (13/350)
integration	0% (0/1)	0% (0/4)	0% (0/6)
game	0% (0/3)	0% (0/14)	0% (0/37)
fuzzer	0% (0/1)	0% (0/6)	0% (0/32)
board	30% (3/10)	11% (6/53)	10% (15/142)

```java
package nl.tudelft.jpacman.board;

import static org.assertj.core.api.Assertions.assertThat;
import static org.mockito.Mockito.*;
import org.junit.jupiter.api.Test;
new *
public class WithinBordersTest {
    1 usage
    int x = -1;
    1 usage
    int y = -1;
    no usages
    int z = 23;
    no usages
    int w = 20;


    1 usage
    Board testBoard = mock(Board.class);

    new *
    @Test
    void testBorders() {
        assertThat(testBoard.withinBorders(x,y)).isEqualTo( expected: false);
    }

}
```

For testing the method withinBorders() in the board package, the goal was to set parameters where the method would return false. In this case, the parameters should not be negative, so I tested negative values. The test method would assert that the return value of withinBorders() would return false.

After second test:

Element	Class, %	Method, %	Line, %
nl.tudelft.jpacman	20% (11/55)	11% (37/312)	9% (105/115...
PacmanConfigurationException	0% (0/1)	0% (0/2)	0% (0/4)
LauncherSmokeTest	0% (0/1)	0% (0/4)	0% (0/29)
Launcher	0% (0/1)	0% (0/21)	0% (0/41)
ui	0% (0/6)	0% (0/31)	0% (0/127)
sprite	66% (4/6)	46% (21/45)	52% (67/128)
points	50% (1/2)	14% (1/7)	10% (2/20)
npc	0% (0/10)	0% (0/47)	0% (0/237)
level	23% (3/13)	11% (9/78)	5% (21/351)
integration	0% (0/1)	0% (0/4)	0% (0/6)
game	0% (0/3)	0% (0/14)	0% (0/37)
fuzzer	0% (0/1)	0% (0/6)	0% (0/32)
board	30% (3/10)	11% (6/53)	10% (15/142)

```java
package nl.tudelft.jpacman.points;
import nl.tudelft.jpacman.level.Pellet;
import nl.tudelft.jpacman.level.Player;
import nl.tudelft.jpacman.level.PlayerFactory;
import nl.tudelft.jpacman.sprite.PacManSprites;
import org.junit.jupiter.api.Test;
import static org.assertj.core.api.Assertions.assertThat;

new *
public class consumedAPelletTest {
    2 usages
    private static final PacManSprites SPRITE_STORE = new PacManSprites();
    1 usage
    private PlayerFactory Factory = new PlayerFactory(SPRITE_STORE);
    3 usages
    private Player ThePlayer = Factory.createPacMan();
    1 usage
    int points = 200;
    1 usage
    Pellet createdPellet = new Pellet(points, SPRITE_STORE.getPelletSprite());
    1 usage
    DefaultPointCalculator pointCalculator = new DefaultPointCalculator();
    new *
    @Test
    void testScore(){
        assertThat(ThePlayer.getScore()).isEqualTo( expected: 0);
        pointCalculator.consumedAPellet(ThePlayer, createdPellet);
        assertThat(ThePlayer.getScore()).isEqualTo( expected: 200);
    }
}
```

For testing the method consumedAPellet() in the points package, the goal was to ensure that the right number of points is calculated after “consuming a pellet.” I first instantiated the necessary object to create a Player, and also a Pellet object. By creating a DefaultPointCalculator, I was able to call the consumedAPellet(), and assert that the player has 0 points before consuming a pellet and 200 points after consuming, since each pellet had a value of 200.

After third test:

Element	Class, %	Method...	Line, %
nl.tudelft.jpacman	21% (12/...	12% (38/...	9% (106/...
PacmanConfigurationException	0% (0/1)	0% (0/2)	0% (0/4)
LauncherSmokeTest	0% (0/1)	0% (0/4)	0% (0/29)
Launcher	0% (0/1)	0% (0/21)	0% (0/41)
ui	0% (0/6)	0% (0/31)	0% (0/127)
sprite	83% (5/6)	48% (22/...	53% (68/...
points	50% (1/2)	14% (1/7)	10% (2/20)
npc	0% (0/10)	0% (0/47)	0% (0/23...
level	23% (3/13)	11% (9/78)	5% (21/3...
integration	0% (0/1)	0% (0/4)	0% (0/6)
game	0% (0/3)	0% (0/14)	0% (0/37)
fuzzer	0% (0/1)	0% (0/6)	0% (0/32)
board	30% (3/10)	11% (6/53)	10% (15/1...

```java
package nl.tudelft.jpacman.sprite;
import org.junit.jupiter.api.Test;
import static org.assertj.core.api.AssertionsForClassTypes.assertThat;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.when;

new *
public class EmptySpritesplitTest {

    2 usages
    int w=1;
    2 usages
    int x=2;
    2 usages
    int y=3;
    2 usages
    int z=4;
    2 usages
    EmptySprite expectedSprite;
    2 usages
    EmptySprite blank = mock(EmptySprite.class);
    new *
    @Test
    void TestSplit() {
        when(blank.split(w,x,y,z)).thenReturn(expectedSprite);
        Sprite actualSprite = blank.split(w,x,y,z);
        assertThat(actualSprite).isEqualTo(expectedSprite);
    }
}
```

For testing the method split() in the sprite package, the goal was to successfully duplicate the same Sprite object that was returned in said method. To do this, I used isolation to determine if invoking the method isolated would return the same object as doing it not isolated. Then, I would assert that both returned Sprite objects would be equal.

TASK 3:

jpacman

Element	Missed Instructions	Cov.	Missed Branches	Cov.	Missed	Cxty	Missed	Lines	Missed	Methods	Missed	Classes
nl.tudelft.jpacman.level		67%		57%	74	155	104	344	21	69	4	12
nl.tudelft.jpacman.npc.ghost		71%		55%	56	105	43	181	5	34	0	8
nl.tudelft.jpacman.ui		77%		47%	54	86	21	144	7	31	0	6
default		0%		0%	12	12	21	21	5	5	1	1
nl.tudelft.jpacman.board		86%		58%	44	93	2	110	0	40	0	7
nl.tudelft.jpacman.sprite		86%		59%	30	70	11	113	5	38	0	5
nl.tudelft.jpacman		69%		25%	12	30	18	52	6	24	1	2
nl.tudelft.jpacman.points		60%		75%	1	11	5	21	0	9	0	2
nl.tudelft.jpacman.game		87%		60%	10	24	4	45	2	14	0	3
nl.tudelft.jpacman.npc		100%		n/a	0	4	0	8	0	4	0	1
Total	1,213 of 4,694	74%	293 of 637	54%	293	590	229	1,039	51	268	6	47

There are some areas where the Jacoco and IntelliJ are similar, but other areas are not. I think this is because of the branch calculations that are included in Jacoco.

Yes, I find it very helpful that Jacoco visualizes the uncovered branch coverage. It seems that I still have a lot of branches to cover.

I prefer IntelliJ's coverage window more. Although the bar visualization is helpful, having to open the Jacoco .html repeatedly seems like a hassle. Also, IntelliJ's is straight-to-the-point, I know exactly where my unit tests have covered.