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Git link: https://github.com/AndiBabes/ab224sh_1dv600

Testing

Test Plan

The objective is to test the code that was implemented the last iteration.

I will be testing UC1 and UC2 by writing and running dinamic manual test-cases. Automated unit tests will be implemented for the methods: “play”, “stillPlaying” and “getWord” from the class ‘Play’.

Task	Expected	Actual
Manual Test Cases	1h	45m
Running Manual Tests	10m	5m
Unit Tests	1h	1h
Code Inspection	20m	20m
Test Report	20m	10m

Manual test cases

TC1 Start Game Successfully

UC1 Start Game

Scenario: game starts successfully

The main scenario of UC1 is tested when a user starts the game successfully.

Precondition: none

Test Steps:

1. Start the game
2. The system shows the main menu with the buttons: “Play Game”, “View Highscores”, “Quit Game”
3. Click on the “Play Game” button

Expectations:

1. The game itself should start; The system will ask for input
2. See UC2

TC2.1 Win game

UC2 Play game

Scenario: The user plays and wins the game

The main scenario of UC2 Play game is tested. In this iteration the user is required to guess the word “testing”, instead of a random one.

Precondition: the game is running

Test Steps:

1. Start the game (see UC1)
2. The system will show a representation of the word using underscores and ask for input
3. Input the letters ‘t’, ‘e’, ‘s’, ‘i’, ‘n’, ‘g’ by typing them one by one and then clicking the “Check Letter” button

Expectations:

1. The system decides that all letters have been guessed and thus the game is won
2. The Game Over menu is shown with the message “You have won” giving the option to play again or to return to the main menu

TC2.2 Win game

UC2 Play game

Scenario: The user plays and loses the game

The alternate scenario 7.1 of UC2 Play game is tested. In this iteration the user is required to guess the word “testing”, instead of a random one.

Precondition: the game is running

Test Steps:

1. Start the game (see UC1)
2. The system will show a representation of the word using underscores and ask for input

3. Input the letter ‘a’ in the textbox and click on the “Check Letter” button for 6 times

Expectations:

1. The system decides that too many mistakes have been made and the game is lost
2. The Game Over menu is shown with the message “You have lost” giving the option to play again or to return to the main menu

Automated Tests

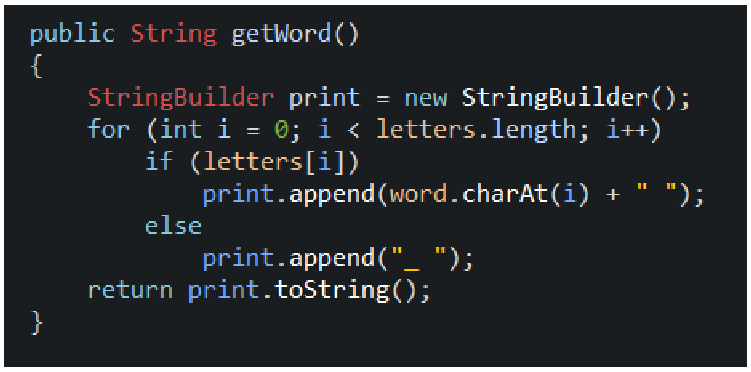
The first method being tested:

```java
public void play(char letter)
{
    boolean correct = false;
    for (int i = 0; i < word.length(); i++)
        if (letter == word.charAt(i))
        {
            correct = true;
            letters[i] = true;
        }
    if (!correct)
        mistakes++;
}
```

The test methods

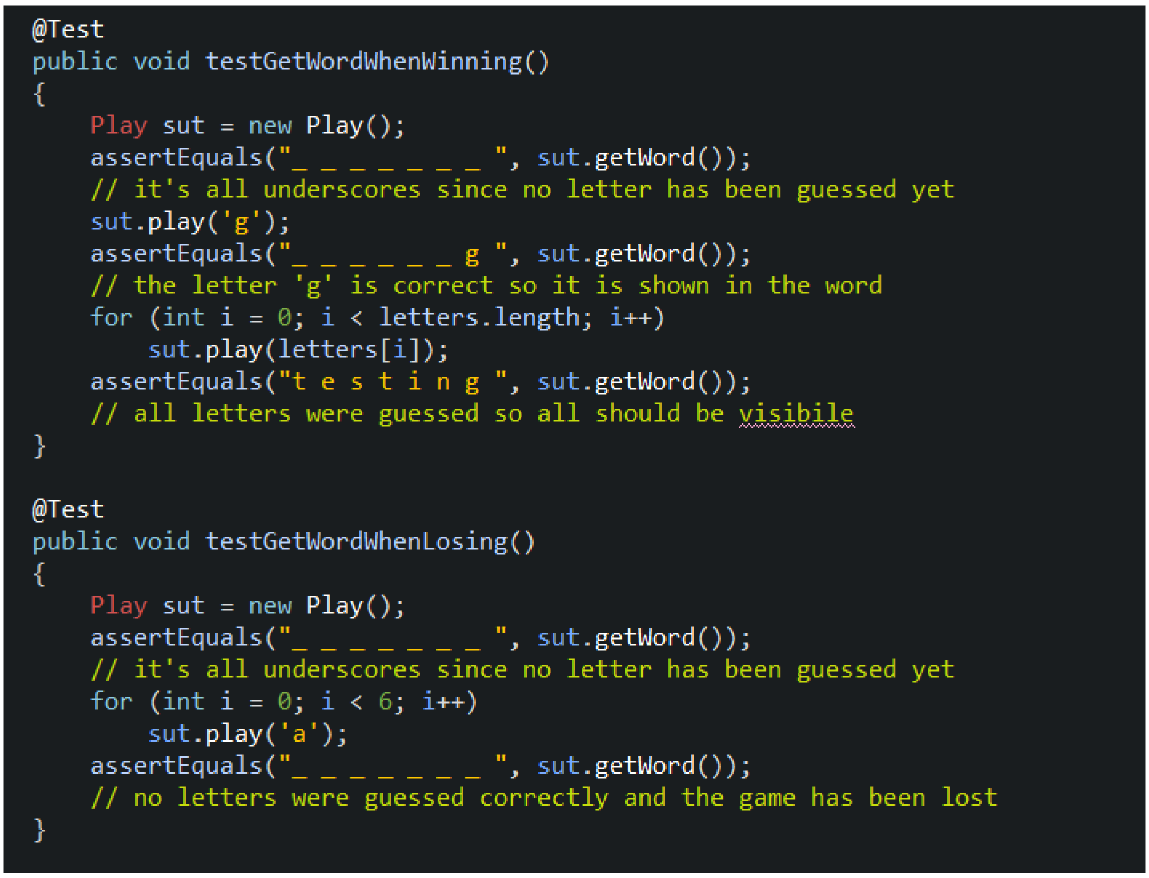
```java
char[] letters = { 't', 'e', 's', 'i', 'n', 'g' };

@Test
public void testPlayCountingMistakesWhenLosing()
{
    Play sut = new Play();
    // the method being tested is Play.play()
    assertEquals(0, sut.getMistakes());
    for (int i = 0; i < 6; i++)
        sut.play('a');
    assertEquals(6, sut.getMistakes());
}

@Test
public void testPlayCountingMistakesWhenWinning()
{
    Play sut = new Play();
    // the method being tested is Play.play()
    assertEquals(0, sut.getMistakes());
    for (int i = 0; i < letters.length; i++)
        sut.play(letters[i]);
    assertEquals(0, sut.getMistakes());
}
```

The second method being tested



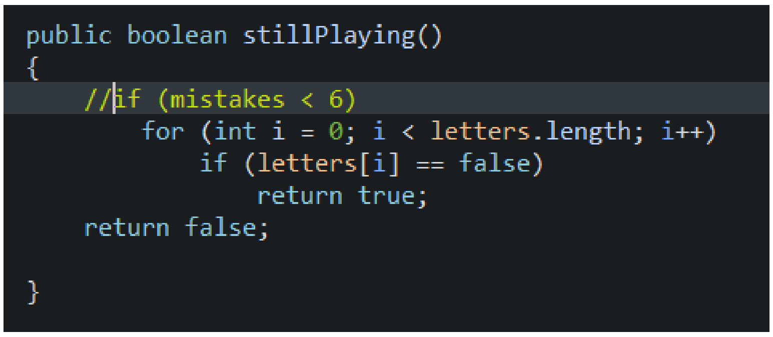
```java
public String getWord()
{
    StringBuilder print = new StringBuilder();
    for (int i = 0; i < letters.length; i++)
        if (letters[i])
            print.append(word.charAt(i) + " ");
        else
            print.append("_ ");
    return print.toString();
}
```

The test methods



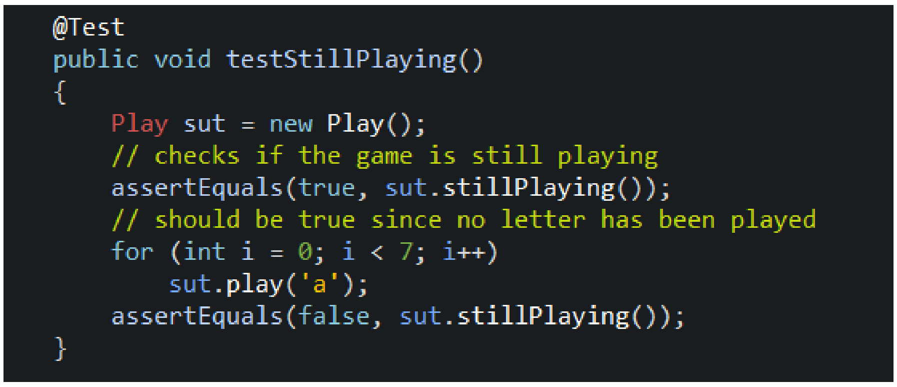
```java
@Test
public void testGetWordWhenWinning()
{
    Play sut = new Play();
    assertEquals("_ _ _ _ _ _ _ ", sut.getWord());
    // it's all underscores since no letter has been guessed yet
    sut.play('g');
    assertEquals("_ _ _ _ _ _ g ", sut.getWord());
    // the letter 'g' is correct so it is shown in the word
    for (int i = 0; i < letters.length; i++)
        sut.play(letters[i]);
    assertEquals("t e s t i n g ", sut.getWord());
    // all letters were guessed so all should be visibile
}

@Test
public void testGetWordWhenLosing()
{
    Play sut = new Play();
    assertEquals("_ _ _ _ _ _ _ ", sut.getWord());
    // it's all underscores since no letter has been guessed yet
    for (int i = 0; i < 6; i++)
        sut.play('a');
    assertEquals("_ _ _ _ _ _ _ ", sut.getWord());
    // no letters were guessed correctly and the game has been lost
}
```

Third method being tested

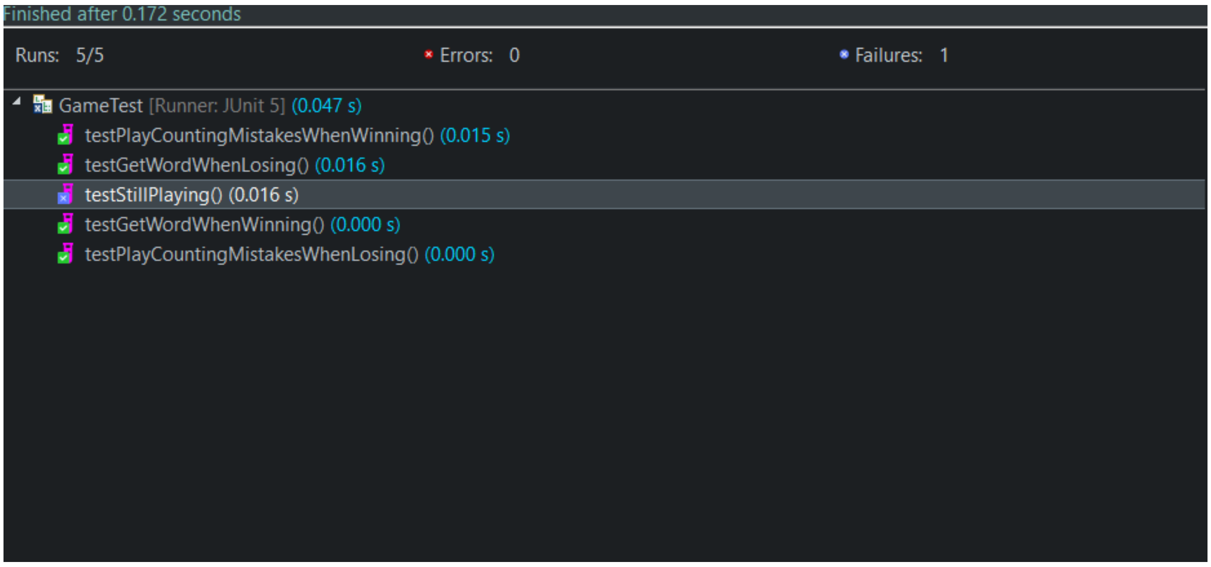


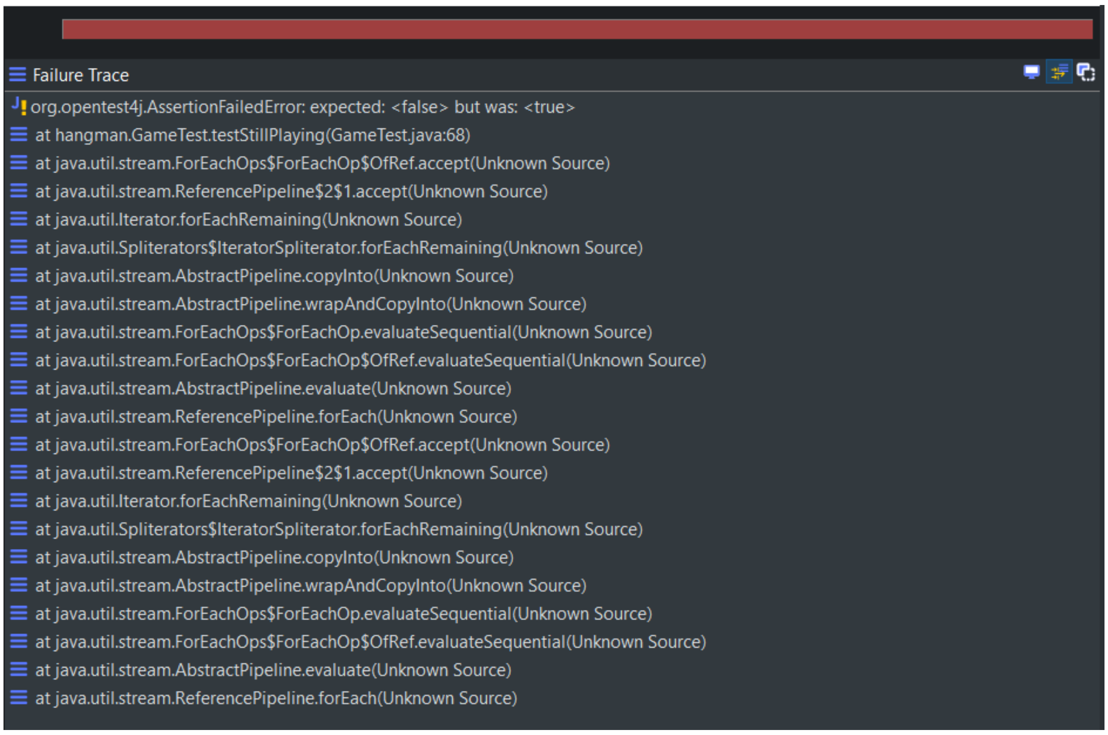
```java
public boolean stillPlaying()
{
    //if (mistakes < 6)
        for (int i = 0; i < letters.length; i++)
            if (letters[i] == false)
                return true;
    return false;

}
```

The test method


```
@Test
public void testStillPlaying()
{
    Play sut = new Play();
    // checks if the game is still playing
    assertEquals(true, sut.stillPlaying());
    // should be true since no letter has been played
    for (int i = 0; i < 7; i++)
        sut.play('a');
    assertEquals(false, sut.stillPlaying());
}
```

The test results


```
Finished after 0.172 seconds
Runs:  5/5          Errors:  0          Failures:  1

GameTest [Runner: JUnit 5] (0.047 s)
    testPlayCountingMistakesWhenWinning() (0.015 s)
    testGetWordWhenLosing() (0.016 s)
    testStillPlaying() (0.016 s)
    testGetWordWhenWinning() (0.000 s)
    testPlayCountingMistakesWhenLosing() (0.000 s)
```


```
Failure Trace
org.opentest4j.AssertionFailedError: expected: <false> but was: <true>
at hangman.GameTest.testStillPlaying(GameTest.java:68)
at java.util.stream.ForEachOps$ForEachOp$OfRef.accept(Unknown Source)
at java.util.stream.ReferencePipeline$2$1.accept(Unknown Source)
at java.util.Iterator.forEachRemaining(Unknown Source)
at java.util.Spliterators$IteratorSpliterator.forEachRemaining(Unknown Source)
at java.util.stream.AbstractPipeline.copyInto(Unknown Source)
at java.util.stream.AbstractPipeline.wrapAndCopyInto(Unknown Source)
at java.util.stream.ForEachOps$ForEachOp.evaluateSequential(Unknown Source)
at java.util.stream.ForEachOps$ForEachOp$OfRef.evaluateSequential(Unknown Source)
at java.util.stream.AbstractPipeline.evaluate(Unknown Source)
at java.util.stream.ReferencePipeline.forEach(Unknown Source)
at java.util.stream.ForEachOps$ForEachOp$OfRef.accept(Unknown Source)
at java.util.stream.ReferencePipeline$2$1.accept(Unknown Source)
at java.util.Iterator.forEachRemaining(Unknown Source)
at java.util.Spliterators$IteratorSpliterator.forEachRemaining(Unknown Source)
at java.util.stream.AbstractPipeline.copyInto(Unknown Source)
at java.util.stream.AbstractPipeline.wrapAndCopyInto(Unknown Source)
at java.util.stream.ForEachOps$ForEachOp.evaluateSequential(Unknown Source)
at java.util.stream.ForEachOps$ForEachOp$OfRef.evaluateSequential(Unknown Source)
at java.util.stream.AbstractPipeline.evaluate(Unknown Source)
at java.util.stream.ReferencePipeline.forEach(Unknown Source)
```

Test Report

Manual Tests

Test	UC1	UC2
TC1	1/OK	0
TC2.1	0	1/OK
TC2.2	0	1/OK
COVERAGE & SUCCESS	1/OK	2/OK

Reflection

This assignment helped me familiarize myself more with software testing. It plays an important role in software development and helps with detecting and ultimately removing any sorts of bugs or problems that might appear in the program.

More importantly however, it made me realize that my way of writing code proved to be inefficient in this case. My program is written in such a way that makes writing automated unit tests. I will try to rethink my code and include as many methods and classes as I can.