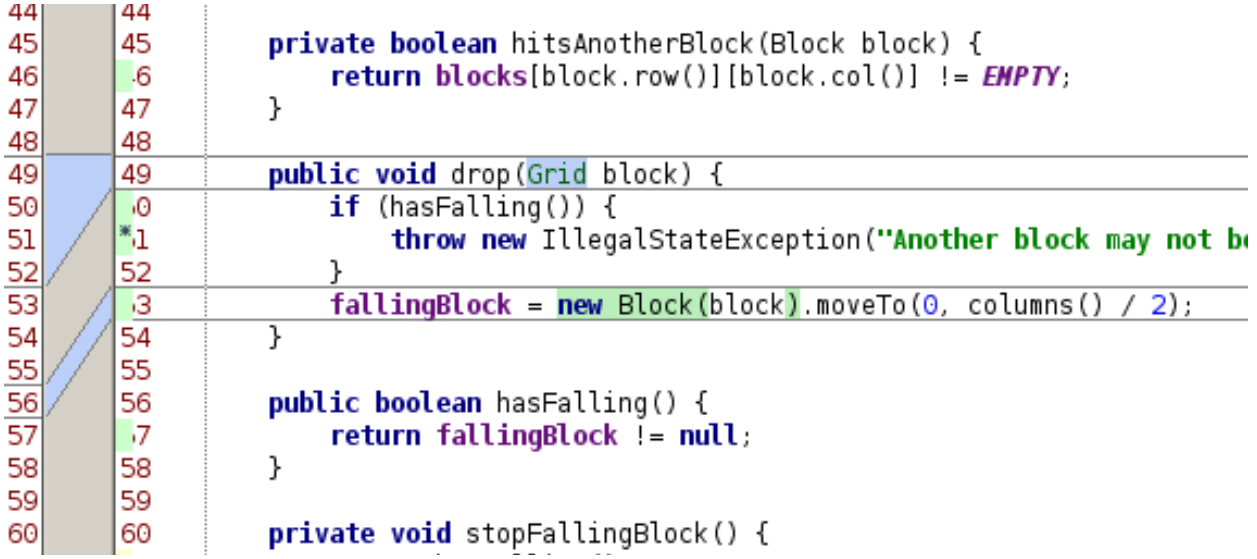
Refactoring - Tetris #3

(with examples in java)

3. Make Block implement the same interface as Tetromino.

```
14  public class Block implements Grid {
15
16      private final int row;
17      private final int col;
18      private final char style;
19
20      public Block(char style) {
21          this(0, 0, style);
22      }
23
24      private Block(int row, int col, char style) {
25          this.row = row;
26          this.col = col;
27          this.style = style;
28      }
29
30      public int row() {
31          return row;
32      }
33
34      public int col() {
35          return col;
36      }
37
38      public char style() {
39          return style;
40      }
41
42      public int rows() {
43          return 1;
44      }
45
46      public int columns() {
47          return 1;
48      }
49
50      public char cellAt(int row, int col) {
51          return style;
52      }
53
54      public boolean isAt(int row, int col) {
55          return row == this.row && col == this.col;
56      }
57
58      public Block moveTo(int row, int col) {
59          return new Block(row, col, style);
60      }
61
```

4a. Change Board.drop() to accept any Grid.
Block contains the movement logic, so we wrap the Grid in it.



```
44
45      private boolean hitsAnotherBlock(Block block) {
46          return blocks[block.row()][block.col()] != EMPTY;
47      }
48
49      public void drop(Grid block) {
50          if (hasFalling()) {
51              throw new IllegalStateException("Another block may not be
52          }
53          fallingBlock = new Block(block).moveTo(0, columns() / 2);
54      }
55
56      public boolean hasFalling() {
57          return fallingBlock != null;
58      }
59
60      private void stopFallingBlock() {
```

4b. Make Block contain a Grid.

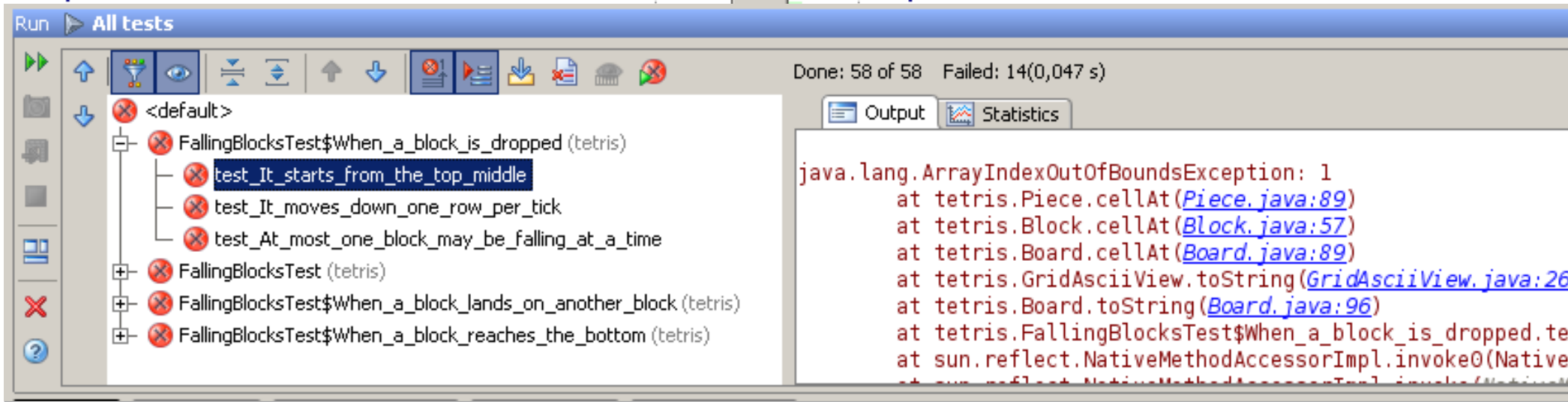
```
14  public class Block implements Grid {
15
16      private final int row;
17      private final int col;
18      private final char style;
19      private final Grid inner;
20
21      public Block(char style) {
22          this(0, 0, style, new Piece(style + "\n"));
23      }
24
25      public Block(Grid inner) {
26          this(0, 0, 'z', inner);
27      }
28
29      private Block(int row, int col, char style, Grid inner) {
30          this.row = row;
31          this.col = col;
32          this.style = style;
33          this.inner = inner;
34      }
35
36      public int row() {
37          return row;
38      }
39
```

```
55
56      public char cellAt(int row, int col) {
57          return style;
58      }
59
60      public boolean isAt(int row, int col) {
61          return row == this.row && col == this.col;
62      }
63
64      public Block moveTo(int row, int col) {
65          return new Block(row, col, style, inner);
66      }
67
68      public Block moveDown() {
69          return new Block(row + 1, col, style, inner);
70      }
71  }
72
```

4c. Change Block to delegate its Grid methods to the contained Grid.

```
public char style() {
    return style;
}

public int rows() {
    return 1;
}

public int columns() {
    return 1;
}

public char cellAt(int row, int col) {
    return style;
}

public boolean isAt(int row, int col) {
    return row == this.row && col == this.col;
}

public Block moveTo(int row, int col) {
    return new Block(row, col, style, inner);
}

public Block moveDown() {
```

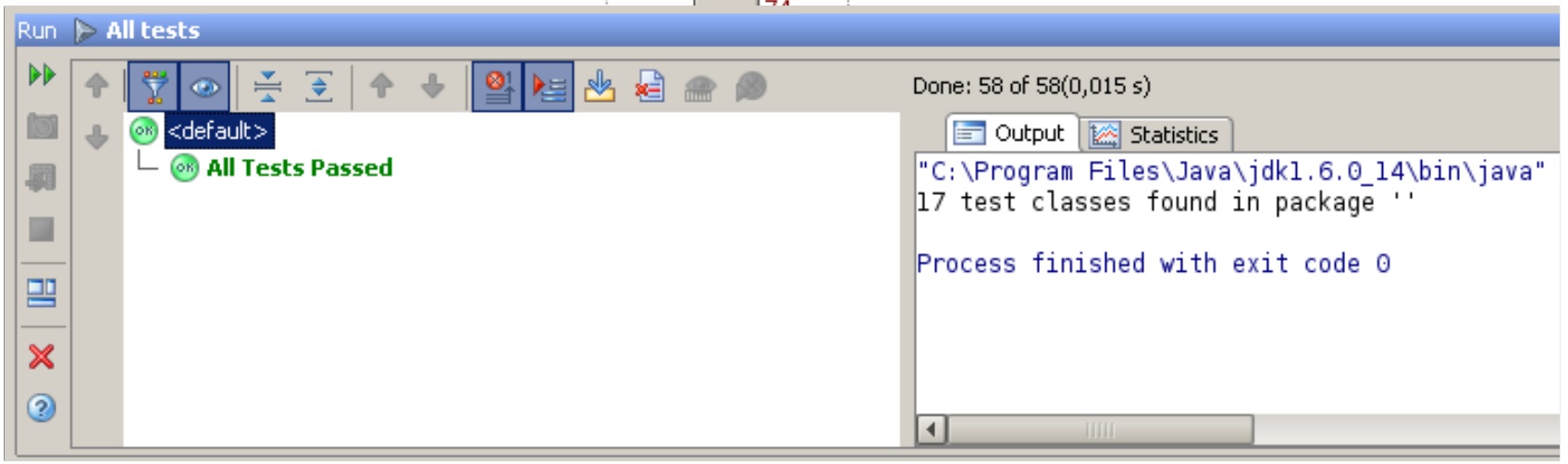
```
public char style() {
    return style;
}

public int rows() {
    return inner.rows();
}

public int columns() {
    return inner.columns();
}

public char cellAt(int row, int col) {
    return inner.cellAt(row, col);
}

public boolean isAt(int row, int col) {
    return row == this.row && col == this.col;
}

public Block moveTo(int row, int col) {
    return new Block(row, col, style, inner);
}

public Block moveDown() {
```



4d. Fix the row/column coordinate mismatch in Block.cellAt().

```
    }

    public int columns() {
        return inner.columns();
    }

    public char cellAt(int row, int col) {
        return inner.cellAt(row, col);
    }

    public boolean isAt(int row, int col) {
        return row == this.row && col == this.col;
    }

    public Block moveTo(int row, int col) {
        return new Block(row, col, style, inner);
    }

    public Block moveDown() {
        return new Block(row + 1, col, style, inner);
    }
}
```

```
    public int columns() {
        return inner.columns();
    }

    public char cellAt(int row, int col) {
        int innerRow = row - rowOffset;
        int innerCol = col - colOffset;
        return inner.cellAt(innerRow, innerCol);
    }

    public boolean isAt(int row, int col) {
        return row == this.rowOffset && col == this.colOffset;
    }

    public Block moveTo(int row, int col) {
        return new Block(row, col, style, inner);
    }

    public Block moveDown() {
        return new Block(rowOffset + 1, colOffset, style, inner);
    }
}
```

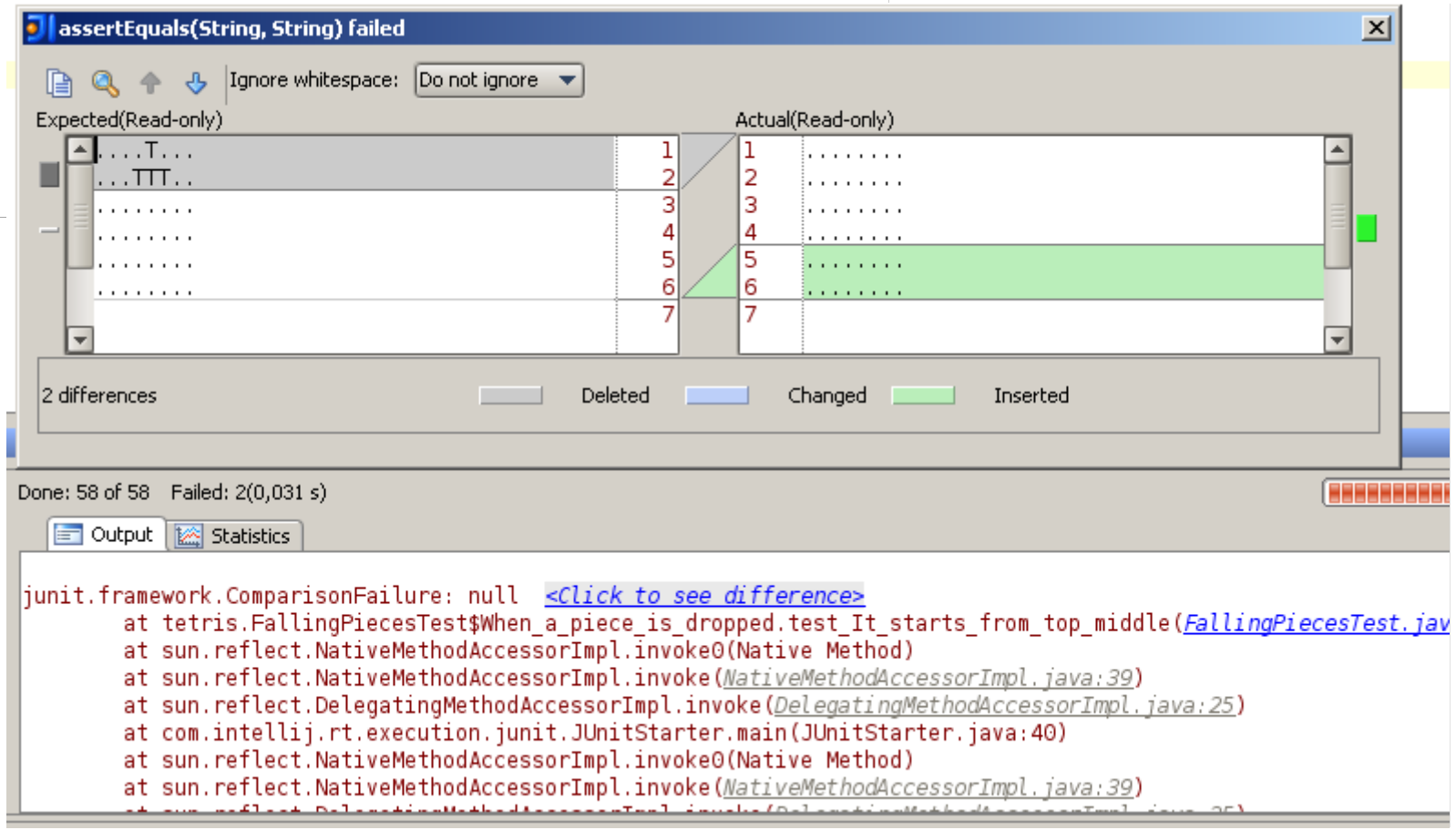


6. Change Board to use MovableGrid instead of Block.

```
*6  public class Board implements Grid {
17
18      private MovableGrid fallingBlock;
19      private char[][] blocks;
20
21      public Board(int rows, int columns) {
22          blocks = new char[rows][columns];
23          for (char[] tmp : blocks) {
24              Arrays.fill(tmp, EMPTY);
25          }
26      }
27
28      public void tick() {
29          MovableGrid test = fallingBlock.moveDown();
30          if (conflictsWithBoard(test)) {
31              stopFallingBlock();
32          } else {
33              fallingBlock = test;
34          }
35      }
36
37      private boolean conflictsWithBoard(MovableGrid block) {
38          return outsideBoard(block) || hitsAnotherBlock(block);
39      }
40
41      private boolean outsideBoard(MovableGrid block) {
42          return block.row() >= rows();
43      }
44
45      private boolean hitsAnotherBlock(MovableGrid block) {
46          return blocks[block.row()][block.col()] != EMPTY;
47      }
48
49      public void drop(Grid block) {
50          if (hasFalling()) {
*51             throw new IllegalStateException("Another block may not be dropped when one is already falling");
52          }
53          fallingBlock = new MovableGrid(block).moveTo(0, columns() / 2 - block.columns() / 2);
54      }
55
56      public boolean hasFalling() {
57          return fallingBlock != null;
58      }
59
60      private void stopFallingBlock() {
61          assert hasFalling();
62          copyToBoard(fallingBlock);
63          fallingBlock = null;
64      }
65
66      private void copyToBoard(MovableGrid block) {
67          for (int row = 0; row < blocks.length; row++) {
```

7a. Try running the first test. It fails.

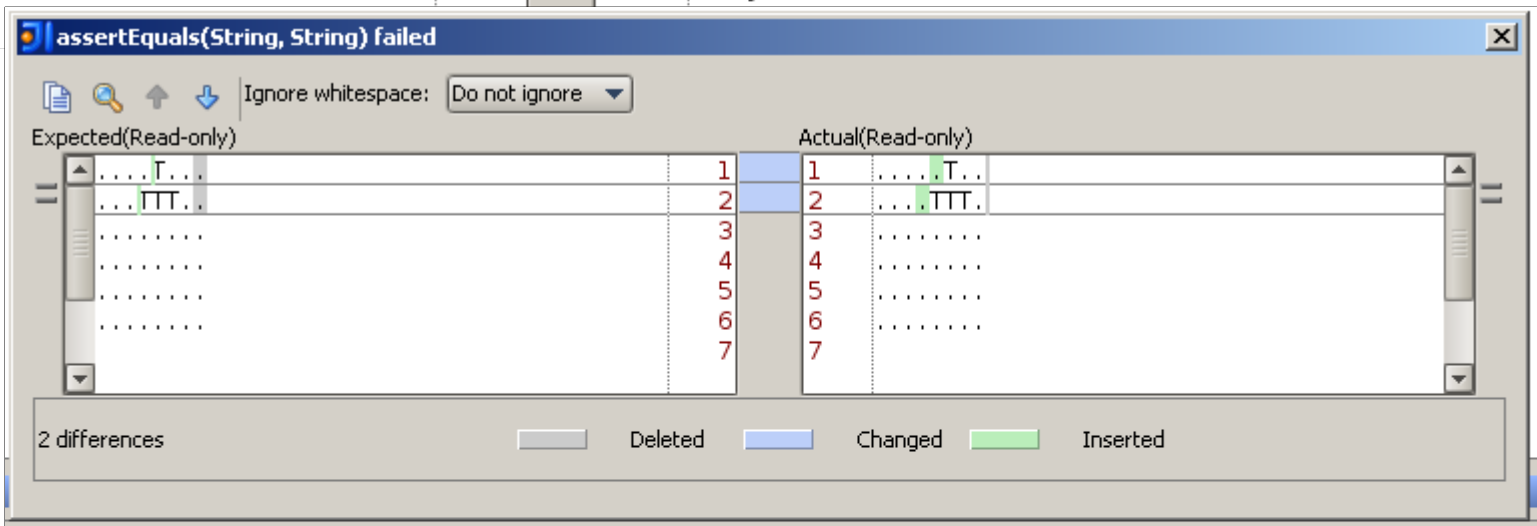
```
21
22      public static class When_a_piece_is_dropped extends TestCase {
23
24          private Board board;
25
26          protected void setUp() throws Exception {
27              board = new Board(6, 8);
28              board.drop(Tetrominoe.T_SHAPE);
29          }
30
31          public void test_It_starts_from_top_middle() {
32              assertEquals("" +
33                      "....T...\n" +
34                      "...TTT..\n" +
35                      "........\n" +
36
37
38
39          }
40      }
41
```



7b. Fix the row/column coordinate mismatch in Block.isAt(). Now FallingPiecesTest *almost* passes.

```
    public char cellAt(int row, int col) {
        int innerRow = row - rowOffset;
        int innerCol = col - colOffset;
        return inner.cellAt(innerRow, innerCol);
    }

    public boolean isAt(int row, int col) {
        return row == this.rowOffset && col == this.colOffset;
    }

    public Block moveTo(int row, int col) {
        return new Block(row, col, style, inner);
    }

    public Block moveDown() {
        return new Block(rowOffset + 1, colOffset, style, inner
    }
}
```

```
    public char cellAt(int row, int col) {
        int innerRow = row - rowOffset;
        int innerCol = col - colOffset;
        return inner.cellAt(innerRow, innerCol);
    }

    public boolean isAt(int row, int col) {
        int innerRow = row - rowOffset;
        int innerCol = col - colOffset;
        return innerRow >= 0 && innerRow < inner.rows() &&
                innerCol >= 0 && innerCol < inner.columns();
    }

    public Block moveTo(int row, int col) {
        return new Block(row, col, style, inner);
    }

    public Block moveDown() {
        return new Block(rowOffset + 1, colOffset, style, inner);
    }
```



Done: 58 of 58 Failed: 2(0,047 s)

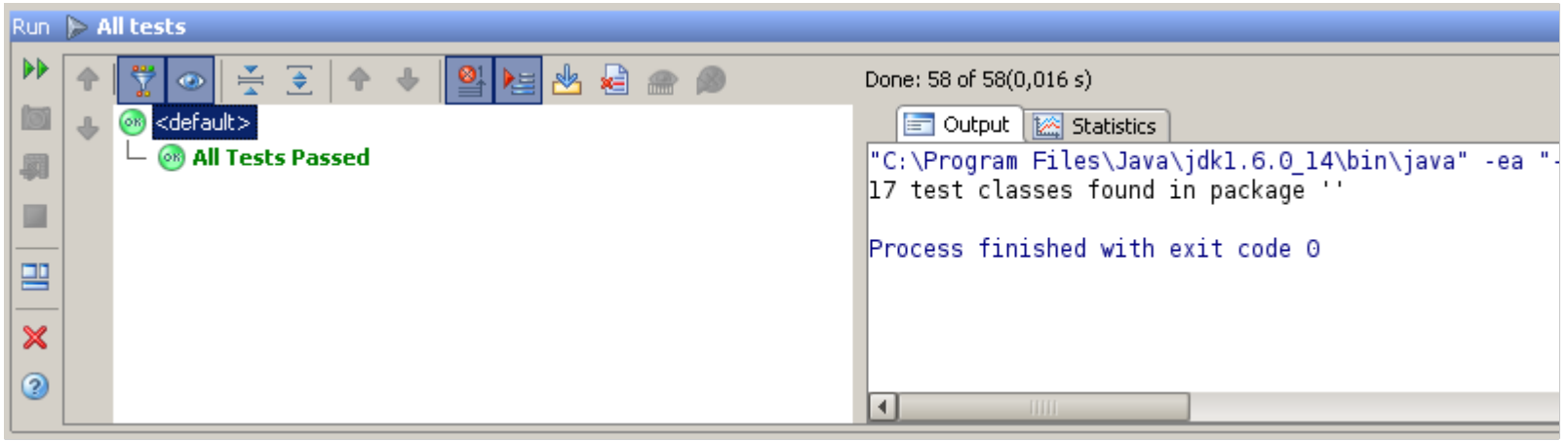
Output | Statistics

```
junit.framework.ComparisonFailure: null <Click to see difference>
        at tetris.FallingPiecesTest$When_a_piece_is_dropped.test_It_starts_from_top_middle(FallingPiecesTest.java:32)
        at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
        at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:39)
        at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:25)
```

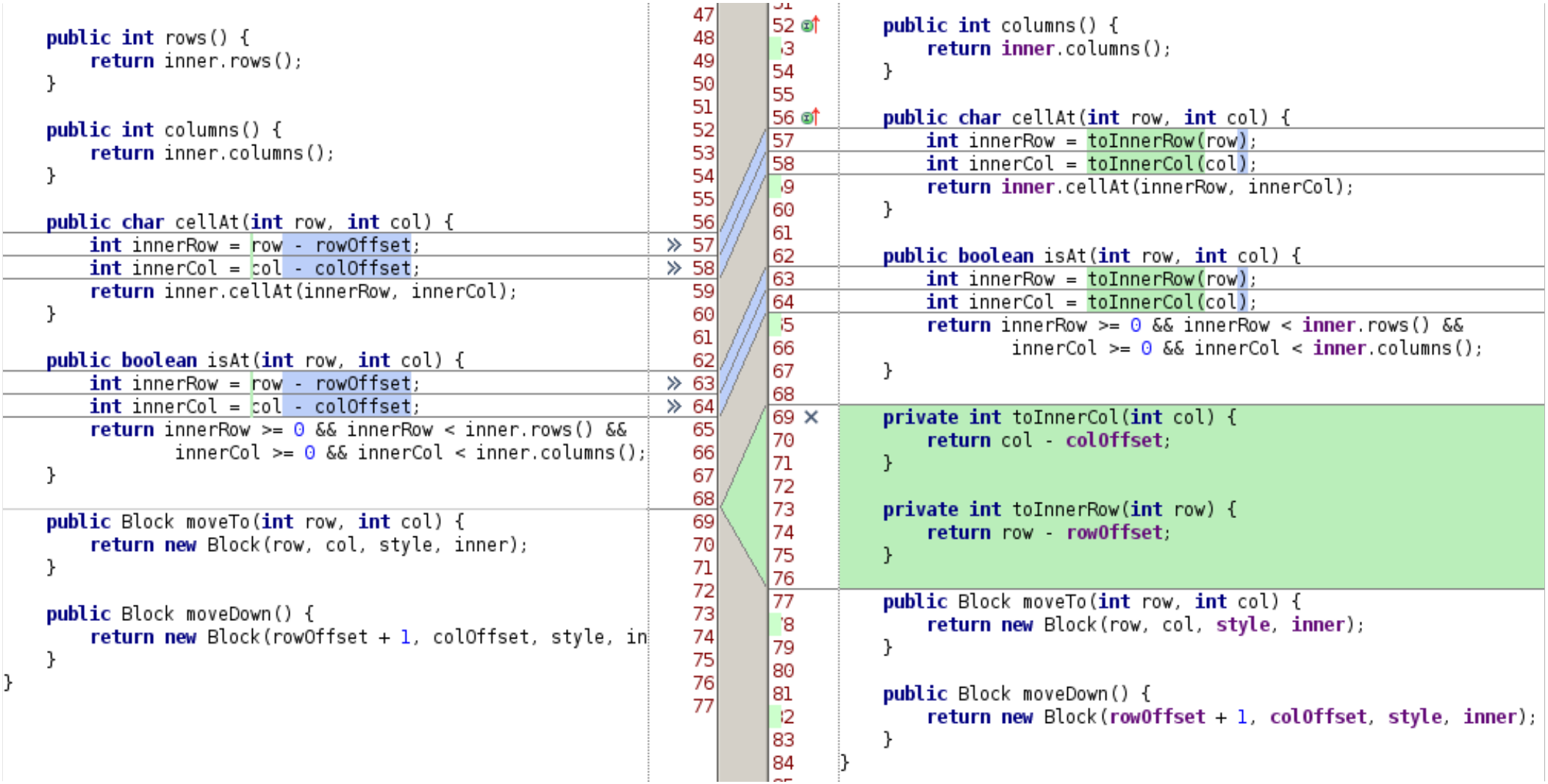
7c. Fix the falling Grid's initial position in Board.drop(). Now FallingPiecesTest passes. (Wohoo!)

```
lock(Block block) {
)][block.col()] != EMPTY;

 {

teException("Another block may not

(block).moveTo(0, columns() / 2);

{
ull;

x() {

);
```

```
45  45      private boolean hitsAnotherBlock(Block block) {
46  46          return blocks[block.row()][block.col()] != EMPTY;
47  47      }
48  48
49  49      public void drop(Grid block) {
50  50          if (hasFalling()) {
51  51              throw new IllegalStateException("Another block may not be dropped when one is alr
52  52          }
53  53          fallingBlock = new Block(block).moveTo(0, columns() / 2 - block.columns() / 2);
54  54      }
55  55
56  56      public boolean hasFalling() {
57  57          return fallingBlock != null;
58  58      }
59  59
60  60      private void stopFallingBlock() {
61  61          assert hasFalling();
62  62          copyToBoard(fallingBlock);
63  63          fallingBlock = null;
64  64      }
```



7d. Remove the obvious code duplication.



```
    public int rows() {
        return inner.rows();
    }

    public int columns() {
        return inner.columns();
    }

    public char cellAt(int row, int col) {
        int innerRow = row - rowOffset;
        int innerCol = col - colOffset;
        return inner.cellAt(innerRow, innerCol);
    }

    public boolean isAt(int row, int col) {
        int innerRow = row - rowOffset;
        int innerCol = col - colOffset;
        return innerRow >= 0 && innerRow < inner.rows() &&
                innerCol >= 0 && innerCol < inner.columns();
    }

    public Block moveTo(int row, int col) {
        return new Block(row, col, style, inner);
    }

    public Block moveDown() {
        return new Block(rowOffset + 1, colOffset, style, in
    }
}
```

```
    public int columns() {
        return inner.columns();
    }

    public char cellAt(int row, int col) {
        int innerRow = toInnerRow(row);
        int innerCol = toInnerCol(col);
        return inner.cellAt(innerRow, innerCol);
    }

    public boolean isAt(int row, int col) {
        int innerRow = toInnerRow(row);
        int innerCol = toInnerCol(col);
        return innerRow >= 0 && innerRow < inner.rows() &&
                innerCol >= 0 && innerCol < inner.columns();
    }

    private int toInnerCol(int col) {
        return col - colOffset;
    }

    private int toInnerRow(int row) {
        return row - rowOffset;
    }

    public Block moveTo(int row, int col) {
        return new Block(row, col, style, inner);
    }

    public Block moveDown() {
        return new Block(rowOffset + 1, colOffset, style, inner);
    }
}
```