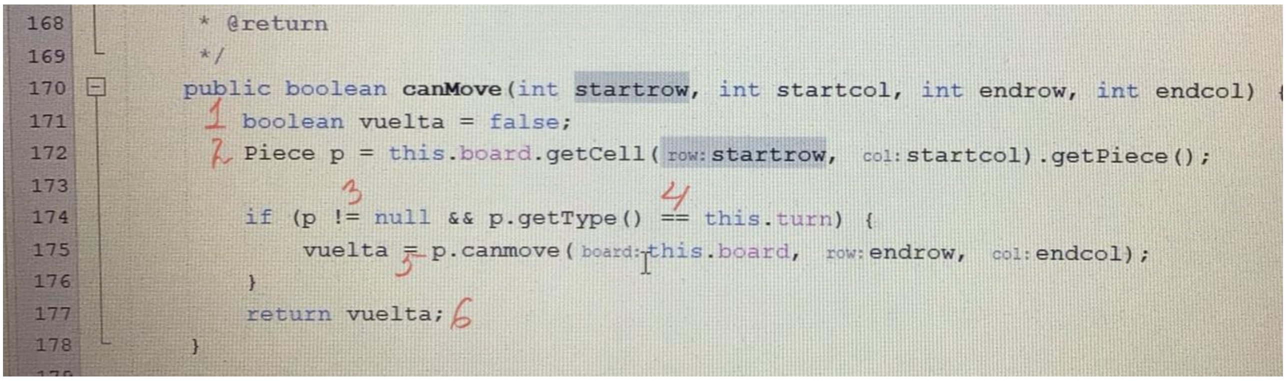
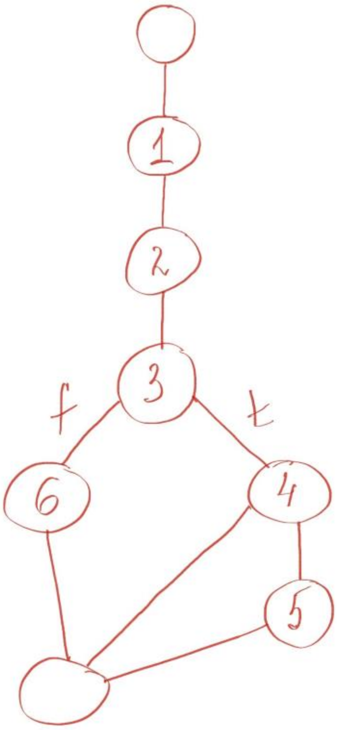
Practica 7

El grafo de posibles caminos del método canMove de la clase Game:



```
     * @return
     */
    public boolean canMove(int startrow, int startcol, int endrow, int endcol) {
        boolean vuelta = false;
        Piece p = this.board.getCell( row: startrow,  col: startcol).getPiece();

        if (p != null && p.getType() == this.turn) {
            vuelta = p.canmove( board: this.board,  row: endrow,  col: endcol);
        }
        return vuelta;
    }
```



Caja blanca:

El método canMove:

Entrada	Salida

startrow = 6
startcol = 0
endrow = 5
Endcol = 0
this.board = inicial
this.turn = White
	true

startrow = 7
startcol = 0
endrow = 6
Endcol = 0
this.board = inicial
this.turn = White
	false

startrow = 2
startcol = 0
endrow = 3
Endcol = 0
this.board = inicial
this.turn = White
	false

startrow = 1
startcol = 0
endrow = 2
Endcol = 0
this.board = inicial
this.turn = White
	false

startrow = 6
startcol = 0
endrow = 3
Endcol = 0
this.board = inicial
this.turn = White
	false

Caja negra:

Método getCell de la clase Board:

Entrada, clases de equivalencia:

Codigo	Row
e1a	Valor menores que 0
e1b	Valor mayores que 7
e1c	Valor entre 0 y 7

Codigo	Col
e2a	Valor menores que 0
e2b	Valor mayores que 7
e2c	Valor entre 0 y 7

Salida, clases de equivalencia:

Codigo	Salida
sa	Cell
sb	Null

Valores frontera o límite:

Codigo	Row
l1a	-1
l1b	0
l1c	7
l1d	8

Codigo	Col
l2a	-1
l2b	0
l2c	7
l2d	8

Casos de prueba: clases de equivalencia

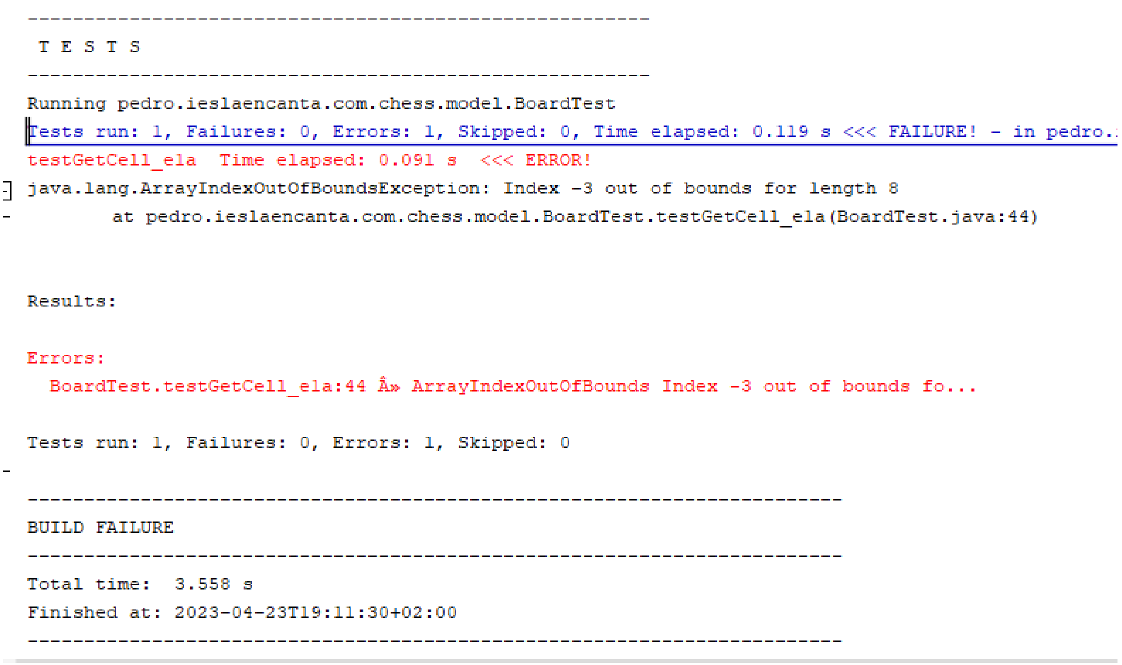
Entrada	Salida	Clases de equivalencia	Descripción
row=-3, col=0	Null	e1a, sb	Valor menor que 0
row=10, col=0	Null	e1b, sb	Valor mayor que 7
row=1, col=0	Cell	e1c, sa	Valores entre 0 y 7
row=7, col=2	Cell	e2c, sb	Valores entre 0 y 7
row=0, col=-3	Null	e2a, sb	Valor menor que 0
row=0, col=10	Null	e2b, sb	Valor mayor que 7

Casos de prueba: valores límite

Entrada	salida	Valor límite	Descripción
row=-1, col=0	Null	l1a	Valor límite inválido a la izquierda
row=0, col=0	Cell	l1b	Valor límite válido a la izquierda
row=7, col=0	Cell	l1c	Valor límite válido a la derecha
row=8, col=0	Null	l1d	Valor límite inválido a la derecha

row=0, col=-1	Null	I2a	Valor límite inválido a la izquierda
row=2, col=0	Cell	I2b	Valor límite válido a la izquierda
row=0, col=7	Cell	I2c	Valor límite válido a la derecha
row=0, col=10	Null	I2d	Valor límite inválido a la derecha

Resumen: En metodo GetCell (assertNull(celda) no podemos hacer test porque tenemos error "ArrayIndexOutOfBoundsException: Index -1 out of bounds for length 8", que significa que este metodo no vuelve null en caso cuando tenemos row o col menor que 0 y mayor que 7.

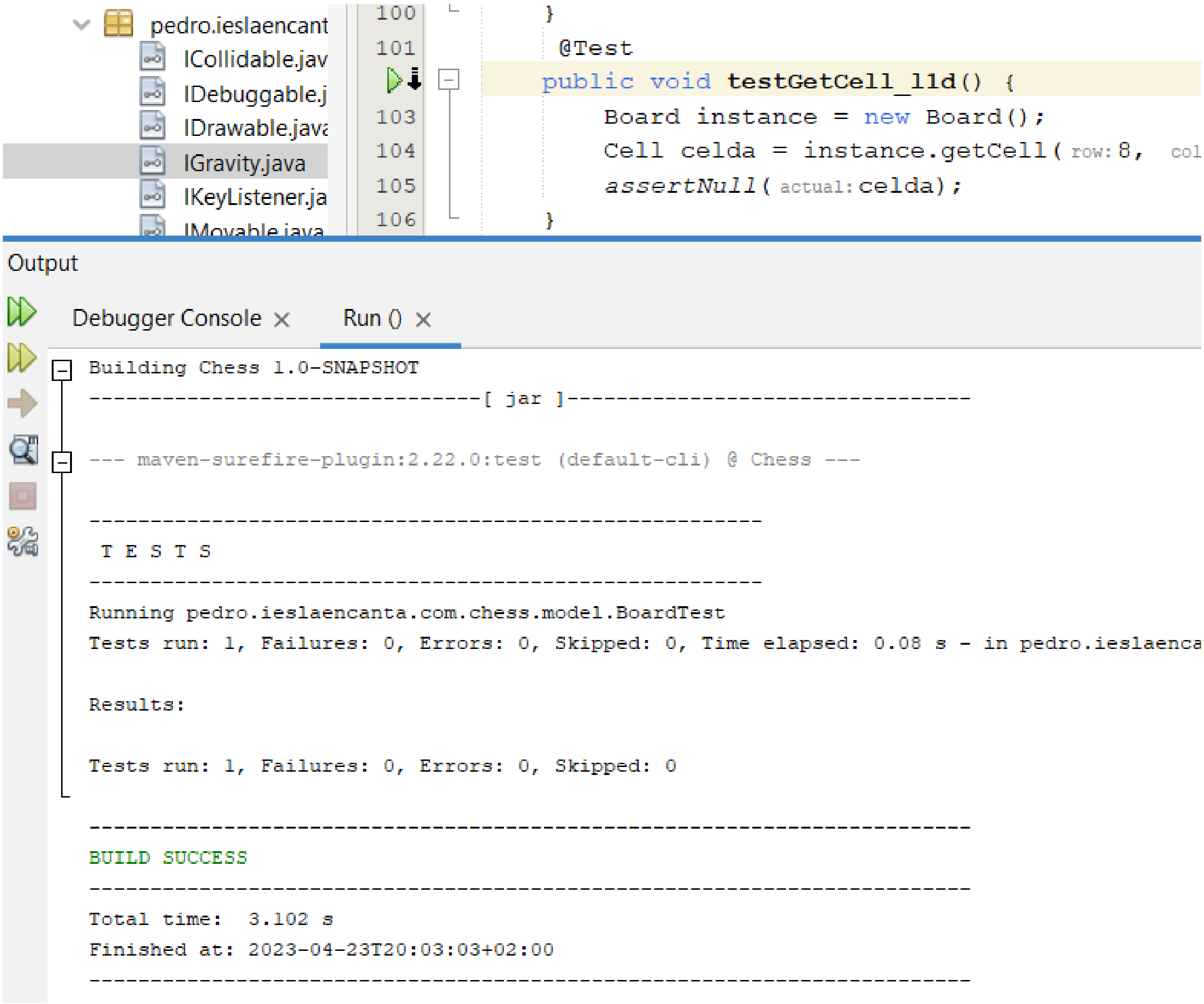


```
-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running pedro.ieslaencanta.com.chess.model.BoardTest
Tests run: 1, Failures: 0, Errors: 1, Skipped: 0, Time elapsed: 0.119 s <<< FAILURE! - in pedro.:
testGetCell_ela  Time elapsed: 0.091 s  <<< ERROR!
java.lang.ArrayIndexOutOfBoundsException: Index -3 out of bounds for length 8
        at pedro.ieslaencanta.com.chess.model.BoardTest.testGetCell_ela(BoardTest.java:44)


Results:

Errors:
  BoardTest.testGetCell_ela:44 Â» ArrayIndexOutOfBounds Index -3 out of bounds fo...

Tests run: 1, Failures: 0, Errors: 1, Skipped: 0

------------------------------------------------------------------------
BUILD FAILURE
------------------------------------------------------------------------
Total time:  3.558 s
Finished at: 2023-04-23T19:11:30+02:00
------------------------------------------------------------------------
```

Es método caja negra y no podemos cambiar codigo, pero si cambiamos – todo funciona bien.

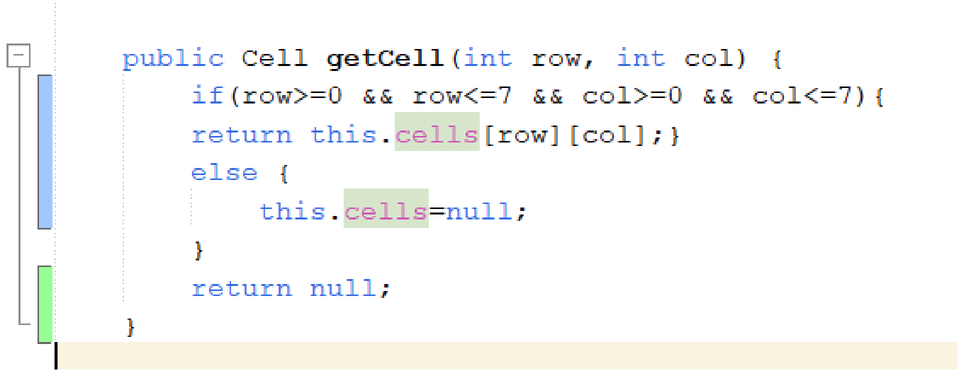
Si añadimos este comprueba en metodo GetCell y vuelve row y col =nul en caso que menor que 0 y mayor que 7=>

```
public Cell getCell(int row, int col) {
    if(row>=0 && row<=7 && col>=0 && col<=7){
    return this.cells[row][col];}
    else {
        this.cells=null;
    }
    return null;
}
```



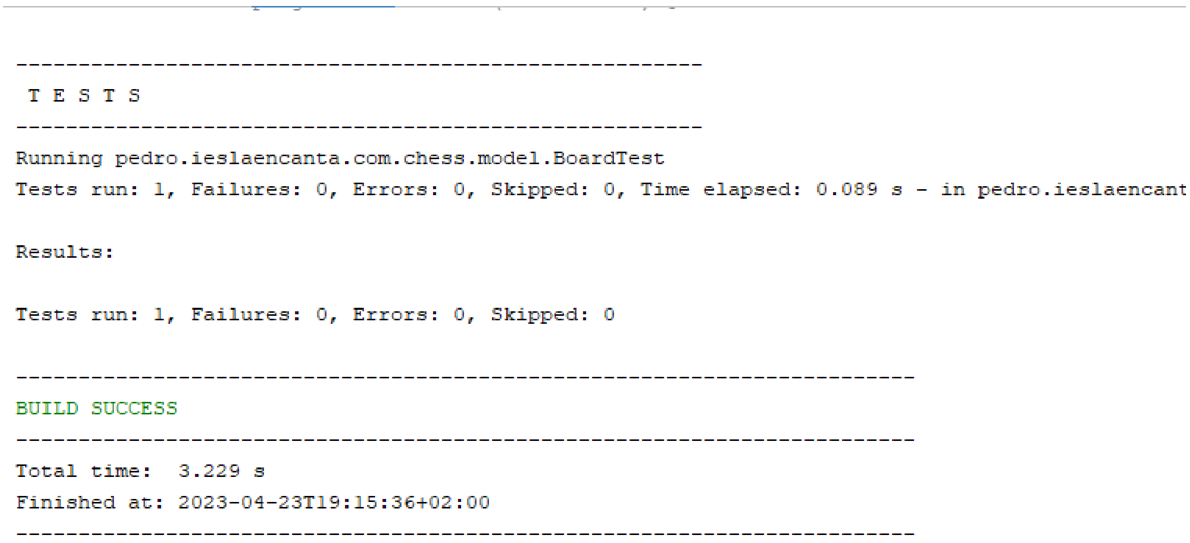
```
    }
    @Test
    public void testGetCell_11d() {
        Board instance = new Board();
        Cell celda = instance.getCell( row: 8,  col
        assertNull( actual: celda);
    }
```

```
Building Chess 1.0-SNAPSHOT
--------------------------------[ jar ]---------------------------------

--- maven-surefire-plugin:2.22.0:test (default-cli) @ Chess ---

-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running pedro.ieslaencanta.com.chess.model.BoardTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.08 s - in pedro.ieslaenca

Results:

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  3.102 s
Finished at: 2023-04-23T20:03:03+02:00
------------------------------------------------------------------------
```



```
    public Cell getCell(int row, int col) {
        if(row>=0 && row<=7 && col>=0 && col<=7){
        return this.cells[row][col];}
        else {
            this.cells=null;
        }
        return null;
    }
```

En caso de assertTrue(celda instanceof Cell); todo funciona bien:

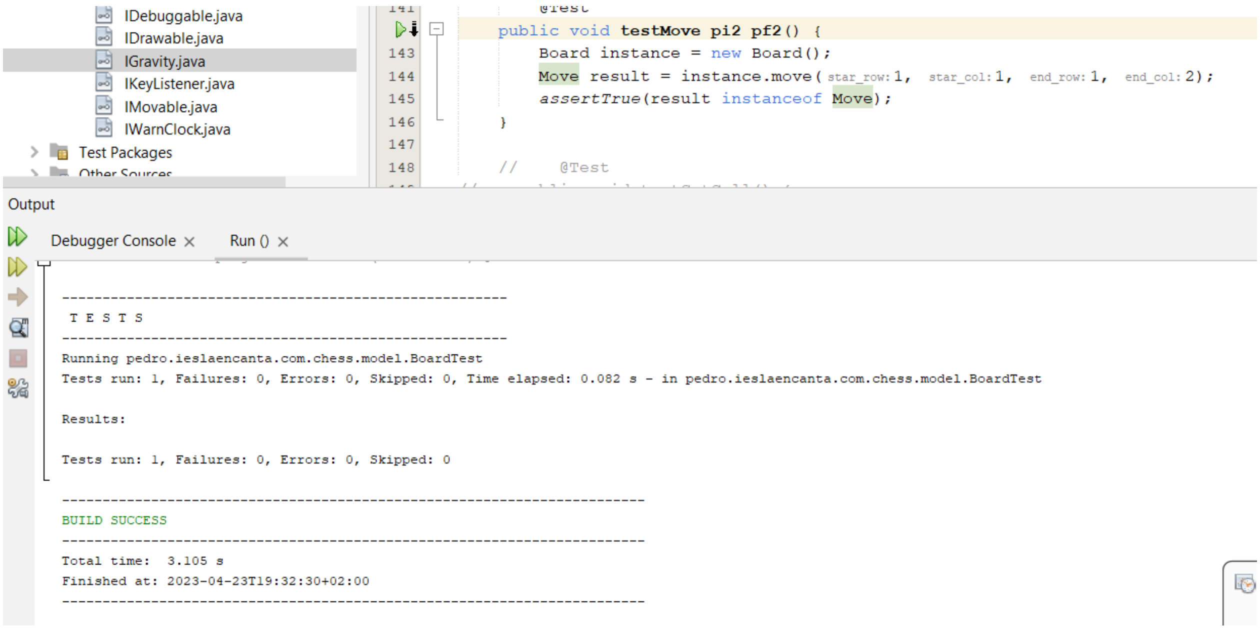


```
------------------------------------------------------
 T E S T S
------------------------------------------------------
Running pedro.ieslaencanta.com.chess.model.BoardTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.089 s - in pedro.ieslaencant

Results:

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  3.229 s
Finished at: 2023-04-23T19:15:36+02:00
------------------------------------------------------------------------
```

Método move de la clase Board:

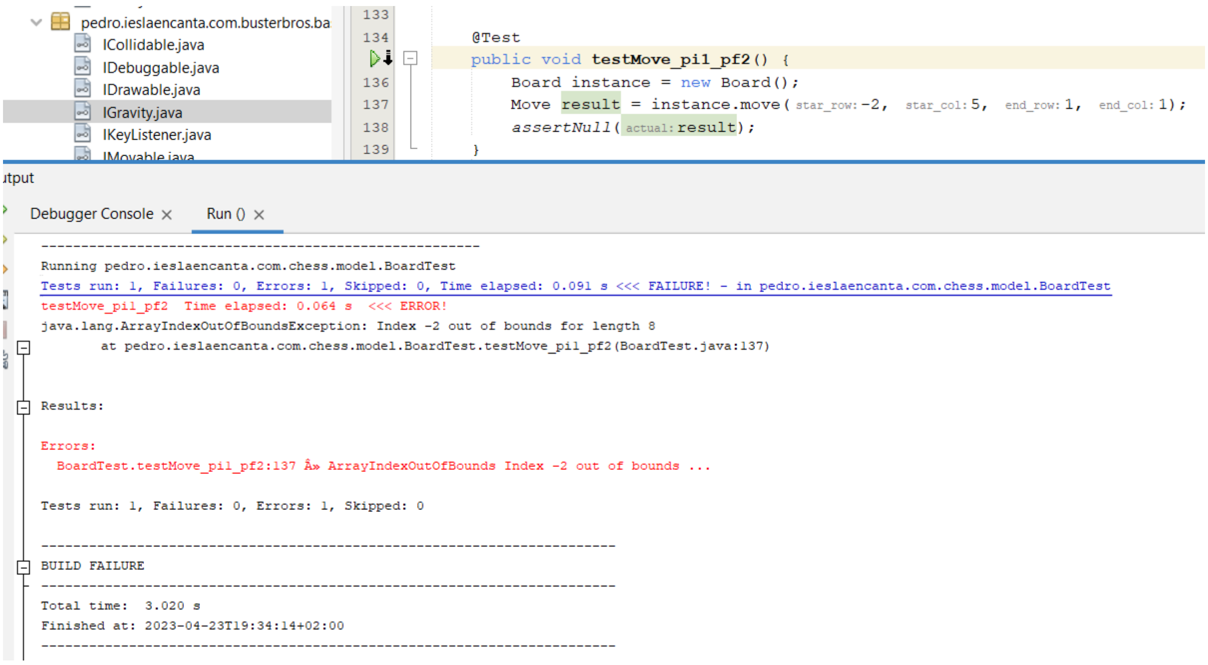
En este método como en el método GetCell:

Todo funciona donde salida-Move, y no funciona donde salida Null.



```
    @Test
    public void testMove pi2 pf2() {
        Board instance = new Board();
        Move result = instance.move( star_row:1,  star_col:1,  end_row:1,  end_col:2);
        assertTrue(result instanceof Move);
    }

//    @Test
```

```
------------------------------------------------------
 T E S T S
------------------------------------------------------
Running pedro.ieslaencanta.com.chess.model.BoardTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.082 s - in pedro.ieslaencanta.com.chess.model.BoardTest

Results:

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  3.105 s
Finished at: 2023-04-23T19:32:30+02:00
------------------------------------------------------------------------
```



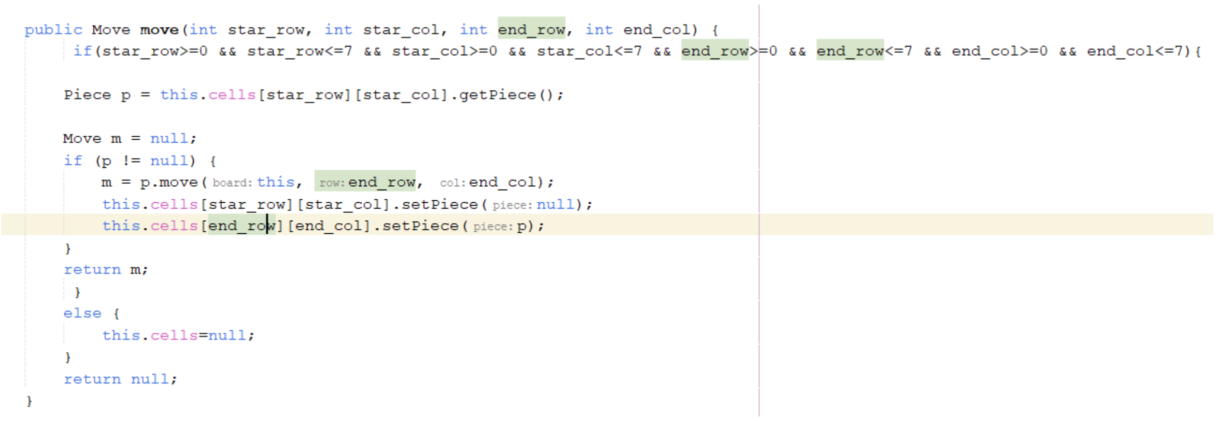
```java
    @Test
    public void testMove_pi1_pf2() {
        Board instance = new Board();
        Move result = instance.move( star_row: -2,  star_col: 5,  end_row: 1,  end_col: 1);
        assertNull( actual: result);
    }
```

```
--------------------------------------------------------
Running pedro.ieslaencanta.com.chess.model.BoardTest
Tests run: 1, Failures: 0, Errors: 1, Skipped: 0, Time elapsed: 0.091 s <<< FAILURE! - in pedro.ieslaencanta.com.chess.model.BoardTest
testMove_pil_pf2  Time elapsed: 0.064 s  <<< ERROR!
java.lang.ArrayIndexOutOfBoundsException: Index -2 out of bounds for length 8
	at pedro.ieslaencanta.com.chess.model.BoardTest.testMove_pil_pf2(BoardTest.java:137)


Results:

Errors: 
  BoardTest.testMove_pil_pf2:137 Â» ArrayIndexOutOfBounds Index -2 out of bounds ...

Tests run: 1, Failures: 0, Errors: 1, Skipped: 0

------------------------------------------------------------------------
BUILD FAILURE
------------------------------------------------------------------------
Total time:  3.020 s
Finished at: 2023-04-23T19:34:14+02:00
------------------------------------------------------------------------
```

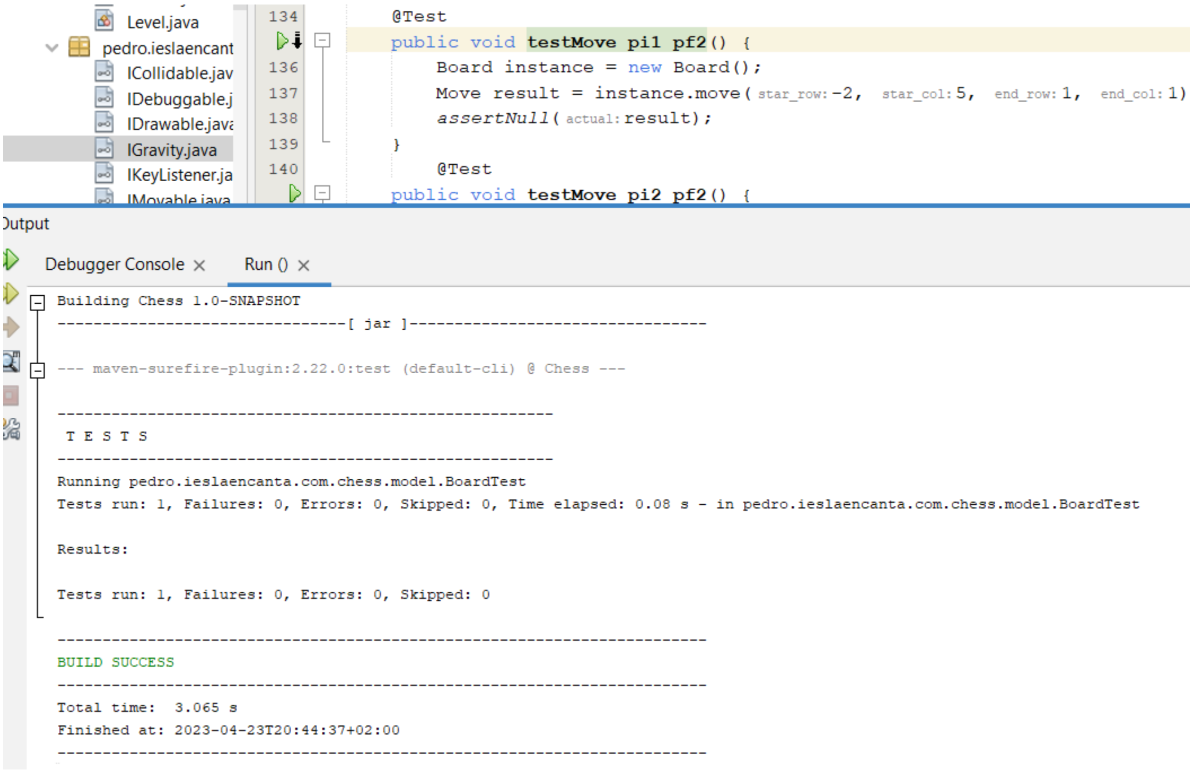
Es método caja negra y no podemos cambiar codigo, pero si cambiamos – todo funciona bien.

Si cambiamos método move- todo funciona bien.

```java
    public Move move(int star_row, int star_col, int end_row, int end_col) {

        if(star_row>=0 && star_row<=7 && star_col>=0 && star_col<=7 && end_row>=0 && end_row<=7 && end_col>=0 && end_col<=7){

        Piece p = this.cells[star_row][star_col].getPiece();

        Move m = null;

        if (p != null) {

            m = p.move(this, end_row, end_col);

            this.cells[star_row][star_col].setPiece(null);

            this.cells[end_row][end_col].setPiece(p);

        }

        return m;

         }
        else {
            this.cells=null;
        }
        return null;
    }
```



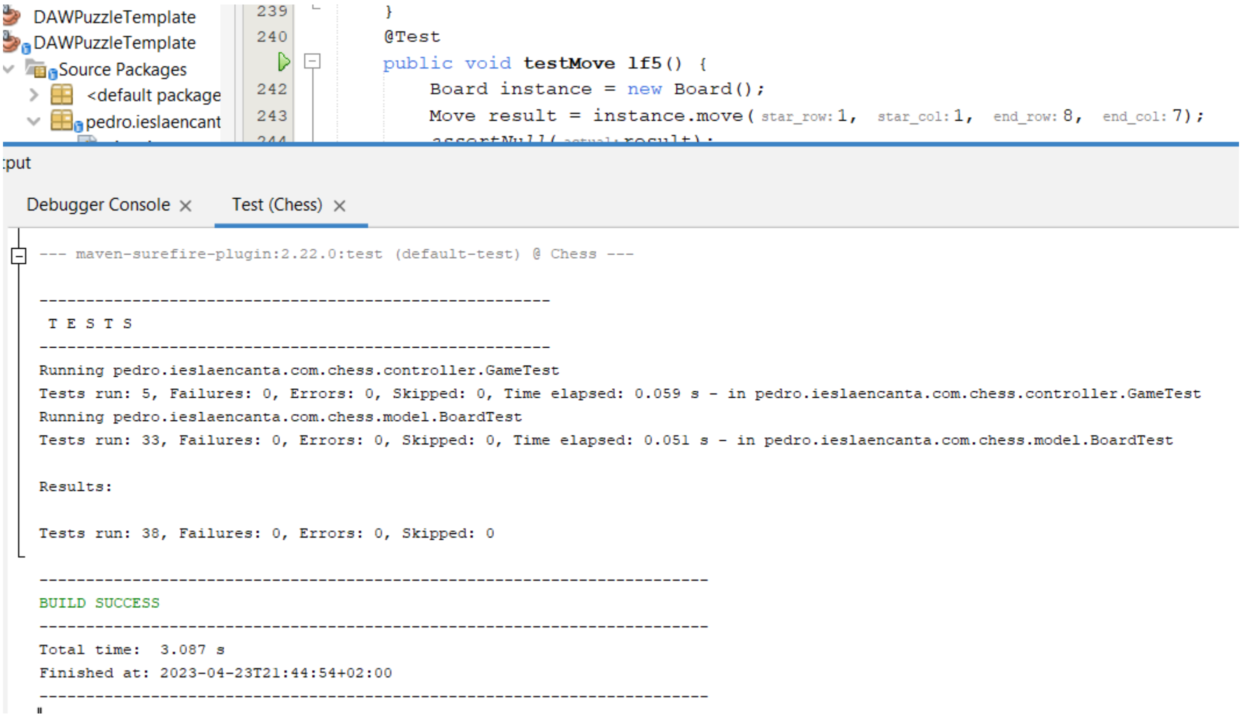
```
public Move move(int star_row, int star_col, int end_row, int end_col) {
    if(star_row>=0 && star_row<=7 && star_col>=0 && star_col<=7 && end_row>=0 && end_row<=7 && end_col>=0 && end_col<=7){

    Piece p = this.cells[star_row][star_col].getPiece();

    Move m = null;
    if (p != null) {
        m = p.move( board: this,  row: end_row,  col: end_col);
        this.cells[star_row][star_col].setPiece( piece: null);
        this.cells[end_row][end_col].setPiece( piece: p);
    }
    return m;
     }
    else {
        this.cells=null;
    }
    return null;
}
```



```
    @Test
    public void testMove pi1 pf2() {
        Board instance = new Board();
        Move result = instance.move( star_row: -2,  star_col: 5,  end_row: 1,  end_col: 1)
        assertNull( actual: result);
    }
        @Test
    public void testMove pi2 pf2() {
```

```
Building Chess 1.0-SNAPSHOT
--------------------------------[ jar ]---------------------------------

--- maven-surefire-plugin:2.22.0:test (default-cli) @ Chess ---

-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running pedro.ieslaencanta.com.chess.model.BoardTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.08 s - in pedro.ieslaencanta.com.chess.model.BoardTest

Results:

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  3.065 s
Finished at: 2023-04-23T20:44:37+02:00
------------------------------------------------------------------------
```

Todos tests funciona bien.



```
}
@Test
public void testMove 1f5() {
    Board instance = new Board();
    Move result = instance.move( star_row: 1,  star_col: 1,  end_row: 8,  end_col: 7);
    assertNull( actual: result);
```

```
--- maven-surefire-plugin:2.22.0:test (default-test) @ Chess ---

-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running pedro.ieslaencanta.com.chess.controller.GameTest
Tests run: 5, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.059 s - in pedro.ieslaencanta.com.chess.controller.GameTest
Running pedro.ieslaencanta.com.chess.model.BoardTest
Tests run: 33, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.051 s - in pedro.ieslaencanta.com.chess.model.BoardTest

Results:

Tests run: 38, Failures: 0, Errors: 0, Skipped: 0

------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  3.087 s
Finished at: 2023-04-23T21:44:54+02:00
------------------------------------------------------------------------
```