

UNIVERSITÄT BERN

P2 - Lab 05

Assignment 04

Was your code testable? (did you change it?)

```
@Test
public void moveDown3() {
    turtle.move(new Down(3), board);

    assertTrue(board[0][1]);
    assertTrue(board[0][2]);
    assertTrue(board[0][3]);
    assertFalse(board[0][4]);
}
```

what about board[0][5]?

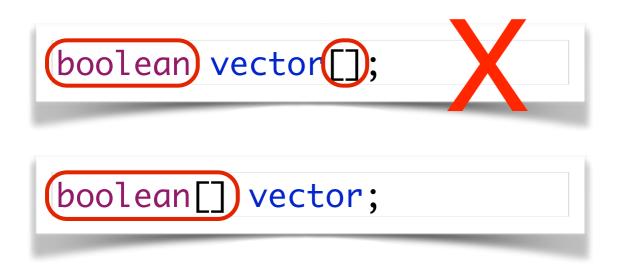
```
@Test
public void moveDown3() {
    turtle.move(new Down(3), board);
    assertTrue(board[0][1]);
    assertTrue(board[0][2]);
    assertTrue(board[0][3]);
    for(int i=4; i<100; i++)
       assertFalse(board[0][i]);
    for(int i=1; i<100; i++)
      for(int j=0; j<100; j++) {
         assertFalse(board[i][j]);
```

Can we do better?

```
@Test
public void moveDown3() {
   turtle.move(new Down(3), board);

   expectedBoard = new boolean[100][100];
   expectedBoard[0][1] = true;
   expectedBoard[0][2] = true;
   expectedBoard[0][3] = true;

   assertArrayEquals(expectedBoard, board);
}
```



Keep the declaration of the type in one place

```
boolean board[][];

boolean[] board[];

boolean[][] board;
```

```
int distance = Integer.parseInt("0");

int distance = 0;

int distance;
```

Variables of type 'int' are by default initialized with 0

```
board = new boolean[size][size];
for (int i = 0; i < size; i++){
    for(int j = 0; j < size; j++){
        this.board[i][j] = false;
    }
}</pre>
```

```
board = new boolean[size][size];
```

Boolean variables default to false

All primitive types have a default value

```
if (direction.equals(""))
  throw new ParserException("Empty command");
if (steps == 0)
  throw new ParserException("Missing steps");
if (direction.equals("right") && (steps + colTurtle > 99))
  throw new TurtleOutOfBoardException("right", steps + colTurtle);
if (direction.equals("down") && (steps + rowTurtle > 99))
  throw new TurtleOutOfBoardException("down", steps + rowTurtle);
if (direction.equals("left") && (steps - colTurtle < 0))
  throw new TurtleOutOfBoardException("left", steps - colTurtle);
if (direction.equals("up") && (steps - rowTurtle < 0))
  throw new TurtleOutOfBoardException("up", steps - rowTurtle);</pre>
```

Complex boolean conditions are hard to follow

```
try {
    moveRelative(move);
} catch (Exception e) {}
```

```
try {
    moveRelative(move);
} catch (TurtleOutOfBoardException e) {
    e.printTrace();
}
```

It's bad practice to catch 'Exception'
It will catch everything (NullPointerException)

Do not swallow exceptions without handling them

```
private void checkBounds(){
   if(x + dx < 0) xEnd = 0;
   else if(x + dx > 99) xEnd = 99;
   else xEnd = x + dx;

   if(y + dy < 0) yEnd = 0;
   else if(y + dy > 99) yEnd = 99;
   else yEnd = y + dy;
}
```

Avoid 'Magic numbers'

Avoid 'Magic constants'

```
public final static int NINETY_NINE = 100;
```

== vs. equals

```
String command1 = new String("down");
String command2 = new String("down");

System.out.println( command1 == command2 );
System.out.println( command1.equals(command2) );

true
```

Use 'equals' to compare String object. 'equals' tests equality.

'==' test the identity of objects

```
String command1 = "down";
String command2 = "down";

System.out.println( command1 == command2 );
System.out.println( command1.equals(command2) );

true
```

String literals are reused: command1 and command 2 represent the same object

```
public class Point {
    private int x;
    private int y;

public Point(int x, int y) {
        this.x = x;
        this.y = y;
    }
}
```

```
Point p1 = new Point(0, 0);
Point p2 = new Point(0, 0);
```

'new' always creates a new object

```
p1 == p2
```

'==' tests if p1 and p2 represent the same object

```
false
p1.equals(p2)
```

the default implementation of 'equals' tests if p1 and p2 are the same object

```
Point p1 = new Point(0, 0);
public class Point {
                                       Point p2 = new Point(0, 0);
   private int x;
   private int y;
                                                              false
   public Point(int x, int y) {
                                                 p1 == p2
       this.x = x;
       this.y = y;
                                                              true
   @Override
                                                 p1.equals(p2)
   public boolean equals(Object anObject) {
       if (anObject == null)
          return false;
       if (getClass() != anObject.getClass())
           return false;
       Point other = (Point) anObject;
       return (x == other.x) && (y == other.y);
```

Most collections from Java use equals to search for elements

```
public class Point {
   private int x;
   private int y;
   private Color color;)
   public Point(int x, int y, Color color) {
       this.x = x;
       this.y = y;
      (this.color = color;)
   @Override
   public boolean equals(Object anObject) {
       if (anObject == null)
          return false;
       if (getClass() != anObject.getClass())
          return false;
       Point other = (Point) anObject;
       return (x == other.x) && (y == other.y);
```

```
Point p1 = new Point(0, 0, Color.WHITE);
Point p2 = new Point(0, 0, Color.BLACK);
```

```
p1.equals(p2)
```

Depending on what the object represents we might not want to compare all instance variables



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