

### 3 Lab 2: Category-Partition and Boundary Values

Many testing approaches are based on partitioning the data set into categories, focusing on domain boundaries, and selecting appropriate combinations of inputs, as explained in Chapters 10 of Binder. In this exercise we will build up some experience with these techniques, and learn how to test methods using them. To that end, we will be building and testing an implementation for the `Board.withinBorders(x, y)` method, which simply checks that the `x` and the `y` integer values fall within the borders (width `x` height) of the board, i.e.  $0 \leq x < \text{width}$ ,  $0 \leq y < \text{height}$ .

Our approach follows the approach from Binder, p419-426

**Exercise 16** *List at least three possible errors that an implementor of this method could make.*

**Exercise 17** *Identify representative categories of values for the inputs of this unit.*

**Exercise 18** *Identify representative choices (specific test values) for these classes.*

Parameter	Category	Choices
x	n-th element	n=2
	...	...
[par.2]	...	...
[par.3]	...	...

Table 1: Categories and choices (Binder Table 10.9).

**Exercise 17** *Next, generate the full test case specifications. This will yield a table like Table 10.10, p.424.*

TestCase	Function Input/Choices par.1	par.2	par.X	Expected Result Returned	Exception	Other Status?
1	x=2	y=2	...	...	...	...
2	...	...	...	...	...	...

Table 2: Test Suite

**Exercise 18** *Implement your test case specs into the `BoardTest` class and run the test suite.*

**Exercise 19** *Actually implement the `withinBoarders` method. Then re-run the test suite. Inspect code coverage results, and explain your findings.*

**Exercise 20** *Would your test suite reveal all faults you proposed in Exercise 14? If not, explain why the category-partition approach missed it, and add appropriate test cases separately to your JUnit implementation.*

**Exercise 21** *Repeat steps Exercises 16-20 for the method `Game.addGuestFromCode(char code, int x, int y)`. Try to hit the asserts. How many test cases do you end up with?*

**Exercise 22** *Imagine a more complex Board and an additional parameter that describes the shape of the Guest (likely to occupy multiple cells). How does a category partitioning approach scale?*