

The answers to the following five questions. For question (1), Explain if there is a fault. For others, give the input, expected(correct) output, and actual output

(1) Is there a fault in the program? If so, locate it.

There is a fault in the program in the line “if (x[i] >= 0)”. Since the purpose of the function is to return the number of positive elements (or throw a NullPointerException), the if statement incorrectly identifies positive numbers as it's supposed to do. It should be changed to “if (x[i] > 0)” or “if (x[i] >= 1)” (since they're all ints).

(2) If possible, define a test case that does not execute the fault.

Input	Expected (correct) Output	Actual Output
X = null	NullPointerException	NullPointerException

Since we will get the NullPointerException error before the problematic line, the fault is never executed.

(3) If possible, define a test case that executes the fault but does not result in an error state.

Input	Expected (correct) Output	Actual Output
X = {1, 2, 3, 4, 5}	5	5

Since all of the numbers are greater than 0, this does not result in an error state.

(4) If possible, define a test case that results in an error, not failure.

Input	Expected (correct) Output	Actual Output
X = {"abc", "def", "t"}	IllegalArgumentException	IllegalArgumentException

If the input X is not a list of ints, it will error as its passed into the function. Outside of that, there shouldn't be anything major.

(5) If possible, define a test case that results in failure.

Input	Expected (correct) Output	Actual Output
X = {0, 0, 8, 7, 2, 4}	4	6

When X is a list of ints that contains 0s, they are incorrectly counted as positive. This results in a failure.