

CITS5501 Software Testing and Quality Assurance

Semester 1, 2022

Week 3 workshop – ISP

1. Binary search

Consider the Javadoc documentation and signature for the following Java method, which searches inside an array of `chars` for a particular value.

(Adapted from the Android version of the Java standard library.)

```
1  /**
2   * Performs a binary search for @code value in the ascending sorted
3   * array @code array, in the range specified by fromIndex (inclusive)
4   * and toIndex (exclusive). Searching in an unsorted array has an
5   * undefined result. It's also undefined which element is found if there
6   * are multiple occurrences of the same element.
7   *
8   * @param array the sorted array to search.
9   * @param startIndex the inclusive start index.
10  * @param endIndex the exclusive start index.
11  * @param value the element to find.
12  * @return the non-negative index of the element, or a negative index
13  *         which is <code>-index - 1</code> where the element would be
14  *         inserted.
15  * @throws IllegalArgumentException if <code>startIndex > endIndex</code>
16  * @throws ArrayIndexOutOfBoundsException if
17  *         <code>startIndex < 0 || endIndex > array.length</code>
18  * @since 1.6
19  */
20 public static int binarySearch(char[] array, int startIndex, int endIndex,
    ↪ char value)
```

Discuss how you would go about creating tests using Input Space Partitioning.

- What steps are involved?
- What is the input domain?
- what characteristics and partitions would you use?

2. Stack class

Suppose we have a `Stack` class that stores `ints`, with the following method signatures:

- `public IntStack ();`
- `public void push (int i);`
- `public int pop (); /** Throws an exception if empty */`
- `public boolean isEmpty()`

Assume the object state consists of an `int` array.

- a. If we wanted to model `push` as a function, what sort of function would we use? How about `pop`?
- b. Identify all the parameters for the `pop` method, and suggest some characteristics that can be used to partition the input space.

3. Requirements

Consider the following, each of which is supposed to be a system requirement. Discuss with a partner – do you think it would be straightforward to write tests for them? If not, why not?

- a. The flight booking system should be easy for travel agents to use.
- b. The `int String.indexOf(char ch)` method should return a `-1` if `ch` does not appear in the receiver string, or the index at which it appears, if it does.
- c. Internet-aware Toast-O-Matic toasters should have a mean time between failure of 6 months.