

## Week 5 submission work:

Trace the partition function discussed in lectures for the array

$$A = \{27, 38, 12, 39, 27, 16\}.$$

After each iteration of the loop check that the invariant is true.

Initialisation of function partition(a, 0, a.length):

p

∨

27	unknown
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During iteration:

1.

p

∨

<-----S1-----><-----S2-----><-----unknown----->

27		38	???
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The Invariant is still true here as anything from LastS1 + 1 -> firstunknown - 1 is still bigger than 27 or equal to it.

2.

p

∨

<-----S1-----><-----S2-----><-----unknown----->

27	12	38	???
----	----	----	-----

The Invariant is still true as a[first+1...LastS1] are all < 27

3.

p

∨

<-----S1-----><-----S2-----><-----unknown----->

27	12	38, 39	???
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The Invariant is still true as [12]<27<=[38,39]

4.

p

∨

<-----S1-----><-----S2-----><-----unknown----->

27	12	38,39,27	???
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The Invariant is still true as [12]<27<=[38,39,27]

5.

p

∨

<-----S1-----><-----S2-----><-----unknown----->

27	12,16	38,39,27	???
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The Invariant is still true as [12,16]<27<=[38,39,27]

Post iteration:

p

<-----S1----->

∨

<-----S2----->

12,16	27	38,39,27
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Post Condition Invariant also remains true for the same reasoning as step 5 of the iteration