

fn partition_point_mut

Michael Shoemate

September 18, 2025

1 Hoare Triple

Precondition

Compiler-verified

Types consistent with pseudocode.

Caller-verified

- `x` must be partitioned by `pred`.
- `pred` may mutate its argument, but not change its true value used for comparisons.

Pseudocode

```
1 def partition_point_mut(  
2     x: list[T],  
3     pred: Callable[[T], bool],  
4 ) -> usize:  
5     return binary_search_by_mut(x, lambda x_i: "less" if pred(x_i) else "greater")
```

Postcondition

Theorem 1.1. Returns the index of the partition point according to the given predicate (the index of the first element of the second partition), or an error if the predicate fails.

Proof. By the postcondition of `binary_search_by_mut`, the return value is the index of the first element that changes the comparison from `Less` to `Greater`.

By the definition of the comparator, this is also the index of the first element of the second partition. \square