Test Report

Student: Đặng Quốc Khánh
ID: 18020696

File under test:
https://github.com/AllAlgorithms/python/blob/master/algorithms/searches/interpolation_search.py
Function under test: interpolation_search()

I. Source Code

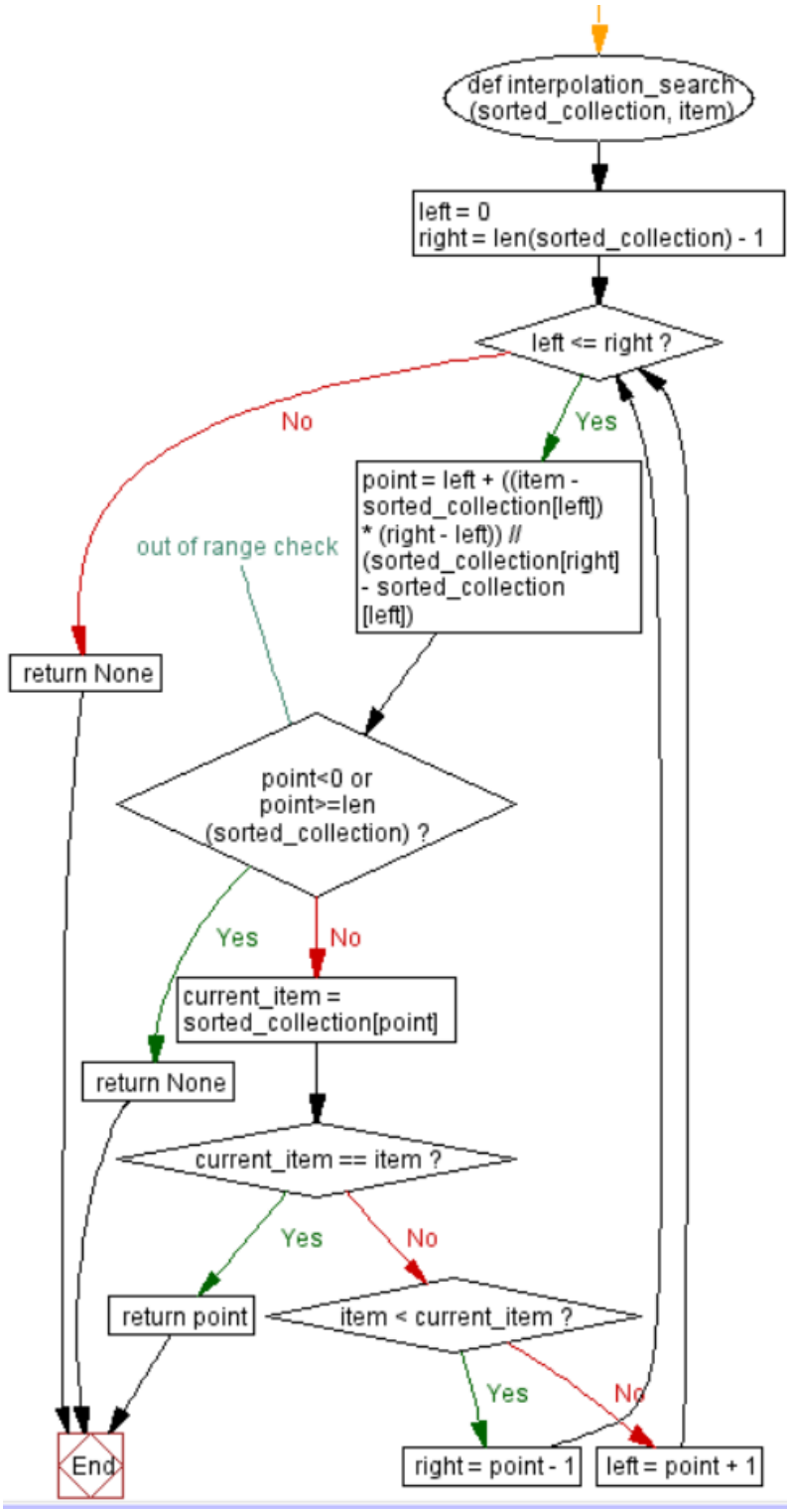
```python
def interpolation_search(sorted_collection, item):
    left = 0
    right = len(sorted_collection) - 1

    while left <= right:
        point = left + ((item - sorted_collection[left]) * (right - left)) // (sorted_collection[right] - sorted_collection[left])

        #out of range check
        if point<0 or point>=len(sorted_collection):
            return None

        current_item = sorted_collection[point]
        if current_item == item:
            return point
        else:
            if item < current_item:
                right = point - 1
            else:
                left = point + 1
    return None
```

II. Flow Graph



III. MCC Coverage Testcases

Line 9:

Path	point < 0	point >= len(sorted_ collection)	Test case	Expected Output	Result
Start → 5 → 9 → End	T	T	Không xảy ra		
Start → 5 → 9 → End	F	T	sorted_collection = [2, 5, 7, 8] item = [12]	None	Pass
Start → 5 → 9 → End	T	F	sorted_collection = [2, 5, 7, 8] item = [0]	None	Pass
Start → 5 → 9 → 13 → End	F	F	sorted_collection = [2, 5, 7, 8] item = [5]	1	Pass

Line 13:

Path	current_item == item	Test case	Expected Output	Result
Start → 5 → 9 → 13 → End	T	sorted_collection = [3, 6, 12, 14, 17] item = [12]	2	Pass
Start → 5 → 9 → 13 → 15-16 → … → End	F	sorted_collection = [3, 6, 12, 14, 17] item = [6]	1	Pass

Line 16:

Path	item < current_item	Test case	Expected Output	Result
Start → 5 → 9 → 13 → 15-16 → 17 → 9 → 13 → End	T	sorted_collection = [3, 6, 12, 14, 17] item = [10]	None	Test case không hiện ra kết quả (Có thể do vòng lặp while vô hạn)
Start → 5 → 9	F	sorted_collection	1	Pass

→ 13 → 15-16 → 18 –> 9 → 13 → End		= [3, 6, 12, 14, 17] item = [6]		

IV. All-DU Path Coverage Testcases

All-DU Path for sorted_collection:

Path	Test case	Expected Output	Result
Start → 2 → 3	sorted_collection = [2, 5, 7, 8] item = [12]	None	Pass
Start → 2 → 3 → 5 → 6	sorted_collection = [2, 5, 7, 8] item = [0]	None	Pass
Start → 2 → 3 → 5 → 6 → 9	sorted_collection = [2, 5, 7, 8] item = [5]	1	Pass
Start → 2 → 3 → 5 → 6 → 9 → 12	sorted_collection = [3, 6, 12, 14, 17] item = [12]	2	Pass

All-DU Path for item:

Path	Test case	Expected Output	Result
Start → 2 → 3 → 5 → 6	sorted_collection = [2, 5, 7, 8] item = [5]	1	Pass
Start → 2 → 3 → 5 → 6 → 9 → 12 → 13	sorted_collection = [3, 6, 12, 14, 17] item = [6]	1	Pass
Start → 2 → 3 → 5 → 6 → 9 → 12 → 13 → 15-16	sorted_collection = [5, 7, 11, 15, 19] item = [15]	3	Pass