Test Report

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Code: https://github.com/TheAlgorithms/Python/blob/master/sorts/iterative_merge_sort.py

Function under the test: iter_merge_sort()

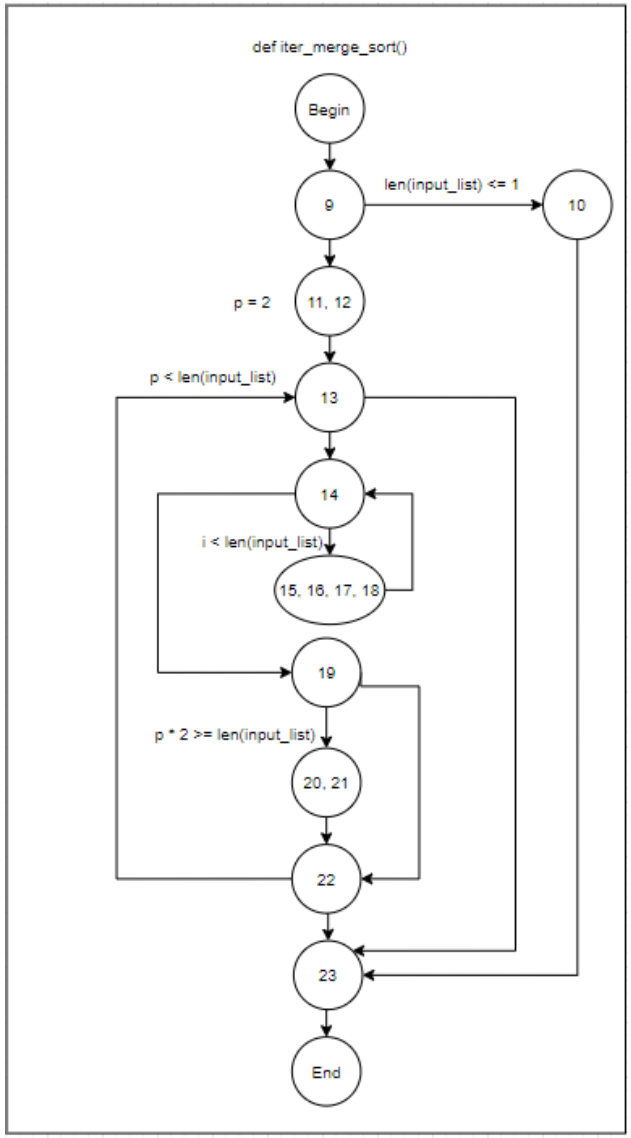
Purpose: Using merge sort to sort an array.

Source code

Line	Code
1	`def merge(input_list: list, low: int, mid: int, high: int) -> list:`
2	`    result = []`
3	`    left, right = input_list[low:mid], input_list[mid : high + 1]`
4	`    while left and right:`
5	`        result.append((left if left[0] <= right[0] else right).pop(0))`
6	`    input_list[low : high + 1] = result + left + right`
7	`    return input_list`
8	`def iter_merge_sort(input_list: list) -> list:`
9	`    if len(input_list) <= 1:`
10	`        return input_list`

```
11      input_list = list(input_list)
12      p = 2
13      while p < len(input_list):
14          for i in range(0, len(input_list), p):
15              low = i
16              high = i + p - 1
17              mid = (low + high + 1) // 2
18              input_list = merge(input_list, low, mid, high)
19          if p * 2 >= len(input_list):
20              mid = i
21              input_list = merge(input_list, 0, mid, len(input_list) - 1)
22          p *= 2
23      return input_list
```

Graph


def iter_merge_sort()
Begin
9
len(input_list) <= 1
10
p = 2
11, 12
p < len(input_list)
13
14
i < len(input_list)
15, 16, 17, 18
19
p * 2 >= len(input_list)
20, 21
22
23
End

Find all path and corresponding equation:

Id	Path	Equations	Solution	Test case
1	Begin → 9 → 10 → 23 → End	len(input_list) ≤ 1	len(input_list) ∈ [0, 1]	[1]
2	Begin → 9 → 11,12 → 13 → 23 → End	1 < len(input_list) ≤ 2	len(input_list) ∈ [2]	[1, 2] [2, 1]
3	Begin → 9 → 11,12 → 13 → 14 → 19 → 22 → 23 → End	2 < len(input_list) 0 ≥ len(input_list)	No solution	No test sastifies these conditions.
4	Begin → 9 → 11, 12 → 13 → 14 → 15,16,17,18 → 14 → 19 → 22 → 23 → End	2 < len(input_list) 0 < len(input_list) 4 < len(input_list) 4 ≥ len(input_list)	No solution	No test sastifies these conditions.
5	Begin → 9 → 11, 12 → 13 → 14 → 15,16,17,18 → 14 → 19 → 20, 21 → 22 → 23 → End	2 < len(input_list) 0 < len(input_list) len(input_list) ≤ 4	len(input_list) ∈ [3, 4]	[1, 2, 3] [2, 1, 3] [1, 2, 3, 4] [4, 3, 2, 1]
6	Begin → 9 → 11, 12 → 13 → 14 → 15,16,17,18 → 14 → 19 → 20, 21 → 22 → 13 → …	2 < len(input_list) 0 < len(input_list) len(input_list) ≤ 4 len(input_list) > 4	No solution	No test sastifies these conditions.

7	Begin → 9 → 11, 12 → 13 → 14 → 15,16,17,18 → 14 → 19 → 22 → 13 → …	2 < len(input_list) 0 < len(input_list) len(input_list) > 4	len(input_list) ∈ [5, ∞)	[5, 4, 3, 2, 1]

Test cases

ID	Input	Expected output	Actual output	Result
1	[1]	[1]	[1]	True
2	[2, 1]	[1, 2]	[2, 1]	False
3	[2, 1, 3]	[1, 2, 3]	[1, 2, 3]	True
4	[4, 3, 2, 1]	[1, 2, 3, 4]	[1, 2, 3, 4]	True
5	[5, 4, 3, 2, 1]	[1, 2, 3, 4, 5]	[1, 2, 3, 4, 5]	True
6	[‘c’, ‘b’, ‘a’]	[‘a’, ‘b’, ‘c’]	[‘a’, ‘b’, ‘c’]	True
7	[0.3, 0.2, 0.1]	[0.3, 0.2, 0.1]	[0.1 , 0.2, 0.3]	True
8	['dep', 'dang', 'trai']	['dang', 'dep', 'trai']	['dang', 'dep', 'trai']	True