

86. Median of medians

Program:

```
def median_of_medians(arr):
    n = len(arr)
    if n <= 5:
        return sorted(arr)[n // 2]

    sublists = [arr[i:i + 5] for i in range(0, n, 5)]
    medians = [sorted(sublist)[len(sublist) // 2] for sublist in sublists]

    pivot = median_of_medians(medians)

    low = [x for x in arr if x < pivot]
    high = [x for x in arr if x > pivot]

    k = len(low)

    if n < 2 * k:
        return median_of_medians(low)
    elif n > 2 * k:
        return median_of_medians(high)
    else:
        return pivot
```

Example

```
arr = [3, 6, 2, 9, 1, 5, 7, 8, 4]
print(median_of_medians(arr)) # Output: 5
```

Output:

4

=== Code Execution Successful ===

Time complexity:

$O(n)$