

LAB № 4

Instructions

1. Please write the code for the problems in python language in Jupyter notebook
2. The code should be readable with variables named meaningfully
3. Plagiarism is unacceptable and we have ways to find it. So do not do it.
4. Follow the instructions and define the methods/functions as given in the problem statement.
5. Write test cases wherever required so that they cover all scenarios.

Problem 1

Given an list with n elements. Write a python method which takes this list as input , index $i(< n)$, index $j(< n)$ and returns the element which is minimum between the two indices(including both the indices). Your solution should run in $O(\sqrt{n})$ complexity.

For example this is the list [70, 78, 69, 96, 19, 68, 54, 60]

if $i = 1$ and $j = 5$, then minimum element is 19

if $i = 5$ and $j = 7$, then minimum element is 54

if $i = 0$ and $j = 2$ then minimum element is 69

Approach through dry run

1. Let say nums is the list and there 19 elements in it.
2. $\sqrt{19}$ is approximately 4 (round off the number)
3. Create another list queryList which stores minimum of every 4 elements in this way
4. $\text{queryList}[0] = \text{minimum}(\text{nums}[0], \text{nums}[1], \text{nums}[2], \text{nums}[3])$, $\text{queryList}[1] = \text{minimum}(\text{nums}[4], \text{nums}[5], \text{nums}[6], \text{nums}[7])$, $\text{queryList}[2] = \text{minimum}(\text{nums}[8], \text{nums}[9], \text{nums}[10], \text{nums}[11])$ and so on ...
5. If $i = 2$ and $j = 15$, then you should return $\text{minimum}(\text{nums}[2:3], \text{queryList}[1], \text{queryList}[2], \text{nums}[13, 14, 15])$
6. In the above example left side elements are $\text{nums}[2], \text{nums}[3]$

7. Right side elements are nums[13], nums[14], nums[15]

8. Query List Elements are queryList[1], queryList[2], queryList[2]

Write the code as below printing the left , query list elements, right elements and the minimum value.

```
1 def find_minimum_in_range(num_list, i, j):
2     '''Your code
3         comes here'''
4     print("Left Side of the elements are:")
5     print("Query List Elements are :")
6     print("Right Side Elements are:")
7     print("Minimum Value:")
8     return
```
