Ministry of Education and Science of Ukraine

National Technical University of Ukraine

«Kyiv Polytechnic Institute. Igor Sikorsky »

Faculty of Informatics and Computer Technologies

Department of Computer Engineering

LAB № 3

from the discipline "Theory of Algorithms"

on the topic «Quick sort method»

PERFORMED BY:

1st year student

group ІП-93

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The credit - 9312

Variant – 12

CHECKED:

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c.t.s.,s.r.

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**TASK**

**Goal:**

implementation of three modifications of the Quick Sort algorithm and comparison of their performance.

**Option task:**

Implement three modifications of the Quick Sort algorithm and compare their performance. The speed of the algorithms is compared on the basis of counting the number of comparisons of the array elements during the operation of the algorithms.

**CODE**

**let** swaps **=** 0

**const** qsort **=** **(**arr**)** **=>** **{**

**if** **(**arr**.**length **<** 2**)** **{**

**return** arr**;**

**}** **else** **{**

// Pivot position. Can be set by 3 methods

**const** pivotPosition **=** 0**;** // First element

// const pivotPosition = Math.floor(Math.random() \* arr.length); // Middle element

// const pivotPosition = arr.length-1; // Last element

**const** pivot **=** arr**[**pivotPosition**];**

// Elements less or equivalent than the pivot

**const** less **=** arr**.**filter**((**value**,** index**)** **=>** **{**

**const** isPivot **=** index **===** pivotPosition**;**

**return** **!**isPivot **&&** **(**value **<=** pivot**);**

**});**

// Elements less or equivalent than the pivot

**const** greater **=** arr**.**filter**(**value **=>** value **>** pivot**);**

// Counting swaps

swaps **+=** less**.**length **+** greater**.**length

**return** **[...**qsort**(**less**),** pivot**,** **...**qsort**(**greater**)];**

**}**

**};**

**const** arr **=** **[**1**,** 213**,** 3**,** 5**,** 2**,** 8**,** 7**];**

console**.**log**(**qsort**(**arr**));**

console.log(swaps);

**RESULTS OF THE PROGRAM WORK**

The input array is = [1, 213, 3, 5, 2, 8, 7].

Output array: = [1, 2, 3, 5,7, 8, 213]. Swaps = 18

**CONCLUSIONS**

I got acquainted with the topic of laboratory work.

Have acquired relevant work skills.

An appropriate test program has been developed.

The running time of the sorting algorithm depends on the balance characterizing the partition. Balance, in turn, depends on which element is selected as the reference (relative to which element is being partitioned)