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 № 1

from the discipline "Theory of Algorithms"

on the topic «Development of algorithms. Sort by inclusion»

PERFORMED BY:

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**TASK**

**Goal:**

creating an insertion sort algorithm.

**Option task:**

Modify the insertion sort algorithm for the next task.

Incoming data. An array of integers: A = [30, 19, 9, 15, 55, 24, 3, 78, 46, 41].

Output data. An array of numbers A, sorted this way: first, all the even numbers are in ascending order and then all odd numbers are in descending order.

**CODE**

# Input array

arr **=** **list(map(int,** **input().**split**(**', '**)))**

arr\_even **=** **list()**

arr\_odd **=** **list()**

**def** check\_elements**(**arr**):**

**for** element **in** arr**:**

**if** element **%** 2 **==** 0**:**

arr\_even**.**append**(**element**)**

**else:**

arr\_odd**.**append**(**element**)**

# # Function to do insertion sort

**def** insertionSort**(**arr**):**

**for** i **in** **range(**1**,** **len(**arr**)):**

key **=** arr**[**i**]**

# Move elements of arr[0..i-1], that are

# greater than key, to one position ahead

# of their current position

j **=** i**-**1

**while** j **>=** 0 **and** key **<** arr**[**j**]** **:**

arr**[**j **+** 1**]** **=** arr**[**j**]**

j **-=** 1

arr**[**j**+**1**]** **=** key

# Select elements in two arrays

check\_elements**(**arr**)**

# Sort itself

insertionSort**(**arr\_even**)**

insertionSort(arr\_odd)

# Reverse array for task

arr\_odd.reverse()

#Output data

print(arr\_even + arr\_odd)

**RESULTS OF THE PROGRAM WORK**

The input array is A = [-5, 3, 4, -10, -1, -3, -9, -4, -5, 8, -3, -10, 3, 5, -3, -6, 5, 5, 10, 6].

Output array: A = [-10, -10, -6, -4, 4, 6, 8, 10, 5, 5, 5, 3, 3, -1, -3, -3, -3, -5, -5, -9].

**CONCLUSIONS**

I got acquainted with the topic of laboratory work.

Have acquired relevant work skills.

An appropriate test program has been developed.

The results of the successful operation of the test program above confirm the correctness of the chosen decisions, the ultimate goal of the work is achieved.