

CDAC-Mumbai

Subject: Coding Challenge

Date:18-09-2024

Total Marks:5

Time duration: 1:30hrs.

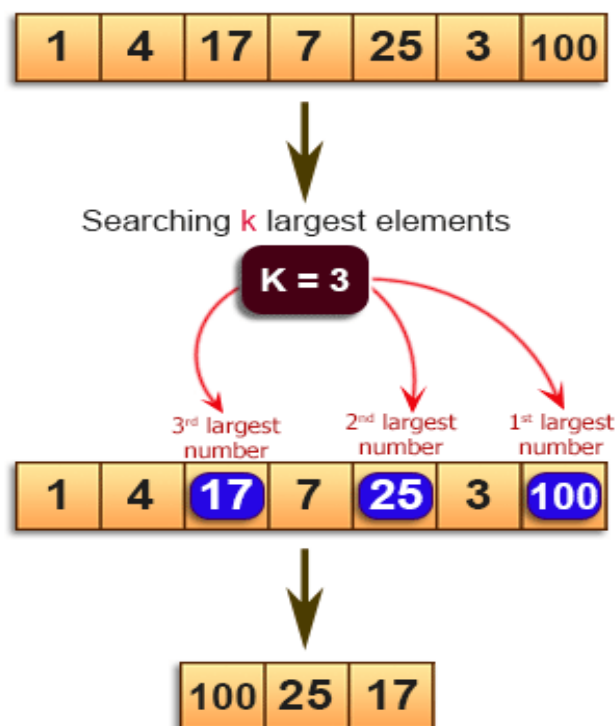
Batch: Aug-24

1. Write a Java program to prove that Euclid's algorithm computes the greatest common divisor of two positive given integers. [1 Marks]

"The Euclidean algorithm is based on the principle that the greatest common divisor of two numbers does not change if the larger number is replaced by its difference with the smaller number. For example, 21 is the GCD of 252 and 105 (as $252 = 21 \times 12$ and $105 = 21 \times 5$), and the same number 21 is also the GCD of 105 and $252 - 105 = 147$. Since this replacement reduces the larger of the two numbers, repeating this process gives successively smaller pairs of numbers until the two numbers become equal. When that occurs, they are the GCD of the original two numbers. By reversing the steps, the GCD can be expressed as a sum of the two original numbers each multiplied by a positive or negative integer, e.g., $21 = 5 \times 105 + (-2) \times 252$. The fact that the GCD can always be expressed in this way is known as Bézout's identity."

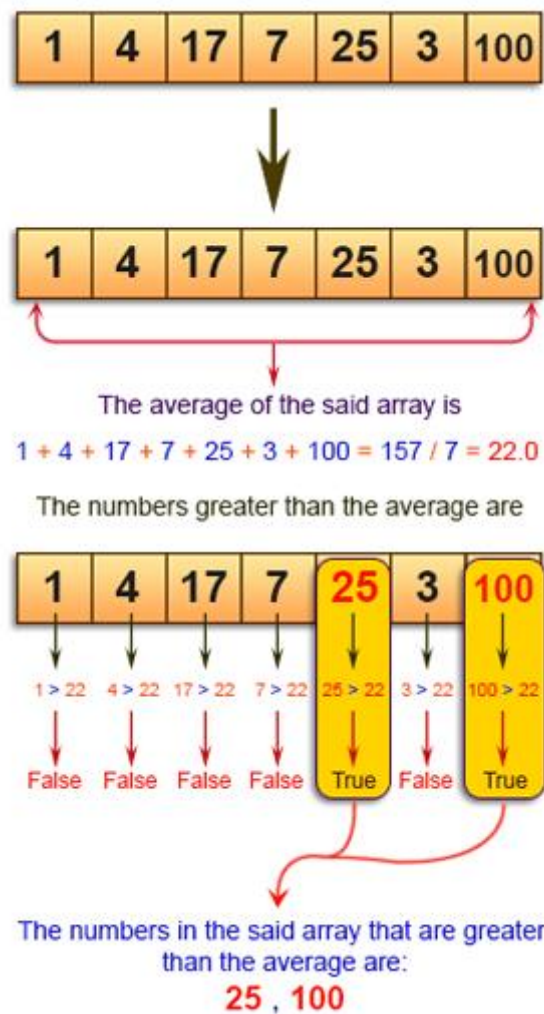
2. Write a Java program to find the k largest elements in a given array. Elements in the array can be in any order (Use scanner class to input and Array, below picture is example do not make static array as represented in example). [1 Mark]

Pictorial Presentation:



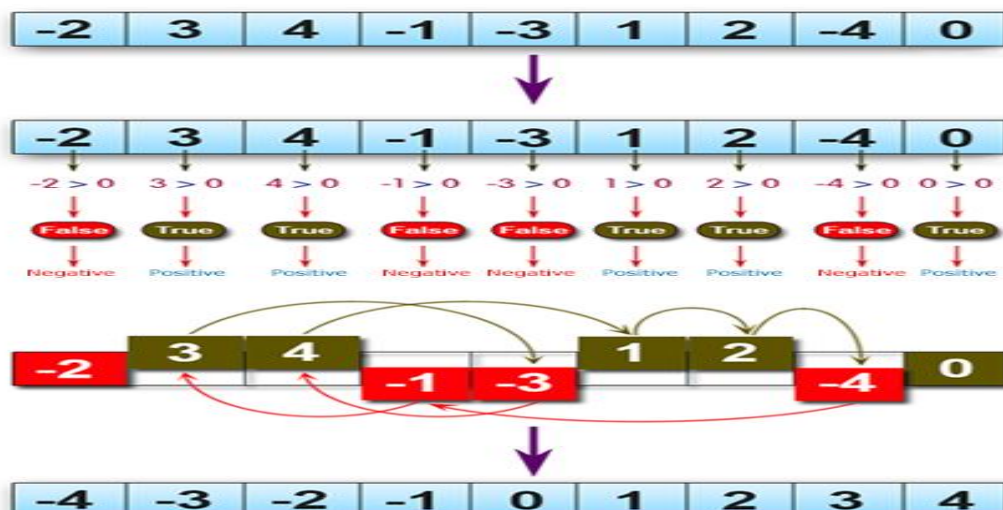
3. Write a Java program to find the numbers greater than the average of the numbers of a given array (Use scanner class to input and Array, below picture is example do not make static array as represented in example). [1 mark]

Pictorial Presentation:



Q4. Write a Java program to move every positive number to the right and every negative number to the left of a given array of integers (Use scanner class to input and Array, below picture is example do not make static array as represented in example). [1 Mark]

Pictorial Presentation:



5. Write a Java program to find the median of the number inside the window (size k) at each moving in a given array of integers with duplicate numbers. Move the window from the start of the array. [1 Mark]

Example:

{|1, 2, 3|, 4, 5, 6, 7, 8, 8} -> Return median 2

{1, |2, 3, 4|, 5, 6, 7, 8, 8} -> Return median 3

{1, 2, |3, 4, 5|, 6, 7, 8, 8} -> Return median 4

{1, 2, 3, |4, 5, 6|, 7, 8, 8} -> Return median 5

{1, 2, 3, 4, |5, 6, 7|, 8, 8} -> Return median 6

{1, 2, 3, 4, 5, |6, 7, 8|, 8} -> Return median 7

{1, 2, 3, 4, 5, 6, |7, 8, 8|} -> Return median 8

Result array {2, 3, 4, 5, 6, 7, 8}

Note: Above representation is just example, use scanner class for input the array and for getting size of window to slide.