CHRIST(Deemed to be University)
Department of Computer Science
MAI271-JAVA Programming Date:23-10-2024
Lab-Exe:2

Write a JAVA code for the following two scenarios:

1)Consider a Java program that manages an array of N numbers and a positive integer K. The objective is to identify K numbers with the highest occurrences, specifically the top K numbers with the maximum frequency. In cases where two numbers share the same frequency, the program prioritizes the number with the larger value. The program then presents the results in descending order based on their frequencies. It is assumed that the array contains at least K numbers.

The program structure includes:

Static Variable:

- A static variable is employed to store the input array of N numbers.

Static Method:

- A static method is designed to take a positive integer K as a parameter. Inside the method, the program utilizes a frequency analysis algorithm to identify and prioritize the top K numbers with the maximum occurrences. The results are then presented in descending order based on their frequencies.

Sample Test Case:

Given an array {3, 1, 4, 4, 5, 2, 6, 1} and K = 2:
Output: 4 1

Explanation: The frequency of 4 is 2, and the frequency of 1 is 2. These two numbers exhibit the maximum frequency, with 4 being larger than 1.

Given an array {7, 10, 11, 5, 2, 5, 5, 7, 11, 8, 9} and K = 4:
Output: 5 11 7 10

Explanation: The frequency of 5 is 3, the frequency of 11 is 2, the frequency of 7 is 2, and the frequency of 10 is 1. These four numbers showcase the maximum frequency, and 5 has the highest value among the rest.

2)In the context of daily share trading, a share trader engages in buying and selling shares within the same day. The trader is restricted to a maximum of 2 transactions in a day, with the condition that the second transaction can only commence after the completion of the first one (Buy -> Sell -> Buy -> Sell). To determine the maximum profit that a share trader could achieve based on the stock prices throughout the day, we can encapsulate this logic within a class.

Consider a class ShareTrader with a static variable maxProfit to store the maximum profit and a static method findMaxProfit to calculate this value. The findMaxProfit method takes an array of stock prices as input and iteratively explores the possibilities of buying and selling, considering the constraint of at most 2 transactions.

Sample Test Case:

Input: price[] = {10, 22, 5, 75, 65, 80}
Output: 87
Trader earns 87 as sum of 12, 75
Buy at 10, sell at 22,
Buy at 5 and sell at 80
Input: price[] = {2, 30, 15, 10, 8, 25, 80}
Output: 100
Trader earns 100 as sum of 28 and 72
Buy at price 2, sell at 30, buy at 8 and sell at 80