GROUP 32

Assignment #3

Given a dataset of size, N, you are required to compute the dataset's arithmetic, geometric, and harmonic means.

(a) Describe in detail, the steps that you would use to get the job done [20 Marks]

(b) Draw a flowchart to implement your steps [25 Marks]

(c) Test your flowchart with an arbitrary 10-element dataset [5 Marks]

A. The steps that you would use to get the job done

Step 0: Problem well understood.

Step 1: Problem restatement; To compute the dataset's arithmetic, geometric, and harmonic mean of a dataset of size N.

Step 2: Background support; Mathematical formulation, Data

Step 3: Knowns Vs. Unknowns

Knowns/Inputs: N, dataSet

Unknowns/ Outputs: arithmeticMean, geometricMean, and harmonicMean

Internal: k, totN1, totN2, totN3, where k = counter, totN1 = total summation of N dataSet, totN2 = total product summation of N dataSet, totN3 = total summation of the reciprocal of N dataSet

Step 4: Bookkeeping

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Name | Type | Validation |
| inputs | N  dataSet | Integer  Integer | >= 0 |
| internal | k  totN1  totN2  totN3 | Integer  Real  Real  Real | >= 0 |
| output | arithmeticMean geometricMean harmonicMean | Real |  |

Step 5: Algorithm/Pseudocode/Flowchart

0. Start/Begin

1. Declare Integer k, N

2. Declare Real harmonicMean, geometricMean, arithmeticMean, dataSet, totN1, totN2, totN3

3. Input N

4. Assign totN1 = 0

5. Assign totN2 = 1

6. Assign totN3 = 0

7. Repeat loop

8. For k = 1 to N

9. Input dataSet

10. Assign totN1 = totN1 + dataSet

11. Assign totN2 = totN2 \* dataSet

12. Assign totN3 = totN3 + 1/dataSet

13. End loop

14. Repeat

15. If N == 0

16. Assign arithmeticMean = 0

17. Assign geometricMean = 0

18. Assign harmonicMean = 0

19. Else

20. Assign arithmeticMean = totN1/N

21. Assign geometricMean = (totN2) ^(1/N)

22. Assign harmonicMean = totN3 / N

23. End

24.Output "Number of Dataset = N, Arithmetic Mean = arithmeticMean, Geometric Mean = geometricMean, Harmonic Mean = harmonicMean

25. End

B. Flowchart to implement the steps

Flowgorithm file

C. Testing the flowchart with an arbitrary 10-element dataset

Text file

GROUP 32 MEMBERS

1. ANOKYE ERNEST - 8598821

2. DOWOUNA NII NOI BENJAMIN - 8602721

3. OFOSU YEBOAH PRINCE - 8607321

4. ABUBAKAR ANAS - 8596221