

Assignment - 12

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Title :- Mean, variance, standard deviation calculation.

Problem statement :-

Write x386 ALP to calculate
(i) mean (ii) variance (iii) Standard Deviation
of an array of element.

S/w requirements :-

Text editor, compiler
(NASM), Debugger (GDB).

Objective :-

To calculate mean, variance, std
deviation using the math coprocessor
80386

Theory :-

given distribution of number say

12.45, 81.36, 71.49, 32.81, 06.73

mean is calculated as $\frac{\sum x_i}{N}$

$$= \frac{\sum f_i x_i}{N} \text{ if } f_i = 1 = \frac{x_1 + x_2 + \dots + x_n}{N}$$

$$= \frac{12.45 + 81.36 + 71.49 + 32.81 + 06.73}{5}$$

$$= 50.968$$

The variance is given by $= \frac{\sum f_i x_i^2}{N} - \left(\frac{\sum f_i x_i}{N} \right)^2$

$$= \frac{\sum f_i x_i^2}{N} - \text{mean}^2$$

For this distribution = 1159.27

$$\begin{aligned} \text{S.D.} &= \sqrt{\text{variance}} = \sqrt{1159.27} \\ &= \underline{34.05} \end{aligned}$$

Algorithm 1:-

Initialize stack

- i) For mean
 - 1) set rsi to stack of array, csize of array.
 - 2) Add value pointed by rsi to stack
 - 3) Increment rsi
 - 4) Decrement cl
 - 5) IF cl to go to (2)
 - 6) Divide size of array
 - 7) pop to mean variable

ii) For variance

- 1) Load zero to stack
- 2) make rsi point to array / csize
- 3) load value pointed by rsi on top
- 4) multiply value by itself
- 5) Add SFO & STI, then pop SFO
- 6) Increment rsi
- 7) decrement cl
- 8) IF cl to go to (3)
- 9) divide size
- 10) load mean

- 11) multiply fop by itself.
- 12) subtract STO from ST1 & pop
- 13) pop value to variable variance.

iii) for Standard Deviation

- 1) load variance value
- 2) Take square root
- 3) pop value to standard deviation.

Conclusion :-

Thus with the help of 80387 we ~~are~~ were ~~are~~ able to calculate the mean variance & standard deviation of a distribution.