



DECUS

PROGRAM LIBRARY

DECUS NO.	FOCAL8-96
TITLE	STATISTICS - STANDARD DEVIATION
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SOURCE LANGUAGE	FOCAL

STATISTICS - STANDARD DEVIATION

DECUS Program Library Write-up

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DESCRIPTION

Accepts any number of data values from the keyboard or from paper tape, computes and prints out mean, variance, standard deviation, coefficient of variation, maximum data value, minimum data value, and number of data points.

OPTIONS

1. Loading only first section of program tape sets up for keyboard entry.
2. Paper tape input via high speed reader is possible by loading first and second sections of program tape.

ERROR CORRECTIONS

1. If an error is discovered during keyboard entry before a space or carriage return has been entered, a back arrow (←) (shift 0) erases the entire entry back to the colon. The correct value may then be entered.
2. If an error is discovered during keyboard entry after a space or carriage return has been entered, but before the next value has been entered, the instruction "TERR" may be entered instead of the next value. This recalls the previous value and allows it to be changed.
3. After all data has been entered, the program allows one final means of error correction. Before the data is processed it asks "NO. OF UNCORRECTED ERRORS." If none, enter \emptyset . If errors exist, enter the number of errors to be corrected.

NOTE: This is the only means of correcting errors when data is input via paper tape.

OPERATING INSTRUCTIONS

NOTE: If you wish to identify the information, type "C," then the title (see examples).

1. Load FOCAL. W(8/68), rejecting the extended functions.
2. Load program tape in accordance with the options desired.
3. Type "GO."
4. Enter data values; enter " \emptyset " (zero) when all values have been entered.
5. In response to "NO. OF UNCORRECTED ERRORS?", enter the number requiring correction (zero or a carriage return if none), then enter the incorrect and correct values as requested.

NOTE: If error correction results in changing the maximum or minimum values to lower or higher values respectively, a caution note will be printed next to the value.

GENERAL INFORMATION AND COMMENTS

1. Equations used:

$$\text{Mean} = \frac{\sum_{i=1}^N Y_i}{N}$$

$$\text{Variance} = \sum_{i=1}^N (Y_i - \bar{Y})^2 = \frac{\sum Y^2}{N} - \left(\frac{\sum Y}{N} \right)^2$$

$$\text{Standard Deviation} = \sqrt{\text{Variance}}$$

$$\text{Coefficient of Variation} = \frac{\text{Standard Deviation}}{\text{Mean}} \quad (\text{not defined if Mean}=\emptyset)$$

SAMPLE PROGRAMS

*C.1) DEMONSTRATION OF KEYBOARD ENTRY OF DATA

*
*GO

ENTER VALUES

:1.4563 :1.4571 :1.4566 : 1.4578 :1.4533
:1.4570 :1.4559 ;0

NO. OF UNCORRECTED ERRORS :0

MEAN =	1.4563
VARIANCE =	0.0000
STANDARD DEVIATION =	0.0021
COEFF. OF VARIATION =	0.0014
NO. OF VALUES =	7
MAXIMUM =	1.4578000
MINIMUM =	1.4533000

*C 2) DEMONSTRATION OF TAPE ENTRY OF DATA VIA HIGH SPEED READER

*

*GO

TAPE READY:

: : : : :

: :

NO. OF UNCORRECTED ERRORS :0

MEAN =	1.4563
VARIANCE =	0.0000
STANDARD DEVIATION =	0.0021
COEFF. OF VARIATION =	0.0014
NO. OF VALUES =	7
MAXIMUM =	1.4578000
MINIMUM =	1.4533000

*C 3) DEMONSTRATION OF ERROR CORRECTION-TAPE INPUT

*G

TAPE READY:

: : : : :

: :

NO. OF UNCORRECTED ERRORS :1

INCORRECT VALUE:1.4599

CORRECT VALUE:1.4559

MEAN =	1.4563
VARIANCE =	0.0000
STANDARD DEVIATION =	0.0021
COEFF. OF VARIATION =	0.0014
NO. OF VALUES =	7
MAXIMUM =	1.4559000**CAUTION**CHANGED DURING CORRECTIONS
MINIMUM =	1.4533000

*

*C 4) DEMONSTRATION OF ERROR CORRECTION-KEYBOARD ENTRY

*

*GO

ENTER VALUES

:1.4563 :1.4570 ←1.4571 :1.4566 :1.4533 :1.4579
:1ERR

DELETED- 1.4579000

ENTER CORRECT VALUE:1.45788 ←1.4578

:1.4570 :1.4599 :0

NO. OF INCORRECTED ERRORS :1

INCORRECT VALUE:1.4599

CORRECT VALUE:1.4559

MEAN =	1.4563
VARIANCE =	0.0000
STANDARD DEVIATION =	0.0021
COEFF. OF VARIATION =	0.0014
NO. OF VALUES =	7
MAXIMUM =	1.4559000**CAUTION**CHANGED DURING CORRECTIONS
MINIMUM =	1.4533000

C-FOCAL , 8/68

Ø1.Ø1 C PICKER LIBRARY PROGRAM S-1A 12/19/69 (OVERLAY ON S-1)
Ø1.Ø4 S MI=1E4Ø;S MA=-MI;A !!TAPE READY"M
Ø1.Ø5 *
Ø1.Ø6 A Y
Ø1.Ø7

Ø3.Ø1 * D 1.1Ø;A!! "NO. OF UNCORRECTED ERRORS "K;I (K)3.Ø2,1.14;
*