CSI31 Introduction to Computer Programming I

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Topics

- Statistics, mean, standard deviation, median
- Lists and list methods

Mean

▸ Review average4.py from chapter 8

▸ Computes the average of a set of numbers entered from the keyboard

▸ Doesn't record the data since that isn't needed

Other statistics

▸ Median – the value that splits a set of data into two equal-sized parts, one set of data less than or equal to the median, the other set of data greater than or equal to the median

▸ Sample Standard deviation s – a number that measures how spread out the set of data is around the mean. If x_i represents the data elements, $\bar{x}$ represent the mean, n is the number of data values, then the sample standard deviation has the formula

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$$

▸

How to compute these statistics?

- Median

- Sample standard deviation

- For both you need the entire set of data

Python lists

‣ A list is a sequence of items.

‣ Indexed by subscripts starting with subscript 0

‣ Mutable – you can replace one item with another

‣ Dynamic - Adjustable in size

‣ Heterogeneous – items don't have to be of the same type

‣ Mutable sequence of arbitrary objects

Python sequence operations

\+ : concatenation

* int : repetition

 [ ] : indexing

len( ) : length

[:]: slicing

for <var> in <seq> : iteration

<expr> in <seq> : Boolean membership check

Python list operations

- \<list\>.append(x): attach the item x to the list in last position, changes the list
- \<list\>.sort(): sort the list in increasing order, changes the list
- \<list\>.reverse(): reverse the list, changes the list
- \<list\>.index(x): if x is in the list, returns the index of the first location
- \<list\>.insert(i, x): inserts s into the list at index i, changes the list
- \<list\>.count(x): returns the count of the number of times x appears in the list
- \<list\>.remove(x): removes the item x from the list, changes the list
- \<list\>.pop(i): removes the item at index i list, returns the item, changes the list

Write some functions

▶ mean(numbers): returns the mean of the values in the list numbers

▶ stdDev(numbers, xbar): returns the sample standard deviation of the values in the list numbers.   xbar is the he mean of the values and has already been computed.

▶ median(numbers): returns the median of the list numbers

▶

Test it all

▸ Write a program that gets numbers entered from the keyboard, saves them to a list, and returns the list.

▸ Use the functions to find the mean, standard deviation, and median of the list of numbers.