F10 : Standard Deviation Function

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Iterations overview

- All tasks were completed on time.
- Calculator was developed exclusive for Standard deviation function.
- The calculator has graphical user interface(GUI).

Standard Deviation (SD) Function

Measures extent of variation or separation of data values. The symbol σ notifies SD. The Range for standard deviation is between negative infinity to positive infinity. There are Two types:

1. Population Standard Deviation

Used when an entire population can be measured.

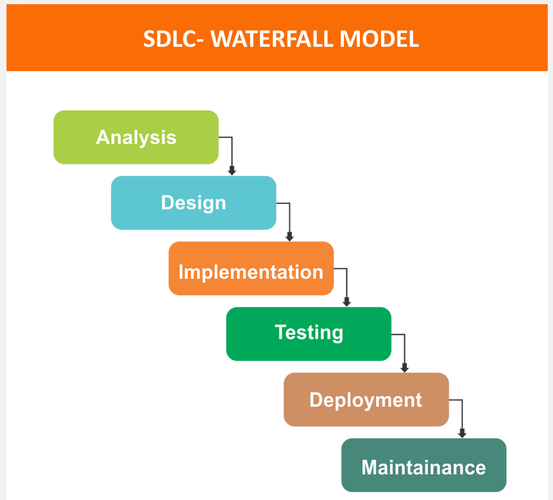
$$\sigma = \sqrt{\frac{1}{N}\Sigma_{i=1}^{N}(x_i - \mu)^2}$$

2. Sample Standard Deviation

Measured through random samples of the population.

$$s = \sqrt{\frac{1}{N-1}\Sigma_{i=1}^{N}(x_i - \bar{x})^2}$$

Process Followed



Critical Decisions Made

- Making the calculator exclusively for Standard deviation function.
  Why is this critical?
  The reason to have only one function was to give basic working function and user should not get confused with other functions.
- There was limited time to decide between Test based or GUI.
  Why is this critical?
  As there was change in deadline for submission, had to decide whether to submit text based or implement GUI. The text-based version was not seeming to be much effective, so within overnight developed GUI.
- Not rounding of result up to certain(2 or 3) decimal place.
  Why is this critical?
  Standard deviation function is used in stock market, measure risk, real estate etc.. If we do not consider the value till the last decimal point the actual values might vary in larger number, so no option to round off decimal point.

Lessons Learnt

- Working in **latex**.
- Building function without using **Math libraries**.
- Java swings for **graphical user interface**.
- **Systematic way of programming**: Using coding standards/coding convention
- Using **tools** : Junit, checkstyle, PMD
- Benefits of code review and testing.

What did not go well and how can we improve

- Users are not given change to select precision.
  How to improve?
  Giving option to select the number, to make number as last decimal point to be rounded.
- Not giving option to save previous calculation history.
  How to improve?
  Using separate button for history and developing it to store last three calculation results.
- One-line commented code or missed comments in the code.
  How to improve?
  By writing Javadoc in more descriptive way so that others can easily understand the code and also write comments for missed return parameter.
- Improvising Graphical user Interface.
  How to improve?
  Find the suitable user interface design pattern and implement same.

Future work

- Incorporating calculator to have multiple functions.
- User will able to choose precision level, i.e points up to what decimal point the user want result to be.
- Calculator will have history button.
- Implementing with user Interface design pattern.
- Improvising GUI with better color and options.

Graphical User Interface

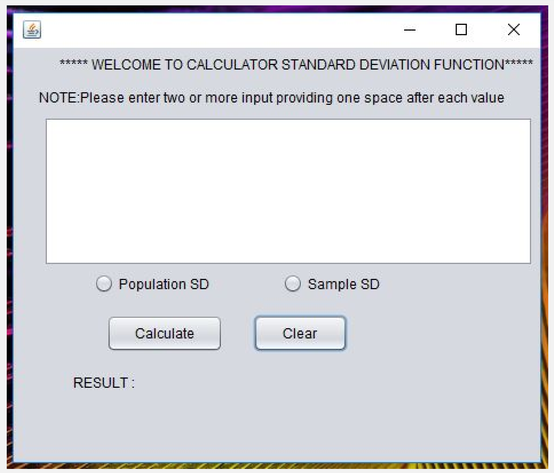


Figure: Screenshot of GUI developed

Java swings is used to develop GUI. User has to provide input values, select radio button (for population or sample SD)and clicks on calculate. The result is displayed in result section.

References

1 https://www.mathsisfun.com/data/standard-deviation-formulas.html
2 https://www.overleaf.com/

GitHub Information

https : //github.com/nayanarajc/SOEN$_6$011
username: nayanarajc

Guided By

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