

Small Group Exercise - Enhanced enhancedToString() for double values with an error term

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Activity Kind

Small group exercise

Purpose

The purpose of this exercise is to enhance your tools to support the use of measured values with error terms.

Pre-requisite

Students are expected to have designed the solution to this activity from the previous day's work.

Tasking

The client wants the calculator to display data in ways that is easy for typical users to use it. Three enhanced toString()-like methods are needed. One for converting double measured values to a string of characters, one for converting double error terms to a string of characters, and one for converting CalculatorValues to a string of characters using the other two methods.

Converting double measured values has two requirements:

1. Measured values less than $1E+7$ and greater than $1E-5$ should be expressed as basic decimal values. (That is the values that are **not** in scientific notation.) Values outside of this range (too large, positive or negative, or too close to zero, positive or negative) should be expressed in scientific notation.
2. Measured values should not have more significant digits than can be justified by the measured value's error term. For example, if the error term is 0.01, the corresponding measured value should have no more than two digits to the right of the decimal point. If the error term is greater than 10, such as ± 200 , a measured value of 37216.5 should be displayed as 37200.¹

Error terms, when they are converted to strings for output, should be displayed with only one significant digit. If the error term value is larger than $9E+3$ or smaller than $1E-3$, express it in scientific notation. If the value is between these limits (e.g. $\pm 9000 \geq \text{error term value} \geq \pm 0.001$) express it as a simple decimal (again, **not** in scientific notation).

Working as a team, break the whole problem up into parts (including the creation of a test mainline), have each person work on a part of this problem, integrate the parts, and demonstrate that the methods work as required. As you do this work, capture who was assigned to do what, document the work you have been assigned to do, provide evidence that you did the work, and provide evidence that the work could be integrated into a working program that satisfies the above requirements with compelling output.

Be sure you have captured the details in your ENB, because you will need this method for your projects.

Deliverable

Students are responsible for producing and posting their notes and their code in their ENB as evidence that they performed this task as required.

Submission

Each student must produce and submit your ENB for the day.

¹ To satisfy these requirements, you need both the measured value and the error term value in order to produce the resulting string for the measured value.