Small Group Exercise - How long does it take to compute square root of 10,000 digits?

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Activity Kind

Small group exercise

Purpose

The purpose of this exercise is to explore the properties of convergence of square root.

Pre-requisite

Students are expected to have performed:

- Individual Research - Rate of convergence to a square root.
- Individual Research - Measure execution time using System.nanoTime().

Tasking

Students are partitioned in to groups of two to four students. Collaboratively, the students compare the results achieved from the previous evening's research. How similar or different are their results for the amount of time required to compute square root of 2 with a result of 10,000 significant digits? Each individual should capture what they see and any insights they have gained in their ENB.

Each individual in the group should rerun their experiment on the following sequence of values: 1) 20; 2) 200; 3) 2000; 4) 20,000; 5) 200,000. For each value, determine in the sequence, determine the total execution time and plot the execution time as a curve using Excel.

Is the execution roughly the same as the value of the input changes, or does the execution time change? If there is a change, what might be at the root of this change? What, if anything could be done to reduce the change?

Deliverable

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

Submission

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