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Figure 1: Run-Time vs Number of Processors

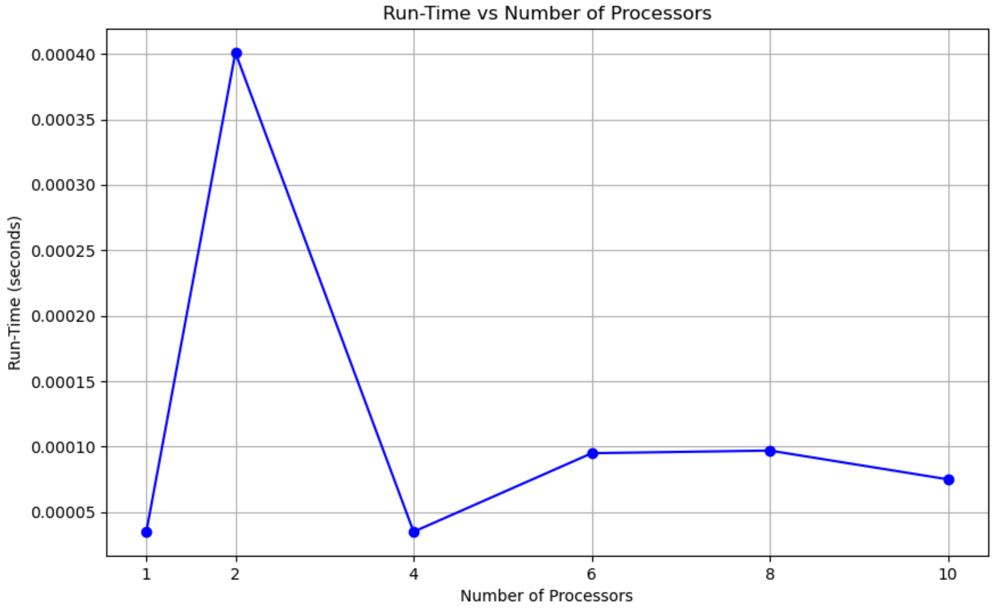
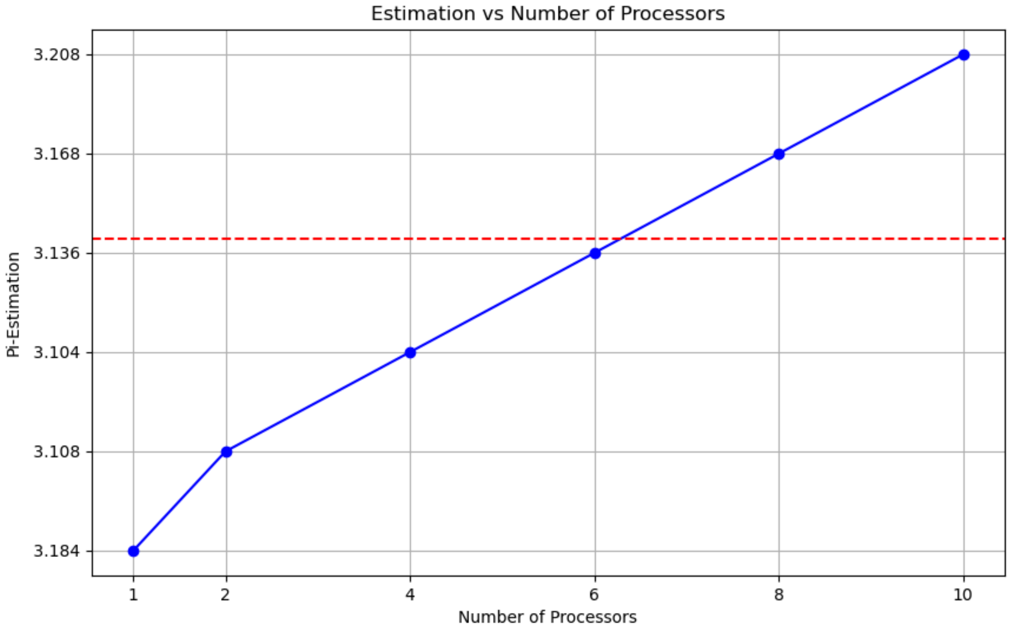


Figure 2: Estimation vs Number of Processors



Observations on Figure 1: Run-Time vs Number of Processors

Non-linear Scaling and Overhead:

The runtime does not decrease linearly with the increase in the number of processors. There's an initial drop when moving from 1 to 2 processors, but then there is an increase in runtime at 4 processors.

The spike in runtime at 4 processors could be due to factors including communication overhead, non-uniform memory access times, or contention for shared resources. This shows that in practice, there is an overhead associated with parallelization that may not always result in decreased runtime.

Optimal Processor Count:

There seems to be a point beyond which adding more processors doesn't significantly reduce runtime. In the graph, after the spike at 4 processors, the runtime decrease flattens as more processors are added. This indicates a diminishing return on adding more processors.

Observations on Figure 2: Accuracy of Pi Estimation

Convergence to π: The estimated value of π appears to converge towards the actual value of π (indicated by the horizontal line at 3.14) as the number of processors increases. This suggests that using more processors might be providing a more accurate estimate due to a larger total number of random points being processed.

Accuracy vs. Processors: The accuracy of π estimation is improving with the number of processors, which is expected in Monte Carlo simulations as more samples should provide a more accurate estimate.

Law of Large Numbers: The improvement in the accuracy of the estimation of π with more processors suggests that the Monte Carlo simulation benefits from the law of large numbers. However, there's an interesting uptick in the estimated value as the number of processors increases. This could be due to random variance in the Monte Carlo method itself or perhaps due to how the work is distributed and computed across processors.