CS4328 Parallel Computing

Lab for Chapter 3. Monte Carlo Methods

Using the second method described in the textbook to compute the integral

$$\int_0^1 \sqrt{1-x^2}\,dx$$

The second method involves generating a sequence of random x_r's and using the following formula to calculate the integral:

$$Area = \int_{x_1}^{x_2} f(x)dx = \lim_{N \to \infty} \frac{1}{N} \sum_{r=1}^{N} f(x_r)(x_2 - x_1)$$

Write a parallel program in which the master process generates Xr's and distribute them among slave processes. Each process finds out the partial sum and sends them back to the master process. The master process then integrates the results and calculate the final result.

For comparison purposes, let the master process calculate the analytical result and compare the empirical results to it. If the empirical result is not close enough to the analytical result (according to a threshold you determine), increase N and continue the calculation, until the empirical result is satisfactory.