Real Time Systems, January 2024

Distributing the task of matrix multiplication among many processes

Opened: Thursday, 25 January 2024, 12:00 AM
Due: Friday, 9 February 2024, 11:59 PM

✔ Done

Let there be two matrices A (n X m) and B (m X p). The product matrix C = A x B will be a n X p matrix where **C[i,j]**, 1 ≤ i ≤ n, 1 ≤ j ≤ p **= ith row of A . jth column of B =** $c_{ij} = \sum_{k=1}^{m} a_{ik} b_{kj}$

Write a complete user-friendly C program that reads two matrices **A** (n X m) and **B** (m X p) from the user in arrays **a[ ][ ]** and **b[ ][ ]**, respectively. The program then creates **n number of child processes** such that each of these child processes computes one unique row of the product matrix **C** and saves that in the corresponding row of an array **c**[ ][ ]. For example, the 1st child process may compute the 1st row, that is, the elements **C**[1,1], **C**[1,2], ..., **C**[1,p] and stores them in **c**[0][0], **c**[0][1], ..., **c**[0][p-1], respectively; the 2nd child process may compute **C**[2,1], **C**[2,2], ..., **C**[2,p] and stores them in **c**[1][0], **c**[1][1],, ..., **c**[1][p-1], and so on. **Please note that the array c[ ][ ] has to be shared among all of n (child) + 1 (parent) processes.**

After all the child processes finish putting corresponding values in c[ ][ ], the parent process prints c[ ][ ] in the matrix form.

Your program(s) should arrange to release the shared memory that has been created during execution.

As enhancement of this assignment (**not to be submitted today**), we may conceive that this program has to be used for a series of such multiplications of matrices (of different sizes) to be done by a collection of cooperating processes. That is, neither the parent process nor any of the child processes terminates after one such matrix multiplication. They can be reused to compute product matrix as long as the user desires. You have to propose and implement a scheme for this.

Submission status

Attempt number	This is attempt 1.
Submission status	Submitted for grading
Grading status	Not graded
Time remaining	Assignment was submitted 5 mins 31 secs early
Last modified	Friday, 9 February 2024, 11:53 PM
File submissions	program2.c 9 February 2024, 11:53 PM
Submission comments	Comments (0)

◄ Implementing a variable shared between a child process and its parent process

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Memory shared among independent processes ►