Assignment for 3rd Year 1stSemester Students IT/PC/B/S/313

GUIDELINES

1. Try to write a clean program with enough comments.

2. At the beginning of the file, use block comments to write details about name, roll no, assignment details, input required and output generated.

3. Also put the compilation [should be WARNING free] and execution sequence under the block comment.

4. The name of the file should be as per the following format.

    <Two Digit Team Number>_<Assignment Number>.sh

5. The type of the file should be pure plain ASCII Text.

6. The assignment files should be uploaded AS PER THE LAB SCHEDULE. Upload only required no of files. NOT A BIT MORE.

7. While coding, always use indentation of 4 spaces.

8. Blocks of code should be separated by a newline.

9. Always use command line argument handling to take inputs.

10. Duplicate assignments will incur penalties. [Marks will be allocated proportionally]

11. Not adhering to any of these guidelines will incur penalties.

12. For the description of any system/library call use man command.

13. Always use the 'perror' routine to check the return status of the system/library call.

ASSIGNMENT – 7
Total Marks - 10 [CO4 & CO5]
Thread, Synchronizations & Shared Memory

Consider a main process which creates three threads Th1, Th2, and Th3. The main process also creates two random quantities (X, Y), both less than 10. These two values will be placed by the main process in the shared memory (One variant of IPC Primitive) that is accessible by all the three threads Th1, Th2 and Th3. The shared memory will be created by the main process also.

For each pair of values (X,Y), it is required that some computations will be done by various threads. The thread Th1 will compute A (X*Y) and the thread Th2 will compute B (X*Y)/2). Similarly, Th3 computes C (X+Y), Th2 again computes D ((X*Y)/(X+Y)), and finally Th1 computes E ((X+Y)(X-Y)). All these values are kept in the shared memory in a tabular fashion as shown below.

The number of (X,Y) pairs will be taken as an argument from the CLI. It is the responsibility of the main process to populate required numbers of (X,Y)s in the shared memory. The program will only exit when all A,B,C etc. are computed for all given (X,Y) values. Before exiting, all (X,Y)s, As, Bs etc. should be displayed.

Whenever, the threads complete one phase of computations (A, B, C, D and E), they will go for another pair of (X,Y) values; but they will start all together. This can be achieved by proper synchronization.

Use the proper shell command to display the Shared Memory Status/Info/Statistics and attach this sample output as a comment.

Example:—

Input: *N, number of random pairs*

Output Format:

Pairs(X,Y)	A	B	C	D	E
(1, 2)	2	1	3	.66	-3
(4, 1)	4	2	5	.8	15

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