**PDC Assignment Home Activity**

Q2. Given shared memory and distributed memory architectures, do the following: (soft copy)

* Suggest a suitable architecture for coarse-grain parallelism with supporting arguments.

For Coarse-grain parallelism which generally means that decomposition of tasks (independent tasks) with higher granularity. Process in coarse grain are broken down into split into large sub tasks and each tasks are then mapped to a processor.

For this type of architecture, Distributed memory architecture is the most suitable and message passing will be much more efficient in this type of architecture because distributed memory model are based on a way that each cpu has its own memory unit and they are connected with a network. The distributed model usually uses message passing (exchange of messages through send/receive unlike shared memory space) which takes more time than shared memory architecture’s communication time.

So by the time the tasks in coarse-grain architecture will complete its task, the communication will be also completed by the distributed model and less waiting overhead will be there.

* Suggest a suitable architecture for fine-grain parallelism with supporting arguments.

In fined-grain parallelism, the complex task is broken down into a large number of sub-tasks and then are mapped to each processors. The amount of parallel work required is comparatively low and work is distributed among its processors mostly.

For this type of architecture, Shared memory architecture is the most suitable and will be much more efficient because the granularity of tasks are very low and the number of processors required to complete the task is very high which increases the communication and synchronized overhead which is why it requires fast communication model which can be supported by shared-address-space platforms in shared memory model.

* State reasons why other architectures are not suitable for both types of parallelisms.

For fine-grain parallelism the distributed memory architecture is not suitable because distributed memory model usually uses message passing model has more communication overhead than shared-memory as they send and receive the packages and each time for sending and receiving a message package, the cpu has to be involved for the completion of the communication. Whereas in shared memory model, the cpu is involved only once to create an common address space that can be used by both the sender and receiver and for the rest, the process can directly write or read messages in that space and cpu doesn’t needs to be involved any more in that. For this reason, distributed model is not suitable for fine-grain parallelism as communication needs to be done fast.

For coarse-grain parallelism, the shared memory is not suitable because it has the low communication time than the required process’s completion time which will make the cpu idle as the cpu’s speed is always faster than the i/o completion time. Thus, for this model, distributed model is the best suitable architecture.