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THE COLLEGE OF TECHNOLOGY (COLTECH) *ECOLE DE TECHNOLOGIE*

Building Capacities in Innovative Technology for sustainable Development

DEPARTMENT OF COMPUTER ENGINEERING

OPTION: SOFTWARE ENGINEERING

**ADVANCED COMPUTER ARCHITECTURE
ASSIGNMENT GROUP 4**

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QUESTION 1 Give five benefits of multicore Architecture.

- ❖ **Energy Efficiency.** By using multicore processor, architects can decrease the number of embedded computers. They overcome increased heat generation due to Moore's law (that is smaller circuits increase electrical resistance, which creates more heat), which in turn decreases the need for cooling. The use of multicore processing reduces power consumption (less energy wasted as heat), which increases battery life.
- ❖ **True Concurrency.** By allocating applications to different cores, multicore processing increases the intrinsic support for actual (as opposed to virtual) parallel processing within individual software application across multiple applications.
- ❖ **Performance.** Multicore processing can increase performance by running multiple applications concurrently. The decreased distance between cores on an integrated chip enables shorter resource access latency and higher cache speeds when compared to using separate processors or computers. However, the size of the performance increase depends on the number of cores, the level of real concurrency in the actual software, and the use of shared resources.
- ❖ **Reliability and Robustness.** Allocating software to multiple cores increases reliability and robustness (that is, fault and failure tolerance) by limiting fault and/or failure propagation from software on one core to software on another. The allocation of software to multiple cores also supports failure tolerance by supporting failover from one core to another (and subsequent recovery).
- ❖ **Hardware Costs.** By using multicore processors, architecture can produce systems with fewer computers and processors.

QUESTION TWO What is synchronization in computer architecture and why do we need it

- ❖ Synchronization is a process which keeps all concurrent threads in execution to be in synch.

- ❖ We need this because it avoids memory consistence errors caused due to inconsistent view of shared memory, process deadlocks and prevent race conditions

QUESTION THREE Give 3 disadvantages and 3 advantages of distributed memory architecture.

Advantages

- ❖ **Easy Abstraction.** since the address space is the name, data migration is not an issue for programmers, making it simpler to build than RPC.
- ❖ **Easier Potability.** Sequential to distributed system migration is made easy by the access protocols employed in DSM. Because they make use of a common programming interface, DSM programs are portable.
- ❖ **Large Memory space.** Large virtual memory space is provided, paging operations are decreased, and the total memory size is the sum of the memory sizes of all the nodes.

Disadvantages

- ❖ Accessing is faster in a non-distributed shared memory system than in a distributed system.
- ❖ Simultaneous access to data has always been a topic of discussion. It should ensure some additional protection to it.
- ❖ It is not much efficient as the message-passing implementation as it uses the asynchronous message-passing implementations.