# COM/006/15

# NAMU EPHANTUS

# COM 419: Computer design Cat

# Question one

1. ***Explain the concepts of parallel computing.***

This is the use of two or more processors (cores, computers) in combination to solve a single problem. A problem is broken down into discrete parts that can be solved concurrently. Each part is broken down into to a series of instructions. Instructions from each part executed simultaneously on different processors.

1. ***Discuss trends in computer clock cycles***

Early computer processors and CPUs used to execute one instruction per clock cycle. With advances in modern microprocessors such as superscalar are capable of executing multiple instruction per clock cycle. Most CPU processes need multiple clock cycles, as only simple commands can be executes in each clock cycle.

1. ***Explain factors that determines performance of a computer.***
2. Processor speed – the processor determines how fast your machine can run.
3. Installed memory – the amount and type of memory you have installed in your computer determines how much data can be processed at once.
4. ***What is a multi-computer?***

This is a cluster of separate computer nodes connected to each other over a network that operate as a singular computer.

1. ***Discuss the following***
2. **Synchronization** – this is the coordination of simultaneous threads or process to complete a task with correct runtime order and no expected race coordination.
3. **Memory consistence** – this specifies the ordering of loads and stores to different memory locations.

# Question two

1. ***Discuss the six(6) basic task actions***
2. A task can read local memory
3. A task can write local memory
4. A task can send a message on its out ports
5. A task can receive a message on it imports
6. A task can create new tasks suspending until they terminate
7. A task can terminate
8. ***Highlight five properties of a task/channel model***
9. Performance
10. Mapping independence
11. Modularity
12. Determinism
13. Scalability

# Question three

1. ***What are the main disadvantages of multithreading***
2. Complex in debugging and testing processing
3. Constructing and synchronizing thread is CPU/Memory intensive
4. Increased difficulty level in writing a program
5. ***Granularity is an important function of parallel computing. Discuss?***

Granularity affects the performance of parallel computers. Using fine grain or small tasks results more parallelism and hence increase speedups. In order to reduce the communication overhead, granularity can be increased, coarse grain tasks have less communication overheads but they often cause load imbalance.

# Question four

1. ***How is massively parallel processing different from Von Neumann***

In Von Neumann model the computer consist of a CPU, memory and I/O devices, the CPU fetches an instructions from the memory at a time and executes it, thus the instructions are executes sequentially which is slow, in parallel processing several CPU are connected in parallel to solve a problem, the basic building blocks are Neumann processors.

1. ***Explain the following terms***
2. Computation / Commutation Ratio – this is granularity which is the qualitative measure of the ratio of computation to communication.
3. Fine-grain Parallelism – Relatively small amounts of computation work are done between communication events.