**Tutorial 5**

1. List THREE (3) basic criteria for the *evaluation of a system.*

* Functionality
* Performance
* Cost

1. List and explain any THREE (3) *cloud resource management policies*.

* **Admission control**
  + Prevent the system from accepting workload in violation of high level system policies
* **Capacity allocation**
  + Allocate resources for individual activations of a service
* **Load Balancing** 
  + Distribute the workload evenly among the servers
* **Energy optimization**
  + Minimization of energy consumption
* **Quality of service(QoS)**
  + Ability to satisfy timing or other conditions specified by a Service Level Agreement

1. Give and explain any THREE (3) *mechanisms* for the implementation of *resource management policies*

* **Control theory**
* Uses the feedback to guarantee system stability and predict transient behavior
* **Machine learning**
* Does not need a performance model of the system
* **Utility-based**
* Require a performance model and a mechanism to correlate user-level performance with cost
* **Market-oriented/economic**
* Do not require a model of the system, e.g., combinatorial auctions for bundles of resources

1. Differentiate between *Hard Deadlines* and *Soft Deadlines.*

**Hard Deadlines**

* If the task is not completed by the deadline, other tasks which depend on it may be affected and there are penalties
* A hard deadline is strict and expressed precisely as milliseconds or seconds

**Soft Deadlines**

* A soft deadline is a more of a guideline and there are no penalties
* Soft deadlines can be missed by fractions of the units used to express them
* E.g. Minutes if the deadline is expressed in hours, or hours if the deadline is expressed in days

1. Define the term Optimal Partitioning Rule (*OPR*) and Equal Partitioning Rule (*EPR*).

**Optimal Partitioning Rule (OPR)**

* The workload is partitioned to ensure the earliest possible completion time
* All tasks are required to complete at the same time.

**Equal Partitioning Rule (EPR)**

* Assigns an equal workload to individual worker nodes.