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MSDS 432 Foundations of Data Engineering

June 28th, 2020

Module 1 – Reading Comprehension

**1. Define what Reliability, Scalability, and Maintainability mean in terms of Data Systems.**

Reliability - means that whenever there is a fault or deficient software or hardware, the system can tolerate it, and everything can proceed as normal.

Scalability – This is defined as having additional resources when a system grows larger such as through data, users, or complexity.

Maintainability - defined as an aspect of a system that can be fixed easily, evolve to new changes and requirements, and understandable to all; low in complexity.

**2. Describe three types of issues that cause problems with Reliability.**

Three types of issues that cause Reliability are:

Hardware problems such as a Hard disk failure, RAM, power grid, or network cables accidentally unplugged.

Software Errors that can be caused by a bug but can be present on multiple servers.

Human Errors – For example, internet services have had configuration errors caused by humans, and only 10-25% are cause by non-human issues.

**3. Describe a few ways we can deal with and plan for Scalability.**

One way we can deal with scalability is to use a mixture scaling up and scaling out. Scaling up means to have a machine with more processing power while scaling out means having more machines instead. Sometimes complexity can be too much, so that is why it is important to have a combination of both.

Another way to deal with this is adding a machine that provides elasticity. This means that we can add devices that can be upgraded when more resources are needed such as more CPU/RAM power etc.

**4. Describe the design principles to take into consideration when dealing with Maintainability.**

Design principles involved in Maintainability are:

Operationality - Makes it easy to run the system

Simplicity – Allows users to understand system

Evolvability – Allows flexibility to change things as it pertains to an organization’s requirements.