Agenda – Module #3
Chapter 3: Principles of Software Architecture

Overview:

The software architecture activity corresponds to a macro design approach for transforming software requirements into design elements that support quality and functions of software systems. During software architecture, perspectives appropriate for modeling particular concerns are identified and design elements created to address those concerns. These design elements present systems from different perspectives, thus providing stakeholders, with different backgrounds and expertise, the means to evaluate the appropriateness of architectural decisions for supporting the construction of the desired system. The software architecture activity places emphasis on systems' quality and therefore provides the earliest means for ensuring that identified quality goals are evaluated and incorporated into the design before moving on to more detailed design and construction work. The software architecture lays the foundation for all subsequent work in the development process and serves as an important communication, reasoning, and analysis tool for developing and maintaining software systems.

Module Objectives:

- *Understand the role of software architecture within the software design phase.*
- *Become familiar with architectural tasks and problem-solving during architecture.*
- *Understand the importance and role of architectural views in software architecture.*
- *Become familiar with the software architecture process.*
- *Become familiar with the concept of architecture evaluation.*

Session 1: Fundamentals of Software Architecture (30 - 45 minutes)

This session focuses on a detailed coverage of the fundamental concepts of software architecture. Important architectural tasks are discussed, including: identifying the stakeholders and their concerns, the architectural views, styles, and patterns, the major components and interfaces, evaluating and validating the architecture, and introducing policies for ensuring that architectural decisions are upheld during the development process. In addition, a framework for problem-solving during architecture is presented.

Slides – Chapter 3 – Session I

Session 2: Fundamentals of Requirements Engineering (30 - 45 minutes)

This session presents the software architecture process, which includes: understanding and evaluating requirements, designing the architecture, evaluating the architecture, documenting the architecture, and controlling implementation throughout the development life cycle. Because designers spend a great deal of time working with requirements, this session provides a detailed coverage of requirements engineering by focusing on activities such as requirements elicitation,

analysis, specification, and validation. After completion of this session, students should be equipped with the knowledge to create effective requirements that serve as basis for design and development.

Slides – Chapter 3 – Session II

Session 3: Designing the Architecture (30 - 45 minutes)

Designing software architectures for most large-scale systems require modeling of the system from different perspectives/views, each addressing particular items of concern that deal with the system's desired quality. This session presents in detail the topic of architectural views using the popular 4+1 View Model, which focuses on the *logical*, *process*, *development*, *physical, and user* perspectives of the system. This session initiates discussion about essential modeling perspectives that are important to understanding the reasoning behind using architectural styles and patterns, which is the topic of the next module. Designing using multiple perspectives help provide a complete picture of the system and the means to evaluate quality attributes before detailed design begins.

Slides – Chapter 3 – Session III

Homework #3

- Read chapter 3 and answer review questions 1-13. Submit your answers as a word or PDF document.
- Read the attached Homework #3b file and turn in your answers.

Quiz #3
See Quiz #3.