Examination questions – TI-AREM 2015 (24.03.2015).

Question 1: Architectural Views (course week #1)

a. Explain the concept of architectural views and give examples of different view models, compare and discuss them.
b. Explain how a view model can be used in an iterative process model.

Question 2: Architecture Styles and the Two-Part Architecture Model (course week #2)

a. Explain the concept architecture styles and give some examples.
b. Explain the two-part architecture model; give an example of its use and how it can be extended to be used in a concurrent system with threads.

Question 3: Architecture Patterns (course week #3)

a. Explain the Channel Architecture Pattern and compare it to the Pipes & Filters architecture style.
b. Explain the Hierarchical Control Pattern and compare it to the Recursive Containment Patten.

Question 4: Concurrency Patterns (course week #4)

a. Explain the POSA2 Active Object pattern and compare it to the normal thread abstraction, where a user thread is created by inheritance from a Thread class.
b. Explain the POSA2 Leader Followers pattern and compare it to the active object pattern.

Question 5. Resource Patterns (course week #5)

a. Explain the POSA2 Monitor pattern, how it supports wait in the monitor and how it uses the Scoped Locking Idiom.
b. Explain the Guarded Call Pattern and compare it to the Monitor Pattern.

Question 6. Priority Inversion Problem and Solutions (course week #5)

a. Explain the Priority Inversion Problem and the Priority Inheritance Pattern.
b. Explain the Highest Locker Pattern and compare it to the Priority Inheritance Pattern.

Question 7. RMA Techniques (course week #6)

a. Explain the basic Rate Monotonic Analysis technique, the assumption for using this technique and how it can be extended to account for blocking between tasks.
b. Explain how the analysis is performed if the tasks deadlines are shorter than the period time.

Question 8. Memory Patterns (course week #7)

a. Explain the Static Allocation Pattern its advantages and limitations.
b. Explain the Pool Allocation Pattern and compare it with the Fixed Sized Buffer Pattern.

Question 9. Design Patterns in Action (course week #1-7)

a. Explain the architecture and design patterns used in exercise 1-4; the advantages and liabilities with combining the command pattern with the state pattern and how the liabilities can be solved by use of a memory pattern.
b. Explain how a hierarchical and a parallel state machine can be implemented using the State Pattern.