MANIPAL INSTITUTE OF TECHNOLOGY
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A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (INFORMATION TECHNOLOGY/COMPUTER AND COMMUNICATION ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: PROGRAM ELECTIVE VI : SOFTWARE ARCHITECTURE [ICT 4014]
REVISED CREDIT SYSTEM
(28/11/2017)

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:
- ❖ Answer ALL the questions.
- ❖ Missing data, if any, may be suitably assumed.

1A. A-7E is an attack aircraft used in war fields, equipped with an onboard computer with a software which is responsible for reading sensors and updating cockpit displays that help the pilot to drop weapons on a target. Now, there is an enhancement request for this system with following functional requirement specification: "It should be possible to make changes to the weaponry, the symbology on the display, and add new inputs through the keypad to the avionics system" What is the quality attribute that need to be addressed for the above stated functional requirement? Explain how it can be achieved in A-7E avionics system. **5**

1B. Describe the role of LDV (Logical Data Viewpoint) in modeling the data schema. Support the description with an appropriate pictorial representation. **3**

1C. Describe the skills and background that is required for an architect to create an effective overall design. **2**

2A. With a suitable example, explain various steps involved in Attribute-Driven Design process. **5**

2B. Differentiate between general and concrete quality attribute scenarios. Draw a concrete scenario for following event: **3**
"Users initiate 1,000 transactions per minute stochastically under normal operations, and these transactions are processed with an average latency of two seconds."

2C. Explain the activities involved in database construction phase of software architecture reconstruction process. **2**

3A. List the various types of dependencies that one module can have on another that could cause a ripple effect. Discuss the tactics that are available for preventing ripple effect in order to achieve modifiability. **5**

3B. Explain the terms 'functional group' and 'operational unit' with respect to Air Traffic Controller (ATC) architecture. What is the switch over procedure on failure of primary address space in ATC system? **3**

3C. Bring out the Traps and pitfalls of the software architecture process activities. **2**

4A. Explain the three components of Model-View Controller (MVC) pattern. Depict the dynamic behavior of MVC, with a suitable scenario. 5

4B. Define the following terms: 3
    i) Architectural model ii) Reference model iii) Reference architecture

4C. Briefly discuss any four different roles played by a software architect during the life cycle of software system construction. 2

5A. Enumerate and explain in detail, the different group software architecture structures are categorized into, with the help of appropriate pictorial descriptions. 5

5B. Draw activity diagram for following order management scenario: 3
When an order is received from the client, check client's credit card data and availability of ordered product in the inventory.
If credit card data are enough to pay for the products, wait for payment and then send the receipt. Once payment is registered in archive client is notified of payment received.
If product is not present in inventory, fill the order to buy it or if the product is internally produced, then start production process, then update the inventory.
Once product is ready to be sent and payment is made successfully then product can be sent to the client.

5C. List out the advantages and disadvantages of proxy design pattern. 2