Question Paper

MANIPAL UNIVERSITY

SCHOOL OF INFORMATION SCIENCES (SOIS)
SECOND SEMESTER MASTER OF ENGINEERING - ME (EMBEDDED SYSTEMS)
DEGREE EXAMINATION - APRIL / MAY 2017
Friday, 28, 2017
Time : 10:00 AM - 1:00 PM

Embedded Software Design [ESD 614]

Marks: 100 **Duration: 180 mins.**

Answer all the questions.

1) Distinguish between embedded software architecture and embedded software design. Also explain the various UML notations which come handy in the design of embedded software systems. (10)

2) How are aggregation and composition relationships represented in UML? Also with an example/examples and adequate code snippets show how the two differ when you implement them in Java language. (10)

3) Distinguish between a use case, a scenario, and a use case diagram. Consider an online payment system which is time critical with regards to the OTP sent by the payment server to the user. Apply the three terms for the above system and express them. (10)

4) Imagine the working of a four floor elevator. Use UML modeling to draw a use case diagram, a class diagram and a sequence diagram which depicts the working of the elevator system. (10)

5) Explain the following object oriented terms which you may need to adopt while designing object oriented solutions for a given problem at hand: (i) Multiple Inheritance (ii) Multilevel Inheritance. Give proper examples to (10)

adequately explain these concepts. Further draw adequate UML class diagrams for your samples.

6) List the constructors and major methods of a Thread class and the Runnable interface. Also depict how the two are related. Next show the implementation of a new class by extending Thread class and indicate the relationship between the new class and the Thread class. Also explain the meaning of thread, and explain what exactly happens when a new thread is created and executed? (10)

7) Implement the following time constraint problem using Java language: write a program which schedules a one time task as well as a periodic task. The one time task should be functional after a initial delay of 8 seconds. The second periodic task should get repeated 4 times, with a delay of 3 seconds between every two appearances. Make use of Timer and TimerTask classes to implement your program. Depict the classes used in the program and their relationships through a UML class diagram. (10)

8) Distinguish between a class, a static nested class and a non-static nested class. Write sample codes to justify your explanation. (10)

9) Explain UML packages. (10)

10) What do you understand by components? How are components depicted in Unified Modeling Language. Explain. (10)