Question Paper

Exam Date & Time: 24-May-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal School of Information Sciences (MSIS), Manipal
Second Semester Master of Engineering - ME (Embedded Systems) Degree Examination - May 2023

Embedded Software Design [ESD 5203]

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

Wednesday, May 24, 2023

Answer all the questions.

1)	a. Differentiate between embedded software and embedded systems. L4 CO3 (5 marks) b. Discuss the different types of embedded software and their purposes in detail. L2 CO3 (5 marks)	(10)
2)	Explain the following terms pertaining to Unified Modeling Language: (i) generalization (ii) dependency (iii) aggregation (iv) composition L2 CO1	(10)
3)	Compare and contrast interfaces and abstract classes and discuss when each should be used. How do you indicate that a method is abstract in a UML Class Diagram? L4 CO1	(10)
4)	a. Draw a class diagram for the given software requirements. Assume that a class Student contains attributes like name, id, department name. Department class contains attributes as department name and list of student objects. It is associated with student class through its objects. Department class contain a method which will return list of student type. Institute class contains list of Department objects and Institute name. It is associated with Department class through its objects L3 CO1 (5 marks) b. Write a short note on Generalization and the usage of keyword "super" in Java application L3 CO2(5 marks)	(10)
5)	With adequate Java code snippets explain the following terms: (i) Static nested class (ii) Inner class (iii) Method Local inner class L2 CO1	(10)
6)	Explain the term "synchronization" with respect to a block and also with respect to a method. Also design and implement a producer-consumer array buffer problem in Java to illustrate synchronization concept. L2 CO2	(10)
7)	Imagine the working of multi-thread programming application by creating two threads, where individual thread is executing for 4 and 6 milliseconds respectively. Use UML modeling to draw a class diagram and a sequence diagram. L3 CO2	(10)
8)	Write a short note on Java Generics. Write a java program to create a	(10)

generic class that contains a method that returns the average of an array of numbers of any type, including integers, floats, and doubles. L3 CO2

9) Distinguish between a use case, a scenario, and a use case diagram. Draw a use case diagram for a hospital reception module. Provide "include" and "extends" relationship in the diagram wherever adequate. Also explain the reception module as well as the above two terms in adequate words. L4 CO3 (10)

10) Explain Component diagram and discuss the various components that are used to represent Component diagram in Unified Modeling Language. L2 CO3 (10)

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