Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

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A Constituent Institution of Manipal University

I SEMESTER M.TECH. (SOFTWARE ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: SOFTWARE DESIGN [ICT 5123]

REVISED CREDIT SYSTEM
(21/11/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data may be suitably assumed.

1A. Draw a Swim lane diagram for the following narrative. **5**

Consider a Ticket Vending Machine whose working is outlined as follows.

Activity is started by Commuter or an actor who needs to buy a ticket. Ticket vending machine will request trip information from Commuter. This information will include number and type of tickets, e.g. whether it is a monthly pass, one way or round ticket, route number, destination or zone number, etc.

Based on the provided trip info ticket vending machine will calculate payment due and request payment options. Those options include payment by cash, or by credit or debit card. If payment by card was selected by Commuter, another actor, Bank will participate in the activity by authorizing the payment.

1B. Outline the features of Extreme Programming practice. **3**

1C. Which lifecycle model is used in risk intensive softwares? Explain. **2**

2A. What is meant by a use-case? Draw the use-case diagram and write specification for each use-case for the following narrative. **5**

The author completes an online form that requests the user to input author name, correspondence address, email and, title of paper. The system validates this data and, if correct, asks the author to submit the paper. The author then browses to find the correct paper on their system and submits it. Once received and stored, the system returns to the author a reference number for the paper. Authors may submit as many papers as they like to be considered for acceptance to the conference up until the deadline date for submissions. Papers are allocated to referees for assessment. They review each paper and submit to the system their decision. Once the programme organiser has agreed to the decisions, authors are informed by email. Accepted papers are then scheduled to be delivered at a conference. This involves allocating a date, time and place for the presentation of the paper.

2B. Using the example of a retail clothing store in a mall, list relevant data flows, data stores, processes, and sources/sinks. Draw a context and the level-1 diagram that represent the selling system at the store. **3**

2C. Outline CRC approach for indentification of classes and relationships. **2**

3A. List and explain each of the building blocks of UML 5

3B. Explain the following design concepts with suitable illustrations. 3
i) Abstraction ii)modularity iii)Refactoring

3C. What is a design Pattern? List the types of design patterns along with suitable application scenario for each listed type. 2

4A. Draw the class diagram for the following Scenario with all relationship, multiplicity, roles operations, attributes etc. 5
An international airport requires a system to keep track of flight details for customers. For each flight the system needs to store the flight number, origin, destination, departure time, departure gate, airline and flight cost. Some flights are direct flights, i.e. they fly non-stop to the destination and some fly via another airport to their destination. We will call these flights indirect flights. In this case the flight stops at an airport en route to its destination to refuel. In the case of indirect flights information regarding the transit airport must also be stored. The flight cost is calculated to be the cost charged by the airline per customer plus a percentage of this amount (the profit_rate). In the case of indirect flights an additional levy must be added to this amount per customer in order to cover re-fueling levies at the transit airport.
Furthermore, on some flights additional passengers can board the plane at the transit airport. The system needs to keep track of whether boarding will take place at the transit airport or not. The system also needs to store details of the aircraft used for a flight. The aircraft make, model and capacity (number of passengers that it can carry), must be stored for each aircraft.

4B. Consider an Address Book application with facilities for adding, editing, deleting, sorting, printing, opening saving. Draw a Sequence diagram and collaboration diagram for delete Person. 3

4C. Distinguish between 2
i) Composition and Aggregation
ii) Association and Dependency

5A. Explain abstract factory design Pattern with an example. 5

5B. Explain different extensibility mechanisms of UML. 3

5C. Mention any two agile principles. 2