

Department of Information Technology, Jadavpur University
Master of Software Engineering, 1st year, 2nd Semester examination, 2025

Subject: Object Oriented Software Systems

Time - Three hours

Full marks - 100

Answer question number 1(one) and any 5(five) from the rest.

1.

10x2 = 20

- a) In XML-RPC, which data types are supported?
- b) Write the names of four relationships used in UML.
- c) What is meant by *binding* a socket to a socket address?
- d) How will you represent the relation 'a company has one or more employees' in UML?
- e) How does *multicasting* differ from *broadcasting*?
- f) How will you represent different kind of visibility (e.g. private, public etc.) in UML?
- g) Which range does *reserved ports* belong?
- h) Represent the relation 'Circle implements Shape2D' in UML.
- i) Write briefly the goals of UML.
- j) Draw a diagram for the package containing Java networking classes and interfaces.

2.

[4+6+6]

- a) What is an *interface*? How do you represent an interface in UML?
- b) Explain with examples the difference between 'association' and 'aggregation'?
- c) Consider a simple dice game of two players and two dices. The players alternatively roll two dices. A player wins/looses/draws if his/her total face value is greater than/less than/equal to the other respectively. Draw a sequence diagram for this dice game. Write down assumption(s) you made (if any).

3.

[4+6+6]

- a) Briefly explain *aggregation* and *composition* in class diagram with examples?
- b) What are differences between primary and secondary actors? Explain «*extend*» and «*include*» in use cases?
- c) Describe with examples different kinds of messages used in UML sequence diagram.

4.

- a) Is it possible to develop a multicasting application using TCP? If yes, how? How will you compare it with the same application developed using UDP?
- b) Draw a sequence diagram to indicate temporal flow of a client-server program using TCP socket.
- c) Write the skeleton of a server application that can handle multiple client requests simultaneously.

[Turn over

5. [4+6+6]
- a) Write the concept of socket address used in socket programming.
 - b) Write the relative merits and demerits of TCP and UDP style programs.
 - c) Outline the basic steps required to develop a TCP based socket application.
6. [4+6+6]
- a) What is the function of *registry* in RMI?
 - b) What is mean by *object serialization/de-serialization*?
 - c) Write the basic steps required for the above.
7. [4+6+6]
- a) What are the functions of *stub* and *skeleton* in RMI?
 - b) What do you mean by 'exporting' an object in RMI? What are different ways to *export* an object in RMI.
 - c) Briefly describe how to write a secured RMI application.
8. [4+6+6]
- a) Briefly write the operational principle of XML-RPC.
 - b) Write with examples the format of XML-RPC request and response messages
 - c) Write relative merits and demerits of `WebServer` and `ServletWebServer`
9. [4+6+6]
- a) Briefly write the operational principle of SOAP.
 - b) Write the relative merits and demerits of XML-RPC and SOAP.
 - c) Write with examples the format of a SOAP message.