



INSTITUTE OF AERONAUTICAL ENGINEERING

(AUTONOMOUS)

Dundigal, Hyderabad -500 043

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

2017 - 2018

Course Name	:	DISTRIBUTED SYSTEMS
Course Code	:	A60521
Class	:	III B. Tech II Semester
Branch	:	Computer Science and Engineering
Year	:	2017-2018
Course Faculty	:	Mr. RM Noorullah, Mr. N V Krishna Rao , Associate Professor, CSE. Mr. Ch Srikanth, Mr. Rakesh, Assistant Professor, CSE.

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

TUTORIAL QUESTION BANK

UNIT – I			
PART – A (SHORT ANSWER QUESTIONS)			
S. No	Question	Blooms Taxonomy Level	Course Outcome
UNIT – I			
1	Define distributed system and list out three advantages in it?	Remember	1
2	Define the properties of the distributed system?	Remember	2
3	List the examples of the distributed systems?	Remember	2
4	Define effective resource sharing?	Remember	7
5	State the challenges of the distributed systems?	Understand	4
6	Describe distributed client and distributed server?	Understand	3
7	Give some reasons why centralized systems are not adequate to modern computing?	Remember	7
8	Compute architectural and fundamental models?	Remember	7
9	Define interaction model?	Remember	3
10	Describe failure model?	Understand	3
11	Explain transparency and its types?	Remember	3
12	Define synchronous and asynchronous distributed systems?	Remember	2

13	Define omission failure?	Remember	1
14	Define arbitrary failure?	Remember	1
15	Define masking failure?	Remember	3
16	Describe how failure handling in distributed system?	Understand	3
17	What is meant by Byzantine failure?	Remember	7
18	Define types of failures?	Remember	7
19	List the design requirements for distributed architectures?	Remember	7
20	List the services provided by multiple servers, proxy servers, peer processes?	Remember	7
PART – B (LONG ANSWER QUESTIONS)			
1	Discuss the challenges of the distributed systems with their examples?	Understand	1
2	Differentiate between centralized systems and the distributed systems with a suitable example?	Understand	3
3	Discuss the applications of the distributed systems?	Understand	7
4	Explain resource sharing in the distributed systems?	Remember	7
5	Explain world wide web in a detail manner?	Remember	7
6	Illustrate with an example how resources are shared in the distributed systems and explain how it is not possible in the centralized systems?	Understand	7
7	Describe features of the distributed systems and also examples of the distributed systems?	Understand	7
8	Discuss how distributed systems are more scalable than the centralized systems?	Understand	3
9	Explain failure handling and transparency?	Remember	3
10	Describe the definition of the distributed systems and effective resource sharing and explain them clearly?	Understand	7
11	Differentiate between centralized and distributed systems with at least 15 differences?	Understand	3
12	Illustrate with an example how distributed plays a keen role in real world and support your answer?	Understand	7
13	Explain how events are ordering in an distributed systems and list all the types of an fundamental model ?	Remember	3
14	Explain how reliability is achieved in one to one communication and explain in detail?	Remember	3
15	Explain briefly how threats are defeated in security of the distributed systems?	Remember	3
16	Discuss any five types of hardware resources and five types of data or software resource that can usefully be shared ?	Understand	3
17	Describe the advantages and disadvantages of the HTML,URL&HTTP as core technologies for information browsing?	Understand	7
18	List the three main components of the URL, stating how their boundaries are denoted and illustrating each one from your example?	Remember	12
19	Describe and illustrate the client server architecture of one or more major internet applications?	Understand	7
20	Differentiate between buffering and caching?	Understand	3
PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1	Describe the types of the system models and their types in a detail manner?	Understand	4
2	Explain why architecture model is important for distributed systems?	Understand	4
3	Explain fundamental model in detail?	Understand	4
4	Explain system architectures in distributed systems?	Remember	7
5	Demonstrate the design requirements for distributed architectures?	Understand	7
6	Describe all the types of the fundamental models?	Remember	7
7	Differentiate interaction model, security model, failure model?	Understand	7

8	Illustrate the client-server architecture of one or more major internet applications?	Understand	7
9	Explain the types of the failures that may normally happen in distributed systems?	Remember	7
10	Explain how events are ordering in real-time with neat sketch?	Understand	4
UNIT-II			
PART – A (SHORT ANSWER QUESTIONS)			
1	Explain clocks, events and process states?	Remember	5
2	Explain how synchronizing the physical clocks?	Remember	5
3	Discuss the Lamport logical clocks and logical time?	Understand	6
4	Describe Distributed debugging?	Understand	5
5	Explain Global states in detail?	Remember	5
6	Explain the Snapshot Algorithm of Chandy and Lamport ?	Remember	5
7	Differentiate all the type of the multicast communication?	Understand	5
8	Discuss the termination procedure of the snapshot algorithm with an example?	Understand	5
9	Explain how consistent global states are observing in distributed debugging process?	Remember	5
10	Explain possibly Θ -and evaluating definitely Θ in distributed debugging process?	Remember	5
11	Explain why computer clock synchronization is necessary? Describe the design requirements for a system to synchronize the clocks in distributed systems?	Remember	5
12	Discuss the factors to be taken into account when deciding to which NTP Server of a client should synchronize its clock?	Understand	5
13	Discuss how it is possible to compensate for clock drift between synchronization points by observing the drift rate over time?	Understand	3
14	Explain clearly if all clients processes are single threaded, is mutual exclusion condition (ME3), which specifies entry in happened-before order, relevant?	Remember	5
15	Explain why the algorithm for reliable multicast over IP multicast does not work for open groups. Given any algorithms for closed groups, how to simply and derive an algorithm for open groups?	Remember	5
16	Explain clearly how to adapt the bully algorithm to deal with temporary network partition and slow processes?	Remember	3
17	Explain clearly how to adapt the casually ordered multicast protocol to handle overlapping groups?	Remember	5
18	Define a solution to reliable, totally ordered multicast in a synchronous system, using a reliable multicast and a solution to the consensus problems?	Remember	5
19	Explain how that the byzantine agreement can be reached for the three generals, with one of them faulty, if the generals digitally signed their messages?	Remember	5
20	Illustrate an example execution of the ring-based algorithm to show that processes are not necessarily granted entry to the critical section in happened-before order?	Understand	8
PART – B (LONG ANSWER QUESTIONS)			
1	Explain clocks, events and process states?	Remember	5
2	Explain how synchronizing physical clocks?	Remember	5
3	Discuss the Lamport logical clocks and logical time?	Understand	5
4	Describe distribute debugging?	Understand	5
5	Explain global states in detail?	Remember	5
6	Explain the snapshot algorithm of Chandy and Lamport ?	Remember	5
7	Differentiate all the type of the multicast communication?	Understand	8,9

8	Discuss the termination procedure of the snapshot algorithm?	Understand	5
9	Explain how consistent global states are observing in distributed debugging process?	Remember	7
10	Describe possibly Θ -and evaluating definitely Θ in distributed debugging process?	Understand	5
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PART –C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1	Explain Network Time Protocol in detail?	Remember	5
2	Differentiate failure assumptions and failure detectors?	Understand	5
3	Define critical section and mutual exclusion and explain its algorithms?	Remember	5
3	Explain distributed mutual exclusion in detail?	Remember	5
4	Discuss in detail about the algorithms of the mutual exclusion?	Understand	5
5	Explain how election is done when any particular system crashes?	Remember	5
6	Discuss the types of the election algorithms with a neat sketch?	Understand	5
7	Discuss in detail about the multicast communication?	Understand	5
8	Explain different kinds of problems that are associated with the coordination and agreement in distributed systems?	Remember	5
9	Discuss in detail about consensus and related problems in coordination and agreement?	Understand	5
10	Discuss in detail about consensus and related problems in coordination and agreement?	Understand	5
UNIT-III			
PART – A (SHORT ANSWER QUESTIONS)			
1	Define the uses of UDP?	Remember	5
2	Explain TCP Stream communication?	Understand	3
3	List the issues related to the stream communication?	Remember	8
4	Define data marshalling?	Remember	7
5	Define data representation?	Remember	5
6	Define CORBA?	Remember	5

7	Explain request-reply protocols?	Remember	3
8	State IP multicast?	Understand	5
9	Define some examples of the effects of reliability and ordering?	Remember	8
10	Explain data gram communication in UNIX?	Remember	8
11	Define types of network?	Remember	5
12	Define network principles?	Remember	8
13	Define internet protocols?	Remember	8
14	State client-server communication?	Understand	8
15	Define group communication?	Remember	8
16	Define RMI?	Remember	8
17	Define RPC?	Remember	8
18	Define socket?	Remember	8
19	Distinguish synchronous and asynchronous communication?	Understand	8,9
20	Define request (R) protocol?	Remember	8
21	Define request-reply-acknowledge reply (RRA) protocol?	Remember	8
22	Define Content negotiation in HTTP?	Remember	8
23	Define request-reply (RR) protocol?	Remember	8
24	Define Authentication in HTTP?	Remember	8
25	List three design issues of RPC?	Remember	8
PART – B (LONG ANSWER QUESTIONS)			
1	State the two alternative approaches in the data representation and marshalling?	Understand	8
2	Explain the API for the internet protocols in IPC?	Remember	8
3	Explain UDP datagram communication in detail?	Remember	8
4	Explain TCP stream communication in detail?	Remember	8
5	Explain in detail about external data and marshalling?	Remember	8
6	Distinguish client-server communication in detail?	Understand	8
7	Explain group communication in detail?	Remember	8
8	Explain IP multicast in group communication?	Remember	8
9	Explain reliability and ordering of multicast in group communication?	Remember	8
10	Describe the inter process communication in Unix with an example?	Understand	9
11	Discuss the invocation semantics that can be achieved when the request-reply protocol is implemented over a TCP/IP connection, which guarantees that data is delivered in the order sent, without loss or duplication. Take into account all of the conditions causing a connection to be broken?	Understand	5
12	Define the interface to the election service in the CORBA IDL and JAVA RMI. (Note that CORBA IDL provides type long for 32-bit integers). Compare the methods in the two languages for specifying input and output arguments?	Remember	5
13	Explain how to use the java reflection to construct a generic dispatcher. Give java code for a dispatcher whose signature is: Public void dispatch(object target, a method, byte[] args)	Understand	8
14	Explain the styles of exchange protocols in RPC Exchange protocols?	Understand	8
15	Define a remote object table that can support garbage collection as well as translating between local and remote object references?	Remember	5
16	Explain how a forwarding observer may be used to enhance the reliability and performance of the objects interest in an even service?	Understand	8

17	Explain how RMI is implemented in Remote invocation?	Understand	8
18	Explain RPC and its case studies in a detail manner?	Understand	8
19	Define event and notifications and explain simple dealing room system?	Remember	5
20	Explain JINI distributed event specification with detail manner?	Understand	8
21	Discuss in detail about Java RMI case study?	Understand	5
PART –C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1	Discuss about the main arguments for adopting a super node approach in Skype?	Understand	8
2	Why can't binary data be represented directly in XML, for example, by representing it as Unicode byte values? XML elements can carry strings represented as base64. Discuss the advantages or disadvantages of using this method to represent binary data	Understand	8
3	Describe the design of a scheme that uses message retransmissions with IP multicast to overcome the problem of dropped messages. Your scheme should take the following points into account: i) There may be multiple senders. ii) Generally only a small proportion of messages are dropped. iii) Recipients may not necessarily send a message within any particular time limit. Assume that messages that are not dropped arrive in sender order.	Understand	8
4	Explain Sun XDR marshals data by converting it into a standard big-endian form before transmission. Discuss the advantages and disadvantages of this method when compared with CORBA CDR	Remember	8
5	Describe a server creates a port that it uses to receive requests from clients. Discuss the design issues concerning the relationship between the name of this port and the names used by clients.	Understand	8
6	Discuss about the communication between distributed objects in RMI?	Understand	8
7	Explain distributed object model and also discuss the design issues of RMI?	Remember	8
8	Explain the implementation of the RMI and distributed garbage collection?	Remember	8
9	Explain RPC with a neat example?	Remember	8
10	Describe events and its types and explain notifications in the remote invocation?	Understand	9
11	Discuss about jinni distributed event specification?	Understand	9
12	Explain Java RMI and its procedures?	Remember	9
13	Explain how java RMI builds the client and server programs?	Remember	9
14	Describe the design implementation of java RMI?	Understand	9
15	Explain Sun RPC in detail?	Remember	9
UNIT- IV			
PART – A (SHORT ANSWER QUESTIONS)			
1	State distributed file system requirements?	Understand	10
2	Write the types of the transparency?	Understand	10
3	List the differences between global name service and x.500 directory service?	Remember	10
4	Define consistency and efficiency?	Remember	10
5	Differentiate between Andrew file system and sun network file system?	Understand	10
6	Define client integration in the SUN network file system?	Remember	10
7	Define virtual file system?	Remember	10
8	Define mount service?	Remember	10
9	Explain cache consistency in Andrew file system?	Remember	10
10	Explain other aspects in the Andrew file system?	Remember	10

11	Define the definition of the domain name service?	Remember	3
12	Define directory?	Remember	5
13	Define global name service?	Remember	5
14	What is the importance of the name services in the distributed system?	Remember	3
15	Define name resolution?	Remember	8
16	Explain name service requirements?	Understand	5
17	Define name space?	Remember	10
18	Explain the aliasing concept?	Understand	5
19	Explain name resolution?	Understand	5
20	List the directory services?	Remember	3
PART – B (LONG ANSWER QUESTIONS)			
1	Explain file service architecture in detail?	Remember	11
2	Explain sun network file system?	Remember	10
3	Describe in detail about Andrew file system?	Understand	10
4	Write about the recent advances in the distributed file systems?	Understand	10
5	Explain the characteristics and distributed file system requirements?	Remember	11
6	Describe basic distributed file system and storage systems and their properties?	Understand	11
7	Explain distributed file system with any two examples?	Remember	11
8	Illustrate sun network file systems and Andrew file systems?	Understand	11
9	Explain the implementation of the Andrew file systems?	Remember	11
10	Explain NFS architecture of the sun network file systems	Remember	11
11	Explain name services and the domain name systems?	Remember	11
12	Explain directory and discovery services?	Remember	11
13	Discuss about global name service in detail?	Understand	3
14	Describe the X.500 directory service in detail?	Understand	3
15	Demonstrate the domain name system?	Understand	3
16	Explain the design and implementation issues of distributed shared memory?	Remember	11
17	Explain sequential consistency and Ivy in detail?	Remember	11
18	Explain release consistency with an example?	Remember	11
19	Discuss in detail about Munin?	Understand	3
20	Write a note on all consistency models?	Understand	11
PART –C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1	What data must the NFS client module hold on behalf of each user-level process?	Remember	10
2	Write a procedure <i>PathLookup(Pathname, Dir) ->UFID</i> that implements <i>Lookup</i> for UNIX-like pathnames based on our model directory service.	Understand	10
3	What condition must be fulfilled by the configuration of the mount tables at the client computers for access transparency to be achieved in an NFS-based filing system?	Remember	10
4	Which features of the AFS design make it more scalable than NFS? What are the limits on its scalability, assuming that servers can be added as required? Which recent developments offer greater scalability?	Remember	10
5	Explain why the RPC interface to early implementations of NFS is potentially insecure. The security loophole has been closed in NFS 3 by the use of encryption. How is the encryption key kept secret? Is the security of the key adequate?	Remember	10
6	Describe the names (including identifiers) and attributes used in a distributed file service such as NFS	Understand	10

7	Discuss the problems raised by the use of aliases in a name service, and indicate how, if at all, these may be overcome.	Understand	10
8	Explain why iterative navigation is necessary in a name service in which different name spaces are partially integrated, such as the file-naming scheme provided by NFS	Remember	10
9	Describe the problem of unbound names in multicast navigation. What is implied by the installation of a server for responding to lookups of unbound names?	Understand	10
10	Discuss the potential advantages and drawbacks of the use of an X.500 directory service in place of the DNS and the Internet mail delivery programs. Sketch the design of a mail delivery system for an internetwork in which all mail users and mail hosts are registered in an X.500 database.	Understand	10
UNIT-V			
PART – A (SHORT ANSWER QUESTIONS)			
1	Define transaction recovery?	Remember	12
2	Compare the flat and nested distributed transactions?	Remember	12
3	State the properties of transactions?	Understand	12
4	List the types of locks?	Remember	12
5	Define 2PL?	Remember	12
6	Compute shrinking and growing phase?	Remember	12
7	Write about time stamp ordering protocol?	Understand	12
8	Illustrate the methods of the concurrency control?	Understand	12
9	Explain nested transactions?	Remember	12
10	Compute how the transactions are executed?	Remember	12
11	Define deadlock?	Remember	3
12	Define atomic commit protocols?	Remember	5
13	Define distributed deadlock?	Remember	8
14	Explain concurrency control in distributed transactions?	Remember	5
15	Define nested transactions?	Remember	7
16	Explain deadlock detection?	Remember	5
17	Explain deadlock recovery?	Remember	5
18	Define wait-for-graph?	Remember	5
19	Define phantom deadlocks?	Remember	5
20	Explain recovery of nested transactions?	Remember	1
PART – B (LONG ANSWER QUESTIONS)			
1	State and explain simple synchronization and failure model for transactions?	Understand	12
2	Explain transactions and their properties in detail?	Remember	12
3	Write a brief note on nested transactions?	Understand	12
4	Write a brief note on locks and its types?	Understand	12
5	Explain about deadlocks in detail?	Remember	12
6	Differentiate the methods for concurrency control?	Understand	12
7	Explain about optimistic concurrency control?	Remember	12
8	Explain about time stamp ordering?	Remember	12
9	Differentiate flat and nested transactions with a neat sketch?	Understand	12
10	Explain atomic commit protocols?	Remember	12
11	Explain how transactions are recovered in distributed systems?	Remember	3
12	Describe how a non-recoverable situation could arise if write locks are released after the last operation of a transaction but before its commitments?	Understand	3

13	Explain why executions are always strict, even if read locks are released after the last operation of a transaction but before its commitments?	Remember	3
14	Explain how the two-phase commit protocol for nested transactions ensures that if the top-level transaction commits?	Remember	3
15	Explain with an example how two transactions are interleaved which are serially equivalent at each server but is not serially equivalent globally?	Remember	3
16	Describe how the actions of the 2-phase commit protocol relate to the concurrency control actions of each individual server, how does distributed deadlock detection fit in (assume in strict two-phase locking)?	Understand	3
17	Discuss the edge-chasing algorithm. Give examples to show that it could detect phantom deadlocks?	Understand	3
18	Explain how locks are released and acquired with a neat example?	Remember	3
19	Define deadlock? And explain how deadlocks are occurred and recovered in the distributed systems?	Remember	5
20	Differentiate all the types of the concurrency control mechanisms?	Understand	12
PART –C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1	Explain two phase commit protocols for nested transactions?	Remember	12
2	Explain concurrency control in distributed transactions?	Remember	12
3	Write a brief note on distributed deadlocks?	Understand	12
4	Explain the transaction recovery procedure in distributed transactions?	Remember	12
5	Explain the recovery of the two- phase commit protocol in distributed transactions?	Remember	12
6	Explain in detail about the three- phase locking?	Remember	12
7	Distinguish between three phase commit and two phase commit protocol?	Remember	12
8	Explain with an example of the interleaving of two transactions that is serially equivalent at each server but is not serially equivalent globally?	Remember	12
9	Explain how the two-phase commit protocol for nested transactions ensures that if the top-level transaction commits, all the right descendants are committed or aborted?	Remember	12
10	Distinguish all the locking protocols in distributed transactions?	Understand	12

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