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CS IT 2015

**(Set-1)**

# B.Tech - 8th
# Advanced Operating System

*Full Marks* : 70

*Time* : 3 hours

**Answer any six questions including Q. No. 1 which is compulsory**

*The figures in the right-hand margin indicate marks*

**1.** Answer the following questions : $2 \times 10$

(*a*) What is fault tolerance ? How fault tolerance of a distributed operating system can be improved ?

(*b*) What do you mean by causal ordering of messages ? Give an example.

(*c*) What is role of server stub in RPC ?

(*d*) When does false sharing occur in the context of DSM ?

( Turn Over )



(*e*) State the four necessary conditions for a deadlock to take place.

(*f*) Give examples of two global scheduling algorithms that may lead to processor thrashing.

(*g*) List two main differences between a thread and a process.

(*h*) What are the two main factors that affect the atomicity of transactions ?

(*i*) Give an example of the following type of name space : A hierarchical name space having four domains with each domain having three names.

(*j*) Differentiate between known-plaintext and chosen-plaintext attacks with respect to cryptosystems.

**2.** (*a*) Discuss some of the important concepts that a designer of a distributed operating system might use to improve the reliability of his or her system.

(*b*) Why scalability is important in distributed systems ? What are the issues of designing a scalable distributed system ? 5

3. (*a*) What are the elements of a typical IPC message ? Discuss the desirable features of a good message passing system. 5

(*b*) Explain the working of a Callback RPC with a neat diagram. 5

4. (*a*) Discuss the relative advantages and disadvantages of using large block size and small block size in the design of block-based DSM system. 5

(*b*) Why does simple LRU policy often used for replacing cache lines in a buffer cache not work well as a replacement policy for replacing blocks in a DSM system ? 5

5. (*a*) A system uses preemption method for deadlock prevention. Suppose the system currently has five transactions T1, T2,





T3, T4 and T5, their timestamp values being t1, t2, t3, t4 and t5, respectively (t1 > t2 > t3 > t4 > t5). Explain what happens if : 5

(*i*) The system uses wait-die scheme and T2 request for a resource held by T5.

(*ii*) The system uses the wait-die scheme and T4 requests for a resource held by T1 

(*b*) Discuss the desirable features of a good global scheduling algorithm. 5

6. (*a*) List some of the potential advantages and disadvantages of process migration. 5

(*b*) Differentiate between replication and caching. Discuss some of the relative advantages of replication. 5

7. (*a*) What is a digital signature ? What are its uses in the security of a distributed system ? Give a method to create a digital signature. 5

(*b*) What is a namespace ? For a hierarchically structured namespace, discuss the relative advantages of using a fixed number of levels and allowing an arbitrary number of levels for the hierarchy. 5

8. Write short notes on any *four* : $2\frac{1}{2} \times 4$

(*i*) Multidatagram communication

(*ii*) Stateless server

(*iii*) Mutual Exclusion in distributed operating systems

(*iv*) Deterministic versus probabilistic load balancing

(*v*) Lightweight RPC.

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