Question Paper Code : X 20405

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Sixth Semester

Computer Science and Engineering

CS 6601 – DISTRIBUTED SYSTEMS

(Common to Information Technology)

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   **(10×2=20 Marks)**

1. Compare and contrast cloud computing with more traditional client-server computing.

2. List the three main software components that may fail when a client process invokes a method in a server object, giving an example of a failure in each case. Suggest how the components can be made to tolerate one another's failures.

3. Give examples of applications where the use of mobile code is beneficial.

4. Is it conceivably useful for a port to have several receivers ?

5. How does caching help a name service's availability ?

6. Why should UFIDs be unique across all possible file systems ?

7. Suggest how to adapt the causally ordered multicast protocol to handle overlapping groups.

8. Why is computer clock synchronization necessary ? Describe the design requirements for a system to synchronize the clocks in a distributed system.

9. What thread operations are the most significant in cost ?

10. Outline a system to support a distributed music rehearsal facility. Suggest suitable QoS requirements and a hardware and software configuration that might be used.

PART – B **(5×13=65 Marks)**

11. a) Give five types of hardware resources and five types of data or software resources that can usefully be shared. Give examples of their sharing as it occurs in distributed systems.

(OR)

b) Use the World Wide Web as an example to illustrate the concept of resource sharing, client and server. What are the advantages and disadvantages of HTML, URLs and HTTP as core technologies for information browsing ? Are any of these technologies suitable as a basis for client-server computing in general ?

12. a) A server creates a port which 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.

(OR)

b) A file server uses caching and achieves a hit rate of 80%. File operations in the server cost 5 ms of CPU time when the server finds the requested block in the cache, and take an additional 15 ms of disk I/O time otherwise. Explaining any assumptions you make, estimate the server's throughout capacity (average requests/sec) if it is :

1) single-threaded;
2) two-threaded, running on a single processor;
3) two-threaded, running on a two-processor computer.

13. a) It is often argued that peer-to-peer systems can offer anonymity for :

 i) clients accessing resources;
ii) the hosts providing access to resources.

Discuss each of these propositions. Suggest a way in which the resistance to attacks on anonymity might be improved.

(OR)

b) Use CORBA IDL to specify a bank account. An account should have the information about account name, account number and balance. The methods for this bank account should include open, deposit, withdraw and balance inquiry. Your IDL should be able to run through CORBA IDL compiler.

14. a) 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.

(OR)

b) Explain why are multi-threaded clients and servers attractive to use in distributed systems as it makes it much easier to express communication in the form of maintaining multiple logical connections at the same time.

15. a) Suggest a scheme for balancing the load on a set of computers. You should discuss :

   i) What user or system requirements are met by such a scheme ?

   ii) To what categories of applications it is suited ?

   iii) How to measure load and with what accuracy ?

   iv) How to monitor load and choose the location for a new process ? Assume that processes may not be migrated.

   v) How would your design be affected if processes could be migrated between computers ?

   vi) Would you expect process migration to have a significant cost ?

(OR)

b) Explain the following term in detail with respect to resource management :

   i) Resource scheduling

   ii) Fair scheduling

   iii) Real-time scheduling.

PART – C (1×15=15 Marks)

16. a) Compare connectionless (UDP) and connection-oriented (TCP) communication for the implementation of each of the following application-level or presentation-level protocols :

   i) Virtual terminal access (for example, Telnet);

   ii) File transfer (for example, FTP);

   iii) User location (for example, rwho, finger);

   iv) Information browsing (for example, HTTP);

   v) Remote procedure call.

(OR)

b) What was the primary motivation behind the development of the RPC facility ? How does a RPC facility make the job of distributed applications programmers simpler ?

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