2004

1. We have a client-server system where the client can make multiple requests on one connection. That is a client opens a connection, makes a request, receives a response, makes another request, etc. In such a system the server needs to know when it has received the entire contents of a single message. What are the different techniques that can be used in a protocol so the server knows when it has received the entire contents of a single message?

2. Some protocols use key-value pairs to transmit data, others do not. What is the advantage of using key-value pairs?

3. We have a protocol that sends a series of key-value pairs. The basic format is key1=value1;key2=value2;…;keyN=valueN;. That is the pairs are separated by the character ";" and the key and value in a pair are separated by the character "=". What problem(s) can occur in reading & parsing this format? How can one solve the problem(s)?

4. Some protocols are text based, others are binary. Give one advantage of a text based protocol over a binary protocol. Give one advantage of a binary protocol over a text based protocol.

5. We have a method multiply(int a, int b) (multiply: anInteger by: integer2 for Smalltalkers) that returns the result of multiplying two integers . The method is an instance method on the class Foo. Write a test case for this method.

6. What are the advantages of using a thread pool over creating a new thread for to handle new connections in a concurrent server?

7. What uniquely defines a connection between two machines using TCP/IP?

8. Why might logging be important in client-server applications? What type of information might be important to log?

9. When would one use an iterative server over a concurrent server?

10. A student was hired to create a database to hold the grades of students in computer science courses. The student produced the following table with the columns listed below. Produce a normalized version of the table.

Student_First_Name, Student_Last_Name, Student_Red_ID
CS107_Assignment1, …, CS107_Assignment25,
CS108_Assignment1, …, CS108_Assignment25,
… (not shown are the other course offered by the department)
CS696_Assignment1, …., CS696_Assignment25

2005

1. What are the advantages of a Lo-fi prototype over building a prototype in software?

2. What are the advantages and disadvantages of using UDP over TCP?

3. What uniquely defines a connection between two machines using TCP/IP?

4. Some protocols are text based, others are binary. Give one disadvantage of using binary protocol in the Bittorent class project.

5. There are a number of ways in which one can write a unit test for a private method in a class. What are two ways of doing this?

6. Servers frequently log information about each client that connects to the server.

    A. Why would the server log the IP of the client?

    B. Why would the server not log the machine name (or full domain name) of the client.

7. Which of the following protocols are stateless?

    A. HTTP

    B. POP

    C. Course Bittorent protocol

8. What is a one-way hash and how is it used?

9. A client-server protocol should be extensible. Explain how the course Bittorent protocol is extendable.

10. A client-server protocol should be parsable. Discuss the features used in the course Bittorent protocol that help make it parsable.

11. What is a transaction script and how may it be used in a server?

12. What is the first normal form and why is it important to use it in databases?

2006

1. What are the advantages and disadvantages of using UDP over TCP?

2. What uniquely defines a connection between two machines using TCP/IP? That is how one can have 15 clients on one machine (say rohan) connect to the same server at the same time on another machine (say bismarck) and not have the connections get mixed up.

3. A client-server protocol should be extensible. Explain how the course Chess protocol is extendable.

4. A client-server protocol should be parsable. Discuss the features used in the course Chess protocol that help make it parsable.

5. We have a client-server system where the client can make multiple requests on one connection. That is a client opens a connection, makes a request, receives a response, makes another request, etc. In such a system the server needs to know when it has received the entire contents of a single message. What are the different techniques that can be used in a protocol so the server knows when it has received the entire contents of a single message?

6. Problems that can arise with client and server are on different hardware platforms (say client is on a PC and server in on Unix).

7. Show how to create a thread in Java (Ruby) and give it a different priority than the default priority.

8. What is a transaction script and how may it be used in a server?

9. Why might logging be important in client-server applications? What type of information might be important to log?

10. What is the first normal form and why is it important to use it in databases?

2007

1. Explain the terms:

    a. Iterative server

    b. Concurrent server

    c. Stateful server

2. What uniquely defines a connection between two machines using TCP/IP? That is how one can have 15 clients on one machine (say rohan) connect to the same server at the same time on another machine (say bismarck) and not have the connections get mixed up.

3. A client-server protocol should be extensible. Explain some important features of HTTP that make it extendable.

4. What are the different techniques that can be used in a protocol so the server knows when it has received the entire contents of a single message from the client?

5. Problems that can arise with client and server are on different hardware platforms (say client is on a PC and server in on Unix).

6. Show how to create a thread in Java (Ruby) and give it a different priority than the default priority.

7. What is an Active Record and how may it be used in a server?

8. Servers often are parameterized. That is when servers are started they are supplied with values needed for them to run properly. Explain the various locations servers typically look for these values and the order in the locations are searched.

9. What are the three normal forms and why is it important to use them when designing database tables?

10. What are the advantages and disadvantages of using XML-RPC to develop a client-server application over developing your own protocol as was done in assignment 4.

2009

1. Explain the terms:

   a. Iterative server

   b. Concurrent server

   c. Connectionless server

2. What uniquely defines a connection between two machines using TCP/IP? That is how one can have 15 clients on one machine (say rohan) connect to the same server at the same time on another machine (say bismarck) and not have the connections get mixed up.

3. What are the three normal forms and why is it important to use them when designing database tables?

4. A student was hired to create a database to hold the courses taken by students. The student produced the following table with the columns listed below. Produce a normalized version of the table.

   Student_First_Name, Student_Last_Name, Student_Red_ID course1, course2, course3, ..., course50

5. What are important features of a good protocol? Using those features what are the good and not so good aspects of the SDwitter protocol.

6. What is the difference between UTF8 and UTF16?

7. Discuss how to maintain states of a connection in a server.

8. What is the difference between Table Data Gateway and Active Record.

9. What is the Smart UI Pattern? What are its benefits and drawbacks?

10. We have a Class Foo with an instance method bar(). We want to restrict bar() so that only one thread can execute bar() at a time regardless of the number of instance (objects) of Foo. Show how to restrict bar() in this way.