

B. C. S. E Third Year Second Semester 2023

Internet Technology (Set I)

Class Test I

Time- 50minutes

Full Marks-30

Answer all Questions

1. In a TCP session, the initial sequence numbers chosen by the client and the server are two 32-bit random numbers X and Y respectively. After the connection establishment the client sends data of length P bytes and the server replies with data of length Q bytes. After that the connection is closed by both the parties. With the help of a time sequence diagram clearly show the values of the sequence number and acknowledgement number fields of the segments exchanged in the TCP connection establishment, data exchange and connection termination. Consider, $X = 2000 + (N+1)2$, $Y = 4000 + (N+1)2$, $P = (N+2)(N+5)$, and $Q = (N+3)(N+4)$, where N = last digit of your class roll number % 5.
Explain with an example how ICMP redirection message can be useful. 8+2=10
2. How does a web container provide different output for different clients when the same servlet is requested? 4
3. What is Event Emitter design pattern? How is it applied in Node.js? Explain with suitable code snippets. 3+4
4. Implement a message passing application using Node.js where a user can send a message to other users who are connected and other users get notified when a user gets disconnected. No need to write HTML code. Comment on how the various function calls are invoked at the server side-direct/CPS/callbacks. 9

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Internet Technology (Set II)

Class Test I

Time- 50 minutes

Full Marks-30

Answer all Questions

1. (a) What is the difference between a web server and a web container? 3
(b) Write a Node.js application to push a static advertisement page to the client after the client has connected to the server. 4
(b) Assume an html form has a submit button and a text field where username is to be entered. Read the user input, and display "Hello <username>". If the text-field is blank, the application displays "Hello user". Write suitable code snippets in Express to implement this. You can utilize template engines. 5
2. Write a basic crawler application in Node.js that takes a URL as input, extracts the content and stores them in a file. Justify how your code is not suffering from the callback hell problem. 8
3. In a TCP session, the initial sequence numbers chosen by the client and the server are two 32-bit random numbers X and Y respectively. After the connection establishment the client sends data of length P bytes and the server replies with data of length Q bytes. After that the connection is closed by both the parties. With the help of a time sequence diagram clearly show the values of the sequence number and acknowledgement number fields of the segments exchanged in the TCP connection establishment, data exchange and connection termination. Consider, $X = 2000 + (N+1)2$, $Y = 4000 + (N+1)2$, $P = (N+2)(N+5)$, and $Q = (N+3)(N+4)$, where N = last digit of your class roll number % 5.
Explain with an example how ICMP redirection message can be useful. 8+2=10

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Internet Technology (Set III)

Class Test I

Time- 50 minutes

Full Marks-30

Answer all Questions

1. In a TCP session, the initial sequence numbers chosen by the client and the server are two 32-bit random numbers X and Y respectively. After the connection establishment the client sends data of length P bytes and the server replies with data of length Q bytes. After that the connection is closed by both the parties. With the help of a time sequence diagram clearly show the values of the sequence number and acknowledgement number fields of the segments exchanged in the TCP connection establishment, data exchange and connection termination. Consider, $X = 2000 + (N+1)2$, $Y = 4000 + (N+1)2$, $P = (N+2)(N+5)$, and $Q = (N+3)(N+4)$, where N = last digit of your class roll number % 5.

Explain with an example how ICMP redirection message can be useful.

8+2=10

2. What is the significance of the Reactor pattern w.r.t Node.JS? Give an example of where it is implemented. 7
3. (a) Assume an html form has a submit button and text fields where username, first name, last name are to be entered. Notify the client of any error or successful insertion of the data into the database. Write code snippets to store the information extracted from a client to database. Denote where (i)direct style is invoked in your code, (ii) promise (if any) is utilized in your code. 9
- (b) Does any control flows synchronously through the promise chain? Justify. 4

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Internet Technology (Set IV)

Class Test I

Time- 50 minutes

Full Marks-30

Answer all Questions

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Explain with an example how ICMP redirection message can be useful.

8+2=10

2. A restaurant deploys a web application for taking online orders. Write a simple chatbot that would communicate with the customers. Assume that there are different request handlers in place for handling individual messages. 9
3. Is Express opinionated? Justify your answer. 3
4. Do Servlets support multithreading? Justify. 3
5. Write a Node.JS application that takes two inputs-student name and Course. It collects these inputs from a user and stores them in Mongo DB. 5

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Internet Technology (Set V)

Class Test I

Time- 50 minutes

Full Marks-30

Answer all Questions

1. A restaurant deploys a web application for taking online orders. Write a simple chatbot that would communicate with the customers. Assume that there are different request handlers in place for handling individual messages. 9
2. Write a basic crawler application in Node.js that takes a URL as input, extracts the content and stores them in a file. Justify how your code is not suffering from the callback hell problem. 8
3. State a feature of Node.js/Express that is not supported by Servlets/Spring. Justify. 3
4. In a TCP session, the initial sequence numbers chosen by the client and the server are two 32-bit random numbers X and Y respectively. After the connection establishment the client sends data of length P bytes and the server replies with data of length Q bytes. After that the connection is closed by both the parties. With the help of a time sequence diagram clearly show the values of the sequence number and acknowledgement number fields of the segments exchanged in the TCP connection establishment, data exchange and connection termination. Consider, $X = 2000 + (N+1)2$, $Y = 4000 + (N+1)2$, $P = (N+2)(N+5)$, and $Q = (N+3)(N+4)$, where N = last digit of your class roll number % 5.
Explain with an example how ICMP redirection message can be useful. 8+2=10

B. C. S. E Third Year Second Semester 2023

Internet Technology (Set VI)

Class Test I

Time- 50 minutes

Full Marks-30

Answer all Questions

1. In a TCP session, the initial sequence numbers chosen by the client and the server are two 32-bit random numbers X and Y respectively. After the connection establishment the client sends data of length P bytes and the server replies with data of length Q bytes. After that the connection is closed by both the parties. With the help of a time sequence diagram clearly show the values of the sequence number and acknowledgement number fields of the segments exchanged in the TCP connection establishment, data exchange and connection termination. Consider, $X = 2000 + (N+1)2$, $Y = 4000 + (N+1)2$, $P = (N+2)(N+5)$, and $Q = (N+3)(N+4)$, where N = last digit of your class roll number % 5.
Explain with an example how ICMP redirection message can be useful. 8+2=10
2. A restaurant deploys a web application for taking online orders for Holi. You own a chat service application. How would you send the advertisement of the restaurant offers through the chat service? Assume all HTML codes are in place. Do not need to write the entire chat message flow. 9
3. What is callback hell problem? How would you identify? 5
4. Is Express opinionated? Justify your answer. 3
5. How would you create an HTTP server in Node.js without using callbacks? Explain with code. 3