



Answer the following questions (Total marks: 60 M)

Q1 . Choose the correct answer (9 M):

- a) The layer deals with user-related commands, makes logic decisions, and processes data.
1. resource 2. business 3.application 4. presentation
- b) The layer enables user access to data and translates data in user friendly content.
1. transport 2. business 3.resource 4. presentation
- c) While developing servlet applications, there is a need to include for all the methods to deal with data inconsistency.
1. serialization 2. synchronization 3.asynchronization 4. concurrently
- d) implements all the Servlet methods, including service(), which determines the request method type.
1. GenericServlet 2. CustomServlet 3. ServletImpl 4. HttpServlet
- e) In HTTP request, the command is used for echo incoming request.
1. CONNECT 2. POST 3. TRACE 4. OPTIONS
- f) In HTTP request, the command is used for reserved for future use.
1. FUTR 2. TRACE 3. CONNECT 4. OPTIONS
- g) In JDBC, the function returns a string containing the indicated column's type name.
1. getColumnTypeName(int) 2. getColumnTypes(int) 3. getColumnID(int) 4. getColumnName(int)
- h) In ICMP packet, if Type=3 and Code=1, it means:
1. Host Unreachable 2. Net Unreachable 3. PortUnreachable 4. Protocol Unreachable
- i) In ICMP packet, if Type=8, it means:
1. Time Exceeded 2. Echo Reply 3. Destination Unreachable 4. Echo Request
- j) is an email service, which is managed by the UAs and refers to what the remote user does with the messages.
1. Reporting 2. Composition 3. Disposition 4. Displaying
- k) In SMTP, the command is employed for secure data transfer.
1. AUTH 2. STARTTLS 3. EHLO 4. RCPT TO
- l) In socket-based SMTP application, we send the message by using the function.
1. writeBytes("QUIT\r\n") 2. send(String) 3. writeBytes("SEND") 4. sendEmail(String) TO
- m) In TCP/IP reference model, the offers the upper layers and the operating system access to the device driver.
1. MAC 2. LLC 3. LCL 4. Interent
- n) In TCP/IP reference model, the is responsible for reporting and setting the device status.
1. Interent 2.LCL 3.LLC 4. MAC
- o) A UDP datagram consists of an byte header followed by a payload.
1. 8 2. 4 3. 16 4. 20
- p) In DNS resource record structure, the denotes the kind of recorder, among other one of the most important is "A" which represents the IP address.
1. Class 2. Type 3. TTL 4.Value
- q) is used for delivering multimedia data over the IP networks.
1. RTCP 2. TPC 3. RTP 4.UDP

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- r) In Java Thread class, causes the thread to temporarily pause and allows other threads to execute.
1. public void yield() 2. void join(long millisec) 3. void join() 4. static void yield()

Q2. Fill in the spaces (12 M):

- a) offers a mechanism for the clients to remotely access services made available at the servers providing all required input data and collecting the outputs following the remote processing at server side.
- b) Two-tier applications are suitable for size applications. In this scenario, has been separated from.....
- c) The main drawbacks of CGI are its issues and
- d) At the server side, there is a that is in charge of managing the servlets. It dispatches them to the corresponding servlet.
- e) In RMI, the contains the signatures of the remote object methods the server wants to make accessible.
- f) The container initializes the instance by calling the method. It then invokes the method whenever a request is made, passing it request and response objects as parameters.
- g) A is a specially defined container storing data relative to a series of client transactions. A stores data about client activities in form of name–value pairs.
- h) FTP commands and replies are exchanged via the connection, while data is exchanged over the connection.
- i) PING uses the protocol to send the data packet and receive the expected echo packet as response.
- j) In Web-based file transfer, there is no need for any to use. There is no need to setup rules for each user class.
- k) The first line of the HTTP Request-line includes (in order):,, and
- l) The first line of the HTTP Response is the Status-line that includes (in order):,, and
- m) ICMP Header Checksum is a field and represents the checksum for the whole ICMP message.
- n) enables the user to have and manipulate multiple mailboxes and permits e-mail access from multiple locations.

Q3. True or False - Correct the wrong statement (20 M):

- a) Client-server network programming refers to the situation when the code runs at both the server and client side, and the corresponding server and client processes exchange data.
- b) Due to the security limitations in Applet-Servlet communication, the applets have to originate from the same servers that host the communicating front-end servlet.
- c) In RMI, the client uses the same naming service to obtain reference to server's interface. The client Skeleton gets created as a local place-holder for the remote object.
- d) In RMI, the transport layer hides all the details of the communication protocol between the Stub and the Skeleton.
- e) CGI is a protocol that enables remote users to access services provided at the servers.
- f) When the container needs to remove the servlet, it finalizes the servlet by calling the finalize() method which destroys the servlet instance.
- g) In Servlet applications, the initialization file must be stored in xml format on the server. This file is provided as a parameter to the init() method.
- h) If sessions are found, information about the client previous sessions' activity can be extracted and used by the server to personalize its behavior.
- i) Generating HTML code using servlets is inconvenient as multiple out.println() calls are required, even for typical HTML content generation.
- j) In FTP service, the TYPE command indicates transfer mode, which can be S for Stream, B for Block, or C for Compressed.

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- k) In FTP service, the reply must contain a five-digit status code that enables machines to assess the server status and a text message that describes the server status in human language.
 - l) In Web content transfer, communications are performed in sessions. Each session involves at least one client–server request–response and at least two Web content transfer.
 - m) In HTTP v.1.1, persistent connections are used, and one or more TCP connections are established between client and server.
 - n) Each HTTP request consists of one or more lines of text in Unicode format.
 - o) The first status code digit divides HTTP requests in five categories: Information; Success; Redirection; Client error ; or Server error.
 - p) In Java, the database driver is loaded by loading the appropriate driver class: `Class.forName("sun:jdbc:odbc:BankDatabase");`
 - q) `ResultSet resultSet = statement.executeQuery ("DELETE FROM Accounts WHERE account =1234");`
 - r) In PING, lost packets are also recorded so packer loss can also be estimated.
 - s) ICMP is an unreliable transport layer protocol that uses network layer services offered by the IP protocol.
 - t) The MIME extends the original format of the e-mail messages to support extra features and encoding rules for non-text data.
 - u) In IMAP protocol, “RETR n” command is used to retrieve message number “n”.
 - v) In JavaMail SMTP application to get the communication with the server session, we write the following code:

```
Properties props = System.getProperties();
props.put("JavaMail", srv);
Session session = Session.getDefaultInstance(props, null);
```
 - w) In multicast receiving data application, we create `DatagramSocket` object and bind it to the port number.
 - x) RTP uses transport layer protocols such as UDP and is considered an application layer protocol which delivers multimedia data itself.
 - y) As bridges require some network-related information, they operate at the level of frames at the data link network layer.

Q4: Write code segments that do the following tasks (15 M):

- a) In RMI:
 - Create the URL that is used to publish the remote object.
 - Register/publish the object.
 - Retrieve a reference to the remote object.
- b) In Servlet, override the `doGet()` method to address GET requests (i.e. write the signature of the `doGet()` method).
- c) In Servlet session:
 - Create a session.
 - Get relevant parameters from the servlet request.
 - Store data in name–value pairs.
 - Retrieve the object associated with a name
- d) In Servlet cookie:
 - Create a cookie.
 - Store the cookie at the client.
 - Get all the cookies stored at the client.
- e) In JSP:
 - How to write Java expression.
 - How to write properties.
 - How to write scriptet.
 - How to write a declaration.
- f) In JavaMail API-Based SMTP:
 - Get the communication with the server session.

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- Prepare the message.
 - Send message to the server.
- g) In JDBC:

- Load database driver.
- Establish connection with the database.
- Create a statement object.
- Run the query statement.

Q5: Write a Java program that sends a messages from multiple TCP clients to a TCP server by using socket programming and multithreading. The TCP server sends back a message to the client that contains the received message and the number of that message. Write the following classes (**5 M**):

1. A single-thread server class that handle client connection.
2. A class implementing the multi-thread echo server that receives a message from the clients and replies with the same message back.
3. A TCP client class that sends a message to the server.

*With my best wishes
Dr. Mohammed Elmoqy*