Define EJB. How EJB is better than Java beans?

EJB stands for Enterprise JavaBeans. It is a server-side technology for developing distributed, enterprise-level applications in Java.

Advantages of EJBs over Java Beans:

- **Transaction Management:** Java Beans lack built-in transaction management.
- **Security:** EJB offers better security model compared to Java Beans.
- **Scalability and Portability:** EJB can be easily deployed to different application servers.
- **Standard API:** The standardized EJB API reduces the need for custom code compared to Java Beans.
- **Resource management:** EJBs provide container-managed resource management.

Explain Struts framework. Give its advantage and application.

Apache Struts is a modern Java framework that uses the MVC (Model View Controller) architecture for building enterprise-ready web applications. It simplifies web development by separating the presentation, business logic, and data access layers.

Advantages of Struts:

- **MVC architecture:** Promotes cleaner and more maintainable code.
- **Simplified development:** Provides pre-built components and tools for various tasks
- **Security:** Offers built-in features like input validation
- **Extensible:** Allows integration with other frameworks and libraries
- **Large community:** Supported by a large community of developers

Applications of Struts:

- It is used for building complex web applications with high traffic
- It used for building dynamic and user-friendly applications.
- Many e-commerce applications use Struts
- It used for building banking system

Define JavaScript. Explain some of the objects of JavaScript.

JavaScript is a high-level, interpreted programming language that adds dynamic behaviour to web pages. Some JavaScript objects are:

- Number: Represents numeric values.

```
var numericValue = 42;
```

- String: Represents textual data.

```
var textData = "Hello, World!";
```

- Boolean: Represents true or false values.

```
var isTrue = true;
```

- Symbol: Unique identifiers.

```
var uniqueSymbol = Symbol("mySymbol");
```

- Undefined: Represents the absence of a value.

```
var undefinedValue;
```

- Null: Represents the intentional absence of a value.

```
var nullValue = null;
```

- Array: Ordered collection of values, accessed by index.

```
var colors = ["red", "green", "blue"];
```

- Function: Represents a block of code that can be executed.

```
function greet(name) {
   console.log("Hello, " + name + "!");
   }
```

- Date: Represents a specific date and time.

```
var currentDate = new Date();
```

Define WWW. Explain HTTP protocol.

The World Wide Web is a system of interconnected documents and resources linked by hyperlinks and URLs. It operates over the Internet and allows users to access and share information.

Hypertext Transfer Protocol (HTTP): It is used to access and share HTML files over the Internet. Components of HTTP are:

1. **Client-** A client sends the HTTP request to fetch information from the server. For example: The web browser
2. **Server-** A server receives requests from the client. It sends an HTTP response back to the client along with the data which is requested by the client.
3. **Proxy-** Proxy servers are smaller servers that contain some of the information that is present in the main server.

Write the HTML code to create nested frame.

```
<!DOCTYPE html>
<html>
<head>
  <title>Nested Frames</title>
</head>
<frameset rows="50%,50%">
  <frame src="frame1.html" name="frame1">

  <frameset cols="25%,75%">
    <frame src="frame2.html" name="frame2">
    <frame src="frame3.html" name="frame3">
  </frameset>
</frameset>
</html>
```

What are JavaBeans? Give some of its advantages. Explain JavaBean API.

JavaBeans are reusable software components for Java. JavaBeans follow certain conventions like providing a default no-argument constructor, providing getter and setter methods, and being serializable.

Advantages of JavaBeans

- **Reusability:** JavaBeans can be easily reused across different applications
- **Encapsulation:** JavaBeans encapsulate data and functionalities within a class
- **Simplicity:** JavaBeans are relatively simple to create and use
- **Extensibility:** JavaBeans can be extended to provide additional functionalities

JavaBean API is a set of classes and interfaces that facilitate the creation and manipulation of JavaBeans. It provides a standard way to define, use, and extend JavaBeans, making them more reusable. Some classes of JavaBean API are:

Class	Description
BeanDescriptor	Provides information about a Bean
EventHandler	Creates dynamic event handler at runtime
PropertyDescriptor	Describes a property of a Bean
MethodDescriptor	Describes a method of a Bean
EventSetDescriptor	Describes an event generated by a Bean
FeatureDescriptor	Superclass of PropertyDescriptor, MethodDescriptor and EventSetDescriptor

Briefly explain SAX

SAX (Simple API for XML): SAX is an event-driven, streaming-based API for parsing and processing XML documents in a sequential manner.

Key features of SAX:

- **Event-driven:** SAX parses the XML document by generating events for different elements encountered
- **Streaming:** SAX parses the document sequentially, avoiding the need to load the entire document into memory
- **Simple API:** SAX provides a small and easy-to-use API with just a few methods.
- **No DOM tree:** SAX does not create a DOM tree representation of the document

How do we handle http request and response in Servlet?

Handling HTTP Requests in a Servlet:

1. **Extend HttpServlet:** Create a Java class that extends HttpServlet.

```
public class MyServlet extends HttpServlet {
    // Servlet code here
}
```

2. **Override doGet:**

```
@Override
protected void doGet(HttpServletRequest request, HttpServletResponse response)
{
        // Handle GET request
}
```

3. **Read Parameters and Perform Logic:**

```
String paramValue = request.getParameter("paramName");
```

Handling HTTP Responses in a Servlet:

1. **Use HttpServletResponse:**

```
@Override
protected void doGet(HttpServletRequest request, HttpServletResponse response)
{
        // Set content type and encoding
        response.setContentType("text/html");
        response.setCharacterEncoding("UTF-8");
}
```

2. **Write to Response Output Stream:**

```
PrintWriter out = response.getWriter();
out.println("<html><body><h1>Hello, Servlet!</h1></body></html>");
```

3. **Set Headers and Redirects:**

```
response.setHeader("HeaderName", "HeaderValue");
response.sendRedirect("newPage.jsp");
```

How Cookies are used for session tracking?

1. **Session Cookie Creation:** When a user first visits a website, the server sends a session cookie to the user's browser. This cookie typically contains a unique identifier for the user's session.
2. **Cookie Storage:** The browser stores the session cookie locally on the user's device.
3. **Information Exchange:** With each subsequent request, the browser sends the session cookie back to the server.
4. **Session Management:** The server uses the information stored in the session cookie to manage the user's session state.
5. **Session Expiration:** Session cookies can have an expiration time set by the server. Once the cookie expires, the user's session ends, and they will need to log in again.

XML Schemas

XML Schema, also known as XSD, provides a formal way to define the structure and content of XML documents. It acts as a blueprint for the data contained within the document, ensuring consistency and validity.

Key features of XML Schema:

- Specifies the allowed elements and attributes within the document
- Performs data type validation
- Defines the hierarchical structure of the document
- Allows defining complex rules on the data

DHTML

Dynamic HTML is a combination of technologies used to create dynamic web pages.

Key Components of DHTML:

1. HTML (Hypertext Markup Language): Provides the basic structure for web documents.

2. CSS (Cascading Style Sheets): Controls the presentation and layout of HTML elements, allowing for more sophisticated designs.

3. JavaScript: Enables the creation of dynamic and interactive content. With DHTML, JavaScript is often used to manipulate the Document Object Model (DOM) in real-time.

4. DOM (Document Object Model): Represents the structure of a document as a tree of objects, which can be manipulated dynamically using JavaScript to update content on the page without requiring a full page reload.

Explain with an example the use of javax.sql.* package.

The javax.sql.* package provides a standard Java API for accessing and manipulating data sources in Java applications. It simplifies database interaction and promotes consistent implementation across different databases.

```
import java.sql.*;
public class SimpleExample {
  public static void main(String[] args) throws Exception {

    // Database connection information
    String url = "jdbc:mysql://localhost:3306/your_database";
    String username = "your_database_username";
    String password = "your_database_password";

    // Connect to the database
    Connection connection = DriverManager.getConnection(url, username,
password);

    // Print a simple message
    System.out.println("Successfully connected to the database!");

    // Close the connection
    connection.close();
  }
}
```

Write the code to show database programming using JDBC.

Same code as above