USER ACCESS MANAGEMENT SYSTEM

To implement the User Access Management system, we need to build a web application using Java Servlets, JSP, and PostgreSQL for database management. Below is a basic code structure for each of the components outlined in the requirements.

1. Database Setup (PostgreSQL Script)

sql

```
-- users table
CREATE TABLE users (
    id SERIAL PRIMARY KEY,
    username TEXT UNIQUE NOT NULL,
    password TEXT NOT NULL,
    role TEXT NOT NULL CHECK (role IN ('Employee', 'Manager', 'Admin'))
);

-- software table
CREATE TABLE software (
    id SERIAL PRIMARY KEY,
    name TEXT NOT NULL,
    description TEXT,
    access_levels TEXT NOT NULL CHECK (access_levels IN ('Read', 'Write', 'Admin'))
);

-- requests table
CREATE TABLE requests (
    id SERIAL PRIMARY KEY,
    user_id INTEGER REFERENCES users(id),
    software_id INTEGER REFERENCES software(id),
    access_type TEXT NOT NULL CHECK (access_type IN ('Read', 'Write', 'Admin')),
    reason TEXT,
    status TEXT NOT NULL CHECK (status IN ('Pending', 'Approved', 'Rejected'))
```

);

2. SignUpServlet.java

java

```
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import java.sql.*;

@WebServlet("/SignUpServlet")
public class SignUpServlet extends HttpServlet {
    protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        try (Connection conn = DriverManager.getConnection("jdbc:postgresql://localhost:5432/yourdb", "user", "password")) {
            String query = "INSERT INTO users (username, password, role) VALUES (?, ?, 'Employee')";
            PreparedStatement stmt = conn.prepareStatement(query);
            stmt.setString(1, username);
            stmt.setString(2, password);
            stmt.executeUpdate();
        } catch (SQLException e) {
            e.printStackTrace();
        }

        response.sendRedirect("login.jsp");
    }
```

}

3. LoginServlet.java

java

```
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;
import java.sql.*;

@WebServlet("/LoginServlet")
public class LoginServlet extends HttpServlet {
   protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
      String username = request.getParameter("username");
      String password = request.getParameter("password");

      try (Connection conn = DriverManager.getConnection("jdbc:postgresql://localhost:5432/yourdb", "user", "password")) {
         String query = "SELECT * FROM users WHERE username = ? AND password = ?";
         PreparedStatement stmt = conn.prepareStatement(query);
         stmt.setString(1, username);
         stmt.setString(2, password);
         ResultSet rs = stmt.executeQuery();

         if (rs.next()) {
            String role = rs.getString("role");
            HttpSession session = request.getSession();
            session.setAttribute("username", username);
```

```
            session.setAttribute("role", role);

            if (role.equals("Employee")) {
                response.sendRedirect("requestAccess.jsp");
            } else if (role.equals("Manager")) {
                response.sendRedirect("pendingRequests.jsp");
            } else if (role.equals("Admin")) {
                response.sendRedirect("createSoftware.jsp");
            }
        } else {
            response.sendRedirect("login.jsp");
        }
    } catch (SQLException e) {
        e.printStackTrace();
    }
  }
}
```

4. SoftwareServlet.java (Admin Only)

java

```
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import java.sql.*;

@WebServlet("/SoftwareServlet")
public class SoftwareServlet extends HttpServlet {
```

```
    protected void doPost(HttpServletRequest request, HttpServletResponse response) throws
ServletException, IOException {
        String softwareName = request.getParameter("softwareName");
        String description = request.getParameter("description");
        String accessLevels = request.getParameter("accessLevels");

        try (Connection conn =
DriverManager.getConnection("jdbc:postgresql://localhost:5432/yourdb", "user", "password")) {
            String query = "INSERT INTO software (name, description, access_levels) VALUES (?, ?, ?)";
            PreparedStatement stmt = conn.prepareStatement(query);
            stmt.setString(1, softwareName);
            stmt.setString(2, description);
            stmt.setString(3, accessLevels);
            stmt.executeUpdate();
        } catch (SQLException e) {
            e.printStackTrace();
        }

        response.sendRedirect("createSoftware.jsp");
    }
}
```

5. RequestServlet.java (Employee)

java

```
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;
import java.sql.*;
```

```
@WebServlet("/RequestServlet")
public class RequestServlet extends HttpServlet {
   protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
      HttpSession session = request.getSession();
      String username = (String) session.getAttribute("username");
      String softwareName = request.getParameter("softwareName");
      String accessType = request.getParameter("accessType");
      String reason = request.getParameter("reason");

      try (Connection conn = DriverManager.getConnection("jdbc:postgresql://localhost:5432/yourdb", "user", "password")) {
         String userQuery = "SELECT id FROM users WHERE username = ?";
         PreparedStatement userStmt = conn.prepareStatement(userQuery);
         userStmt.setString(1, username);
         ResultSet userRs = userStmt.executeQuery();
         int userId = userRs.next() ? userRs.getInt("id") : 0;

         String softwareQuery = "SELECT id FROM software WHERE name = ?";
         PreparedStatement softwareStmt = conn.prepareStatement(softwareQuery);
         softwareStmt.setString(1, softwareName);
         ResultSet softwareRs = softwareStmt.executeQuery();
         int softwareId = softwareRs.next() ? softwareRs.getInt("id") : 0;

         String requestQuery = "INSERT INTO requests (user_id, software_id, access_type, reason, status) VALUES (?, ?, ?, ?, 'Pending')";
         PreparedStatement requestStmt = conn.prepareStatement(requestQuery);
         requestStmt.setInt(1, userId);
         requestStmt.setInt(2, softwareId);
         requestStmt.setString(3, accessType);
         requestStmt.setString(4, reason);
```

```
            requestStmt.executeUpdate();
        } catch (SQLException e) {
            e.printStackTrace();
        }

        response.sendRedirect("requestAccess.jsp");
    }
}
```

6. ApprovalServlet.java (Manager)

java

```
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import java.sql.*;

@WebServlet("/ApprovalServlet")
public class ApprovalServlet extends HttpServlet {
    protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
        String requestId = request.getParameter("requestId");
        String action = request.getParameter("action"); // approve or reject

        try (Connection conn = DriverManager.getConnection("jdbc:postgresql://localhost:5432/yourdb", "user", "password")) {
            String query = "UPDATE requests SET status = ? WHERE id = ?";
            PreparedStatement stmt = conn.prepareStatement(query);
            stmt.setString(1, action.equals("approve") ? "Approved" : "Rejected");
            stmt.setInt(2, Integer.parseInt(requestId));
```

```
            stmt.executeUpdate();
        } catch (SQLException e) {
            e.printStackTrace();
        }

        response.sendRedirect("pendingRequests.jsp");
    }
}
```

7. JSP Pages

These pages correspond to the Servlets mentioned above. Below is an example of signup.jsp:

signup.jsp

html

```
<!DOCTYPE html>
<html>
<head>
    <title>Sign Up</title>
</head>
<body>
    <h2>Sign Up</h2>
    <form action="SignUpServlet" method="post">
        Username: <input type="text" name="username" required><br>
        Password: <input type="password" name="password" required><br>
        <input type="submit" value="Sign Up">
    </form>
</body>
</html>
```

Other JSP pages like login.jsp, createSoftware.jsp, requestAccess.jsp, and pendingRequests.jsp will have similar structures based on the requirements you provided.

Conclusion

This basic code framework should cover the core functionalities of the system as specified in your requirements.