**Database Application Report: Student Management System**

**Introduction:**

The Student Management System is a lightweight web-based application that manages student information using SQLite as the backend database. The frontend is built with HTML, CSS, and JavaScript, offering a simple interface to perform basic operations such as adding and viewing student records. This project is ideal for beginners looking to understand the integration of databases in web development.

**Objective**

The primary objective is to create an intuitive system for managing student information. The goals include:

Using SQLite for a standalone and lightweight database solution.

Designing a user-friendly interface with HTML and CSS.

Implementing data manipulation and interaction through JavaScript.

System Architecture

**1. Frontend:**

HTML: Structures the content and forms the user interface.

CSS: Adds styling to ensure the interface is visually appealing and easy to navigate.

JavaScript: Provides interactivity, processes user inputs, and interacts with the database.

**2. Backend:**

SQLite: Acts as the database engine, storing and managing student records efficiently without requiring a separate server.

Features

Add Student Records: A form allows users to input student details like name, age, and city.

View Records: Displays all stored student data in a tabular format.

No External Dependencies: Fully functional with basic tools, ensuring easy setup.

**Database Design**

**Table: Students**

|  |  |  |
| --- | --- | --- |
| Column | Type | Description |
| id | INTEGER | Auto-incremented unique identifier |
| name | TEXT | Full name of the student |
| age | INTEGER | Age of the student |
| city | TEXT | City of residence |

**Sample Data**

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Name | Age | City |
| 1 | Ahmed Khan | 20 | Karachi |
| 2 | Fatima Ali | 22 | Lahore |
| 3 | Ayesha Siddiqui | 19 | Islamabad |
| 4 | Bilal Ahmed | 21 | Quetta |
|  |  |  |  |

Code Implementation

Frontend (HTML and CSS)

html

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<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Student Management System</title>

<style>

body {

font-family: Arial, sans-serif;

background-color: #f9f9f9;

margin: 0;

padding: 20px;

}

h1 {

color: #333;

}

form {

margin-bottom: 20px;

}

label {

display: inline-block;

width: 100px;

margin-bottom: 10px;

}

input {

padding: 8px;

margin-bottom: 10px;

border: 1px solid #ddd;

border-radius: 4px;

width: calc(100% - 120px);

}

button {

background-color: #4CAF50;

color: white;

padding: 10px 15px;

border: none;

border-radius: 4px;

cursor: pointer;

}

button:hover {

background-color: #45a049;

}

table {

width: 100%;

border-collapse: collapse;

margin-top: 20px;

}

th, td {

border: 1px solid #ddd;

padding: 8px;

text-align: left;

}

th {

background-color: #f2f2f2;

}

</style>

</head>

<body>

<h1>Student Management System</h1>

<form id="student-form">

<label for="name">Name:</label>

<input type="text" id="name" placeholder="Enter full name" required><br>

<label for="age">Age:</label>

<input type="number" id="age" placeholder="Enter age" required><br>

<label for="city">City:</label>

<input type="text" id="city" placeholder="Enter city" required><br>

<button type="button" onclick="addStudent()">Add Student</button>

</form>

<h2>Student List</h2>

<table id="student-table">

<thead>

<tr>

<th>ID</th>

<th>Name</th>

<th>Age</th>

<th>City</th>

</tr>

</thead>

<tbody></tbody>

</table>

<script src="script.js"></script>

</body>

</html>

Frontend Logic (JavaScript)

javascript

Copy code

// Initialize SQLite database

const db = new SQL.Database();

// Create Students table

db.run(`

CREATE TABLE IF NOT EXISTS Students (

id INTEGER PRIMARY KEY AUTOINCREMENT,

name TEXT NOT NULL,

age INTEGER NOT NULL,

city TEXT NOT NULL

);

`);

// Add a student to the database

function addStudent() {

const name = document.getElementById('name').value.trim();

const age = parseInt(document.getElementById('age').value, 10);

const city = document.getElementById('city').value.trim();

if (name && age && city) {

db.run(INSERT INTO Students (name, age, city) VALUES (?, ?, ?), [name, age, city]);

loadStudents(); // Refresh student list

document.getElementById('student-form').reset(); // Clear the form

}

}

// Load all students from the database

function loadStudents() {

const result = db.exec("SELECT \* FROM Students");

const tableBody = document.querySelector('#student-table tbody');

tableBody.innerHTML = ''; // Clear previous rows

if (result[0]) {

result[0].values.forEach(row => {

const tr = document.createElement('tr');

row.forEach(cell => {

const td = document.createElement('td');

td.textContent = cell;

tr.appendChild(td);

});

tableBody.appendChild(tr);

});

}

}

// Initial load

loadStudents();

**Conclusion**

This project highlights the simplicity and effectiveness of combining SQLite with basic web technologies. It offers a user-friendly platform for managing student data and demonstrates foundational concepts in web-based database applications.

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