AD lab 3rd

app development (Anna University)

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JAI SHRIRAM
ENGINEERING COLLEGE

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai,
Accredited byNAAC, NBA Accredited for ECE & CSE)
Dharapuram Road, Avinashipalayam, Tirupur – 638 660.

Academic Year 2023-2024 (Odd Semester)

LABORATORY RECORD

Certified that this is a bonafide record of work done by

Name	…………………………………………………………………..
Reg. No.	…………………………………………………………………..
Branch	…………………………………………………………………..
Year & Semester	…………………………………………………………………..
Course code & Name	…………………………………………………………………..

Course In-Charge Head of the Department

Submitted for the University Practical Examination held on ………………..

Internal Examiner External Examiner

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INDEX

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Ex. No: 1 **Date:**	**BMI CALCULATOR (Body Mass Index)**

AIM

Build a BMI (Body Mass Index) Calculator app using React Native.

ALGORITHM

Step 1: Start
Step 2: Import the required components from React Native and install the npm module.
Step 3: Create a class-based component named BMI App.
Step 4: The initial state with height, weight, bmi, and bmi Result fields.
Step 5: Define methods handle Height and handle Weight to update the state when height and weight inputs change.
Step 6: Create a calculate method to perform the BMI calculation and classify the result.
Step 7: Implement the render method with necessary UI components.
Step 8: Use Text Input for user input of height and weight.
Step 9: Utilize Touchable Opacity for the Calculate button.
Step 10: Display the calculated BMI and its classification as output.

PROGRAM

1.App.js

```
import React, { Component } from 'react';
import './App.css';

class App extends Component {
constructor(props) {
   super(props);
   this.state = { name: 'Guest', weight: 90, height: 180, bmi: 27, message: '', optimalweight: '', time: new
Date().toLocaleTimeString() };
   this.submitMe = this.submitMe.bind(this);
   this.heightchange = this.heightchange.bind(this);
   this.weightchange = this.weightchange.bind(this);
   this.change = this.change.bind(this);
   this.ticker = this.ticker.bind(this);
   this.blur = this.blur.bind(this);
```

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```
   this.calculateBMI = this.calculateBMI.bind(this);
}

heightchange(e){
  this.setState({height: e.target.value});
  e.preventDefault();
}

blur(e){
 this.calculateBMI();
}
 weightchange(e){
  this.setState({weight: e.target.value});
  e.preventDefault();
}

calculateBMI(){

    var heightSquared = (this.state.height/100  * this.state.height/100);
    var bmi = this.state.weight / heightSquared;
    var low = Math.round(18.5 * heightSquared);
    var high = Math.round(24.99 * heightSquared);
    var message = "";
    if( bmi >= 18.5  && bmi <= 24.99 ){
        message = "You are in a healthy weight range";
    }
    else if(bmi >= 25 && bmi <= 29.9){
      message = "You are overweight";
    }
    else if(bmi >= 30){
        message ="You are obese";
```

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```
    }
    else if(bmi < 18.5){
      message = "You are under weight";
    }
    this.setState({message: message});
    this.setState({optimalweight: "Your suggested weight range is between "+low+ " - "+high});
    this.setState({bmi: Math.round(bmi * 100) / 100});

}

submitMe(e) {
   e.preventDefault();
   this.calculateBMI();
}

ticker() {
  this.setState({time: new Date().toLocaleTimeString()})
}

componentDidMount(){
  setInterval(this.ticker, 60000);
}

change(e){
  e.preventDefault();
  console.log(e.target);
  this.setState({name: e.target.value});
}

render() {
  return (
```

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```
      <div className="App">
        <div className="App-header">
          <h2>BMI Calculator</h2>
        </div>
          <form onSubmit={this.submitMe}>
            <label>
              Please enter your name
            </label>
            <input type="text" name="name" value={this.state.name} onBlur={this.blur}
onChange={this.change}   />
             <label>
             Enter your height in cm:
            </label>
            <input type="text" name="height" value={this.state.height} onBlur={this.blur}
onChange={this.heightchange}   />
             <label>
             Enter your weight in kg :
            </label>
            <input type="text" name="weight" value={this.state.weight} onChange={this.weightchange}
/>
            <label>{this.state.checked} Hello {this.state.name}, How are you my friend? It's currently
{this.state.time} where you are living. Your BMI is {this.state.bmi} </label>
              <label>{this.state.message}</label>
              <label>{this.state.optimalweight}</label>

            <input type="submit" value="Submit"/>
          </form>

      </div>
    );
  }
```

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```
}
export default App;
```

2. //index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta http-equiv="X-UA-Compatible" content="IE=edge">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>BMI Calculator with JavaScript</title>
   <link rel="stylesheet" href="style.css">
   <script src="script.js" defer></script>
</head>
<body>
   <div class="wrapper">
      <p>Height in CM:
         <input type="number" id="height"><br><span id="height_error"></span>
      </p>

      <p>Weight in KG:
         <input type="number" id="weight"><br><span id="weight_error"></span>
      </p>

      <button id="btn">Calculate</button>
      <p id="output"></p>
   </div>
</body>
</html>
```

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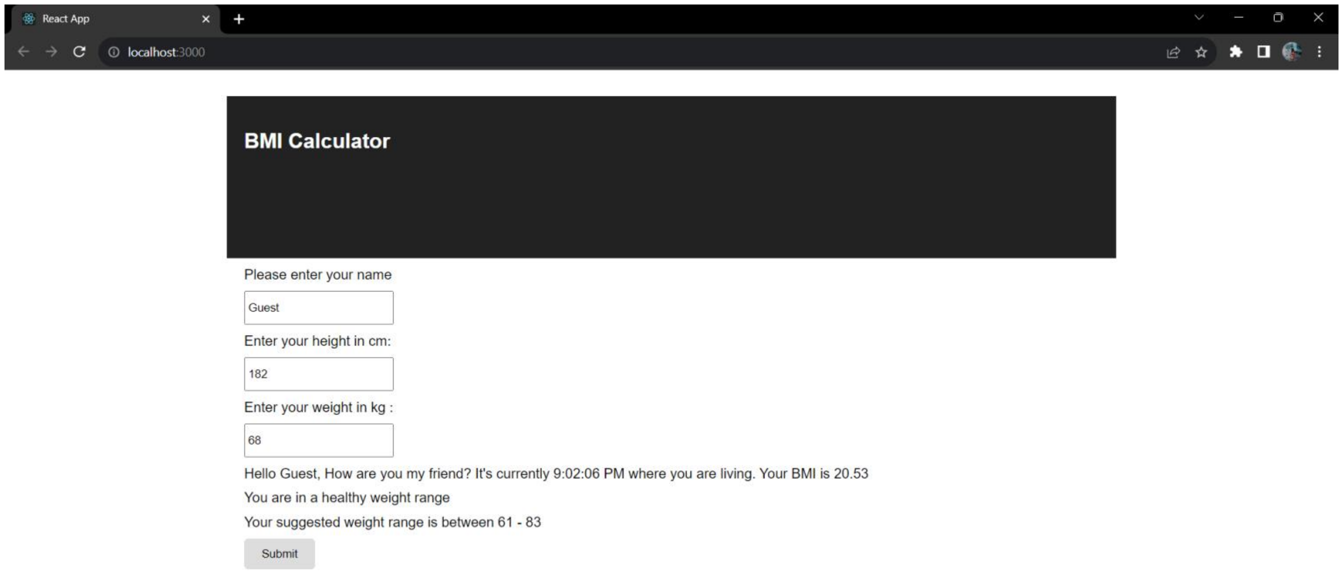
SAMPLE OUTPUT



BMI Calculator

Please enter your name

Guest

Enter your height in cm:

182

Enter your weight in kg :

68

Hello Guest, How are you my friend? It's currently 9:02:06 PM where you are living. Your BMI is 20.53

You are in a healthy weight range

Your suggested weight range is between 61 - 83

RESULT

Thus the program to work with react native was implemented and executed successfully.

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Ex. No: 2 **Date:**	**SIMPLE EXPENSE MANAGER**

AIM:

To Build a cross platform application for simple expense manager which allows entering expenses and income

ALGORITHM

Step 1:Initialize state variables for income, expense, incomeList, expenseList, textIncome, and textExpense.
Step 2:Create functions addIncome and addExpense to handle adding income and expenses.
Step 3:In addIncome and addExpense, check if textIncome or textExpense is empty or not a number. If so, show an alert and exit.
Step 4:If input is valid, add a new item to incomeList or expenseList with a unique ID and the provided income or expense value.
Step 5:Update the income and expense state by adding the entered value to their respective totals.
Step 6:Clear the textIncome or textExpense field.
Step 7:Render the UI with title, input fields, buttons, and two lists.
Step 8:Map through incomeList and expenseList to display their items in separate lists.
Step 9:Style the UI elements using predefined styles.
Step 10:The app allows users to add income and expenses, which are displayed in separate lists for weekly tracking.

PROGRAM

```
import React, { useState } from 'react';
import { StyleSheet, Text, View, TextInput, TouchableOpacity } from 'react-native';

export default function App() {
  const [income, setIncome] = useState(0);
  const [expense, setExpense] = useState(0);
  const [incomeList, setIncomeList] = useState([]);
  const [expenseList, setExpenseList] = useState([]);
  const [textIncome, setTextIncome] = useState('');
  const [textExpense, setTextExpense] = useState('');

  const addIncome = () => {
    if (textIncome === '' || income === '') {
      alert('Please enter the details');
    } else {
      setIncomeList([...incomeList, { id: Math.random().toString(), income: income }]);
      setIncome(parseInt(income) + parseInt(income));
      setTextIncome('');
    }
```

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```
};

const addExpense = () => {
  if (textExpense === '' || expense === '') {
    alert('Please enter the details');
  } else {
    setExpenseList([...expenseList, { id: Math.random().toString(), expense: expense }]);
    setExpense(parseInt(expense) + parseInt(expense));
    setTextExpense('');
  }
};

return (
  <View style={styles.container}>
    <Text style={styles.title}>Expense Manager</Text>
    <View style={styles.inputContainer}>
      <TextInput
        style={styles.input}
        placeholder="Enter Income"
        keyboardType="numeric"
        value={textIncome}
        onChangeText={(text) => setIncome(text)}
      />
      <TouchableOpacity style={styles.button} onPress={() => addIncome()}>
        <Text style={styles.buttonText}>Add Income</Text>
      </TouchableOpacity>
      <TextInput
        style={styles.input}
        placeholder="Enter Expense"
        keyboardType="numeric"
        value={textExpense}
        onChangeText={(text) => setExpense(text)}
      />
      <TouchableOpacity style={styles.button} onPress={() => addExpense()}>
        <Text style={styles.buttonText}>Add Expense</Text>
      </TouchableOpacity>
    </View>
    <View style={styles.listContainer}>
      <View style={styles.list}>
        <Text style={styles.listTitle}>Weekly Income</Text>
        {incomeList.map((item) => (
          <View key={item.id} style={styles.listItem}>
            <Text>{item.income}</Text>
          </View>
        ))}
      </View>
```

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```
        <View style={styles.list}>
          <Text style={styles.listTitle}>Weekly Expense</Text>
          {expenseList.map((item) => (
            <View key={item.id} style={styles.listItem}>
              <Text>{item.expense}</Text>
            </View>
          ))}
        </View>
      </View>
    </View>
  );
}

const styles = StyleSheet.create({
  container: {
    flex: 1,
    backgroundColor: '#fff',
    alignItems: 'center',
    justifyContent: 'center',
  },
  title: {
    fontSize: 30,
    fontWeight: 'bold',
    marginBottom: 20,
  },
  inputContainer: {
    width: '80%',
    marginBottom: 20,
  },
  input: {
    borderWidth: 1,
    borderColor: '#777',
    padding: 8,
    marginVertical: 10,
    borderRadius: 5,
  },
  button: {
    backgroundColor: '#f4511e',
    paddingVertical: 10,
    paddingHorizontal: 20,
    borderRadius: 5,
    alignItems: 'center',
    marginVertical: 10,
  },
  buttonText: {
    color: '#fff',
```

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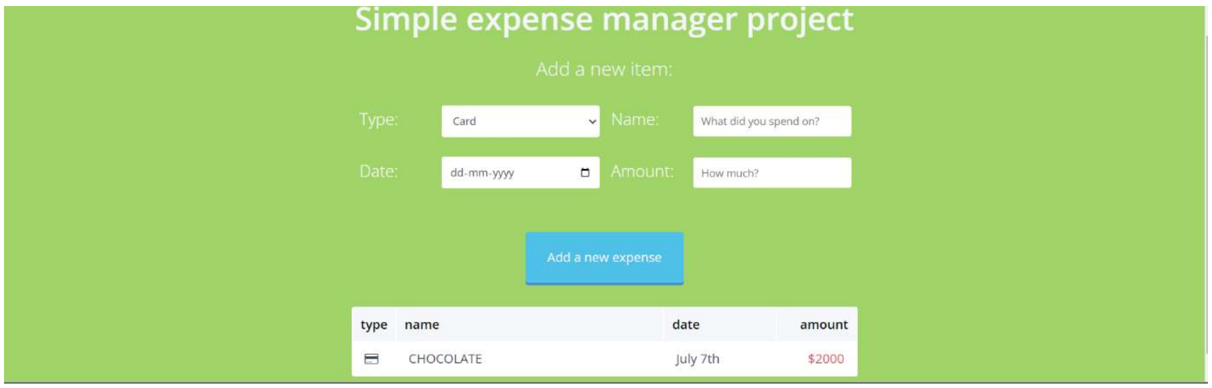
```
    fontSize: 18,
    fontWeight: 'bold',
  },
  listContainer: {
    flexDirection: 'row',
    justifyContent: 'space-between',
    width: '80%',
  },
  listTitle: {
    fontSize: 20,
    fontWeight: 'bold',
    marginBottom: 10,
  },
});
```

SAMPLE OUTPUT



type	name	date	amount
💳	CHOCOLATE	July 7th	$2000

RESULT

Thus the cross platform application for simple expense manager was Implemented and executed successfully.

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Ex. No: 3 Date:	**Develop an Application to Convert Units from Imperial System to Metric System**

AIM:

Build a application to Convert Units from Imperial System to Metric System.

ALGORITHM

Step 1: Initialize state variables for kilometers input, kilometers converted value, kilograms input, and kilograms converted value.
Step 2: Create conversion functions for kilometers to miles and kilograms to pounds.
Step 3: Implement a clear function to reset all fields.
Step 4: Render input fields, conversion buttons, and result displays for both conversions.
Step 5: Set up input handlers to update state variables.
Step 6: Attach conversion functions to the "Convert" buttons.
Step 7: Display the converted values or error messages.
Step 8: Add a "Clear" button to reset fields.
Step 9: Integrate the component into your React Native app.
Step 10: Test and optimize as needed for production.

PROGRAM

```
import React, { useState } from 'react';
import { View, Text, TextInput, Button } from 'react-native';

function UnitConverter() {
  const [kmInputValue, setKmInputValue] = useState('');
  const [kmConvertedValue, setKmConvertedValue] = useState('');

  const [kgInputValue, setKgInputValue] = useState('');
  const [kgConvertedValue, setKgConvertedValue] = useState('');

  const convertKmToMiles = () => {
    const km = parseFloat(kmInputValue);
    if (!isNaN(km)) {
      const miles = km / 1.60934;
      setKmConvertedValue(`${miles.toFixed(2)} miles`);
    } else {
      setKmConvertedValue('Invalid input');
    }
  };

  const convertKgToPounds = () => {
```

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```
    const kg = parseFloat(kgInputValue);
    if (!isNaN(kg)) {
      const pounds = kg * 2.20462;
      setKgConvertedValue(`${pounds.toFixed(2)} pounds`);
    } else {
      setKgConvertedValue('Invalid input');
    }
  };

  const clearFields = () => {
    setKmInputValue('');
    setKmConvertedValue('');
    setKgInputValue('');
    setKgConvertedValue('');
  };

  return (
    <View>
      <Text>Kilometers to Miles Converter</Text>
      <TextInput
        placeholder="Enter value in kilometers"
        keyboardType="numeric"
        value={kmInputValue}
        onChangeText={(text) => setKmInputValue(text)}
      />
      <Button title="Convert" onPress={convertKmToMiles} />
      <Text>{kmConvertedValue}</Text>

      <Text>Kilograms to Pounds Converter</Text>
      <TextInput
        placeholder="Enter value in kilograms"
        keyboardType="numeric"
        value={kgInputValue}
        onChangeText={(text) => setKgInputValue(text)}
      />
      <Button title="Convert" onPress={convertKgToPounds} />
      <Text>{kgConvertedValue}</Text>

      <Button title="Clear" onPress={clearFields} />
    </View>
  );
}

export default UnitConverter;
```

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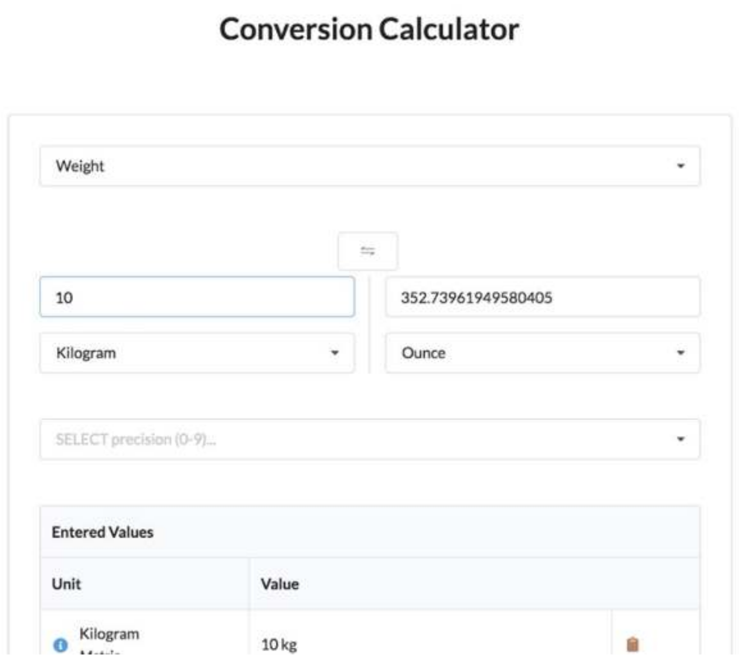
SAMPLE OUTPUT


Conversion Calculator

Weight

10 | 352.73961949580405

Kilogram | Ounce

SELECT precision (0-9)...

Entered Values

Unit	Value
Kilogram	10 kg

RESULT

Thus the Cross Platform Application to Convert Units from Imperial System to Metric System was Implemented and executed successfully.

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Ex. No: 4 **Date:**	**Design and develop a cross platform application for day to day task (to-do) management**

AIM:

To develop a cross platform application for day to day task (To-Do) management using react native.

ALGORITHM

Step 1: Start

Step 2: Create a React Native component.

Step 3: Import required components and libraries

Step 4: Set up state variables using use State.

Step 5: Implement add Todo to add items to the list.

Step 6: Implement toggle Todo to mark items as completed.

Step 7: Implement remove Todo to delete items.

Step 8: Create UI components: input, button, list.

Step 9: Use Flat List to display to-dos.

Step 10: Apply basic styles using Style Sheet.

Step 11: Start the app on an emulator.

Step 12: Verify functionality and customize as needed.

PROGRAM

```
import React, { useState } from 'react';
import { StyleSheet, View, Text, FlatList } from 'react-native';
import { Button, TextInput, List, Checkbox } from 'react-native-paper';
export default function App() {
  const [text, setText] = useState('');
  const [todos, setTodos] = useState([]);
  const addTodo = () => {
    if (text.trim() !== '') {
      setTodos([...todos, { text, id: Date.now(), completed: false }]);
```

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```
      setText('');
    }
  };
const toggleTodo = (id) => {
    setTodos(
      todos.map((todo) =>
        todo.id === id ? { ...todo, completed: !todo.completed } : todo
      )
    );
  };
```

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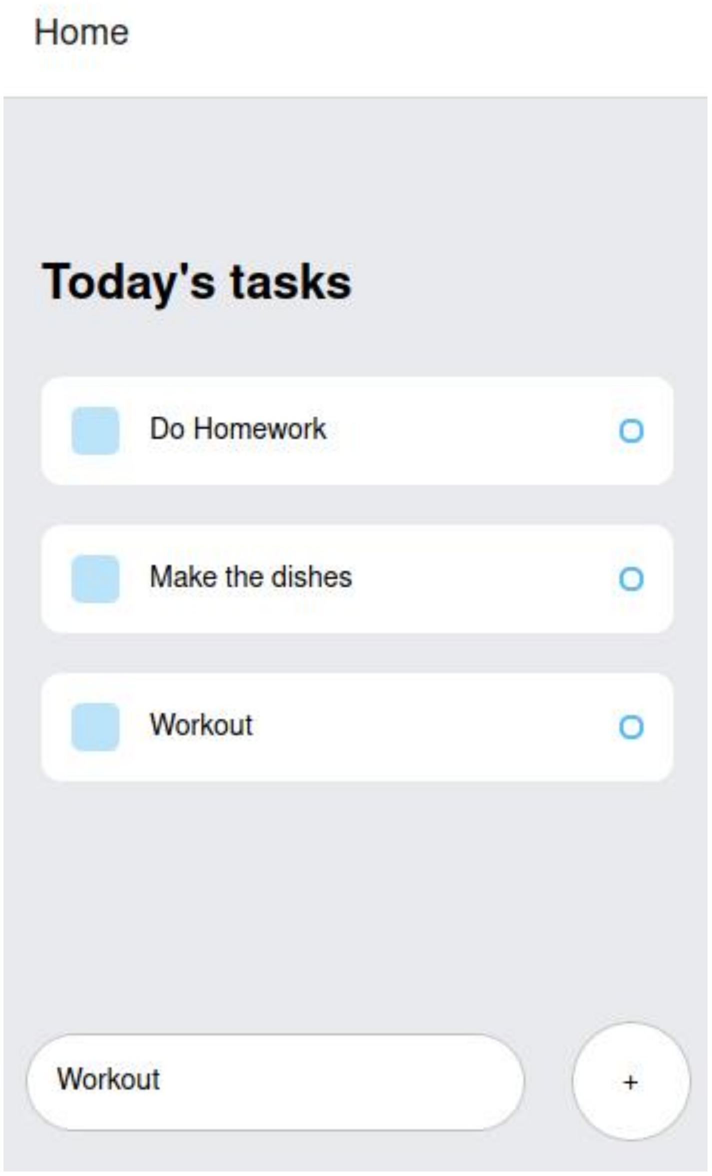
SAMPLE OUTPUT



RESULT

Thus the Cross Platform Application for day to day task management was Implemented and executed successfully.

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Ex. No: 5 **Date:**	**Design an android application using Cordova for a user login screen with username and password**

AIM:

To design android application using Cordova for a user login screen with username and password..

ALGORITHM

Step 1: Start

Step 2: Install the Cordova using the npm

Step 3: Create a new Cordova project with a unique name.

Step 4: Go to the newly created project directory.

Step 5 Add Android as a platform for your Cordova project.

Step 6: Create an index.html file

for the login screen and include form elements for username, password ,reset, and submit buttons.

Step 7: Create an index.js file to handle form interactions and Add event listeners for reset and submit buttons and Implement logic for form reset and login validation.

Step 8: Add a listener for the device ready event in JavaScript.

Step 9: Set AndroidX Enabled to true

and Configure preferences in the config.xml file.

Step 10: Use Cordova to build the Android app and Run the app on an

Android emulator or physical device using Cordova or Android Studio.

PROGRAM

HTML:

```
<!DOCTYPE html>
<html>
<head>
   <title>Login</title>
</head>
<body>
   <h1>Login</h1>
```

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```
    <form>
        <label for="username">Username:</label>
        <input type="text" id="username" name="username" required><br><br>
        <label for="password">Password:</label>
        <input type="password" id="password" name="password" required><br><br>
        <button type="button" id="resetButton">Reset</button>
        <button type="button" id="submitButton">Submit</button>
    </form>
    <script src="js/index.js"></script>
</body>
</html>
```

JS:

```
document.addEventListener("deviceready", onDeviceReady, false);

function onDeviceReady() {
    document.getElementById("resetButton").addEventListener("click", resetForm);
    document.getElementById("submitButton").addEventListener("click", submitForm);
}

function resetForm() {
    document.getElementById("username").value = "";
    document.getElementById("password").value = "";
}

function submitForm() {
    var username = document.getElementById("username").value;
    var password = document.getElementById("password").value;

    // Perform login validation here (e.g., check username and password)

    if (username === "example" && password === "password") {
        alert("Login Successful!");
    } else {
        alert("Login Failed. Please check your credentials.");
    }
}
```

XML:

```
document.addEventListener("deviceready", onDeviceReady, false);
```

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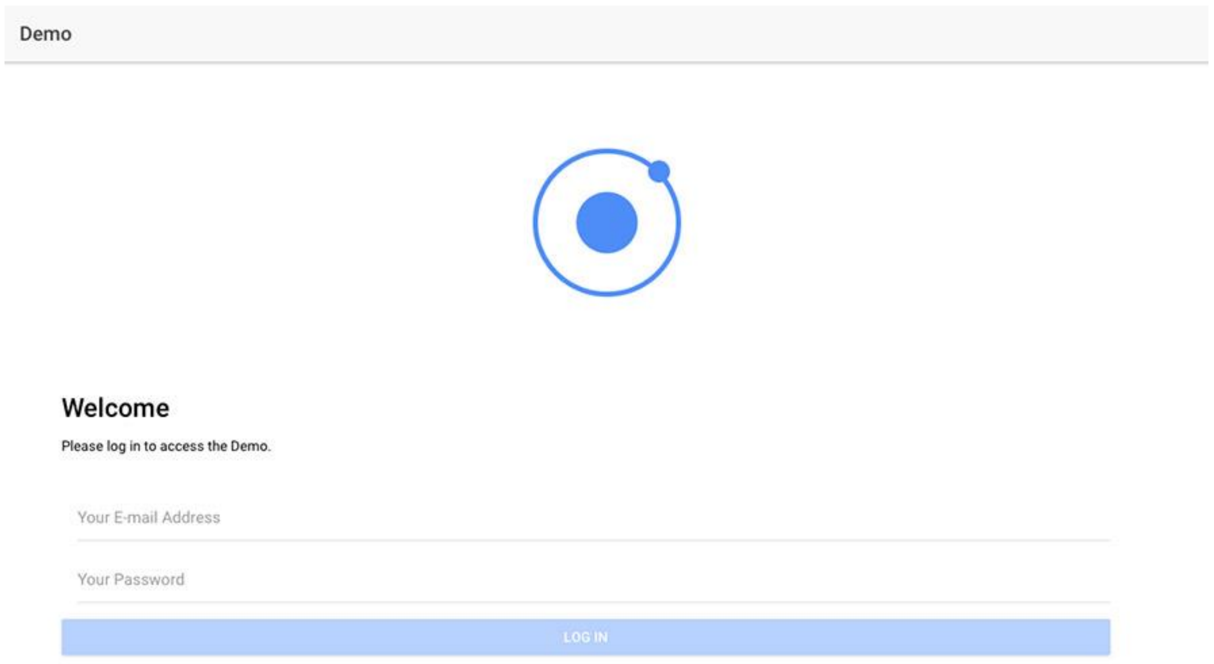
```
function onDeviceReady() {
   document.getElementById("resetButton").addEventListener("click", resetForm);
   document.getElementById("submitButton").addEventListener("click", submitForm);
}

function resetForm() {
   document.getElementById("username").value = "";
   document.getElementById("password").value = "";
}

function submitForm() {
   var username = document.getElementById("username").value;
   var password = document.getElementById("password").value;

   // Perform login validation here (e.g., check username and password)

   if (username === "example" && password === "password") {
      alert("Login Successful!");
   } else {
      alert("Login Failed. Please check your credentials.");
   }
}
```

SAMPLE OUTPUT



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RESULT

Thus we design android application using Cordova for a user login screen with username and password was Implemented and executed successfully.

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Ex. No: 6 **Date:**	**Design an and develop an android application using Apache Cordova to find and display the current location of the user**

AIM:

To design and develop an android application using Apache Cordova to find and display the current location of the user.

ALGORITHM

Step 1: Start

Step 2: Install the Cordova globally.

Step 3: Create a new Cordova project and add Android platform for your project.

Step 4: Add the Cordova Geolocation plugin and create index.html and index.js for UI and logic.

Step 5: Set up a device ready event listener and Implement get Location function using navigator.geolocation.

Step 6: Create on Success function to display location info and Implement on Error function for error handling.

Step 7: Configure app preferences in config.xml.

Step 8: Build and run the app on an emulator or device

Step 9: Click the "Get Location" button to display the current location.

Step 10: Stop

PROGRAM

HTML:

```
<!DOCTYPE html>
<html>
<head>
   <title>Location App</title>
</head>
<body>
   <h1>Current Location</h1>
   <button onclick="getLocation()">Get Location</button>
```

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```
    <p id="locationInfo"></p>
    <script src="js/index.js"></script>
</body>
</html>
```

JS:

```
document.addEventListener("deviceready", onDeviceReady, false);
function onDeviceReady() {
    // Device is ready, initialize geolocation.
}
function getLocation() {
    navigator.geolocation.getCurrentPosition(
        onSuccess,
        onError,
        { enableHighAccuracy: true }
    );
}

function onSuccess(position) {
    var latitude = position.coords.latitude;
    var longitude = position.coords.longitude;
    var accuracy = position.coords.accuracy;
    var locationInfo = `Latitude: ${latitude}<br>Longitude: ${longitude}<br>Accuracy: ${accuracy}
meters`;

    document.getElementById("locationInfo").innerHTML = locationInfo;
}

function onError(error) {
    alert(`Error getting location: ${error.message}`);
```

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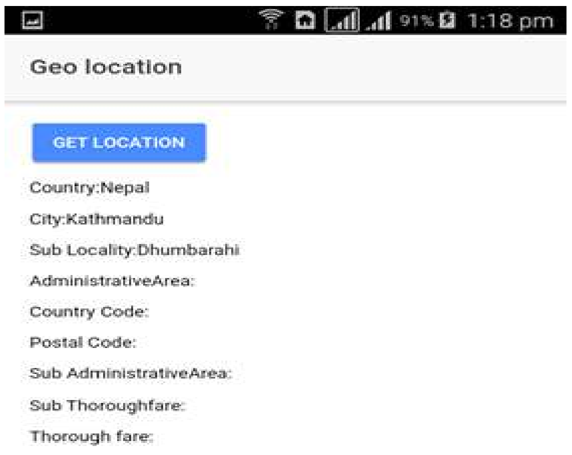
}

XML:

```
<platform name="android">
    ...
    <preference name="AndroidXEnabled" value="true" />
    <preference name="Orientation" value="portrait" />
    ...
</platform>
```

SAMPLE OUTPUT



```
Country:Nepal
City:Kathmandu
Sub Locality:Dhumbarahi
AdministrativeArea:
Country Code:
Postal Code:
Sub AdministrativeArea:
Sub Thoroughfare:
Thorough fare:
```

RESULT

Thus we design and develop an android application using Apache Cordova to find and display the current location of the user Implemented and executed successfully.

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Ex. No: 7(A) **Date:**	**Write programs using Java to create Android application having Databases for a simple library application.**

AIM:

To write program using Java to create Android application having Databases for a simple library application.

ALGORITHM

Step 1: Start

Step 2: Set up a SQLite database for storing book information.

Step 3: Create a table named "books" with columns for bookID, title, and author.

Step 4: Initialize the application and establish a connection to the database

Step 5: Display a menu with options for the user: Add a book ,View all books ,Search for a book by title ,Exit

Step 6: Allow the user to input a book's title and author and insert the book into the database.

Step 7: Retrieve all books from the database and display a list of all books, including their titles and authors.

Step 8: Allow the user to input a title to search for.

Step 9: Provide an option to exit the application gracefully.

Step 10: Implement error handling to catch and display any database-related errors

Step11:Compile the Javacode and run the application in a console or terminal.

Step12: Stop.

PROGRAM

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.util.Scanner;
public class LibraryApp {
```

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```
private static final String DB_URL = "jdbc:sqlite:library.db";

public static void main(String[] args) {
    try {
        // Create or connect to the SQLite database
        Connection connection = DriverManager.getConnection(DB_URL);

        // Create the "books" table if it doesn't exist
        String createTableSQL = "CREATE TABLE IF NOT EXISTS books (" +
            "id INTEGER PRIMARY KEY AUTOINCREMENT," +
            "title TEXT NOT NULL," +
            "author TEXT NOT NULL)";
        connection.createStatement().execute(createTableSQL);

        Scanner scanner = new Scanner(System.in);
        while (true) {
            System.out.println("Library Application");
            System.out.println("1. Add a book");
            System.out.println("2. View all books");
            System.out.println("3. Search for a book by title");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");
            int choice = scanner.nextInt();
            scanner.nextLine(); // Consume the newline

            switch (choice) {
                case 1:
                    addBook(connection, scanner);
                    break;
                case 2:
                    viewBooks(connection);
```

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```
                break;
            case 3:
                searchBookByTitle(connection, scanner);
                break;
            case 4:
                System.out.println("Goodbye!");
                connection.close();
                System.exit(0);
            default:
                System.out.println("Invalid choice. Try again.");
        }
      }
    } catch (SQLException e) {
        e.printStackTrace();
    }
}

private static void addBook(Connection connection, Scanner scanner) throws SQLException {
    System.out.print("Enter the title of the book: ");
    String title = scanner.nextLine();
    System.out.print("Enter the author of the book: ");
    String author = scanner.nextLine();

    String insertSQL = "INSERT INTO books (title, author) VALUES (?, ?)";
    PreparedStatement preparedStatement = connection.prepareStatement(insertSQL);
    preparedStatement.setString(1, title);
    preparedStatement.setString(2, author);
    preparedStatement.executeUpdate();

    System.out.println("Book added successfully!");
}
```

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```
    private static void viewBooks(Connection connection) throws SQLException {
        String selectSQL = "SELECT id, title, author FROM books";
        ResultSet resultSet = connection.createStatement().executeQuery(selectSQL);

        System.out.println("List of Books:");
        while (resultSet.next()) {
            int id = resultSet.getInt("id");
            String title = resultSet.getString("title");
            String author = resultSet.getString("author");
            System.out.println(id + ". " + title + " by " + author);
        }
    }

    private static void searchBookByTitle(Connection connection, Scanner scanner) throws
SQLException {
        System.out.print("Enter the title to search for: ");
        String searchTitle = scanner.nextLine();

        String selectSQL = "SELECT id, title, author FROM books WHERE title LIKE ?";
        PreparedStatement preparedStatement = connection.prepareStatement(selectSQL);
        preparedStatement.setString(1, "%" + searchTitle + "%");
        ResultSet resultSet = preparedStatement.executeQuery();

        System.out.println("Search Results:");
        while (resultSet.next()) {
            int id = resultSet.getInt("id");
            String title = resultSet.getString("title");
            String author = resultSet.getString("author");
            System.out.println(id + ". " + title + " by " + author);
        }
```

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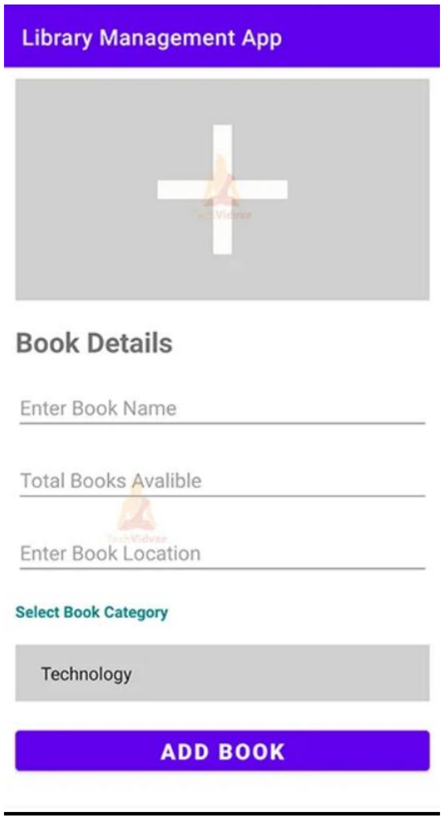
```
    }
}
```

SAMPLE OUTPUT



RESULT

Thus we implemented program using Java to create Android application having Databases for a simple library Implemented and executed successfully.

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Ex. No: 7(B) **Date:**	**Write programs using Java to create Android application having Databases For displaying books available, books lend, book reservation**

AIM:

To write programs using Java to create Android application having Databases For displaying books available, books lend, book reservation

ALGORITHM

Step 1: Start

Step 2: Set up a SQLite database for storing book information.

Step 3: Create "books" and "loans" tables for book and loan information..

Step 4: Initialize the application and establish a connection to the database

Step 5: Display a menu with options for the user:Display available books, Lend a book ,Reserve a book , Exit

Step 6: Check book availability and Record loans in the database.

Step 7: Retrieve all books from the database and display a list of all books, including their titles and authors.

Step 8:Provide an option to exit the application gracefully.

Step 9: Implement error handling to catch and display any database-related errors

Step10:Compile the Javacode and run the application in a console or terminal.

Step11: Stop.

PROGRAM

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.util.Scanner;
public class LibrarySystem {
```

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```
private static final String DB_URL = "jdbc:sqlite:library.db";

public static void main(String[] args) {
  try {
    // Create or connect to the SQLite database
    Connection connection = DriverManager.getConnection(DB_URL);

    // Create tables if they don't exist
    createTables(connection);

    Scanner scanner = new Scanner(System.in);
    while (true) {
      System.out.println("Library Management System");
      System.out.println("1. Display Available Books");
      System.out.println("2. Lend a Book");
      System.out.println("3. Reserve a Book");
      System.out.println("4. Exit");
      System.out.print("Enter your choice: ");
      int choice = scanner.nextInt();
      scanner.nextLine(); // Consume the newline

      switch (choice) {
        case 1:
          displayAvailableBooks(connection);
          break;
        case 2:
          lendBook(connection, scanner);
          break;
        case 3:
          reserveBook(connection, scanner);
          break;
```

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```
                case 4:
                    System.out.println("Goodbye!");
                    connection.close();
                    System.exit(0);
                default:
                    System.out.println("Invalid choice. Try again.");
            }
        }
    } catch (SQLException e) {
        e.printStackTrace();
    }
}

private static void createTables(Connection connection) throws SQLException {
    // Create "books" table
    String createBooksTableSQL = "CREATE TABLE IF NOT EXISTS books (" +
            "id INTEGER PRIMARY KEY AUTOINCREMENT," +
            "title TEXT NOT NULL," +
            "is_available BOOLEAN DEFAULT 1)";
    connection.createStatement().execute(createBooksTableSQL);

    // Create "loans" table
    String createLoansTableSQL = "CREATE TABLE IF NOT EXISTS loans (" +
            "id INTEGER PRIMARY KEY AUTOINCREMENT," +
            "book_id INTEGER NOT NULL," +
            "user_name TEXT NOT NULL," +
            "FOREIGN KEY (book_id) REFERENCES books (id))";
    connection.createStatement().execute(createLoansTableSQL);
}

private static void displayAvailableBooks(Connection connection) throws SQLException {
```

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```
        String selectSQL = "SELECT id, title FROM books WHERE is_available = 1";
        ResultSet resultSet = connection.createStatement().executeQuery(selectSQL);

        System.out.println("Available Books:");
        while (resultSet.next()) {
            int id = resultSet.getInt("id");
            String title = resultSet.getString("title");
            System.out.println(id + ". " + title);
        }
    }

    private static void lendBook(Connection connection, Scanner scanner) throws SQLException {
        System.out.print("Enter the ID of the book you want to lend: ");
        int bookId = scanner.nextInt();
        scanner.nextLine(); // Consume the newline

        // Check if the book is available
        String checkAvailabilitySQL = "SELECT is_available FROM books WHERE id = ?";
        PreparedStatement availabilityStatement = connection.prepareStatement(checkAvailabilitySQL);
        availabilityStatement.setInt(1, bookId);
        ResultSet availabilityResult = availabilityStatement.executeQuery();

        if (availabilityResult.next()) {
            boolean isAvailable = availabilityResult.getBoolean("is_available");
            if (isAvailable) {
                // Book is available, lend it
                System.out.print("Enter your name: ");
                String userName = scanner.nextLine();

                // Update book availability
                String updateAvailabilitySQL = "UPDATE books SET is_available = 0 WHERE id = ?";
```

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```
                PreparedStatement updateAvailabilityStatement =
connection.prepareStatement(updateAvailabilitySQL);
                updateAvailabilityStatement.setInt(1, bookId);
                updateAvailabilityStatement.executeUpdate();

                // Record the loan
                String insertLoanSQL = "INSERT INTO loans (book_id, user_name) VALUES (?, ?)";
                PreparedStatement insertLoanStatement = connection.prepareStatement(insertLoanSQL);
                insertLoanStatement.setInt(1, bookId);
                insertLoanStatement.setString(2, userName);
                insertLoanStatement.executeUpdate();

                System.out.println("Book lent successfully!");
            } else {
                System.out.println("Sorry, this book is already lent.");
            }
        } else {
            System.out.println("Invalid book ID.");
        }
    }
    private static void reserveBook(Connection connection, Scanner scanner) throws SQLException {
        // Similar logic to lending a book can be implemented here
        // You can check availability and reserve the book if it's available
        // This is left as an exercise for further development
        System.out.println("Reservation functionality not implemented in this example.");
    }
}
```

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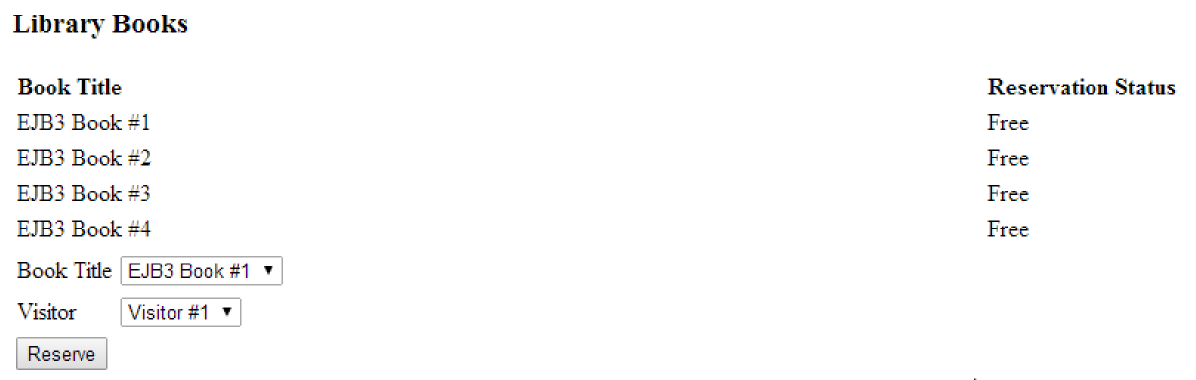
SAMPLE OUTPUT



Library Books

Book Title	Reservation Status
EJB3 Book #1	Free
EJB3 Book #2	Free
EJB3 Book #3	Free
EJB3 Book #4	Free

Book Title EJB3 Book #1

Visitor Visitor #1

RESULT

Thus we implemented programs using Java to create Android application having Databases for displaying books available, books lend, book reservation Implemented and executed successfully.

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