Experiment 6

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AIM: To Connect Flutter UI with fireBase database

THEORY:
Understanding the Connection:

Firebase Realtime Database (RTDB) and Cloud Firestore are NoSQL databases offered by Firebase.
Firebase provides Flutter libraries (firebase_database and cloud_firestore) to connect your Flutter UI with these databases.
You can read, write, and update data from your UI, synchronizing it in real-time (RTDB) or with flexible query options (Firestore).
Key Concepts:

Database References: Represent a specific location within the database hierarchy.
Data Structure: RTDB uses JSON-like objects, while Firestore uses collections and documents with structured fields.
Authentication: Secure access to your database using Firebase Authentication.
Security Rules: Define read/write permissions for different database paths.
Connection Process:

Initialization: Initialize Firebase app and required libraries in your Flutter app.
Reference Creation: Create references to specific database locations using DatabaseReference (RTDB) or CollectionReference (Firestore).
Data Operations: Read, write, or update data using methods like get(), set(), and update().
Listening: Implement real-time data updates using onChildAdded, onChildChanged, etc. (RTDB) or listeners/snapshots (Firestore).
Best Practices:

Choose the appropriate database (RTDB for real-time needs, Firestore for complex queries and scalability).
Structure your data efficiently based on your app requirements.
Implement robust error handling and user feedback mechanisms.
Use security rules to restrict unauthorized access.
Optimize data access patterns for performance.
Advanced Topics:

Explore offline data persistence (Firestore) and cloud functions for backend logic.
Implement complex queries and data transformations.
Integrate user authentication with database access control.
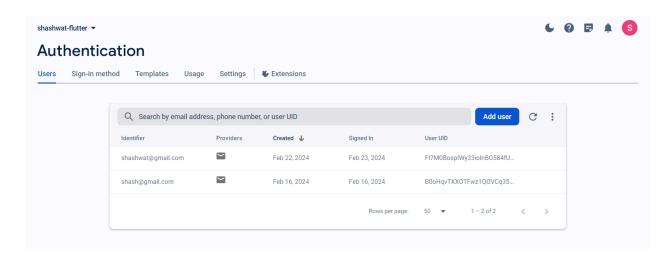
Additional Considerations:

Code:
firebase_options.dart

```dart
// File generated by FlutterFire CLI.
// ignore_for_file: lines_longer_than_80_chars,
avoid_classes_with_only_static_members
import 'package:firebase_core/firebase_core.dart' show
FirebaseOptions;
import 'package:flutter/foundation.dart'
    show defaultTargetPlatform, kIsWeb, TargetPlatform;

/// Default [FirebaseOptions] for use with your Firebase apps.
///
/// Example:
/// ```dart
/// import 'firebase_options.dart';
/// // ...
/// await Firebase.initializeApp(
///   options: DefaultFirebaseOptions.currentPlatform,
/// );
/// ```
class DefaultFirebaseOptions {
  static FirebaseOptions get currentPlatform {
    if (kIsWeb) {
      return web;
    }
    switch (defaultTargetPlatform) {
      case TargetPlatform.android:
        return android;
      case TargetPlatform.iOS:
        return ios;
      case TargetPlatform.macOS:
        throw UnsupportedError(
          'DefaultFirebaseOptions have not been configured for macos
- '
          'you can reconfigure this by running the FlutterFire CLI
again.',
        );
      case TargetPlatform.windows:
        throw UnsupportedError(
          'DefaultFirebaseOptions have not been configured for
windows - '
```

```dart
          'you can reconfigure this by running the FlutterFire CLI
again.',
        );
      case TargetPlatform.linux:
        throw UnsupportedError(
          'DefaultFirebaseOptions have not been configured for linux
- '
          'you can reconfigure this by running the FlutterFire CLI
again.',
        );
      default:
        throw UnsupportedError(
          'DefaultFirebaseOptions are not supported for this
platform.',
        );
    }
  }

  static const FirebaseOptions web = FirebaseOptions(
    apiKey: 'AIzaSyAEhzs4liL0k0_Sawn3DM2JaDUGXYDR_Vs',
    appId: '1:581041793774:web:d95bb71974b88cceff21ff',
    messagingSenderId: '581041793774',
    projectId: 'shashwat-flutter',
    authDomain: 'shashwat-flutter.firebaseapp.com',
    storageBucket: 'shashwat-flutter.appspot.com',
    measurementId: 'G-FSPJTPZXQB',
  );

  static const FirebaseOptions android = FirebaseOptions(
    apiKey: 'AIzaSyApIXoEAlWJ1J3saVcmeNL4qSxuB3JaStA',
    appId: '1:581041793774:android:1f764f270c0c12e5ff21ff',
    messagingSenderId: '581041793774',
    projectId: 'shashwat-flutter',
    storageBucket: 'shashwat-flutter.appspot.com',
  );

  static const FirebaseOptions ios = FirebaseOptions(
    apiKey: 'AIzaSyBWIJtQOrbh96OkJpD1fp4L6zSBdw7cRW0',
    appId: '1:581041793774:ios:7a87673a5c4dbca6ff21ff',
    messagingSenderId: '581041793774',
    projectId: 'shashwat-flutter',
    storageBucket: 'shashwat-flutter.appspot.com',
    iosBundleId: 'com.example.flutterTiktokShashwat',
  );
}
```

OUTPUT :

CONCLUSION: Thus, we have connected firebase to our flutter UI.