

MAD Lab Experiment

No 6 Aim: To connect Flutter UI with Firebase.

Theory: Firebase is a Backend-as-a-Service (BaaS) platform from Google that provides a suite of tools to simplify mobile app development. Integrating Firebase with Flutter allows you to leverage these tools within your Flutter application for functionalities like authentication, database management, storage, analytics, and more.

Here's a breakdown of key concepts related to Firebase in Flutter:

- Firebase Services:
 - Authentication: Provides features for user signup, login, password reset, social logins(Google, Facebook, etc.), and user management.
 - Firestore: A NoSQL cloud database for storing and retrieving structured data in a flexible and scalable manner.
 - Storage: Cloud storage for images, videos, and other files, accessible from your app.
 - Cloud Functions: Serverless functions that you can write and deploy to handle backend logic without managing servers.
 - Real-time Database: A database that synchronizes data across devices in real-time, ideal for collaborative apps or live updates.
 - Analytics: Tracks user behavior and app usage to gather insights into user engagement and app performance.
 - Remote Config: Allows you to dynamically change app configurations without app updates, suitable for A/B testing or feature flags.
 - Crashlytics: Provides crash reporting and analysis tools to help identify and fix bugs in your app.
- Integration with Flutter:
 - FlutterFire Plugins: Firebase provides official Flutter plugins (e.g., `firebase_auth`, `cloud_firestore`) for each service that simplify integration with your Flutter app.
 - Setting Up Firebase Project: You'll need to create a Firebase project and configure it in your Flutter code using the provided web interface and configuration files.
 - Adding Dependencies: Include the necessary FlutterFire plugins for the Firebase services you want to use in your `pubspec.yaml` file.
- Using Firebase Services in Your App:
 - Authentication Example:
 - Initialize Firebase Auth using `FirebaseAuth.instance`.

- Implement user signup or login logic using methods like `createUserWithEmailAndPassword` or `signInWithEmailAndPassword`.
- Securely store user credentials or tokens using secure storage mechanisms.
- Firestore Example:
 - Initialize Firestore using `FirebaseFirestore.instance`.
 - Access collections and documents within your Firestore database.
 - Use methods like `add`, `get`, `set`, and `update` to manage data.
- Storage Example:
 - Initialize Cloud Storage using `FirebaseStorage.instance`.
 - Upload or download files using methods like `putFile` and

downloadURL.4. Benefits of Using Firebase in Flutter:

- **Reduced Development Time:** Firebase provides pre-built services, saving you time on writing backend code.
- **Scalability:** Firebase services are automatically scalable, handling increased app usage without infrastructure management.
- **Offline Support (Firestore and Realtime Database):** Certain Firebase services offer offline capabilities for a seamless user experience.
- **Realtime Features:** Firebase Realtime Database enables real-time data synchronization across devices.
- **Analytics and Monitoring:** Firebase provides tools to track app usage and identify issues.

Steps to Set Up Firebase:

Prerequisites

To complete this tutorial, you will need:

A Google account to use Firebase.

Developing for iOS will require

XCode. To download and install

[Flutter](#).

To download and install [Android](#) HYPERLINK

"<https://developer.android.com/studio>"_ HYPERLINK

"<https://developer.android.com/studio>"[Studio](#) HYPERLINK

"<https://developer.android.com/studio>" and [Visual](#) HYPERLINK

"<https://code.visualstudio.com/>"_ HYPERLINK

"<https://code.visualstudio.com/>"[Studio](#) HYPERLINK

"<https://code.visualstudio.com/>"_ HYPERLINK

["https://code.visualstudio.com/Code"](https://code.visualstudio.com/Code) It is recommended to install plugins for your code editor

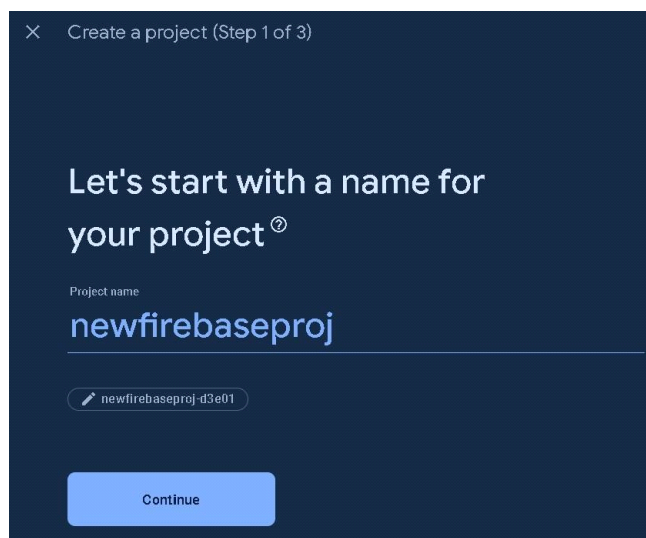
Creating a New Flutter Project:

This tutorial will require the creation of an example Flutter app.

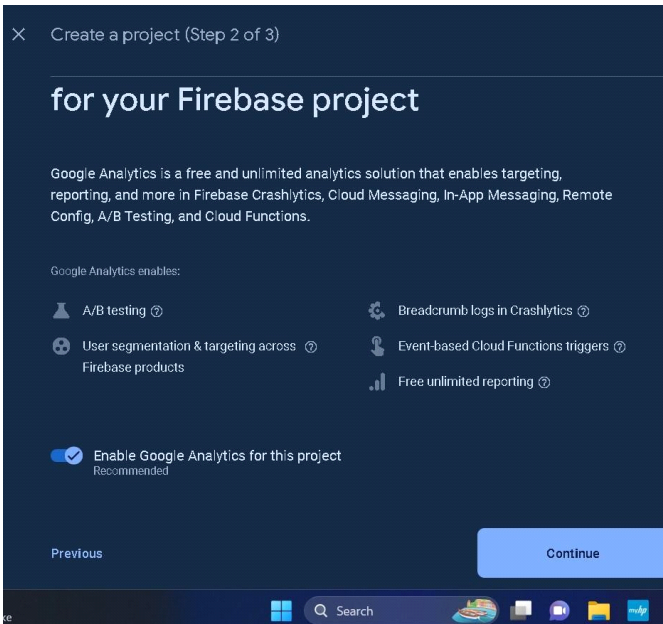
Once you have your environment set up for Flutter, you can run “flutter create <appname>”

command.Creating a New

Firebase Project



First, log in with your Google account to manage your Firebase projects. From within the Firebase dashboard, select the Create new project button and give it a name: Next,



we're given the option to enable Google Analytics. This tutorial will not require GoogleAnalytics, but you can also choose to add it to your project.

If you choose to use Google Analytics, you will need to review and accept the terms and conditions prior to project creation.

After pressing Continue, your project will be created and resources will be provisioned.

You will then be directed to the dashboard for the new project.

Adding Android support:

- Registering the App

In order to add Android support to our dashboard. This brings us to the

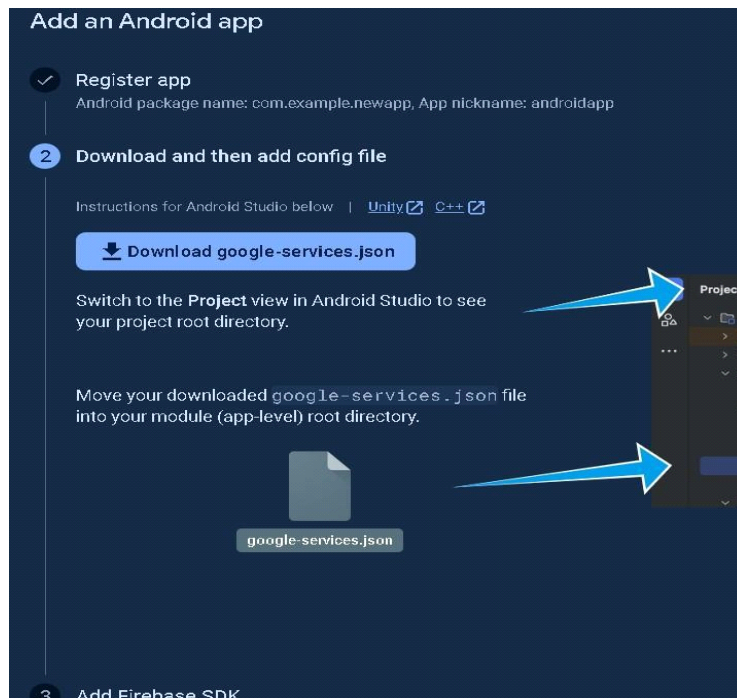
The structure consists of at least two segments. A common pattern is to use a domain name, a company name, and the application name:
com.example.flutterfirebaseexample

Once you've decided on a name, open `android/app/build.gradle` in your code editor and update the `applicationId` to match the Android package name. Select Register app to continue.

- Downloading the Config File

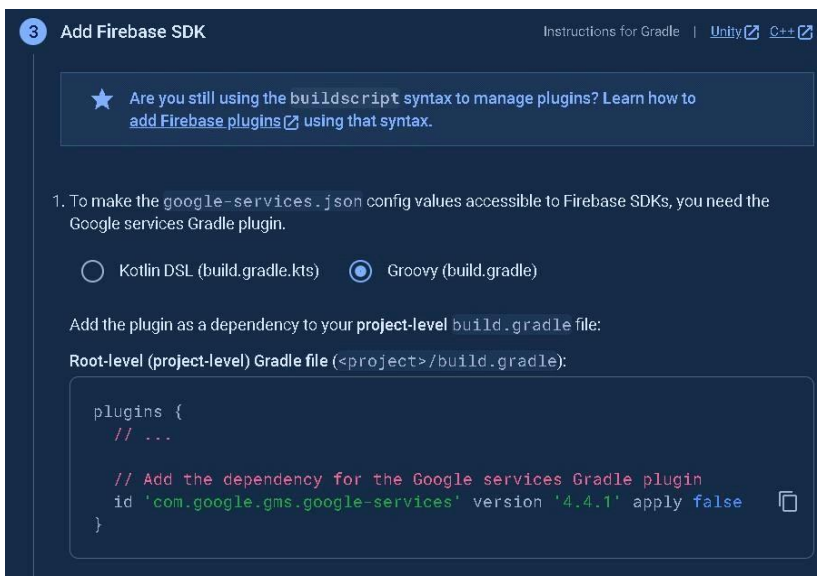
The next step is to add the Firebase configuration file into our Flutter project. This is important as it contains the API keys and other critical information for Firebase to use.

Select Download google-services.json from this page:



Next, move the `google-services.json` file to the `android/app` directory within the Flutter project.

- Adding the Firebase SDK



We'll now need to update our Gradle configuration to include the Google Services plugin.

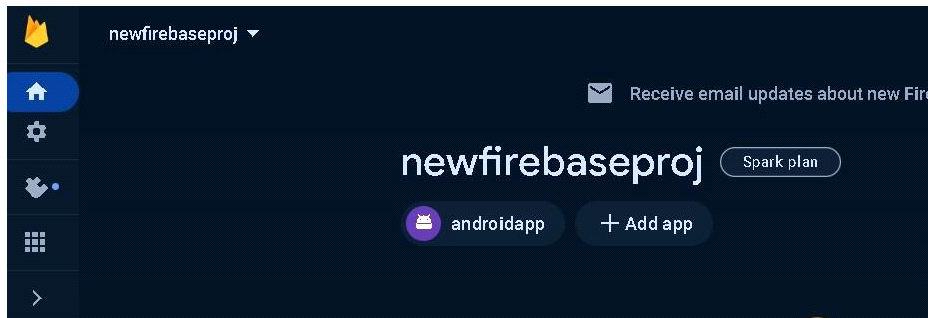
2. Then, in your module (app-level) `build.gradle` file, add both the `google-services` plugin and any Firebase SDKs that you want to use in your app:

Module (app-level) Gradle file (<project>/<app-module>/`build.gradle`):

```
plugins {  
    id 'com.android.application'  
    // Add the Google services Gradle plugin  
    id 'com.google.gms.google-services'  
    ...  
}  
  
dependencies {  
    // Import the Firebase BoM  
    implementation platform('com.google.firebase:firebase-bom:32.7.2')  
  
    // TODO: Add the dependencies for Firebase products you want to use  
    // When using the BoM, don't specify versions in Firebase dependencies  
    implementation 'com.google.firebase:firebase-analytics'  
  
    // Add the dependencies for any other desired Firebase products  
    // https://firebase.google.com/docs/android/setup#available-libraries  
}
```

By using the Firebase Android BoM, your app will always use compatible Firebase library versions. [Learn more](#)

With this update, we're essentially applying the Google Services plugin as well as looking at how other Flutter Firebase plugins can be activated such as Analytics.



Using Firebase Authentication Functionality

Get Started with Firebase Authentication on Flutter

[Send feedback](#)

Connect your app to Firebase

[Install](#) and [initialize](#) the [Firebase SDKs for Flutter](#) if you haven't already done so.

Add Firebase Authentication to your app

1. From the root of your Flutter project, run the following command to install the plugin:

```
flutter pub add firebase_auth
```

2. Once complete, rebuild your Flutter application:

```
flutter run
```

3. Import the plugin in your Dart code:

```
import 'package:firebase_auth/firebase_auth.dart';
```

Creating a test case for authentication purpose:

Authentication

Users Sign-in method Templates Usage Settings Extensions

Add user

Identifier	Providers	Created ↓	Signed In	User UID
test1@gmail.com		Mar 5, 2024	Mar 7, 2024	mBoSWPTtv5dfqgco8JSvJMu...

Rows per page: 50 1 - 1 of 1

```
dependencies:  
  flutter:  
    sdk: flutter  
  
  firebase_core: ^2.26.0  
  firebase_auth: ^4.17.7
```

Code:

```
import 'dart:developer';
```



```

import 'package:firebase_auth/firebase_auth.dart';
// import 'package:cloud_firestore/cloud_firestore.dart';
import 'package:flutter/material.dart';
import 'package:flutter_expense_tracker_app/views/screens/home_screen.dart';
import 'package:flutter_expense_tracker_app/views/screens/register.dart';
import 'package:flutter_expense_tracker_app/views/widgets/custom_text_field_widget.dart';
// import 'package:google_sign_in/google_sign_in.dart';
// import 'package:tinder/authenticationScreen/main_page.dart';
// import 'package:tinder/authenticationScreen/registration_screen.dart';
// import 'package:tinder/widgets/custom_text_field_widget.dart';

```

```

class LoginScreen extends StatefulWidget {
  const LoginScreen({Key? key}) : super(key:
  key);

  @override
  _LoginScreenState createState() => _LoginScreenState();
}

```

```

class _LoginScreenState extends State<LoginScreen> {
  TextEditingController emailTextEditingController = TextEditingController();
  TextEditingController passwordTextEditingController =
  TextEditingController(); bool showProgressBar = false;
  // final FirebaseFirestore _firestore = FirebaseFirestore.instance;

```

```

//function for login with email and
password void login() async {
  String email = emailTextEditingController.text.trim();
  String password = passwordTextEditingController.text.trim();

  if (email == "" || password ==
  "") {print('please fill all
  details');
  }
  else
  {

```

```

try
{
  UserCredential userCredential = await FirebaseAuth.instance
    .signInWithEmailAndPassword(email: email, password: password);

  if (userCredential !=
    null) {Navigator.push(
      context,
      MaterialPageRoute(builder: (context) => HomeScreen()),
    );
    // _firestore.collection('users').doc(userCredential.user!.uid).set({
    //   'uid': userCredential.user!.uid,
    //   'email': email,
    // }, SetOptions(merge: true));
  }
} on FirebaseAuthException catch
(ex) {log(ex.code.toString());
}
}
}

//function for google signin with firebase
// _signInWithGoogle() async {
//   final GoogleSignIn _googleSignIn = GoogleSignIn();
//   final FirebaseFirestore _firestore = FirebaseFirestore.instance;
//   //
//   try {
//     final GoogleSignInAccount? googleSignInAccount =
//     await _googleSignIn.signIn();
//     //
//     if (googleSignInAccount != null) {
//       final GoogleSignInAuthentication googleSignInAuthentication =
//       await googleSignInAccount.authentication;
//       //
//       final AuthCredential credential = GoogleAuthProvider.credential(
//         idToken: googleSignInAuthentication.idToken,
//         accessToken: googleSignInAuthentication.accessToken,
//       );
//       await FirebaseAuth.instance.signInWithCredential(credential);
//     }
//   }

```

```

//    User? user = FirebaseAuth.instance.currentUser;
//    if (user != null) {
//        await _firestore.collection('users').doc(user.uid).set({
//            'uid': user.uid,
//            'email': user.email,

//            'displayName': user.displayName,
//            'photoURL': user.photoURL,
//        }, SetOptions(merge: true));
//    }
//    Navigator.push(
//        context,
//        MaterialPageRoute(builder: (context) => MainPage()),
//    );
//
//    // _firestore.collection('users').doc(credential.accessToken)
//    }
// } catch (e) {
//    log("some error occurred $e");
// }
// }

//main code containing
UI@override
Widget build(BuildContext
context) {return Scaffold(
  body: Container(
    decoration:
      BoxDecoration(
        gradient:
          LinearGradient(
            colors: [Colors.pink,
              Colors.orange],begin:
              Alignment.topLeft,
            end: Alignment.bottomRight,
          ),
        ),
    ),
  child:
    SingleChildScrollView(
      child: Center(

```

```

child:
  Column(
    children: [
      const
        SizedBox(
          height:
            220,
        ),
      // Image.asset(
      // 'images/tinder_logo.png',
      // width: 100,
      // ),
      const SizedBox(

        height: 60,
      ),
      Center(
        child: Padding(
          padding:
            EdgeInsets.symmetric(
              horizontal: 20,
            ),
          child: Text(
            "By clicking Login you agree with our terms. Learn how we process your data in

```

Privacy ",

```

style: TextStyle(
  fontSize: 13,
  wordSpacing: 5,
),
),
),

),
Text('Policy and cookies
policy'),const SizedBox(
  height: 25,
),

```

```

// ElevatedButton(
//   onPressed: () {
//     // Implement your Google login logic here
//     // _signInWithGoogle();
//   },
//   style: ElevatedButton.styleFrom(
//     primary: Colors.white,
//     onPrimary: Colors.black,
//     elevation: 0,
//     shape: RoundedRectangleBorder(
//       borderRadius: BorderRadius.circular(10),
//     ),
//   ),
//   child: Container(
//     padding: EdgeInsets.all(10),
//     width: 275,
//     height: 55,
//     alignment: Alignment.center,

//     child: Row(
//       mainAxisAlignment: MainAxisAlignment.center,
//       children: [
//         Image.asset(
//           'images/google.jpeg',
//           width: 24,
//           height: 24,
//         ),
//         const SizedBox(width: 15),
//         Text(
//           "Continue with Google",
//           style: TextStyle(
//             fontSize: 20,
//             color: Colors.black,
//             fontWeight: FontWeight.bold,
//           ),
//         ),
//       ],
//     ),
//   ),
// ),
// ),

```

```

const
  SizedBox(
    height: 25,
  ),
  SizedBox(
    width: MediaQuery.of(context).size.width -
      36,height: 55,
    child: CustomTextFieldWidget(
      editingController: emailTextEditingController,
      labelText: 'Email',
      iconData:
        Icons.email_outlined,
      isObscure: false,
    ),
  ),
const
  SizedBox(
    height: 20,
  ),
  SizedBox(
    width: MediaQuery.of(context).size.width - 36,

    height: 55,
    child: CustomTextFieldWidget(
      editingController:
        passwordTextEditingController,labelText:
        'Password',
      iconData:
        Icons.lock_outline,
      isObscure: true,
    ),
  ),
const
  SizedBox(
    height: 20,
  ),
  ElevatedButton(
    onPressed: () {
      // Implement your login logic here

```

```

    // For example, you can use
    Get.to(HomeScreen());login();
  },
  style:
    ElevatedButton.styleFrom(
      elevation: 0,
      shape: RoundedRectangleBorder(
        borderRadius: BorderRadius.circular(10),
      ),
      side:
        BorderSide(
          width: 2,
        ),
    ),
  child: Container(
    padding:
      EdgeInsets.all(10),width:
      275,
    height: 55,
    alignment:
      Alignment.center,child:
    const Text(
      "Login",
      style:
        TextStyle(
          fontSize:
            20,
          color: Colors.black,
          fontWeight: FontWeight.bold,
        ),
    ),
  ),
),
const
  SizedBox(
    height: 20,
  ),
Row(

```

```

mainAxisAlignment: MainAxisAlignment.center,
children: [
  Text(
    'Don\'t have an
    Account?',style:
    TextStyle(
      fontSize: 16,
      color: Colors.black,
    ),
  ),
  InkWell(
    onTap: ()
    {
      Navigator.pu
      sh(context,
      MaterialPageRoute(
        builder: (context) => RegistrationScreen(),
      ),
    );
  },
  child: const
    Text('Create
    Here', style:
    TextStyle(
      fontSize: 16,
      color: Colors.black,
      fontWeight: FontWeight.bold,
    ),
  ),
)
],
),
const
  SizedBox(
    height: 80,
  ),
showProgressbar

? const CircularProgressIndicator(
valueColor: AlwaysStoppedAnimation<Color>(Colors.pink),

```

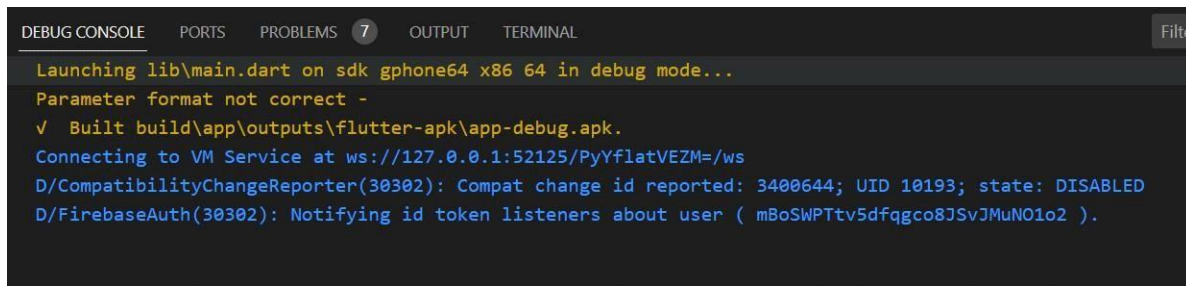


```

    )
    : Container()
  ],
),
),
),
),
);
}
}

```

After running the code check whether the firebase connection is established with the project or not:

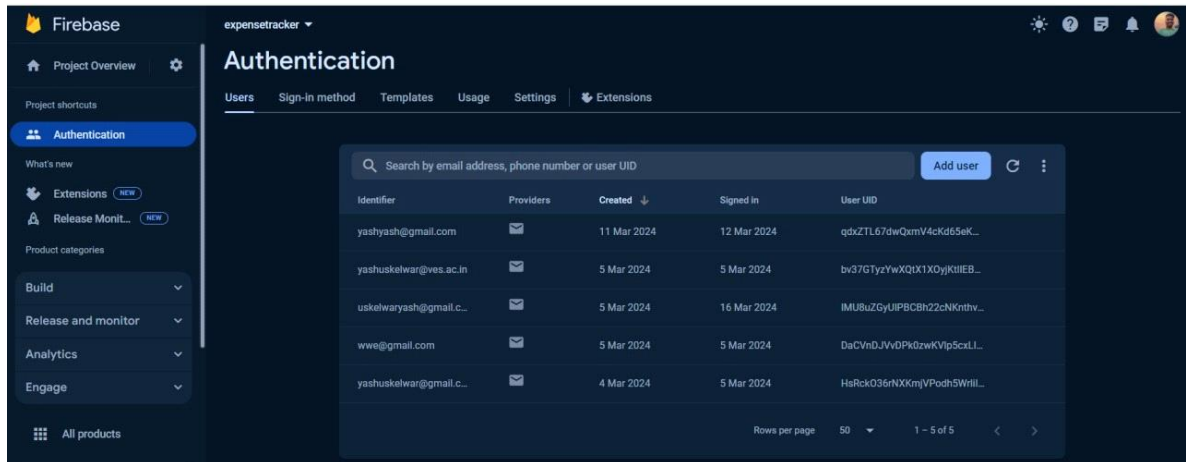


```

DEBUG CONSOLE  PORTS  PROBLEMS  7  OUTPUT  TERMINAL  Filter
Launching lib\main.dart on sdk gphone64 x86 64 in debug mode...
Parameter format not correct -
✓ Built build\app\outputs\flutter-apk\app-debug.apk.
Connecting to VM Service at ws://127.0.0.1:52125/PyYflatVEZM=/ws
D/CompatibilityChangeReporter(30302): Compat change id reported: 3400644; UID 10193; state: DISABLED
D/FirebaseAuth(30302): Notifying id token listeners about user ( mBoSWPTtv5dfqgc08JSvJMUN01o2 ).

```

Output:



The screenshot shows the Firebase Authentication console for a project named 'expensetracker'. The 'Users' tab is selected, displaying a list of users with the following columns: Identifier, Providers, Created, Signed in, and User UID.

Identifier	Providers	Created	Signed in	User UID
yashyash@gmail.com	Google	11 Mar 2024	12 Mar 2024	qdxZTL67dwQzmV4cKd5eK...
yashuskelwar@ves.ac.in	Google	5 Mar 2024	5 Mar 2024	bv37GTyzYwXQ1X1X0yjkIIEB...
uskelwaryash@gmail.c...	Google	5 Mar 2024	16 Mar 2024	IMU8uZGyUIPBCBh22cNKnthv...
www@gmail.com	Google	5 Mar 2024	5 Mar 2024	DaCVnDJVvOPk0zwKVip5cxL...
yashuskelwar@gmail.c...	Google	4 Mar 2024	5 Mar 2024	HaRckO36rNXKmqVPodh5Whill...

At the bottom of the table, it shows 'Rows per page: 50' and '1 - 5 of 5'.

1:22

Create Account

to get Started now

Username

Email

Age

Phone Number

Password

Confirm Password

Register

Conclusion : From this experiment, first of all we studied how to setup firebase. Then we created a firebase project, added multiple dependencies and packages to our flutter project so as to integrate our flutter project with firebase. Next step we authenticate the input fields from our app like email and password using Firebase and store it.