



Department of Information Technology, PICT Pune

Third Year Information Technology (2019 Course)

314458: Laboratory Practice-II (Cloud Computing)

Assignment No. : 08

Design and develop “Money management” custom application using Firebase Authentication and the Google App Engine.

Name and roll number of group members:

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Application:

1. Problem Statement:

- The custom application to be designed is a type of suggestion system or feedback system that can be used by an organization, community, institute or even by an ecommerce site for taking customer views.
- The application has a login interface and then an input area for accepting the suggestions or complaints from the members of the organization.
- The Firebase Authentication has been used for security purpose and the Google App Engine standard environment is used for deploying the application on Firebase. Also, the data is stored in Google Cloud Data Store.

2. Working:

- The Suggestion Box application is a simple application to accept suggestions or complaints. The frontend has been designed using simple web development technologies like HTML, CSS and also framework like Bootstrap and also backend framework Flask. It has two webpages which are explained as follows:

A. Login page:

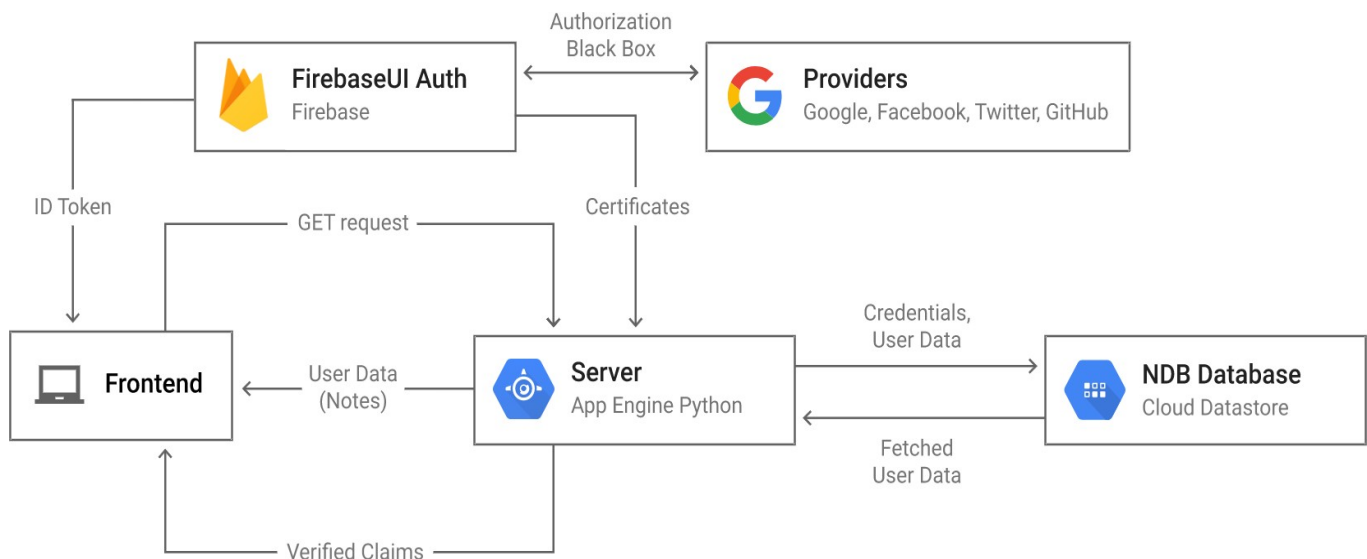
The login page provides the users to login and then they are directed to the main page. This page has heading at the top.

- This page provides this option for login:
 - a. Mail.
- The users can login either by their Google account or any other valid email address.

B. Add (income & expenses page)

This page contains four input forms. After submitting these forms the data will be added to firebase cloud.

- The application involves the use of a number of platforms like Firebase, GAE and Google Cloud Storage. The workflow or the architecture of the system is explained as follows:



- The application stores users' notes or suggestions in their own personal notebooks. Notebooks are stored per user, and identified by each user's unique Firebase Authentication ID. The application has following important components:
 - The frontend configures the sign-in user interface and retrieves the Firebase Authentication ID. It also handles authentication state changes and lets users see their notes.
 - FirebaseUI is an open-source, drop-in solution that simplifies authentication and UI tasks. The SDK handles user login, linking multiple providers to one account, recovering passwords, and more. It implements authentication best practices for a very smooth and secure sign-in experience.
 - The backend verifies the user's authentication state and returns user profile information as well as the user's notes.
 - The application stores user credentials and details in Datastore by using the client library from Google Cloud, but you can store the credentials in a database of your choice.

3. Features:

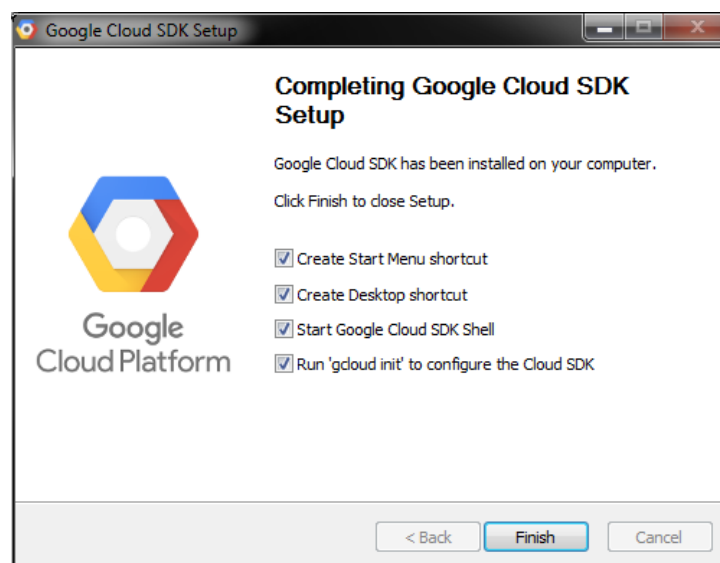
The income page application is very useful and its features are mentioned as follows:

- The application using some of the well-known technologies for its functioning. The Firebase Authentication has been used for security purpose and the Google App Engine standard environment is used for deploying the application on Firebase. Also, the data is stored in Google Cloud Data Store.
- The mobile application developed in this project will help to manage money and learn how to save money. This mobile application will allow students to manage money well and to save with fun. The implementation of the application includes a money manager which the students able to use it for their money-saving and help the students to manage money.
- This made it easier for students to trace money monthly or daily. This Money Management helps the user track the user financial activity efficiently. It allows the user to set up the income and expense from various options such as salary, awards, grants, sale, food, bills, and others. The application will calculate the income and expense. Then, it will display the balance of the income for the current month.

Implementation:

1. Initial Setup:

a. Install and configure Google App Engine:



b. Signup and Login to Google Cloud platform:

The screenshot shows the 'Step 1 of 2 Account information' page for the Google Cloud Platform Free Trial. The user 'deepak A' (d7841996820@gmail.com) is logged in. The country is set to 'India'. The organization type is 'Personal project'. The user has agreed to the Terms of Service. The page highlights 'Access to all Cloud Platform products', '\$300 credit for free', and 'No auto-charge after free trial ends'. A 'CONTINUE' button is at the bottom.

Try Google Cloud for free

Step 1 of 2 Account information

Account: deepak A (d7841996820@gmail.com) [SWITCH ACCOUNT](#)

Country: India

What best describes your organisation or needs?
Please select: Personal project

Terms of Service
☒ I have read and agree to the [Google Cloud Platform Free Trial Terms of Service](#).
Required to continue

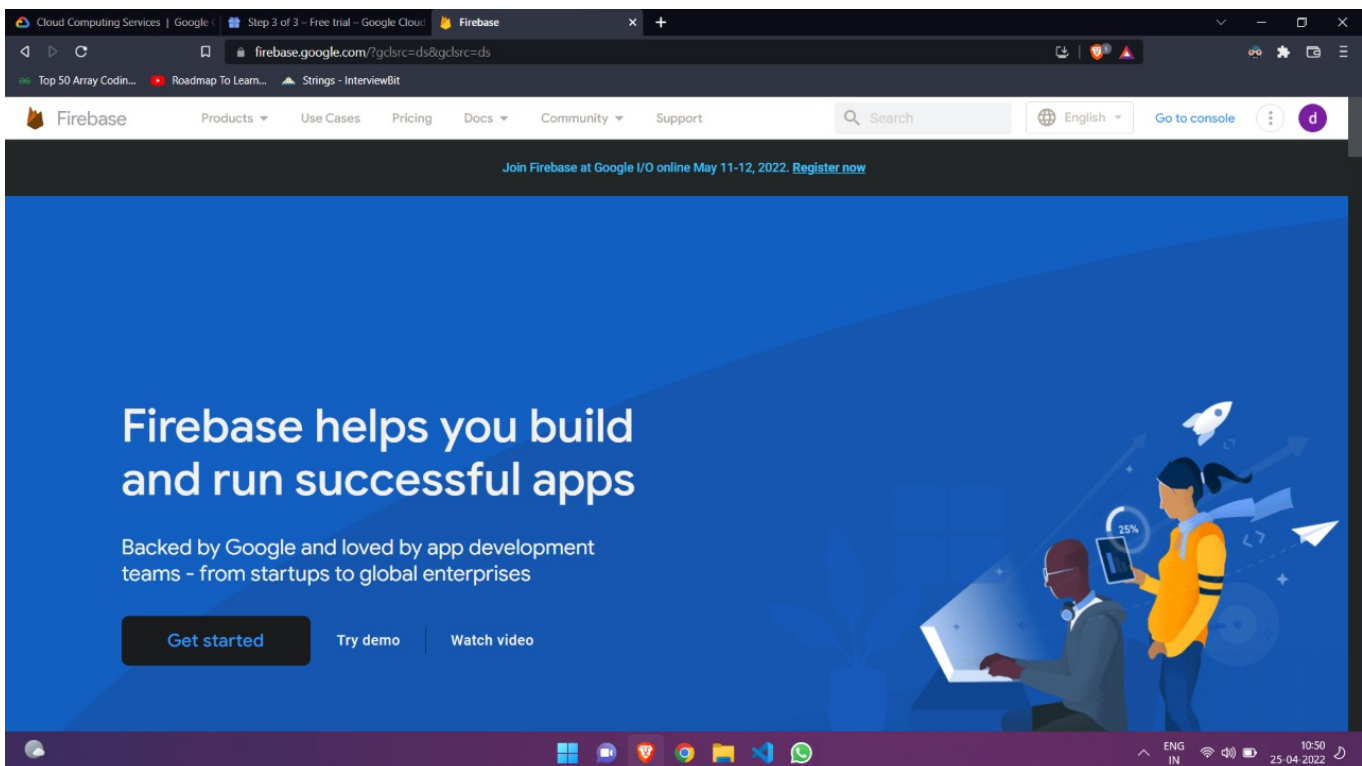
[CONTINUE](#)

Access to all Cloud Platform products
Get everything that you need to build and run your apps, websites and services, including Firebase and the Google Maps API.

\$300 credit for free
Put Google Cloud to work with \$300 in credit to spend over the next 90 days.

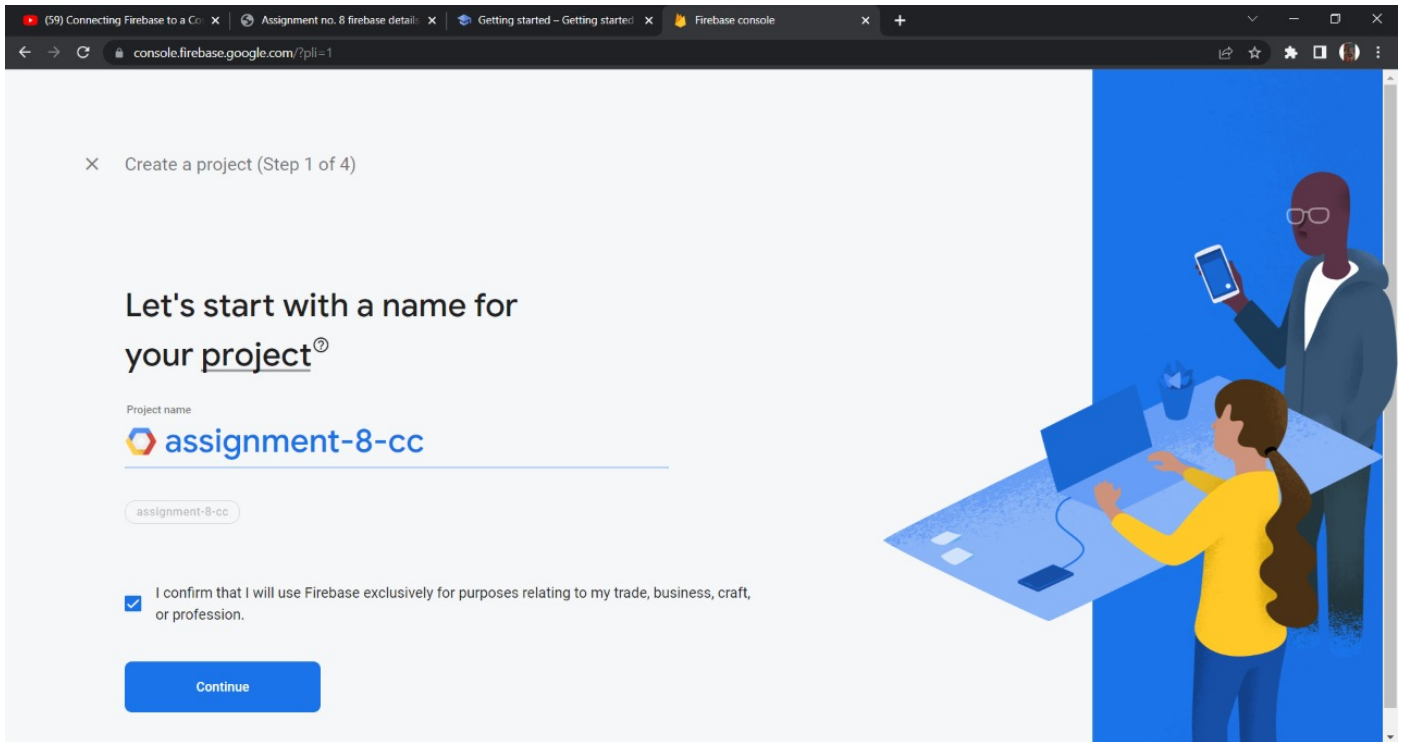
No auto-charge after free trial ends
We ask you for your credit card details to make sure that you are not a robot. You won't be charged unless you manually upgrade to a paid account.

c. Login to Firebase:



2. Creation of project in Google Cloud:

a. Create a new project in Google Cloud platform:



The screenshot shows the 'Create a project' step in the Firebase console. The page title is 'Create a project (Step 1 of 4)'. The main heading is 'Let's start with a name for your project'. Below this, the 'Project name' field is filled with 'assignment-8-cc'. A checkbox is checked, indicating agreement to the terms of use. A blue 'Continue' button is at the bottom. On the right, there is an illustration of two people, one holding a smartphone and the other working on a laptop.

Create a project (Step 1 of 4)

Let's start with a name for your project[®]

Project name

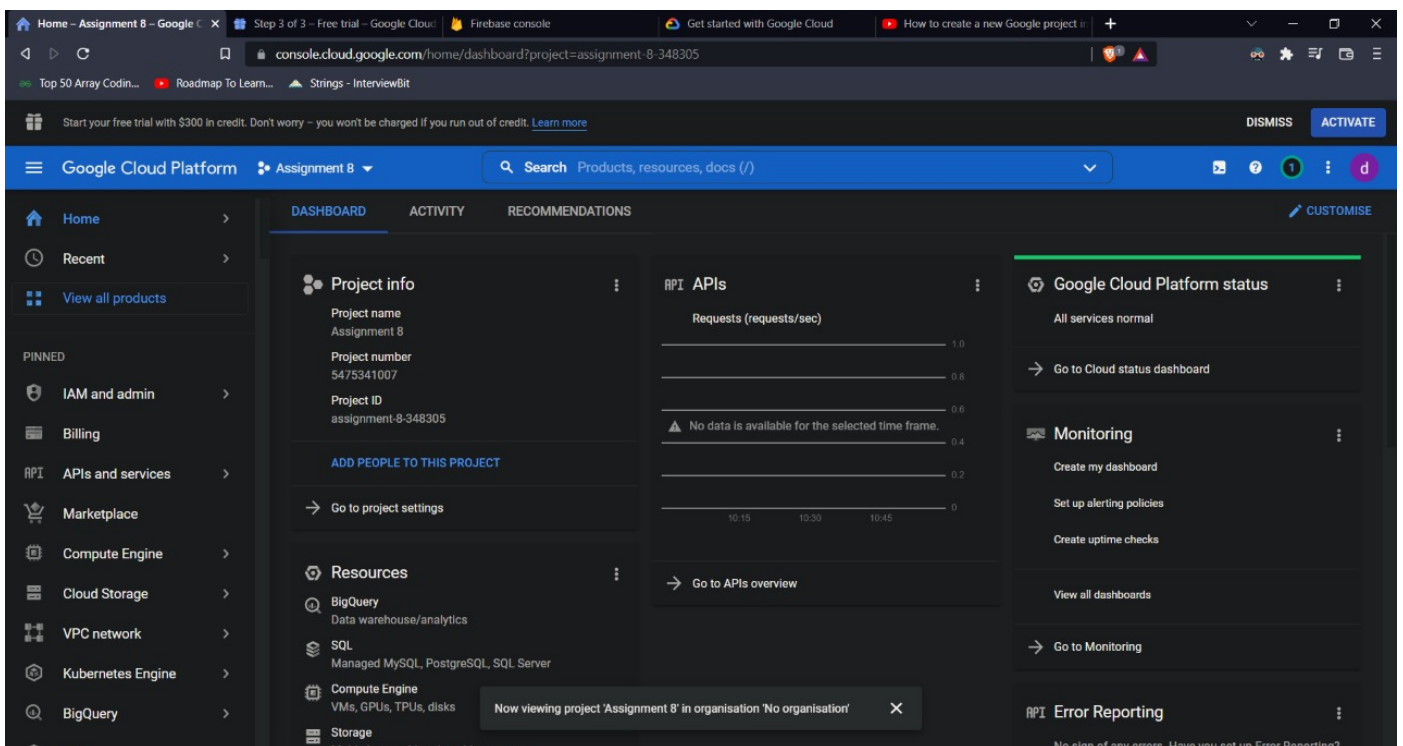
assignment-8-cc

assignment-8-cc

☒ I confirm that I will use Firebase exclusively for purposes relating to my trade, business, craft, or profession.

Continue

b. You can view the created project in the dashboard:



The screenshot shows the Google Cloud Platform dashboard for a project named 'Assignment 8'. The dashboard is divided into several sections: 'Project info', 'APIs', 'Resources', 'Google Cloud Platform status', 'Monitoring', and 'Error Reporting'. The 'Project info' section displays the project name, number, and ID. The 'APIs' section shows a graph of requests per second. The 'Resources' section lists various services like BigQuery, SQL, Compute Engine, and Storage. The 'Google Cloud Platform status' section indicates that all services are normal. The 'Monitoring' section provides options to create a dashboard, set up alerting policies, and create uptime checks. The 'Error Reporting' section shows that there are no errors reported.

Home - Assignment 8 - Google Cloud Platform

Step 3 of 3 - Free trial - Google Cloud Platform

console.cloud.google.com/home/dashboard?project=assignment-8-348305

Start your free trial with \$300 in credit. Don't worry - you won't be charged if you run out of credit. [Learn more](#)

DISMISS ACTIVATE

Google Cloud Platform Assignment 8

Search Products, resources, docs (/)

Home Recent View all products

PINNED

- IAM and admin
- Billing
- APIs and services
- Marketplace
- Compute Engine
- Cloud Storage
- VPC network
- Kubernetes Engine
- BigQuery

DASHBOARD ACTIVITY RECOMMENDATIONS

CUSTOMISE

Project info

- Project name: Assignment 8
- Project number: 5475341007
- Project ID: assignment-8-348305

ADD PEOPLE TO THIS PROJECT

Go to project settings

Resources

- BigQuery: Data warehouse/analytics
- SQL: Managed MySQL, PostgreSQL, SQL Server
- Compute Engine: VMs, GPUs, TPUs, disks
- Storage: Multi-cloud, multi-region object storage

APIs

Requests (requests/sec)

No data is available for the selected time frame.

Go to APIs overview

Google Cloud Platform status

All services normal

Go to Cloud status dashboard

Monitoring

- Create my dashboard
- Set up alerting policies
- Create uptime checks
- View all dashboards

Go to Monitoring

Error Reporting

No sign of any errors. Have you set up Error Reporting?

Now viewing project 'Assignment 8' in organisation 'No organisation'

3. Setup Google App Engine:

- Open the GAE SDK shell and type the command `'gcloud init'`. Then select appropriate configuration an account:

```
Google Cloud SDK Shell - gcloud init
accessibility:
  screen_reader: 'False'
core:
  account: deepakabande26@gmail.com
  disable_usage_reporting: 'True'

Pick configuration to use:
[1] Re-initialize this configuration [default] with new settings
[2] Create a new configuration
Please enter your numeric choice: 1

Your current configuration has been set to: [default]

You can skip diagnostics next time by using the following flag:
  gcloud init --skip-diagnostics

Network diagnostic detects and fixes local network connection issues.
Checking network connection...done.
Reachability Check passed.
Network diagnostic passed (1/1 checks passed).

Choose the account you would like to use to perform operations for this configuration:
[1] deepakabande26@gmail.com
[2] Log in with a new account
Please enter your numeric choice: 2

Your browser has been opened to visit:
  https://accounts.google.com/o/oauth2/auth?response_type=code&client_id=325559409559.apps.googleusercontent.com&redirect_uri=http%3A%2F%2Flocalhost%3A8085%2F&scope=openid+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fuserinfo.email+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcloud-platform+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fengine.admin+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcompute+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Faccounts.reauth&state=HvtkCR2kx0Qsxb0S1LX2r2JyGrkn7&access_type=offline&code_challenge=d9YHohrm7nhE1J221Y1Eu01Nm7h7gx65epJ8wPlyzF1s&code_challenge_method=S256

Updates are available for some Cloud SDK components. To install them,
please run:
  $ gcloud components update

To take a quick anonymous survey, run:
  $ gcloud survey

You are logged in as: [deepakabande26@gmail.com].

Pick cloud project to use:
[1] money-manager-66b46
[2] Create a new project
Please enter numeric choice or text value (must exactly match list item):
```

- From the list that appears select the appropriate project that we created in GC

```
Google Cloud SDK Shell

Network diagnostic detects and fixes local network connection issues.
Checking network connection...done.
Reachability Check passed.
Network diagnostic passed (1/1 checks passed).

Choose the account you would like to use to perform operations for this configuration:
[1] deepakabande26@gmail.com
[2] Log in with a new account
Please enter your numeric choice: 1

You are logged in as: [deepakabande26@gmail.com].

Pick cloud project to use:
[1] money-manager-66b46
[2] Create a new project
Please enter numeric choice or text value (must exactly match list item): 2

Enter a Project ID. Note that a Project ID CANNOT be changed later.
Project IDs must be 6-30 characters (lowercase ASCII, digits, or
hyphens) in length and start with a lowercase letter, assignment-8-cc
Waiting for [operations/cp.6138567064053671122] to finish...done.
Your current project has been set to: [assignment-8-cc].

Not setting default zone/region (this feature makes it easier to use
[gcloud compute] by setting an appropriate default value for the
--zone and --region flag).
See https://cloud.google.com/compute/docs/gcloud-compute section on how to set
default compute region and zone manually. If you would like [gcloud init] to be
able to do this for you the next time you run it, make sure the
Compute Engine API is enabled for your project on the
https://console.developers.google.com/apis page.

Error creating a default .boto configuration file. Please run [gsutil config -n] if you would like to create this file.
Your Google Cloud SDK is configured and ready to use!

* Commands that require authentication will use deepakabande26@gmail.com by default
* Commands will reference project 'assignment-8-cc' by default
Run 'gcloud help config' to learn how to change individual settings

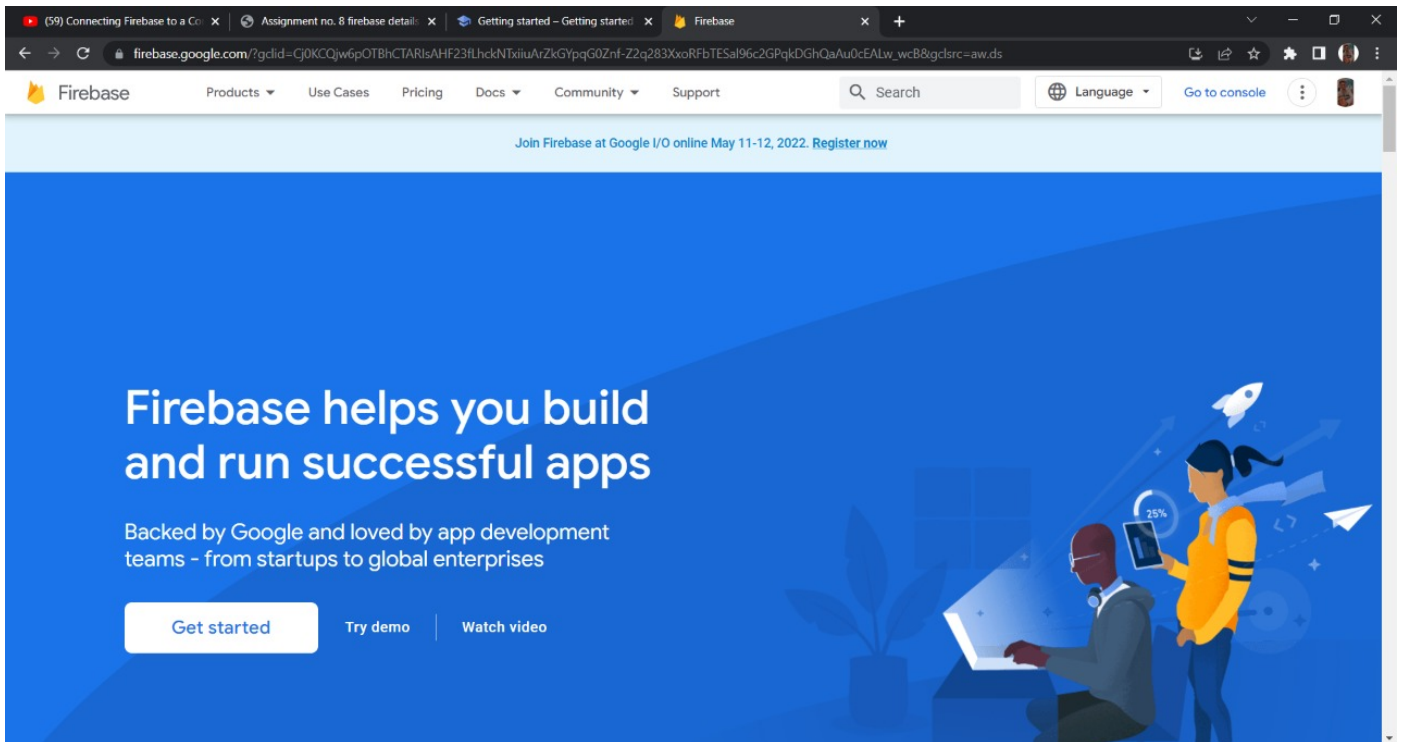
This gcloud configuration is called [default]. You can create additional configurations if you work with multiple accounts and/or projects.
Run 'gcloud topic configurations' to learn more.

Some things to try next:
* Run 'gcloud --help' to see the Cloud Platform services you can interact with. And run 'gcloud help COMMAND' to get help on any gcloud command.
* Run 'gcloud topic --help' to learn about advanced features of the SDK like arg files and output formatting

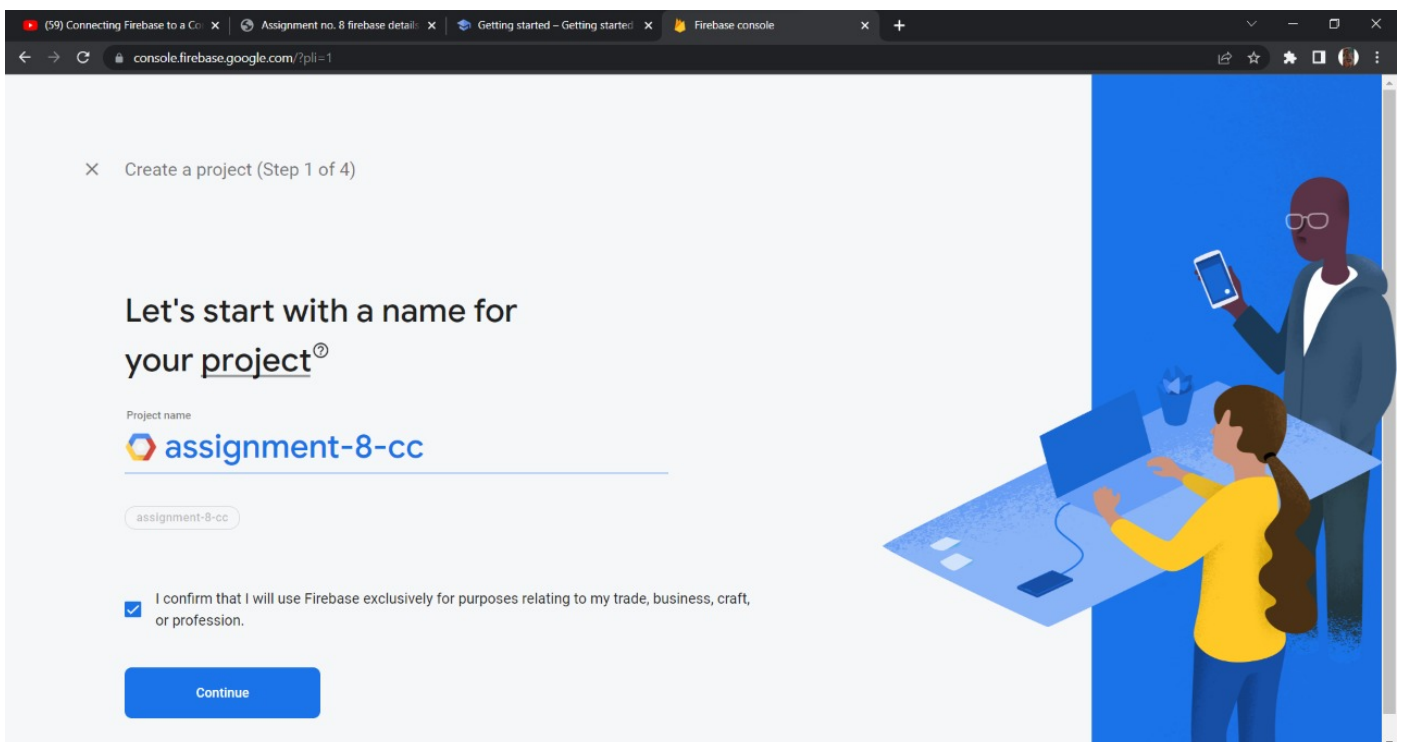
C:\Users\DEEPAK S ABAK\AppData\Local\Google\Cloud SDK>
```

4. Adding Firebase to the project:

a. Go to the Firebase console and click on Create a project:

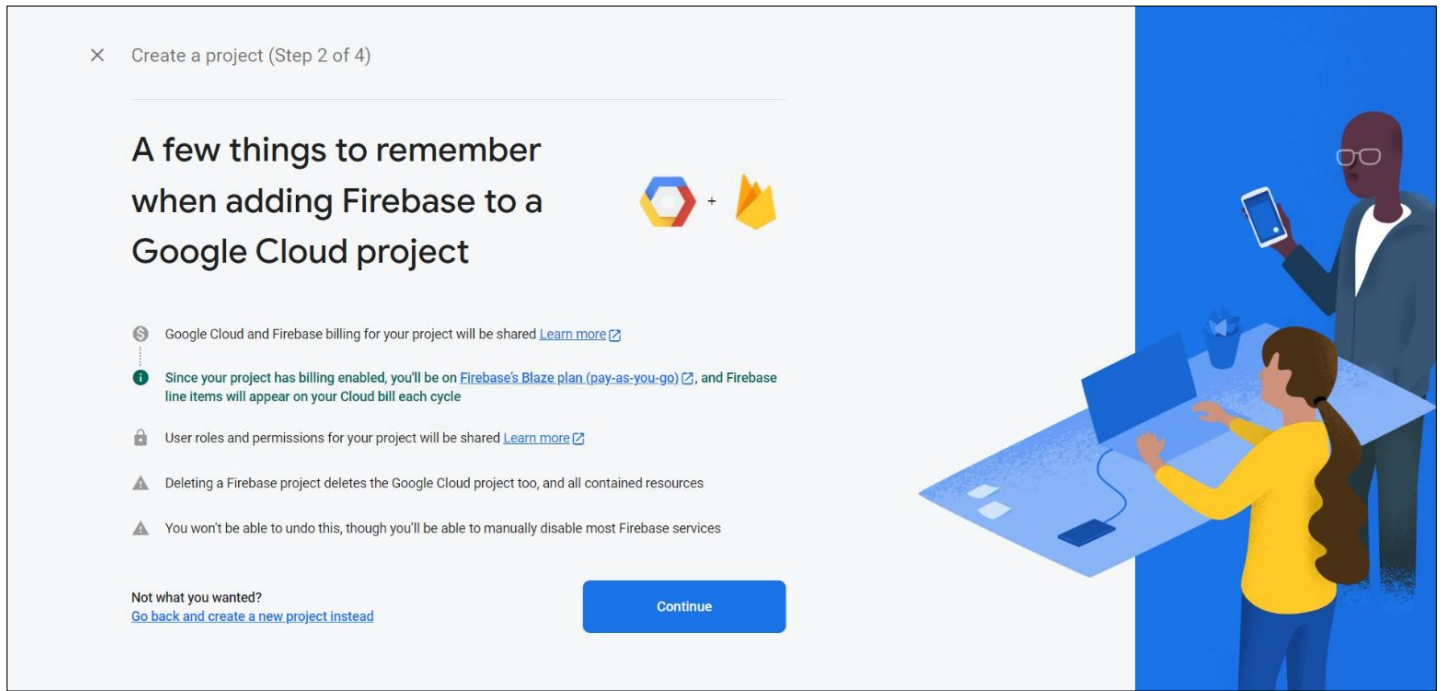


b. In the next window, add the project name that we created in Google Cloud:

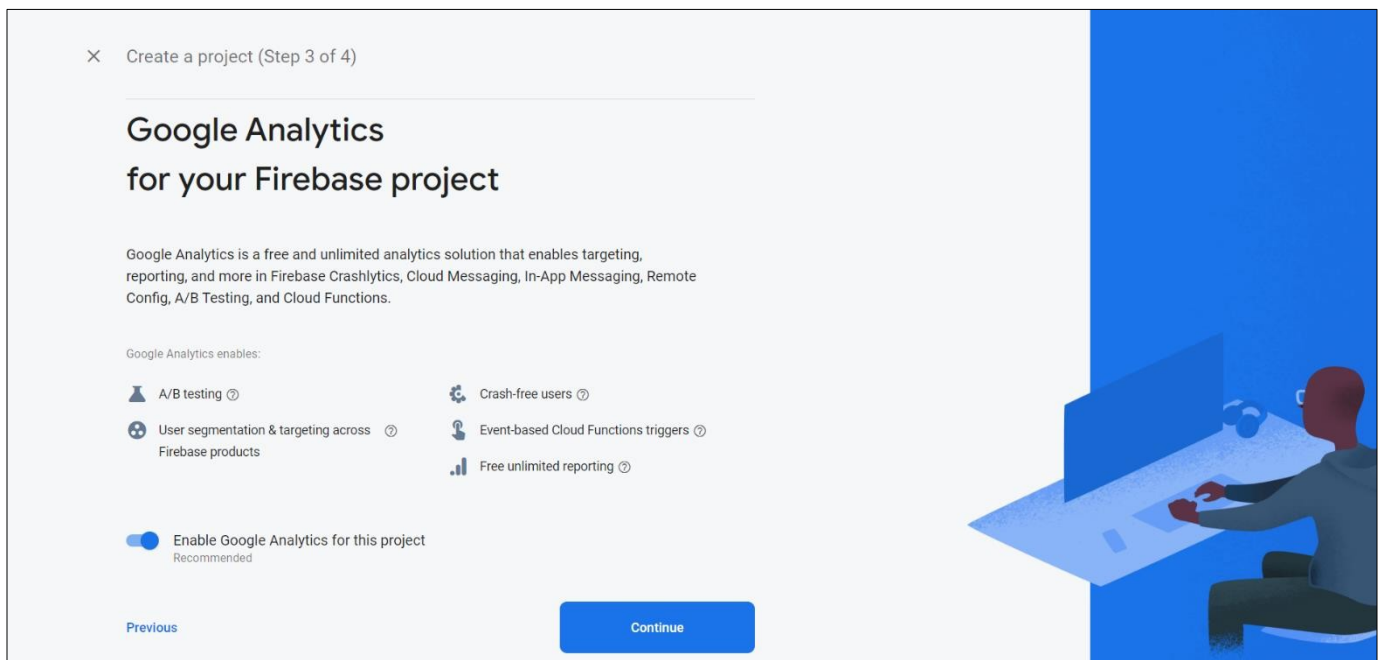


c. Confirm Firebase billing plan:

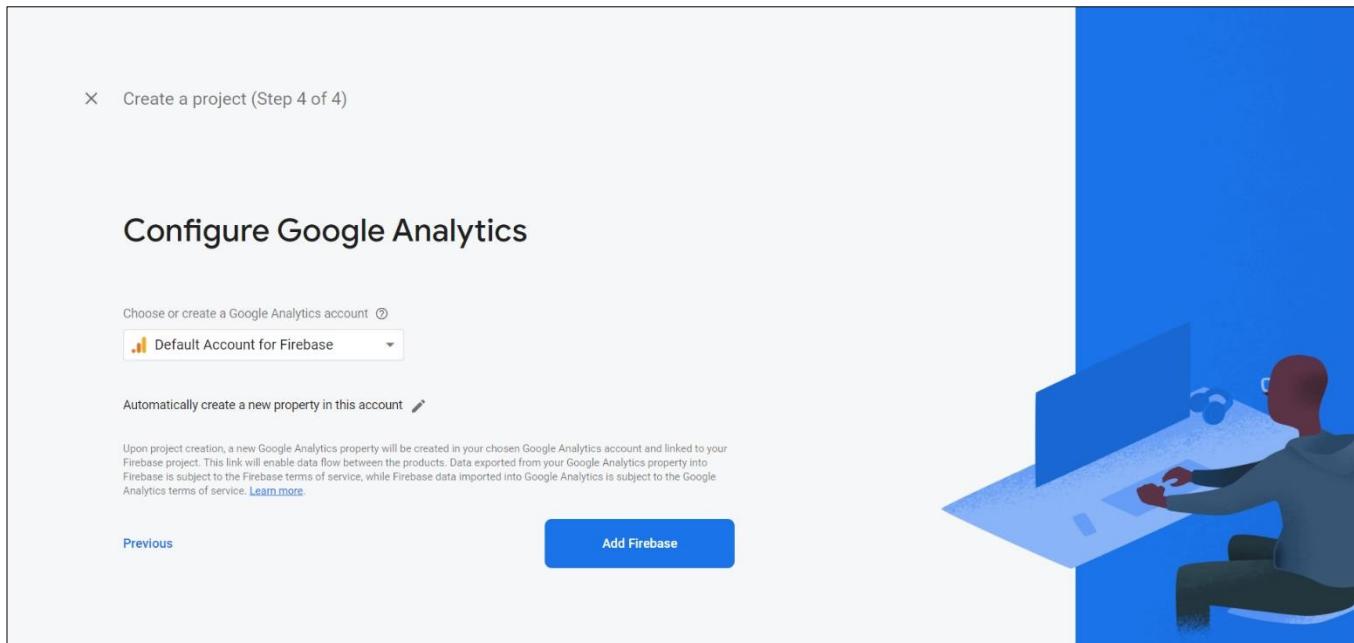
d. The next window shows some instructions. Read those and click Continue:



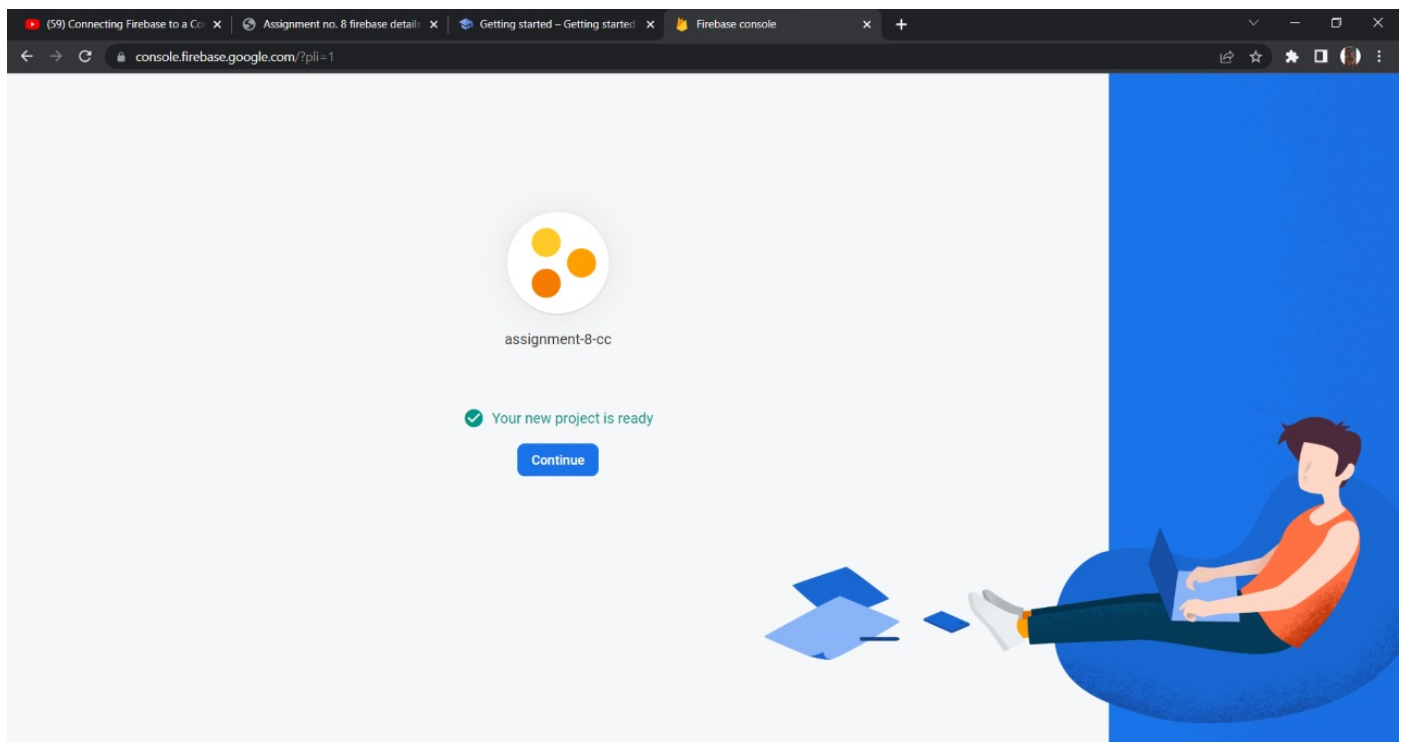
e. Enable Google Analytics for the project:



f. Configure Google Analytics by selecting Default Account for Firebase:

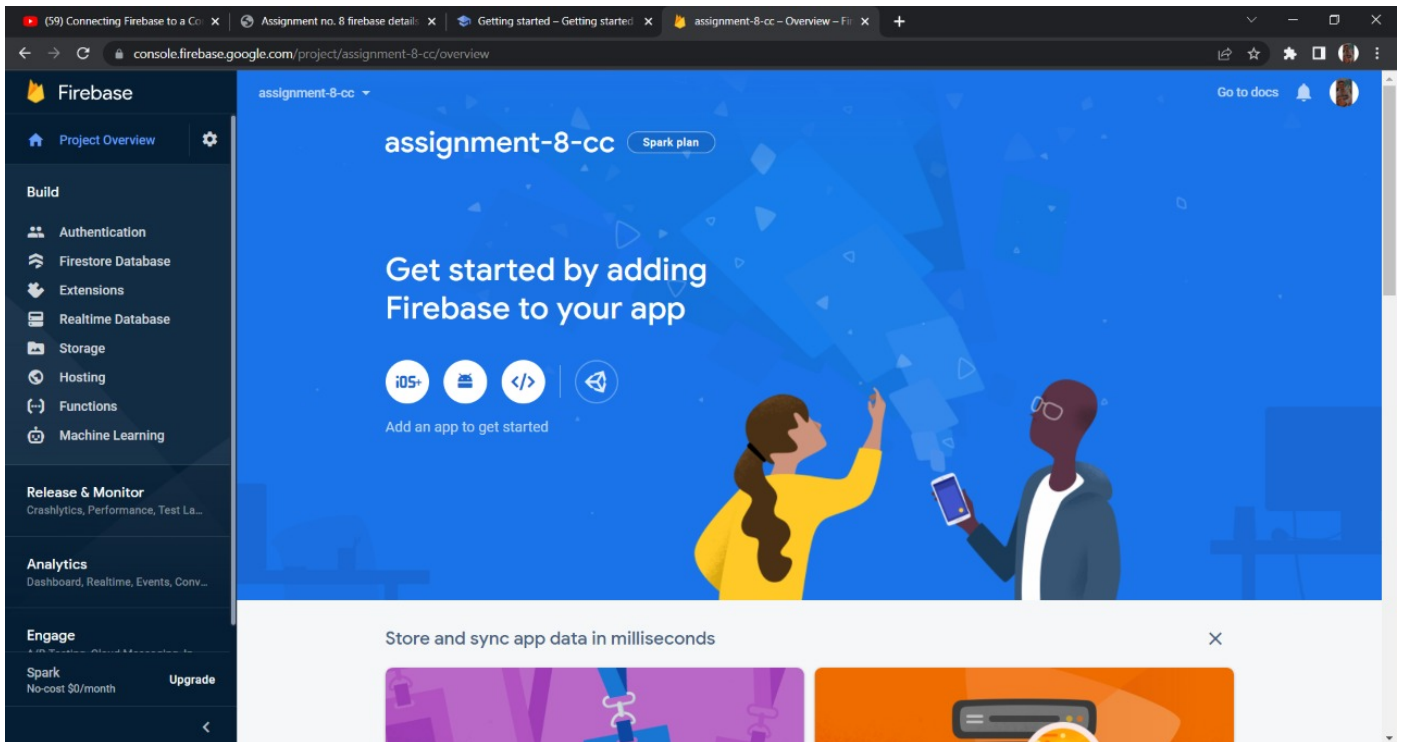


g. We have successfully added Firebase to our project.

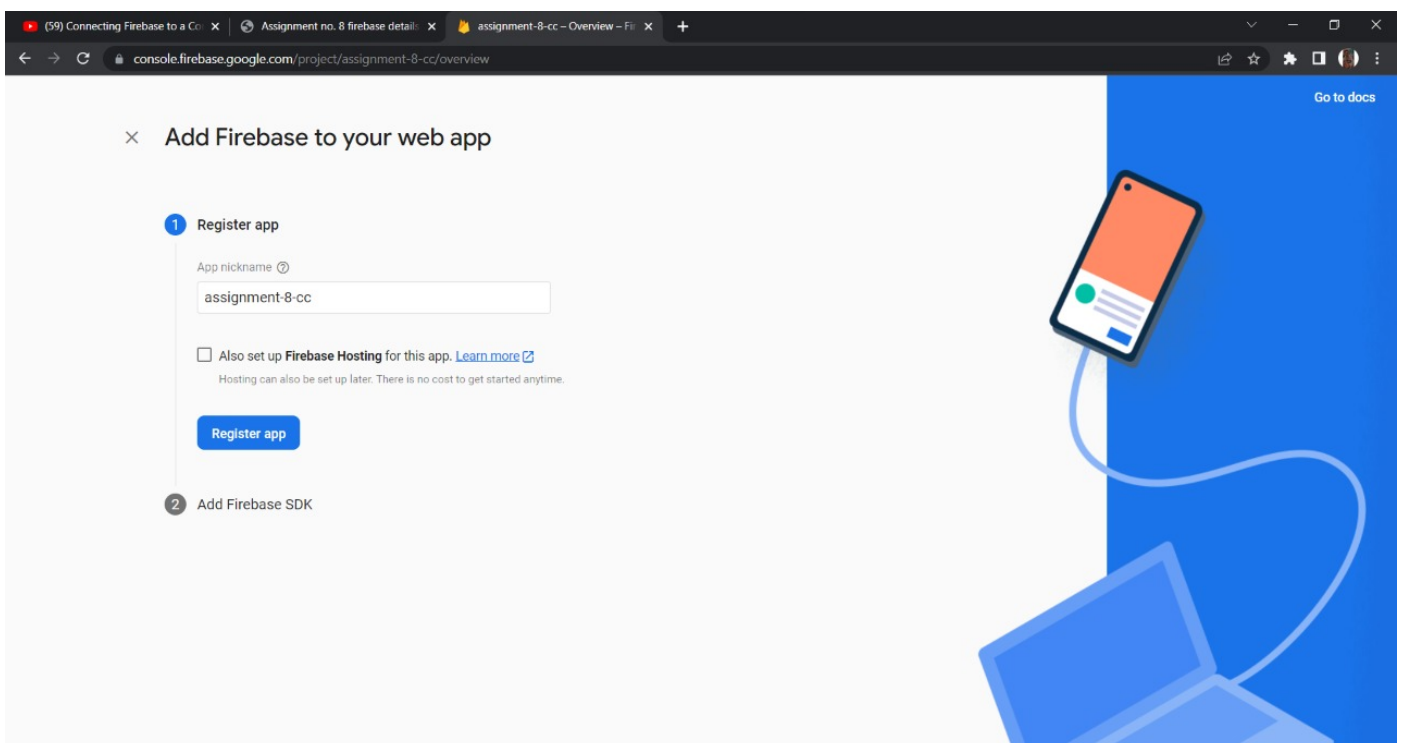


5. Adding an App to the Firebase project:

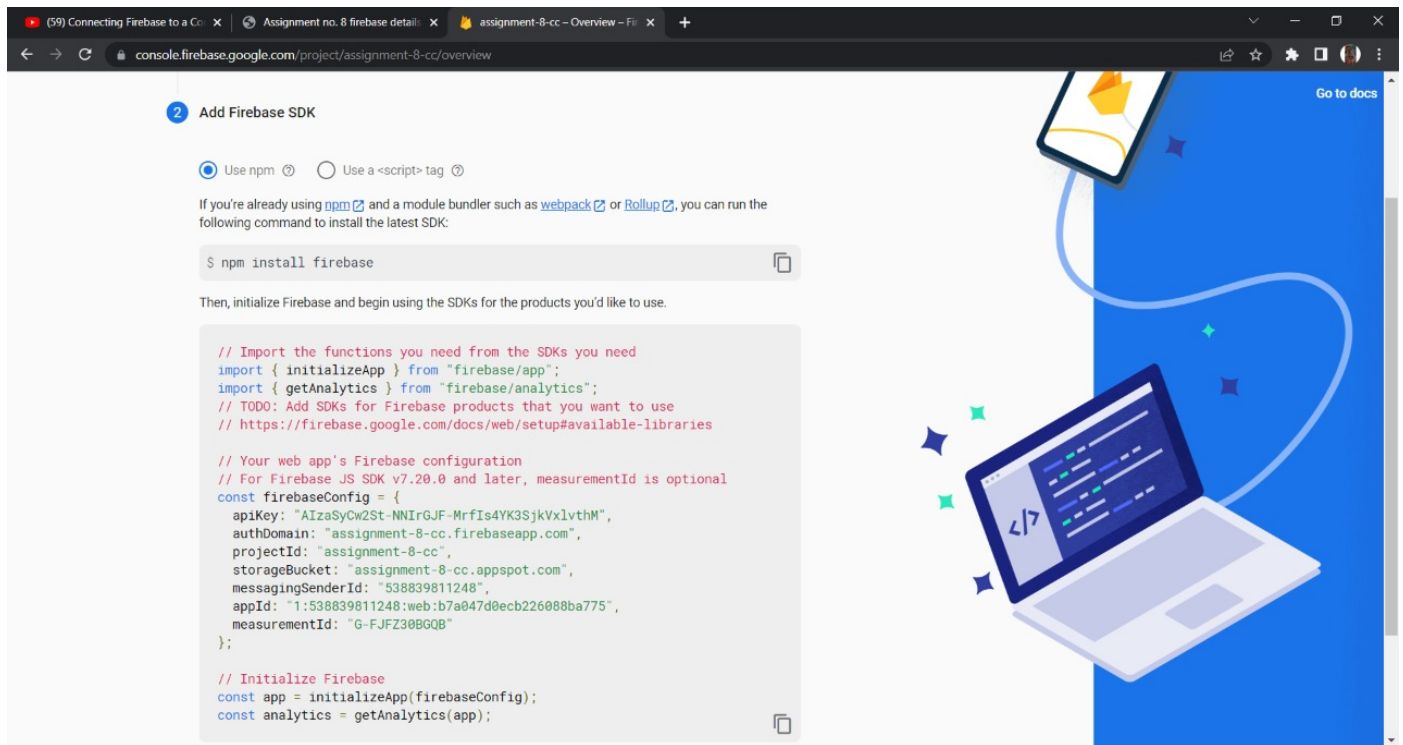
a. From the console, go to your project and click '</>' to add your app:



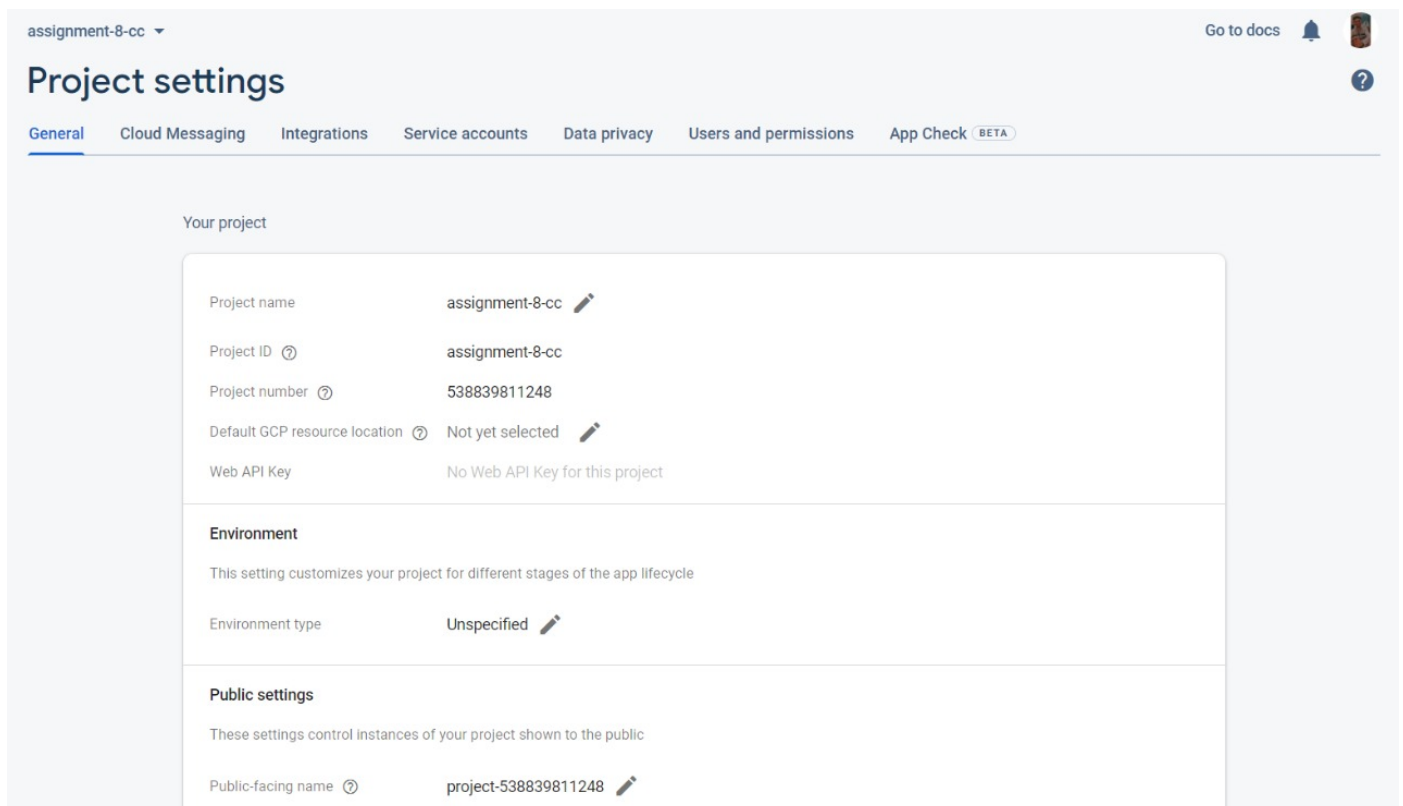
b. Add a nickname for your app and click Register app:



c. You will receive further configuration details then click Continue to console:



d. You will see the app on the console, click on it to view all its details.



The screenshot shows the Firebase console interface. On the left is a dark sidebar with the 'Firebase' logo and a navigation menu. The menu includes 'Project Overview', 'Build' (with sub-items: Authentication, Firestore Database, Extensions, Realtime Database, Storage, Hosting, Functions, Machine Learning), 'Release & Monitor', 'Analytics', and 'Engage' (with sub-items: Spark, No-cost \$0/month, Upgrade). The main content area is titled 'Project settings' for the project 'assignment-8-cc'. Under the 'Your apps' section, a 'Web apps' list contains one entry: 'assignment-8-cc Web App', which is selected. To the right of this entry, the 'App nickname' is 'assignment-8-cc' and the 'App ID' is '1:538839811248:web:b7a047d0ecb226088ba775'. A button 'Link to a Firebase Hosting site' is visible. Below this, the 'SDK setup and configuration' section shows the 'npm' option selected. It provides instructions on how to install the SDK using 'npm install firebase' and includes a code block for initializing Firebase in a web application.

assignment-8-cc Project settings

Your apps

Web apps

assignment-8-cc Web App

App nickname
assignment-8-cc

App ID
1:538839811248:web:b7a047d0ecb226088ba775

[Link to a Firebase Hosting site](#)

SDK setup and configuration

☒ npm ☐ CDN ☐ Config

If you're already using [npm](#) and a module bundler such as [webpack](#) or [Rollup](#), you can run the following command to install the latest SDK:

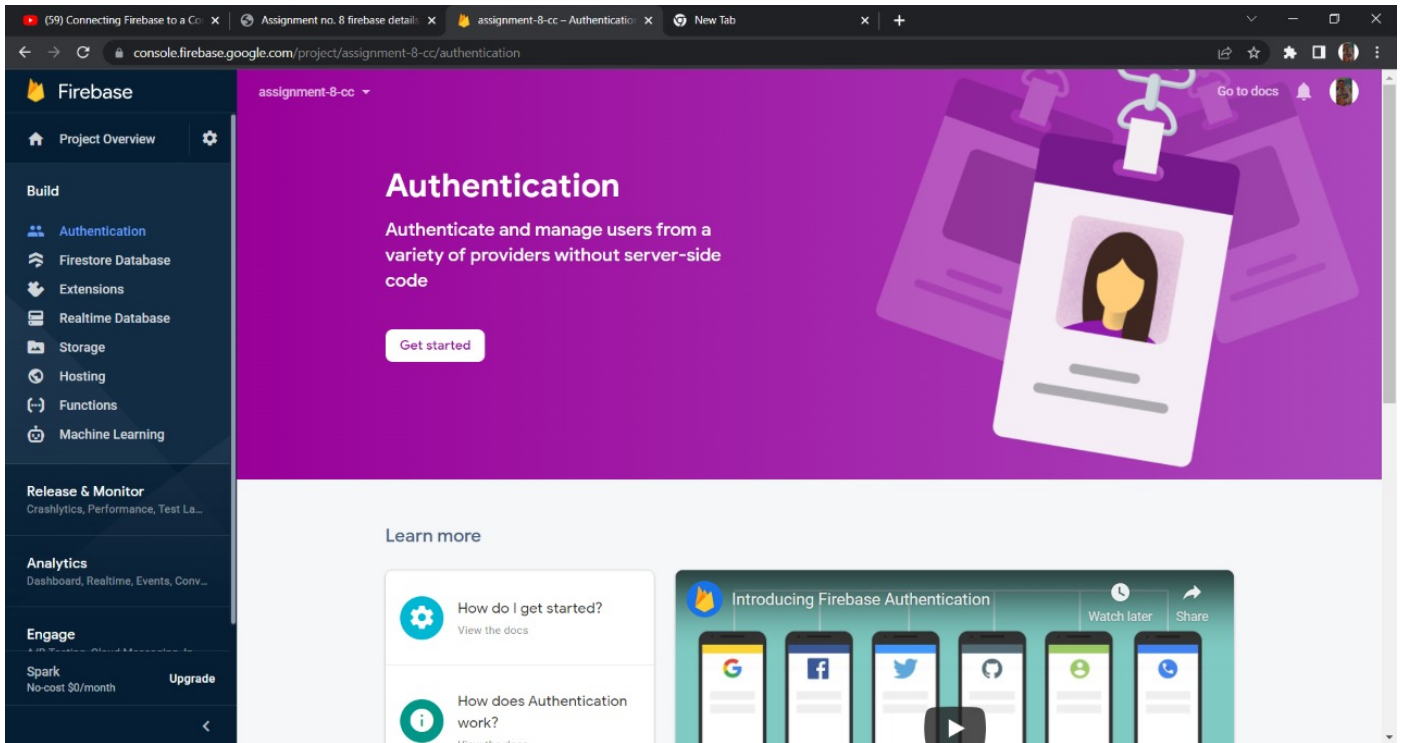
```
$ npm install firebase
```

Then, initialize Firebase and begin using the SDKs for the products you'd like to use.

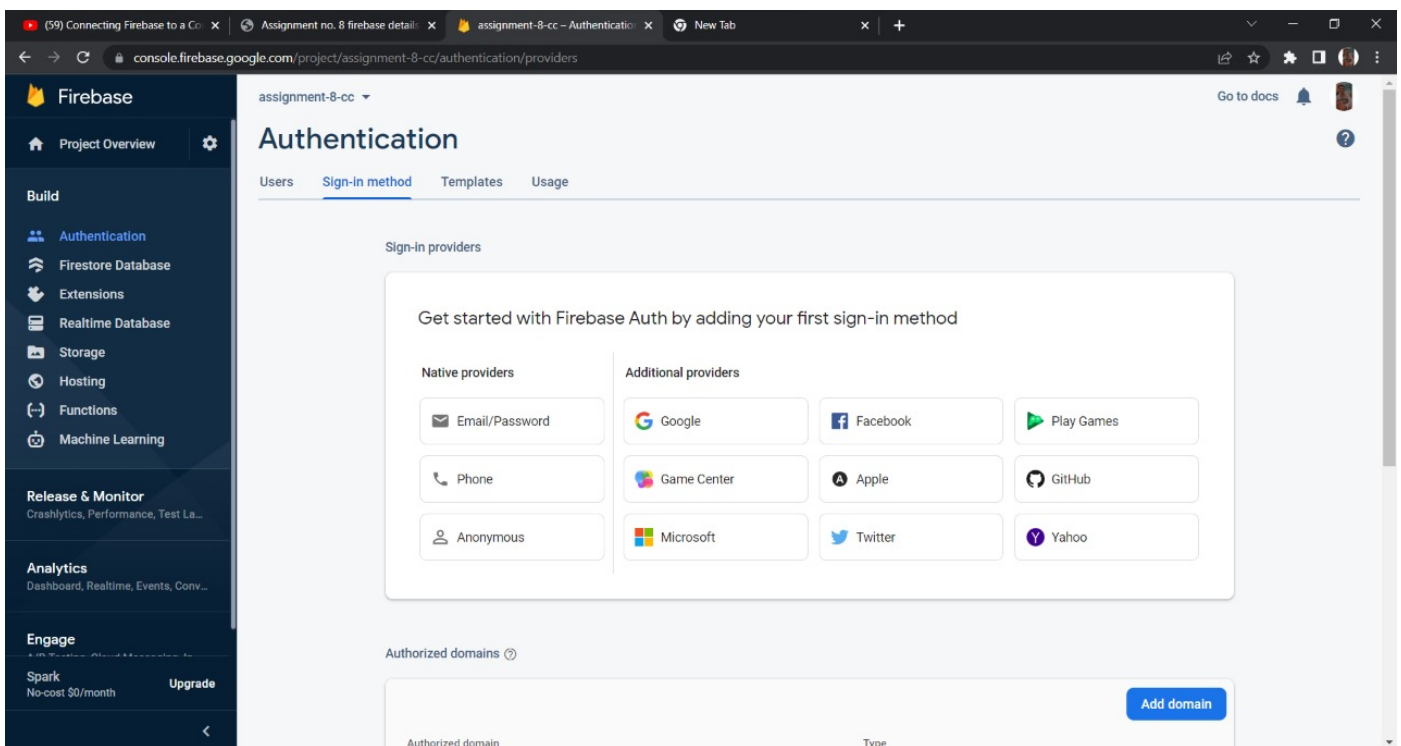
```
// Import the functions you need from the SDKs you need
import { initializeApp } from "firebase/app";
import { getAnalytics } from "firebase/analytics";
// TODO: Add SDKs for Firebase products that you want to use
// https://firebase.google.com/docs/web/setup#available-libraries
```


6. Authentication in Firebase:

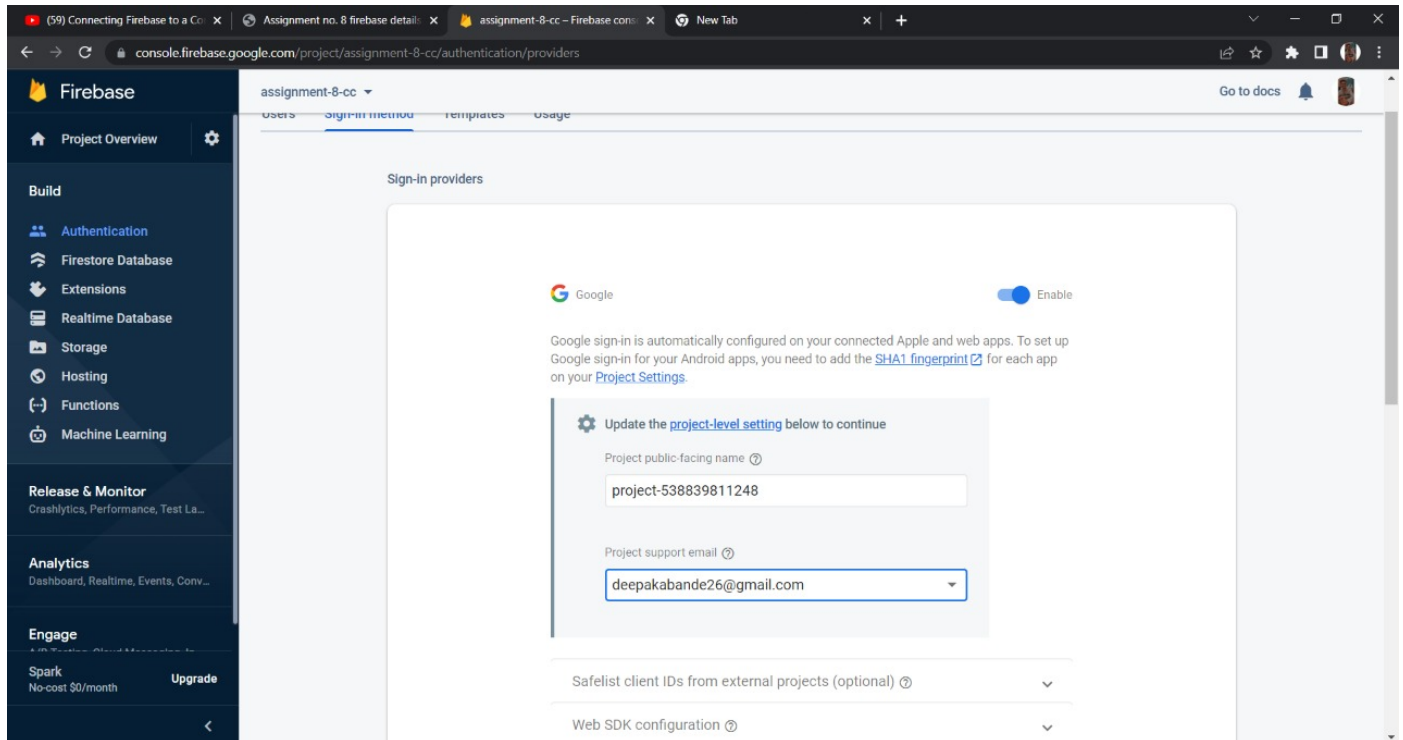
a. Go to the project's console and select Authentication:



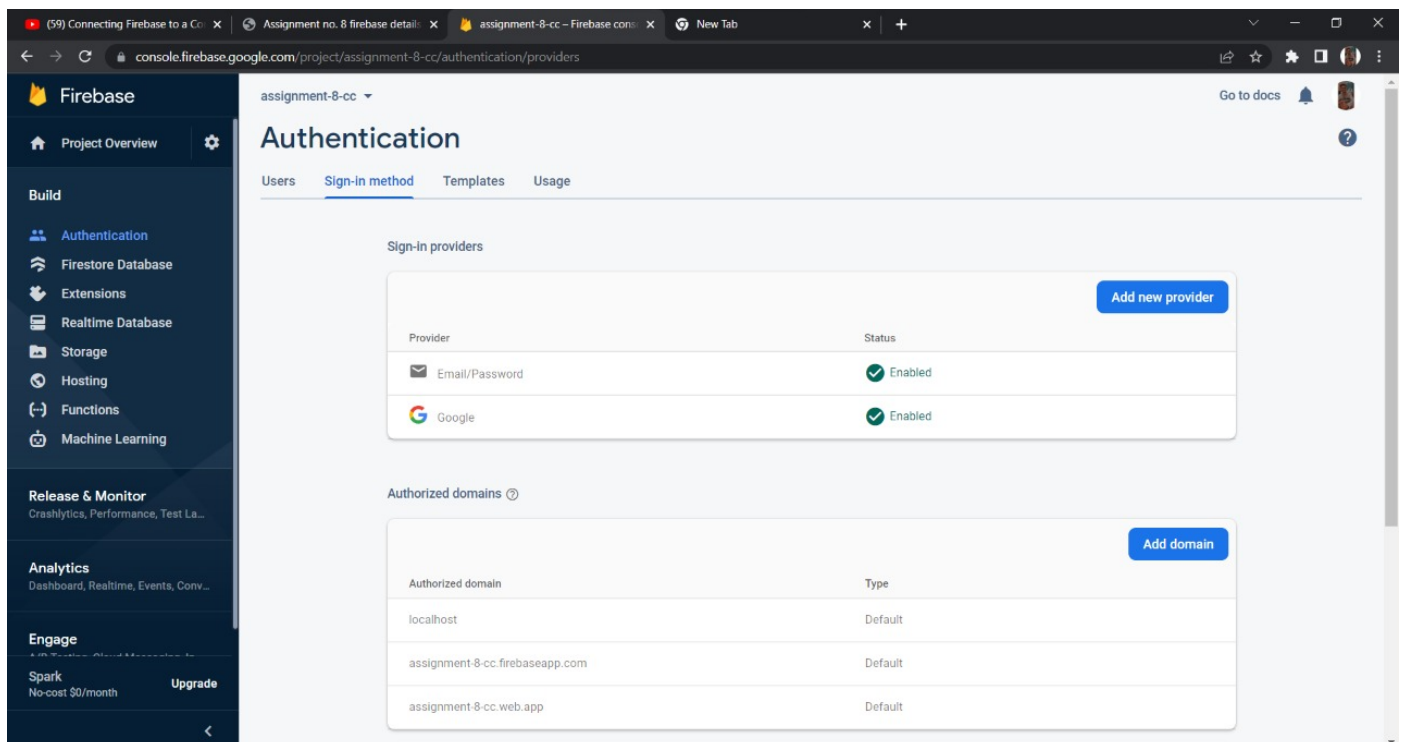
b. In the Sign-in methods you will see various options, select any one option:



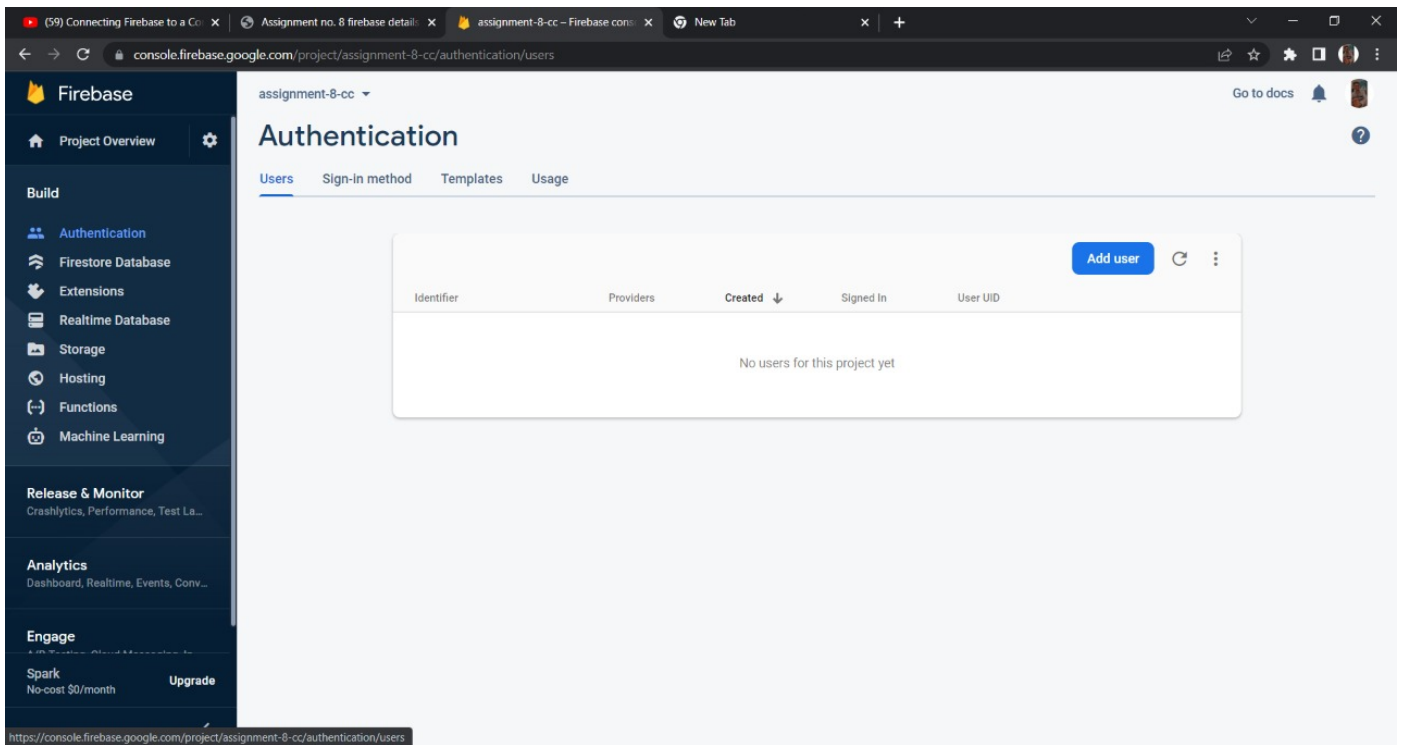
c. Perform appropriate configuration for that platform. You can also add domains:



d. Then you can see the added sign-in methods and the domains:

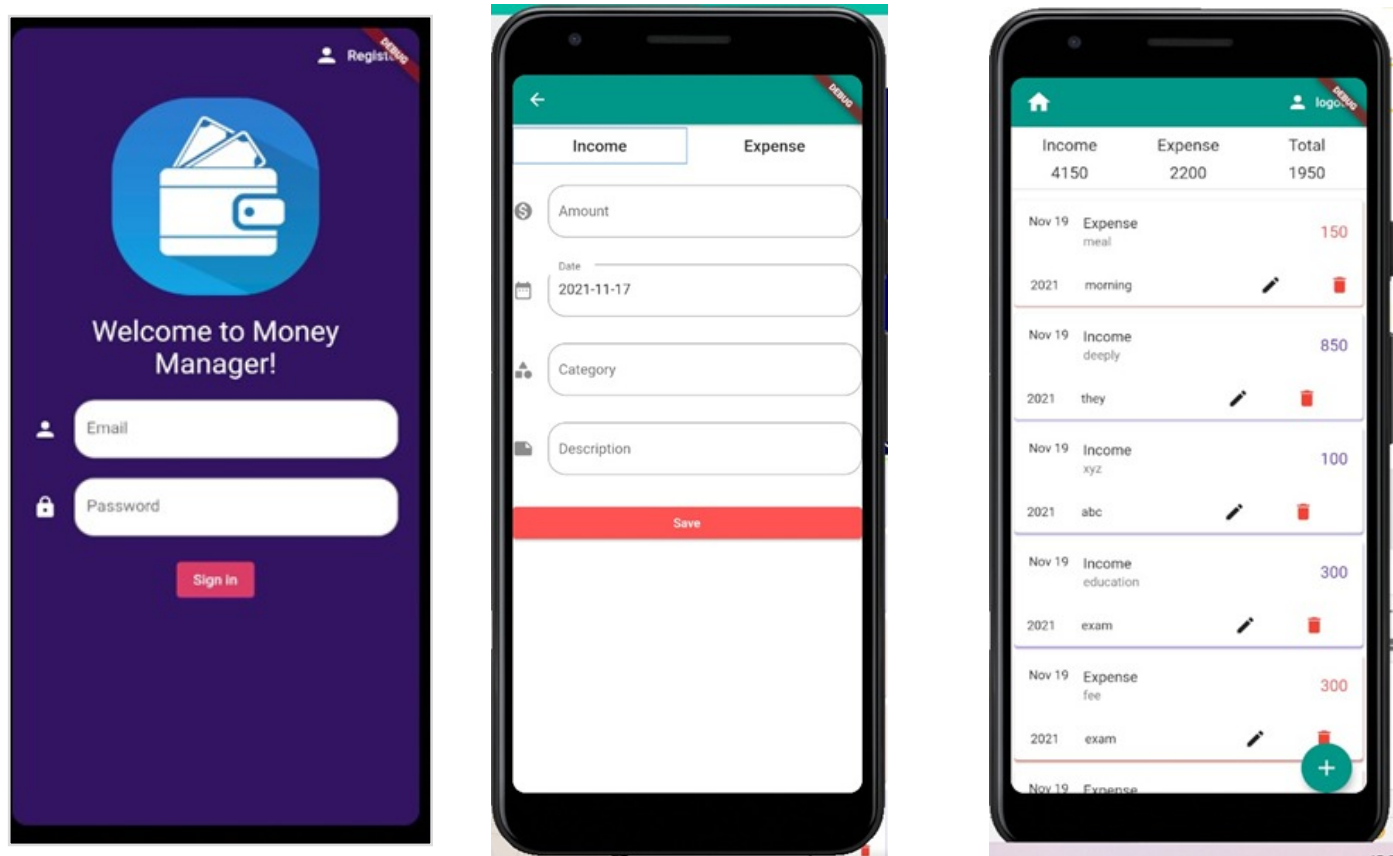


- e. Also, when the users login to your application, their details will be visible at the Users tab.

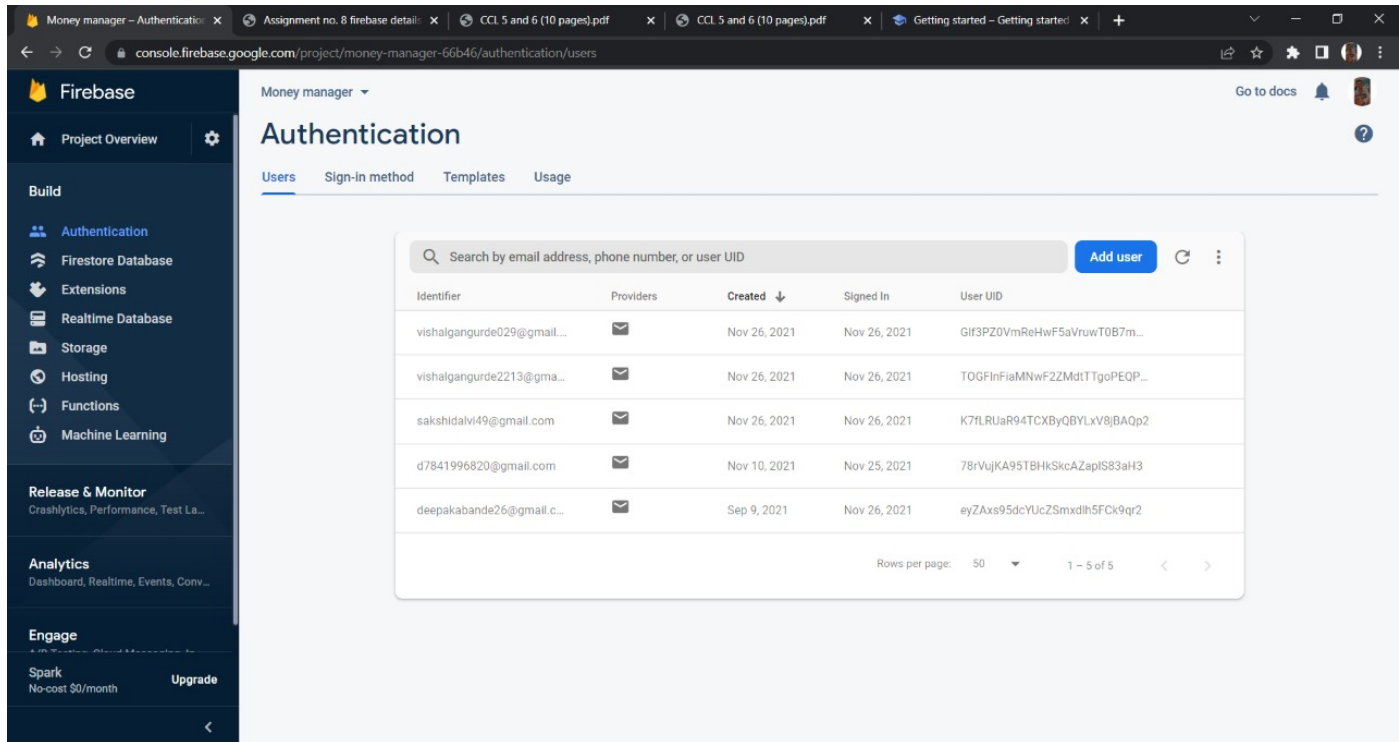


7. Installing dependencies and Running application locally:

A. Our application



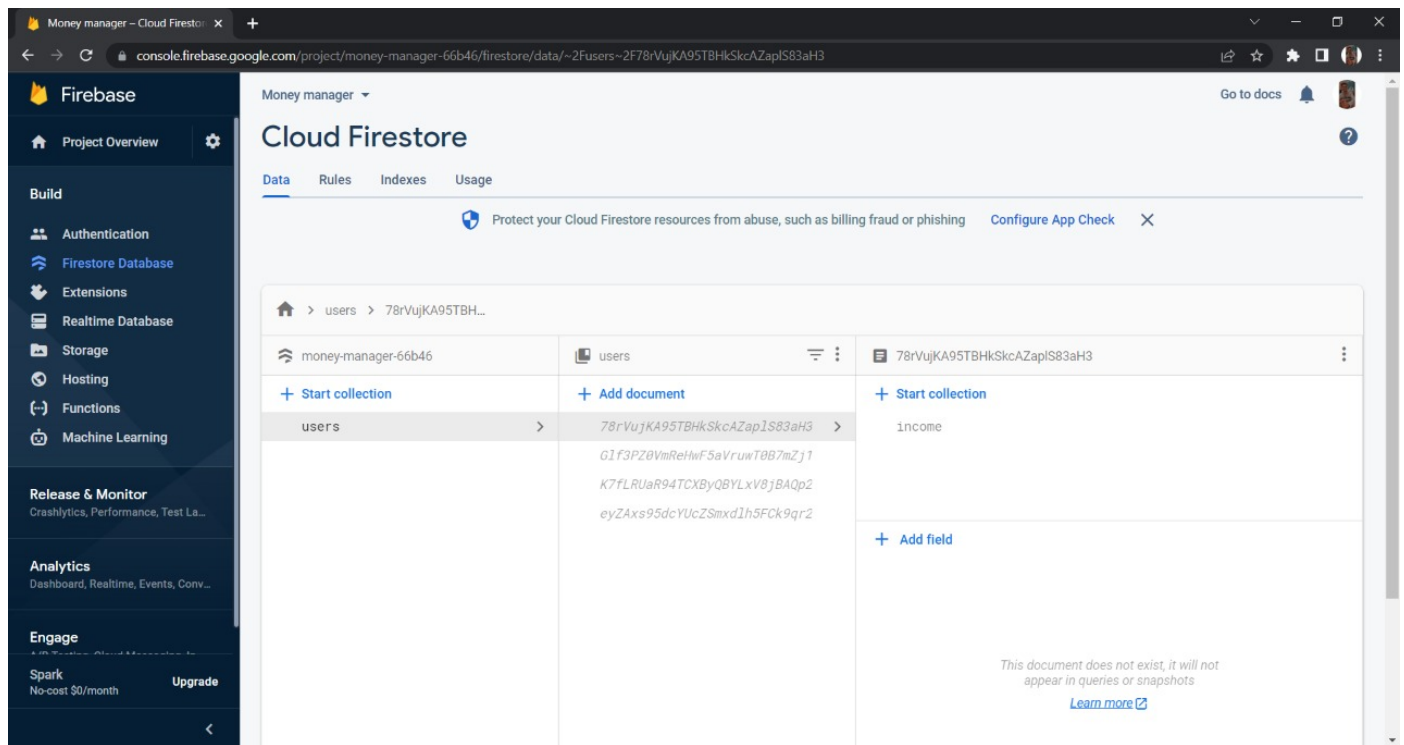
B. Authentication



The screenshot shows the Firebase Authentication console for a project named "Money manager". The left sidebar contains navigation links for Build (Authentication, Firestore Database, Extensions, Realtime Database, Storage, Hosting, Functions, Machine Learning), Release & Monitor (Crashlytics, Performance, Test Lab), Analytics (Dashboard, Realtime, Events, Conversion), and Engage (Spark, No-cost \$0/month, Upgrade). The main content area is titled "Authentication" and has tabs for Users, Sign-in method, Templates, and Usage. The "Users" tab is active, displaying a table of users with columns for Identifier, Providers, Created, Signed In, and User UID. A search bar at the top allows searching by email address, phone number, or user UID. An "Add user" button is located next to the search bar. The table lists five users, all created on November 26, 2021, except for one created on November 10, 2021. The bottom of the table shows "Rows per page: 50" and "1 - 5 of 5".

Identifier	Providers	Created ↓	Signed In	User UID
vishalgangurde029@gmail...	📧	Nov 26, 2021	Nov 26, 2021	Gf3P20VmReHwF5aVruwT0B7m...
vishalgangurde2213@gma...	📧	Nov 26, 2021	Nov 26, 2021	TOGFinFiaMNwF2ZMdtTTgoPEQP...
sakshidai49@gmail.com	📧	Nov 26, 2021	Nov 26, 2021	K7fLRUaR94TCXByQBxV8jBAQp2
d7841996820@gmail.com	📧	Nov 10, 2021	Nov 25, 2021	78rVujKA95TBHkSkcAZapiS83aH3
deepakabande26@gmail.c...	📧	Sep 9, 2021	Nov 26, 2021	eyZAx95dcYUcZSmxdln5FCk9qr2

C. Database



Conclusion:

Performed authentication using firebase to store user credentials and also successfully stored data on Firestore.