Full Angular 16 Firebase Authentication Tutorial Example

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In this tutorial, we are going to share how to build Angular Firebase authentication system from scratch using Firebase Real-time NoSQL cloud database.

This tutorial helps you cover the following topics:

- Sign in with username/password
- Sign up with email/password
- Recover forget password
- Send email verification to a newly created user
- Protect or secure inner pages routes using CanActivate guard
- Restrict access of non-authenticated users
- Manage logged in state of Firebase user with LocalStorage

Step by step Explanation

Getting Started

Before we go ahead, make sure you have Node JS set up on your local development machine.

Install Angular CLI, Ignore if already installed.

```
npm install -g @angular/cli
```

Next, create angular application.

Use the given below cmd to setup the Angular project.

```
ng new angularfiebase-authentication
```

Once the project is downloaded, get into the project directory.

```
cd angularfirebase-authentication
```

Remove Angular TypeScript Errors

To get rid from the errors:

> *Property 'xxxName' comes from an index signature, so it must be accessed with ['xxxName']*

This setting makes sure profound consistency between accessing a field via the **"dot"** `(obj.key)` syntax, and **"indexed"** `(obj["key"])` and the way which the property is declared in the type.

Without this flag, TypeScript will allow you to use the dot syntax to access fields which are not defined:

Make sure to set following properties to false in **tsconfig.json** file:

```
"compilerOptions": {
 ...
 ...
   "strict": false,
   "noPropertyAccessFromIndexSignature": false,
 ...
 ...
},
  "angularCompilerOptions": {
    "strictTemplates": false
  }
```

Install Bootstrap CSS Framework in Angular application.

```
npm install bootstrap
```

Go to `angular.json` file and replace the given below code with “styles”: [ ] array.

```
"styles": [
            "node_modules/bootstrap/dist/css/bootstrap.min.css",
            "src/styles.scss"
          ]
```

Set Up Firebase Packages

I assume you have already created a Firebase project, if not then follow this tutorial How to setup a basic Firebase account and set up a Firebase Project?

Install Firebase packages in Angular app.

```
npm install @angular/fire firebase@9.16.0 --legacy-peer-deps
```

Once you are done setting up this library, make the connection between your Firebase account and your Angular app.

Create **src/environments/** folder and **environment.ts** file, also add firebase configurations in **environments/environment.ts** file.

```
export const environment = {
  production: false,
  firebase: {
    apiKey: "xxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
    authDomain: "xxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
    projectId: "xxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
    storageBucket: "xxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
    messagingSenderId: "xxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
    appId: "xxxxxxxxxxxxxxxxxxxxxxxxxxxxx"
  }
};
```

Import and register firebase modules in **app.module.ts**.

```
// Firebase services + environment module
import { AngularFireModule } from '@angular/fire/compat';
import { AngularFireAuthModule } from '@angular/fire/compat/auth';
import { AngularFireStorageModule } from '@angular/fire/compat/storage';
import { AngularFirestoreModule } from '@angular/fire/compat/firestore';
import { AngularFireDatabaseModule } from '@angular/fire/compat/database';
import { environment } from '../environments/environment';

@NgModule({
  imports: [
    AngularFireModule.initializeApp(environment.firebase),
    AngularFireAuthModule,
    AngularFirestoreModule,
    AngularFireStorageModule,
    AngularFireDatabaseModule,
  ]
})
```

Generate Angular Components

In order to create a complete Angular Firebase Authentication system, we need to generate angular components.

```
ng g c components/dashboard
ng g c components/sign-in
ng g c components/sign-up
ng g c components/forgot-password
ng g c components/verify-email
```

Create Angular Routes

Inside the **src/app/** directory create **app-routing.module.ts** file and add the following code into the file.

```
import { NgModule } from '@angular/core';
import { Routes, RouterModule } from '@angular/router';
import { SignInComponent } from './components/sign-in/sign-in.component';
import { SignUpComponent } from './components/sign-up/sign-up.component';
import { DashboardComponent } from './components/dashboard/dashboard.component';
import { ForgotPasswordComponent } from './components/forgot-password/forgot-password.component';
import { VerifyEmailComponent } from './components/verify-email/verify-email.component';
const routes: Routes = [
  { path: '', redirectTo: '/sign-in', pathMatch: 'full' },
  { path: 'sign-in', component: SignInComponent },
    { path: 'register-user', component: SignUpComponent },
    { path: 'dashboard', component: DashboardComponent },
    { path: 'forgot-password', component: ForgotPasswordComponent },
    { path: 'verify-email-address', component: VerifyEmailComponent },
  ];
  @NgModule({
    imports: [RouterModule.forRoot(routes)],
    exports: [RouterModule],
  })
  export class AppRoutingModule {}
```

Enable the routes within view, add the following code in **app.component.html** file.

```
<router-outlet></router-outlet>
```

Create Firebase Authentication Service

Generate auth service and user interface files to create a Firebase authentication system with Angular.

```
ng g i shared/services/user
ng g s shared/services/auth
```

Go to **shared/services/user.ts**

This user interface class is a schema for User object.

```
export interface User {
   uid: string;
   email: string;
   displayName: string;
   photoURL: string;
   emailVerified: boolean;
}
```

Create Auth Service

This file holds the core logic of our authentication system. I'll be covering up social login using Firebase's Google auth provider. You can also create the login with Facebook, Twitter, and GitHub later on.

The auth service will cover the sign-in with username/password, sign-up with sign-in with email/password, password reset, email verification, and route protection using the canActivate auth guard method.

Update code in app **shared/services/auth.service.ts** file.

```
import { Injectable, NgZone } from '@angular/core';
import { User } from '../services/user';
import {
  AngularFirestore,
  AngularFirestoreDocument,
} from '@angular/fire/compat/firestore';
import * as auth from 'firebase/auth';
import { AngularFireAuth } from '@angular/fire/compat/auth';
import { Router } from '@angular/router';
@Injectable({
  providedIn: 'root',
})
export class AuthService {
  userData: any; // Save logged in user data
  constructor(
    public afs: AngularFirestore, // Inject Firestore service
    public afAuth: AngularFireAuth, // Inject Firebase auth service
    public router: Router,
    public ngZone: NgZone // NgZone service to remove outside scope warning
  ) {
    /* Saving user data in localstorage when
    logged in and setting up null when logged out */
    this.afAuth.authState.subscribe((user) => {
      if (user) {
        this.userData = user;
        localStorage.setItem('user', JSON.stringify(this.userData));
        JSON.parse(localStorage.getItem('user')!);
      } else {
        localStorage.setItem('user', 'null');
        JSON.parse(localStorage.getItem('user')!);
      }
    });
  }
  // Sign in with email/password
  SignIn(email: string, password: string) {
    return this.afAuth
      .signInWithEmailAndPassword(email, password)
      .then((result) => {
        this.SetUserData(result.user);
        this.afAuth.authState.subscribe((user) => {
          if (user) {
            this.router.navigate(['dashboard']);
          }
        });
      })
      .catch((error) => {
        window.alert(error.message);
      });
  }
  // Sign up with email/password
  SignUp(email: string, password: string) {
    return this.afAuth
      .createUserWithEmailAndPassword(email, password)
      .then((result) => {
        /* Call the SendVerificaitonMail() function when new user sign
        up and returns promise */
        this.SendVerificationMail();
        this.SetUserData(result.user);
      })
      .catch((error) => {
        window.alert(error.message);
      });
  }
  // Send email verfificaiton when new user sign up
  SendVerificationMail() {
    return this.afAuth.currentUser
      .then((u: any) => u.sendEmailVerification())
      .then(() => {
        this.router.navigate(['verify-email-address']);
      });
  }
  // Reset Forggot password
  ForgotPassword(passwordResetEmail: string) {
    return this.afAuth
      .sendPasswordResetEmail(passwordResetEmail)
      .then(() => {
        window.alert('Password reset email sent, check your inbox.');
      })
      .catch((error) => {
        window.alert(error);
      });
  }
  // Returns true when user is looged in and email is verified
  get isLoggedIn(): boolean {
    const user = JSON.parse(localStorage.getItem('user')!);
    return user !== null && user.emailVerified !== false ? true : false;
  }
  /* Setting up user data when sign in with username/password,
  sign up with username/password and sign in with social auth
  provider in Firestore database using AngularFirestore + AngularFirestoreDocument service */
  SetUserData(user: any) {
    const userRef: AngularFirestoreDocument<any> = this.afs.doc(
      `users/${user.uid}`
    );
    const userData: User = {
      uid: user.uid,
      email: user.email,
      displayName: user.displayName,
      photoURL: user.photoURL,
      emailVerified: user.emailVerified,
    };
    return userRef.set(userData, {
      merge: true,
    });
  }
  // Sign out
  SignOut() {
    return this.afAuth.signOut().then(() => {
      localStorage.removeItem('user');
      this.router.navigate(['sign-in']);
    });
  }
}
```

Create Angular Login with Firebase API

It’s time to use AuthService class, It will help us creating Login authentication in Angular with Firebase.

We will focus on: Sign-in with Username and Password.

We need to import `AuthService` into **sign-in/sign-in.component.ts**, then inject AuthService into the constructor.

```
import { Component, OnInit } from '@angular/core';
import { AuthService } from "../../shared/services/auth.service";
@Component({
  selector: 'app-sign-in',
  templateUrl: './sign-in.component.html',
  styleUrls: ['./sign-in.component.scss']
})
export class SignInComponent implements OnInit {
  constructor(
    public authService: AuthService
  ) { }
  ngOnInit() { }
}
```

Place the following code inside the **sign-in/sign-in.component.html** file.

```
<div class="displayTable">
  <div class="displayTableCell">
    <div class="authBlock">
      <h3>Sign In</h3>
      <div class="formGroup">
        <input
          type="text"
          class="formControl"
          placeholder="Username"
          #userName
          required
        />
      </div>
      <div class="formGroup">
        <input
          type="password"
          class="formControl"
          placeholder="Password"
          #userPassword
          required
        />
      </div>
      <!-- Calling SignIn Api from AuthService -->
      <div class="formGroup">
        <input
          type="button"
          class="btn btnPrimary"
          value="Log in"
          (click)="authService.SignIn(userName.value, userPassword.value)"
        />
      </div>
      <div class="formGroup">
        <span class="or"><span class="orInner">Or</span></span>
      </div>
      <div class="forgotPassword">
        <span routerLink="/forgot-password">Forgot Password?</span>
        </div>
      </div>
      <div class="redirectToLogin">
        <span
          >Don't have an account?<span
            class="redirect"
            routerLink="/register-user"
          >
            Sign Up</span
          ></span
        >
      </div>
    </div>
  </div>
```

User Registration with Angular Firebase

Now, we will register the user with Angular and Firebase.

Go to **sign-up/sign-up.component.ts** and add the code.

```
import { Component, OnInit } from '@angular/core';
import { AuthService } from "../../shared/services/auth.service";
@Component({
  selector: 'app-sign-up',
  templateUrl: './sign-up.component.html',
  styleUrls: ['./sign-up.component.scss']
})
export class SignUpComponent implements OnInit {
  constructor(
    public authService: AuthService
  ) { }
  ngOnInit() { }
}
```

Go to **sign-up/sign-up.component.html** and add the code.

```
<div class="displayTable">
  <div class="displayTableCell">
    <div class="authBlock">
      <h3>Sign Up</h3>
      <div class="formGroup">
        <input
          type="email"
          class="formControl"
          placeholder="Email Address"
          #userEmail
          required
        />
      </div>
      <div class="formGroup">
        <input
          type="password"
          class="formControl"
          placeholder="Password"
          #userPwd
          required
        />
      </div>
      <div class="formGroup">
        <input
          type="button"
          class="btn btnPrimary"
          value="Sign Up"
          (click)="authService.SignUp(userEmail.value, userPwd.value)"
        />
      </div>
      <div class="formGroup">
        <span class="or"><span class="orInner">Or</span></span>
      </div>
    <div class="redirectToLogin">
      <span
        >Already have an account?
        <span class="redirect" routerLink="/sign-in">Log In</span></span
      >
    </div>
  </div>
</div>
```

Angular Forgot Password with Firebase

We are going to create forgot password feature using Firebase in Angular.

Go to **forgot-password.component.ts** add the code.

```
import { Component, OnInit } from '@angular/core';
import { AuthService } from "../../shared/services/auth.service";
@Component({
  selector: 'app-forgot-password',
  templateUrl: './forgot-password.component.html',
  styleUrls: ['./forgot-password.component.scss']
})
export class ForgotPasswordComponent implements OnInit {
  constructor(
    public authService: AuthService
  ) { }
  ngOnInit() {
  }
}
```

Go to **forgot-password.component.html** add the code.

```
<div class="displayTable">
  <div class="displayTableCell">
    <div class="authBlock">
      <h3>Reset Password</h3>
      <p class="text-center">Please enter your email address to request a password reset.</p>
      <div class="formGroup">
        <input type="email" class="formControl" placeholder="Email Address" #passwordResetEmail required>
      </div>
      <!-- Calling ForgotPassword from AuthService Api -->
      <div class="formGroup">
```

```
        <input type="submit" class="btn btnPrimary" value="Reset Password" (click)="authService.ForgotPasswor
      </div>
    </div>
    <div class="redirectToLogin">
      <span>Go back to ? <span class="redirect" routerLink="/sign-in">Log In</span></span>
    </div>
  </div>
</div>
```

Send Verification Email

Firebase allows us to send verification email easily, add code in **verify-email/verify-email.component.ts**.

```
import { Component, OnInit } from '@angular/core';
import { AuthService } from "../../shared/services/auth.service";
@Component({
  selector: 'app-verify-email',
  templateUrl: './verify-email.component.html',
  styleUrls: ['./verify-email.component.scss']
})
export class VerifyEmailComponent implements OnInit {
  constructor(
    public authService: AuthService
  ) { }
  ngOnInit() {
  }
}
```

Go to `src/app/components/verify-email/verify-email.component.html` and include the code.

```
<div class="displayTable">
  <div class="displayTableCell">
    <div class="authBlock">
      <h3>Thank You for Registering</h3>
      <div class="formGroup" *ngIf="authService.userData as user">
        <p class="text-center">We have sent a confirmation email to <strong>{{user.email}}</strong>.</p>
        <p class="text-center">Please check your email and click on the link to verfiy your email address.</p
      </div>

      <!-- Calling SendVerificationMail() method using authService Api -->
      <div class="formGroup">
        <button type="button" class="btn btnPrimary" (click)="authService.SendVerificationMail()">
          <i class="fas fa-redo-alt"></i>
          Resend Verification Email
        </button>
      </div>
    </div>
    <div class="redirectToLogin">
      <span>Go back to?<span class="redirect" routerLink="/sign-in"> Sign in</span></span>
    </div>
  </div>
</div>
```

Use Route Guards to Protect Angular Routes

Routes guards secure routes in Angular. Now, I will tell you how to easily secure routes from unauthorized access using `canActivate()` route guard.

Head over to **auth.service.ts** and look for the `isLoggedIn()` method.

```
import { Injectable, NgZone } from '@angular/core';
import { User } from '../services/user';
import * as auth from 'firebase/auth';
import { AngularFireAuth } from '@angular/fire/compat/auth';
import {
  AngularFirestore,
  AngularFirestoreDocument,
} from '@angular/fire/compat/firestore';
import { Router } from '@angular/router';
@Injectable({
  providedIn: 'root',
})
export class AuthService {
  userData: any; // Save logged in user data
  constructor(
    public afs: AngularFirestore, // Inject Firestore service
    public afAuth: AngularFireAuth, // Inject Firebase auth service
    public router: Router,
    public ngZone: NgZone // NgZone service to remove outside scope warning
  ) {
    /* Saving user data in localstorage when
    logged in and setting up null when logged out */
    this.afAuth.authState.subscribe((user) => {
      if (user) {
        this.userData = user;
        localStorage.setItem('user', JSON.stringify(this.userData));
        JSON.parse(localStorage.getItem('user')!);
      } else {
        localStorage.setItem('user', 'null');
        JSON.parse(localStorage.getItem('user')!);
      }
    });
  }
  // Sign in with email/password
  SignIn(email: string, password: string) {
    return this.afAuth
      .signInWithEmailAndPassword(email, password)
      .then((result) => {
        this.SetUserData(result.user);
        this.afAuth.authState.subscribe((user) => {
          if (user) {
            this.router.navigate(['dashboard']);
          }
        });
      })
      .catch((error) => {
        window.alert(error.message);
      });
  }
  // Sign up with email/password
  SignUp(email: string, password: string) {
    return this.afAuth
      .createUserWithEmailAndPassword(email, password)
      .then((result) => {
        /* Call the SendVerificaitonMail() function when new user sign
        up and returns promise */
        this.SendVerificationMail();
        this.SetUserData(result.user);
      })
      .catch((error) => {
        window.alert(error.message);
      });
  }
  // Send email verfificaiton when new user sign up
  SendVerificationMail() {
    return this.afAuth.currentUser
      .then((u: any) => u.sendEmailVerification())
      .then(() => {
        this.router.navigate(['verify-email-address']);
      });
  }
  // Reset Forggot password
  ForgotPassword(passwordResetEmail: string) {
    return this.afAuth
      .sendPasswordResetEmail(passwordResetEmail)
      .then(() => {
        window.alert('Password reset email sent, check your inbox.');
      })
      .catch((error) => {
        window.alert(error);
      });
  }
  // Returns true when user is looged in and email is verified
  get isLoggedIn(): boolean {
    const user = JSON.parse(localStorage.getItem('user')!);
    return user !== null && user.emailVerified !== false ? true : false;
  }
  // Sign in with Google
  GoogleAuth() {
    return this.AuthLogin(new auth.GoogleAuthProvider()).then((res: any) => {
      this.router.navigate(['dashboard']);
    });
  }
  // Auth logic to run auth providers
  AuthLogin(provider: any) {
    return this.afAuth
      .signInWithPopup(provider)
      .then((result) => {
        this.router.navigate(['dashboard']);
        this.SetUserData(result.user);
      })
      .catch((error) => {
        window.alert(error);
      });
  }
  /* Setting up user data when sign in with username/password,
  sign up with username/password and sign in with social auth
  provider in Firestore database using AngularFirestore + AngularFirestoreDocument service */
  SetUserData(user: any) {
    const userRef: AngularFirestoreDocument<any> = this.afs.doc(
      `users/${user.uid}`
    );
    const userData: User = {
      uid: user.uid,
      email: user.email,
      displayName: user.displayName,
      photoURL: user.photoURL,
      emailVerified: user.emailVerified,
    };
    return userRef.set(userData, {
      merge: true,
    });
  }
  // Sign out
  SignOut() {
    return this.afAuth.signOut().then(() => {
      localStorage.removeItem('user');
      this.router.navigate(['sign-in']);
    });
  }
}
```

This function returns the boolean result to true when the user is logged-in.

If user is not found then it will return false and doesn’t allow users to access the desired pages.

We have to secure the inner pages, to get this functionality, we have to generate route guard files.

Execute command to create route guards.

```
ng generate guard shared/guard/auth
```

Go to **auth.guard.ts** and place the code.

```
import { Injectable } from '@angular/core';
import {
  ActivatedRouteSnapshot,
  RouterStateSnapshot,
  Router,
  UrlTree,
} from '@angular/router';
import { AuthService } from '../../shared/services/auth.service';
import { Observable } from 'rxjs';
@Injectable({
  providedIn: 'root',
})
export class AuthGuard {
  constructor(public authService: AuthService, public router: Router) {}
  canActivate(
    next: ActivatedRouteSnapshot,
    state: RouterStateSnapshot
  ): Observable<boolean> | Promise<boolean> | UrlTree | boolean {
    if (this.authService.isLoggedIn !== true) {
      this.router.navigate(['sign-in']);
    }
    return true;
    }
  }
```

We have successfully secured application routes, now user needs to be authenticated before accessing app's inner pages.

Next, open the **app-routing.module.ts** file, import the route guard in angular routing file.

```
import { NgModule } from '@angular/core';
import { Routes, RouterModule } from '@angular/router';
import { SignInComponent } from './components/sign-in/sign-in.component';
import { SignUpComponent } from './components/sign-up/sign-up.component';
import { DashboardComponent } from './components/dashboard/dashboard.component';
import { ForgotPasswordComponent } from './components/forgot-password/forgot-password.component';
import { VerifyEmailComponent } from './components/verify-email/verify-email.component';
// route guard
import { AuthGuard } from './shared/guard/auth.guard';
const routes: Routes = [
  { path: '', redirectTo: '/sign-in', pathMatch: 'full' },
  { path: 'sign-in', component: SignInComponent },
  { path: 'register-user', component: SignUpComponent },
  { path: 'dashboard', component: DashboardComponent, canActivate: [AuthGuard] },
  { path: 'forgot-password', component: ForgotPasswordComponent },
  { path: 'verify-email-address', component: VerifyEmailComponent },
];
@NgModule({
  imports: [RouterModule.forRoot(routes)],
  exports: [RouterModule],
})
export class AppRoutingModule {}
```

Manage Firebase User Authentication State with LocalStorage

We have already set up the code for managing user authentication state with LocalStorage API in auth service class. In a bit we will show you how easy it is to manage logged in user data with Local Storage in Angular with Firebase.

Save the user state in Local Storage when the user is logged in, user details will be available even if we refresh the page. Also, remove the user data from local storage if we log out from the app.

Therefore, head over to `dashboard.component.html` file and add the given code into the file.

```
<!-- Top navigation -->
<nav class="navbar navbar-dark fixed-top bg-dark flex-md-nowrap p-0 shadow">
  <a class="navbar-brand col-sm-3 col-md-2 mr-0">
    <img class="brand-logo" src="assets/logo-positronx-white.svg" alt="positronX.io Logo">
  </a>
</nav>
```

```
<!-- Sidebar navigation -->
<div class="container-fluid">
  <div class="row">
    <nav class="col-md-2 d-md-block bg-light sidebar">
      <div class="sidebar-sticky">
        <ul class="nav flex-column">
          <li class="nav-item">
            <a class="nav-link active">
              <i class="fas fa-user"></i>User Profile
            </a>
          </li>
          <!-- Calling SignOut() Api from AuthService -->
          <li class="nav-item">
            <a class="nav-link" (click)="authService.SignOut()">
              <i class="fas fa-sign-out-alt"></i>Log out
            </a>
          </li>
        </ul>
      </div>
    </nav>
    <!-- Main content -->
    <main role="main" class="col-md-9 ml-sm-auto col-lg-10 px-4">
      <div class="inner-adjust">
        <div class="pt-3 pb-2 mb-3 border-bottom">
          <h1 class="h2">User Profile</h1>
        </div>
        <!-- Show user data when logged in -->
        <div class="row" *ngIf="authService.userData as user">
          <div class="col-md-12">
            <div class="media">
              <img class="align-self-start mr-5 img-thumbnail rounded-circle" src="{{(user.photoURL) ? user.p
                alt="{{user.displayName}}">
              <div class="media-body">
                <h1>Hello: <strong>{{(user.displayName) ? user.displayName : 'User'}}</strong></h1>
                <p>User ID: <strong>{{user.uid}}</strong></p>
                <p>Email: <strong>{{user.email}}</strong></p>
                <p>Email Verified: <strong>{{user.emailVerified}}</strong></p>
              </div>
            </div>
          </div>
        </div>
      </div>
    </main>
  </div>
</div>
```

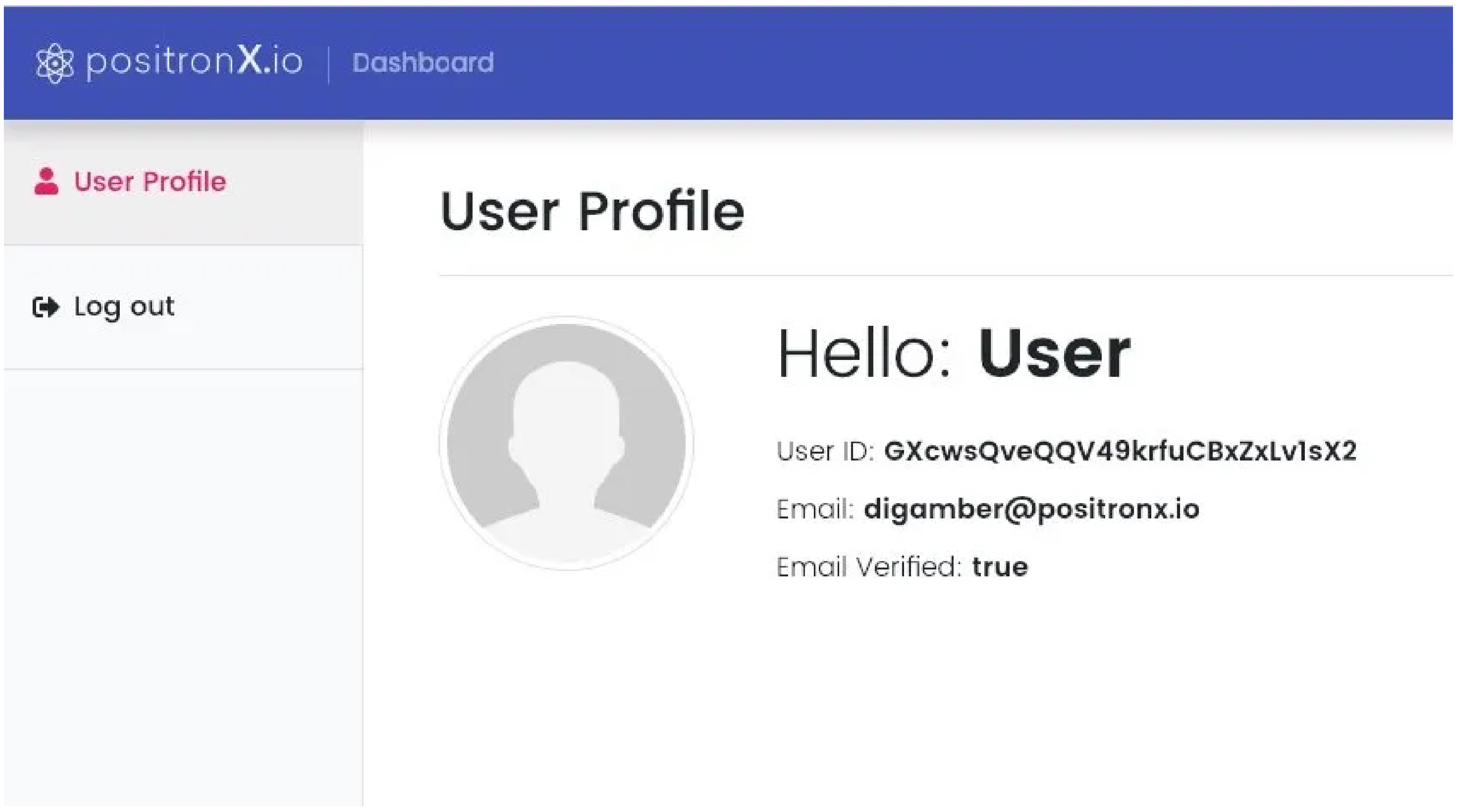
Next, add the auth service class in **dashboard.component.ts** file.

```
import { Component, OnInit } from '@angular/core';
import { AuthService } from '../../shared/services/auth.service';
@Component({
  selector: 'app-dashboard',
  templateUrl: './dashboard.component.html',
  styleUrls: ['./dashboard.component.scss'],
})
export class DashboardComponent implements OnInit {
  constructor(public authService: AuthService) {}
  ngOnInit(): void {}
}
```

Start the Angular authentication project in the browser.

```
ng serve --open
```

The below screenshot gives you the rough idea of how it will look on the browser.



User Profile

Hello: **User**

User ID: **GXcwsQveQQV49krfuCBxZxLv1sX2**

Email: **digamber@positronx.io**

Email Verified: **true**

Lastly you can download the complete code of this tutorial from GitHub.

I hope you liked this tutorial, please consider it sharing with others.

Digamber

A Full-stack developer with a passion to solve real world problems through functional programming.

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