



#Reskilling4Employment Software Developer

Acesso móvel a sistemas de informação - MOB

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- O Firebase é uma plataforma de desenvolvimento móvel e web do Google, criada para facilitar a construção de aplicações de alta qualidade.
- O Firebase incorpora serviços como autenticação de utilizadores, armazenamento em nuvem, base de dados em tempo entre outros.

<https://firebase.google.com/>



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- Vamos começar por criar um projeto na consola do Firebase e interliga-lo ao projeto Android



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The screenshot shows the Firebase console interface. At the top, there's a header bar with the title 'Console do Firebase' and the URL 'console.firebaseio.google.com/u/0/?hl=pt'. Below the header, there's a navigation bar with links to 'Bruno', 'CESAE', 'TODO', 'Calendário', 'Gmail', and 'YouTube'. On the right side of the header, there are icons for 'Todos os marcadores', a profile picture, and other settings.

The main area is titled 'Projetos recentes' (Recent Projects) and features a 3D illustration of a person sitting at a desk with a laptop. A yellow arrow points from the left margin towards this illustration. Below the illustration is a button labeled '+ Adicionar projeto' (Add project). Further down is another button labeled 'Explorar projeto de demonstração' (Explore demo project).

Below these buttons, there are four project cards:

- AppFrases** (appfrases-1c919)
- WhatsAppFirebase** (whatsappfirebase-d32e9)
- f1simulator** (f1simulator-b96f8)

On the right side of the screen, there's another 3D illustration of a person holding a smartphone.



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A screenshot of a web browser window showing the "Criar projeto - Console do Firebase" page. The URL in the address bar is "console.firebaseio.google.com/u/0/?hl=pt". The page title is "Criar um projeto (Passo 1 de 3)". The main text on the page reads "Vamos começar nomeando o projeto [?]". Below this, there is a "Nome do projeto" input field containing "ExemploFirebase". A button labeled "Continuar" is at the bottom of the form. The browser's toolbar shows various open tabs like Bruno, CESAE, TODO, Calendário, Gmail, and YouTube.



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Criar um projeto(Passo 2 de 3)

Google Analytics para seu projeto do Firebase

O Google Analytics é uma solução de análise ilimitada e sem custos financeiros. Com ele, é possível segmentar, gerar relatórios e muito mais nos seguintes produtos: Firebase Crashlytics, Cloud Messaging, Mensagens no app, Configuração remota, Teste A/B e Cloud Functions.

O Google Analytics ativa:

- Teste A/B
- Segmentação de usuários em produtos do Firebase
- Usuários sem falhas
- Gatilhos do Cloud Functions com base em eventos
- Geração de relatórios ilimitada gratuita

Ativar o Google Analytics neste projeto Recomendado

[Anterior](#) [Continuar](#)



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Criar projeto (Passo 3 de 3)

Configurar o Google Analytics

Escolha ou crie uma conta do Google Analytics ⓘ
Default Account for Firebase

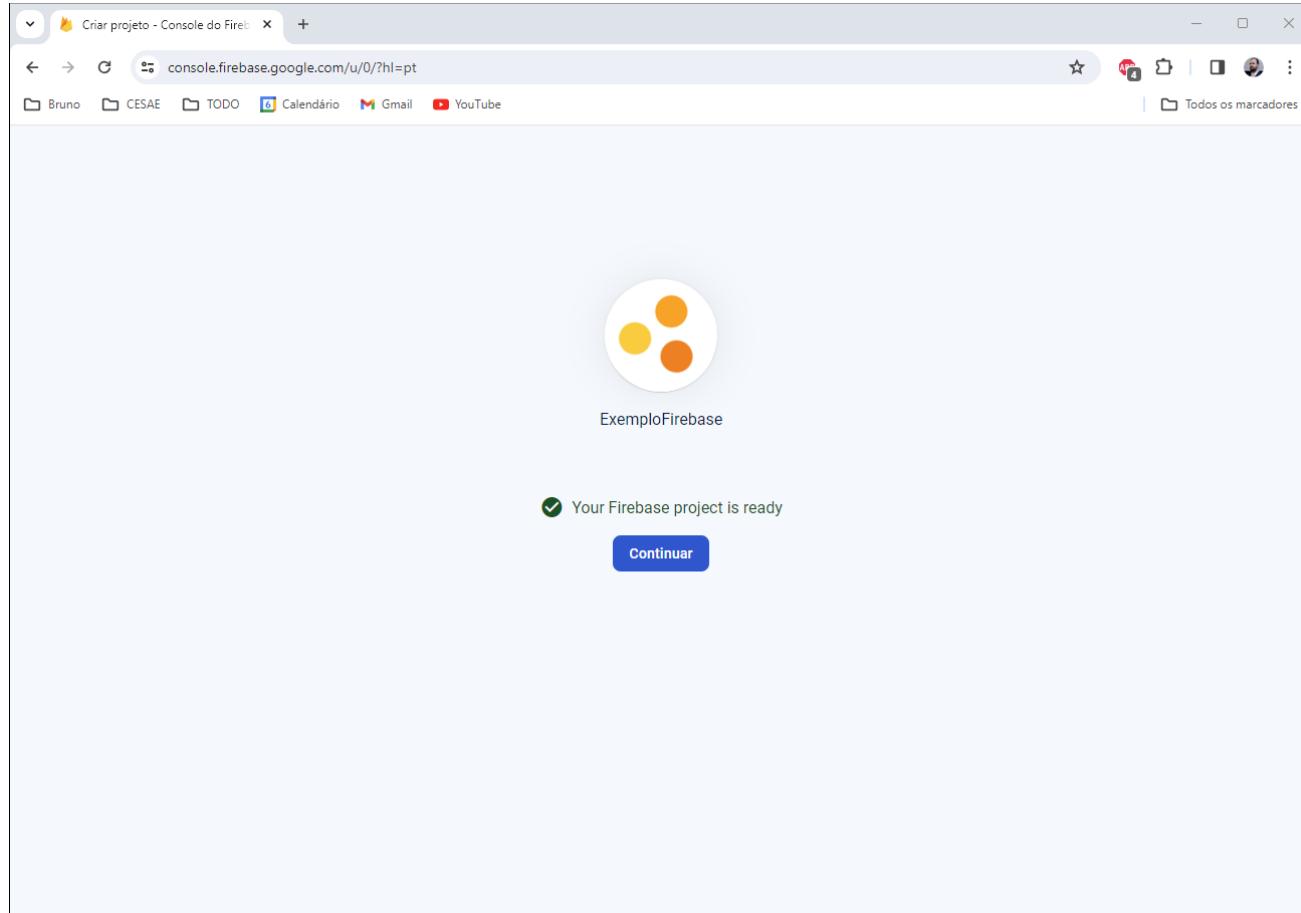
Criar automaticamente uma nova propriedade nesta conta

Após a criação do projeto, uma nova propriedade do Google Analytics será criada na conta selecionada e vinculada ao seu projeto do Firebase. Esse processo permitirá o fluxo de dados entre os produtos. Os dados da propriedade do Google Analytics exportados para o Firebase ficam sujeitos aos Termos de Serviço do Firebase, e os dados do Firebase importados para o Google Analytics ficam sujeitos aos Termos de Serviço do Analytics. [Saiba mais](#)

Anterior Criar projeto



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The screenshot shows the Firebase console interface. On the left, a sidebar lists categories: Criação, Liberar e monitorar, Analytics, and Engajamento. A yellow arrow points from the left margin to the 'Engajamento' section. The main content area displays the project 'ExemploFirebase' with the plan 'Spark'. It features a call-to-action 'Comece adicionando o Firebase ao seu aplicativo' with a button 'Adicione um app para começar'. Below this, there's a section 'Armazene e sincronize dados de app em milissegundos' with two small images: one of a person with a badge and another of a globe with a magnifying glass.



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The screenshot shows a browser window titled "ExemploFirebase - Adicionar app" with the URL "console.firebaseio.google.com/u/0/project/exemplofirebase-464d5/overview?hl=pt". The main content is a form titled "Adicionar o Firebase ao seu app Android".
1 Registrar app
Nome do pacote do Android: com.company.appname
Apelido do app (opcional): Meu app Android
Certificado de assinatura de depuração SHA-1 (opcional): 00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00
1 Necessário para o Dynamic Links, o Login do Google ou o suporte por telefone no Auth. Edite os certificados SHA-1 nas configurações.
Registrar app
2 Faça o download e adicione o arquivo de configuração
3 Adicionar o SDK do Firebase
4 Próximas etapas



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The image displays two side-by-side screenshots illustrating the integration of Firebase into an Android application.

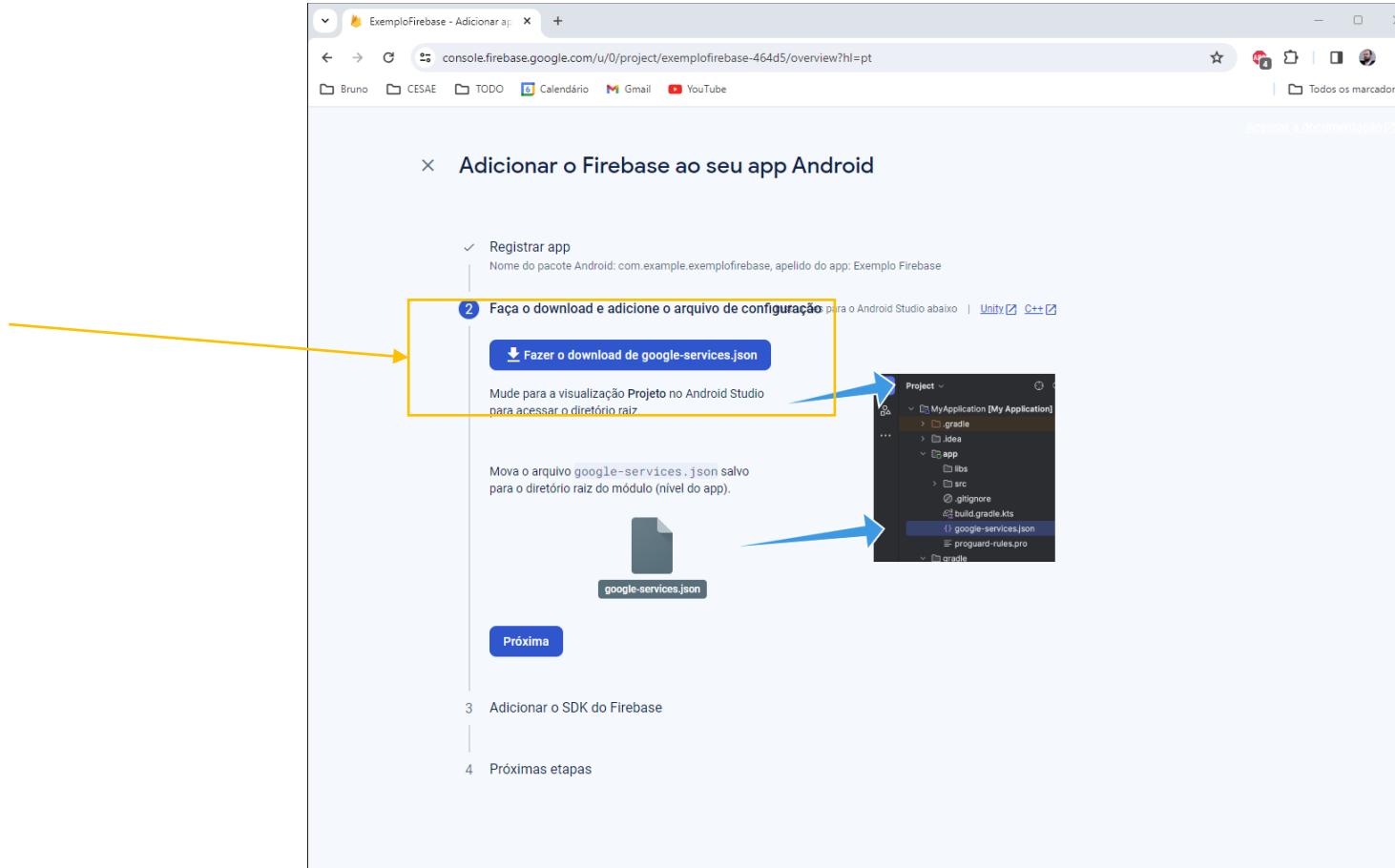
Left Screenshot: Firebase Console - Registering an App

- Nome do pacote do Android:** com.example.exemplofirebase
- Apelido do app (opcional):** Exemplo Firebase
- Registrar app** button highlighted with a yellow box.

Right Screenshot: Android Studio - MainActivity.kt

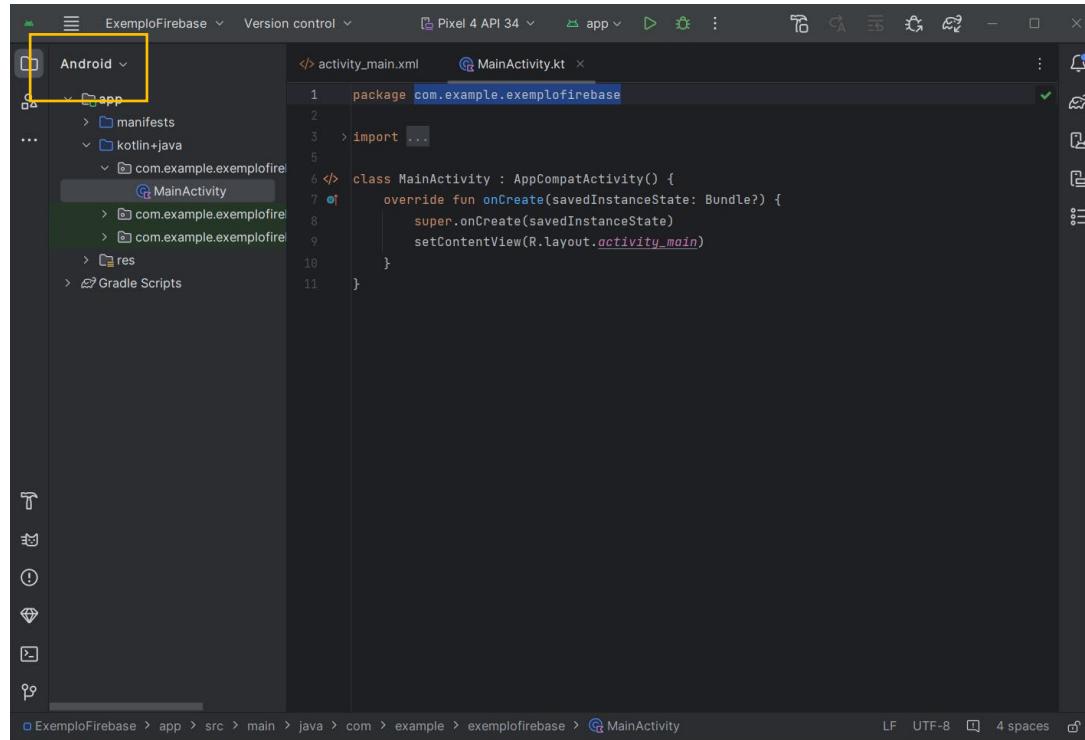
- Project Structure:** ExemploFirebase > app > src > main > java > com > example > exemplofirebase > MainActivity.kt
- MainActivity.kt Code:**

```
1 package com.example.exemplofirebase
2
3 import android.os.Bundle
4 import androidx.appcompat.app.AppCompatActivity
5
6 class MainActivity : AppCompatActivity() {
7     override fun onCreate(savedInstanceState: Bundle?) {
8         super.onCreate(savedInstanceState)
9         setContentView(R.layout.activity_main)
10    }
11 }
```





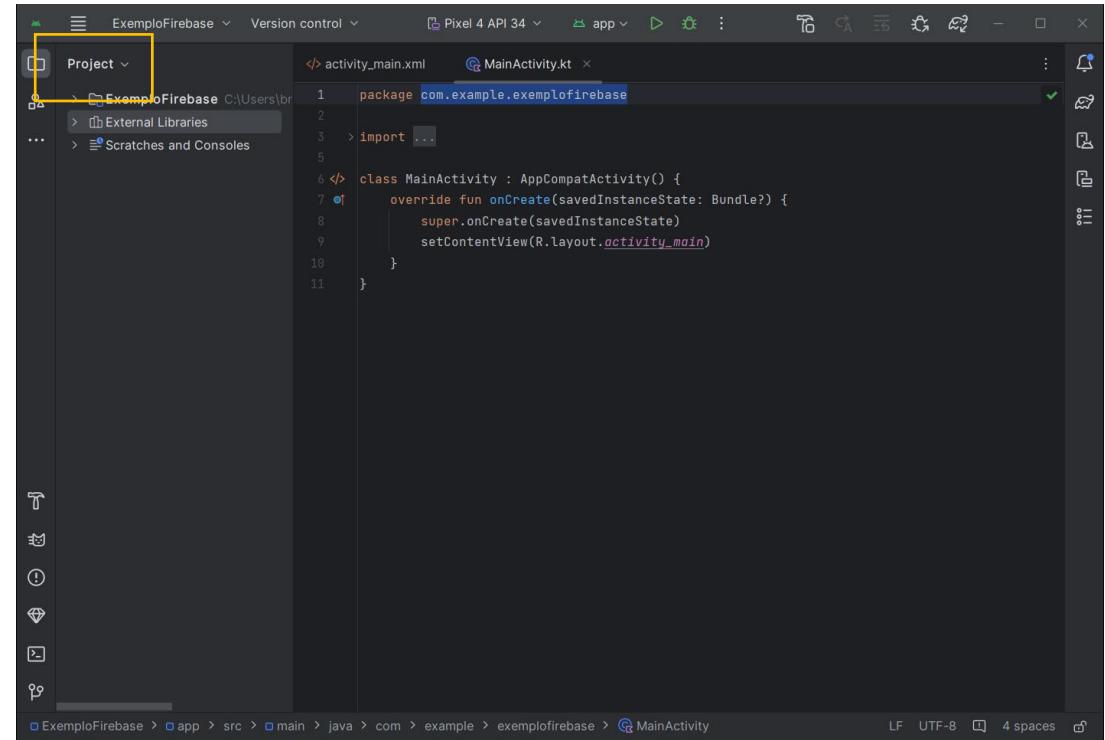
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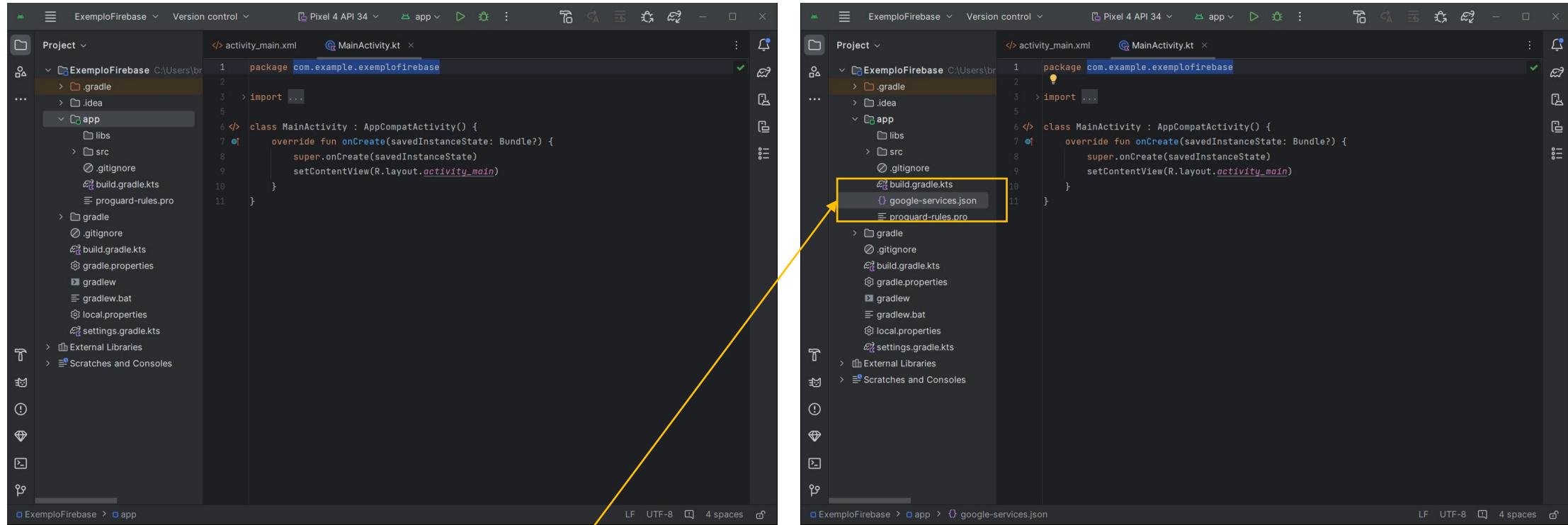
The screenshot shows the Android Studio interface with the project 'ExemploFirebase'. The 'Android' tab in the navigation bar is highlighted with a yellow box. The code editor displays the MainActivity.kt file, which contains the following code:

```
1 package com.example.exemplofirebase
2
3 import ...
4
5
6 class MainActivity : AppCompatActivity() {
7     override fun onCreate(savedInstanceState: Bundle?) {
8         super.onCreate(savedInstanceState)
9         setContentView(R.layout.activity_main)
10    }
11 }
```

The file path at the bottom of the screen is: ExemploFirebase > app > src > main > java > com > example > exemplofirebase > MainActivity



The screenshot shows the Android Studio interface with the project 'ExemploFirebase' selected in the navigation bar. The 'Project' tab is highlighted with a yellow box. The code editor displays the same MainActivity.kt file with the same code as the first screenshot. The file path at the bottom of the screen is: ExemploFirebase > app > src > main > java > com > example > exemplofirebase > MainActivity



Enviar ficheiro google-services.json para dentro da pasta app

x Adicionar o Firebase ao seu app Android

- Registrar app
Nome do pacote Android: com.example.exemplofirebase, apelido do app: Exemplo Firebase
- Faça o download e adicione o arquivo de configuração
- 3 Adicionar o SDK do Firebase**

Instruções para Gradle | Unity | C++ |

★ Você ainda usa a sintaxe buildscript para gerenciar plug-ins? Saiba como [adicionar plug-ins do Firebase](#) usando essa sintaxe.

1. Para tornar os valores de configuração do arquivo google-services.json acessíveis aos SDKs do Firebase, você precisa do plug-in do Gradle para os Serviços do Google.

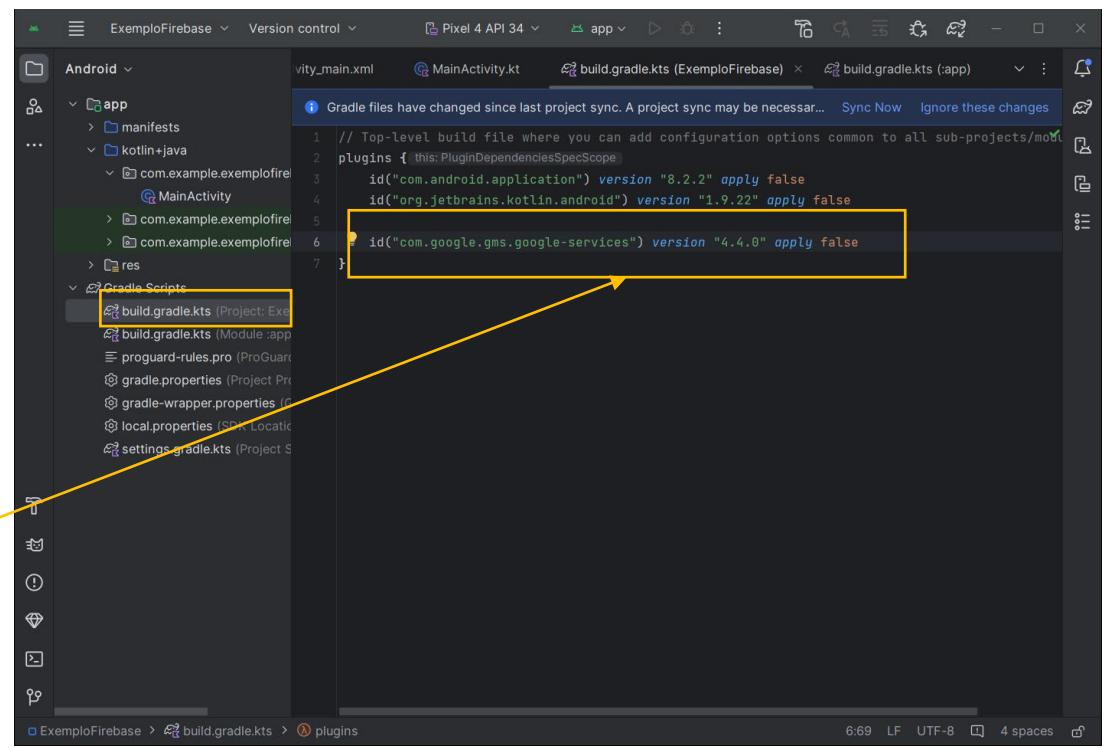
DSL do Kotlin (build.gradle.kts) Groovy (build.gradle)

Adicione o plug-in como uma dependência do arquivo build.gradle.kts no nível do projeto:

```
Arquivo do Gradle no nível raiz (nível do projeto) (<project>/build.gradle.kts):
plugins {
    ...
    // Add the dependency for the Google services Gradle plugin
    id("com.google.gms.google-services") version "4.4.0" apply false
}
```

2. Em seguida, no arquivo build.gradle.kts do módulo (nível do app), adicione o plug-in google-services e todos os SDKs do Firebase que você quer usar no aplicativo:

Arquivo do Gradle do módulo (nível do app) (<project>/<app-module>/build.gradle.kts):



The screenshot shows the Android Studio interface with the project structure on the left and the build.gradle.kts file open on the right. A yellow arrow points from the highlighted code in the left screenshot to the highlighted code in the right screenshot. The code in both screenshots is identical:

```
// Top-level build file where you can add configuration options common to all sub-projects/modules.
plugins {
    id("com.android.application") version "8.2.2" apply false
    id("org.jetbrains.kotlin.android") version "1.9.22" apply false
}
id("com.google.gms.google-services") version "4.4.0" apply false
```

[ExemploFirebase - Adicionar app](#)

// Add the dependency for the Google services Gradle plugin
 id("com.google.gms.google-services") version "4.4.0" apply false

2. Em seguida, no arquivo build.gradle.kts do módulo (nível do app), adicione o plug-in google-services e todos os SDKs do Firebase que você quer usar no aplicativo:

Arquivo do Gradle do módulo (nível do app) (<project>/<app-module>/build.gradle.kts):

```

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:32.7.1"))

    // 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
}

Ao usar a BoM do Firebase para Android, o app sempre vai utilizar versões da biblioteca do Firebase compatíveis.
Saiba mais

```

3. Depois de adicionar o plug-in e os SDKs desejados, sincronize seu projeto do Android com os arquivos do Gradle.

[Anterior](#) [Próxima](#)

4. Próximas etapas

ExemploFirebase

build.gradle.kts (ExemploFirebase)

build.gradle.kts (:app)

Gradle files have changed since last project sync. A project sync may be necessary... Sync Now Ignore these changes

```

plugins {
    id("com.android.application")
    id("org.jetbrains.kotlin.android")
    id("com.google.gms.google-services")
}

android {
    namespace = "com.example.exemplofirebase"
    compileSdk = 34

    defaultConfig {
        applicationId = "com.example.exemplofirebase"
        minSdk = 24
        targetSdk = 34
        versionCode = 1
        versionName = "1.0"

        testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
    }

    buildTypes {
        release {
            isMinifyEnabled = false
            proguardFiles(
                getDefaultProguardFile( name: "proguard-android-optimize.txt"),
                "proguard-rules.pro"
            )
        }
    }
}

```

ExemploFirebase > app > build.gradle.kts > plugins



ExemploFirebase - Adicionar API

console.firebaseio.google.com/u/0/project/exemplofirebase-464d5/overview?hl=pt

Bruno CESAE TODO Calendário Gmail YouTube Todos os marcadores

// Add the dependency for the Google services Gradle plugin
id("com.google.gms.google-services") version "4.4.0" apply false

2. Em seguida, no arquivo build.gradle.kts do módulo (nível do app), adicione o plug-in google-services e todos os SDKs do Firebase que você quer usar no aplicativo:

Arquivo do Gradle do módulo (nível do app) (<project>/<app-module>/build.gradle.kts):

```
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:32.7.1"))  
  
        // 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  
    }  
  
    Ao usar a BoM do Firebase para Android, o app sempre vai utilizar versões da biblioteca do Firebase compatíveis.  
    Saiba mais
```

3. Depois de adicionar o plug-in e os SDKs desejados, sincronize seu projeto do Android com os arquivos do Gradle.

Anterior Próxima

4. Próximas etapas

ExemploFirebase Version control Pixel 4 API 34 app build.gradle.kts (ExemploFirebase) build.gradle.kts (:app)

Gradle files have changed since last project sync. A project sync may be necessary... Sync Now Ignore these changes

Android

app

manifests

com.example.exemplofire

MainActivity

com.example.exemplofire

com.example.exemplofire

res

Gradle Scripts

build.gradle.kts (Project Scope)

build.gradle.kts (Module Scope)

proguard-rules.pro

compileOptions { this: CompileOptions }
sourceCompatibility = JavaVersion.VERSION_1_8
targetCompatibility = JavaVersion.VERSION_1_8

kotlinOptions { this: KotlinJvmOptions }
jvmTarget = "1.8"

dependencies { this: DependencyHandlerScope }
implementation(platform("com.google.firebase:firebase-bom:32.7.1"))
implementation("com.google.firebase:firebase-analytics")

implementation("androidx.core:core-ktx:1.12.0")
implementation("androidx.appcompat:appcompat:1.6.1")
implementation("com.google.android.material:material:1.11.0")
implementation("androidx.constraintlayout:constraintlayout:2.1.4")
testImplementation("junit:junit:4.13.2")
androidTestImplementation("androidx.test.ext:junit:1.1.5")
androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")



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```
vity_main.xml MainActivity.kt build.gradle.kts (ExemploFirebase) build.gradle.kts (app) Sync Now Ignore these changes

    "proguard-rules.pro"
}
compileOptions { this: CompilerOptions
    sourceCompatibility = JavaVersion.VERSION_1_8
    targetCompatibility = JavaVersion.VERSION_1_8
}
kotlinOptions { this: KotlinJvmOptions
    jvmTarget = "1.8"
}

dependencies {
    implementation(platform("com.google.firebase:firebase-bom:32.7.1"))
    implementation("com.google.firebase:firebase-analytics")
    implementation("androidx.core:core-ktx:1.12.0")
    implementation("androidx.appcompat:appcompat:1.6.1")
    implementation("com.google.android.material:material:1.11.0")
    implementation("androidx.constraintlayout:constraintlayout:2.1.4")
    testImplementation("junit:junit:4.13.2")
    androidTestImplementation("androidx.test.ext:junit:1.1.5")
    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")
}

ExemploFirebase > app > build.gradle.kts > dependencies
```

Adicionar o Firebase ao seu app Android

✓ Registrar app
Nome do pacote Android: com.example.exemplofire, apelido do app: Exemplo Firebase

✓ Faça o download e adicione o arquivo de configuração

✓ Adicionar o SDK do Firebase

4 Próximas etapas

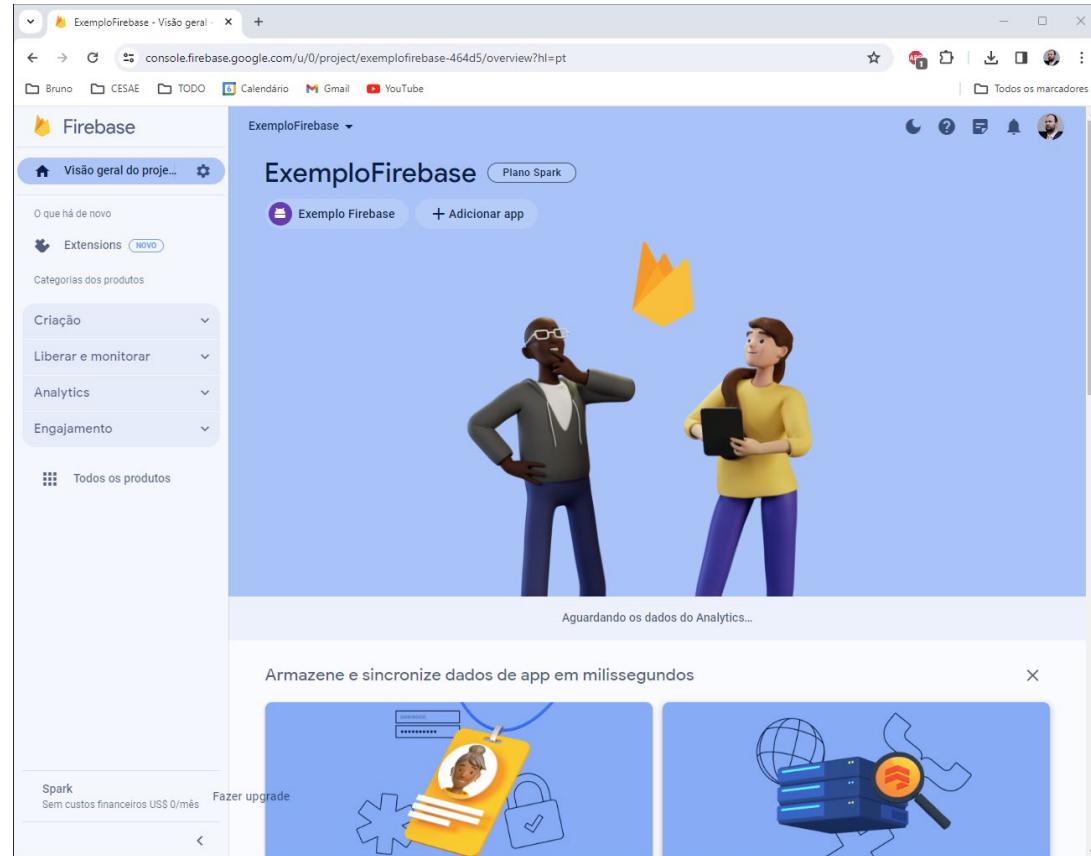
Está tudo pronto!

Certifique-se de verificar a [documentação](#) para saber como começar a usar os produtos Firebase que quiser usar em seu aplicativo.

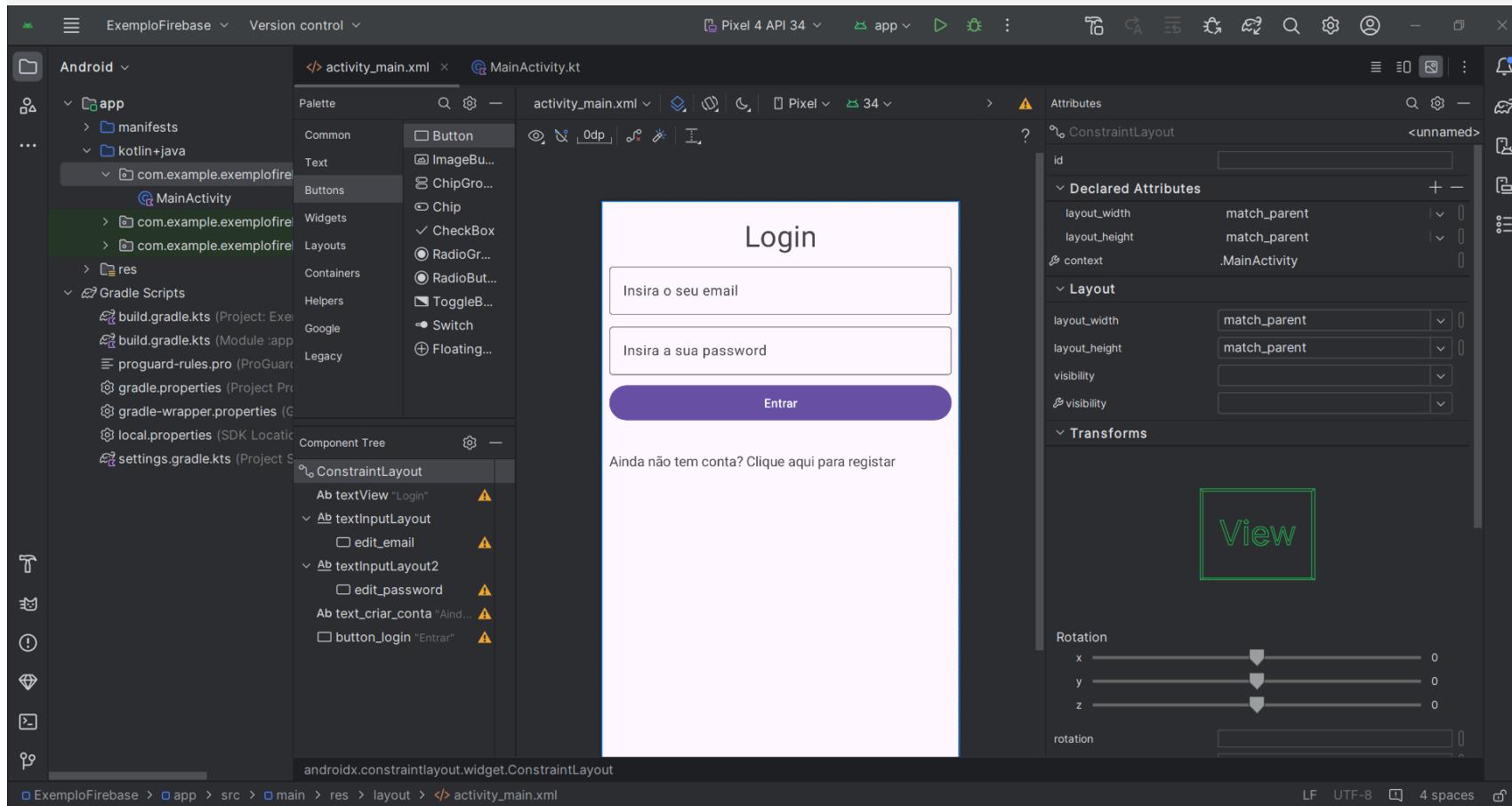
Também é possível explorar [apps de amostra do Firebase](#).

Como opção, continue no console para explorar o Firebase.

Anterior Continuar no console



- Nesta fase a configuração do Firebase e interligação com a nossa aplicação está concluída com sucesso, vamos trabalhar o layout





Firebase



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The screenshot shows the Android Studio interface with the file `activity_main.xml` open. The code defines a ConstraintLayout containing a TextView and two TextInputLayouts for email and password input fields. The TextView has a yellow background color. The TextInputLayouts have a light blue background color.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="8dp"
        android:text="Login"
        android:textAlignment="center"
        android:textSize="34sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_email"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_email"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Insira o seu email" />
    </com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_password"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/edit_email">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_password"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Insira a sua password" />
    </com.google.android.material.textfield.TextInputLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

The screenshot shows the same `activity_main.xml` file with styling changes. The TextView now has a white background color. The TextInputLayouts now have a light blue background color.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

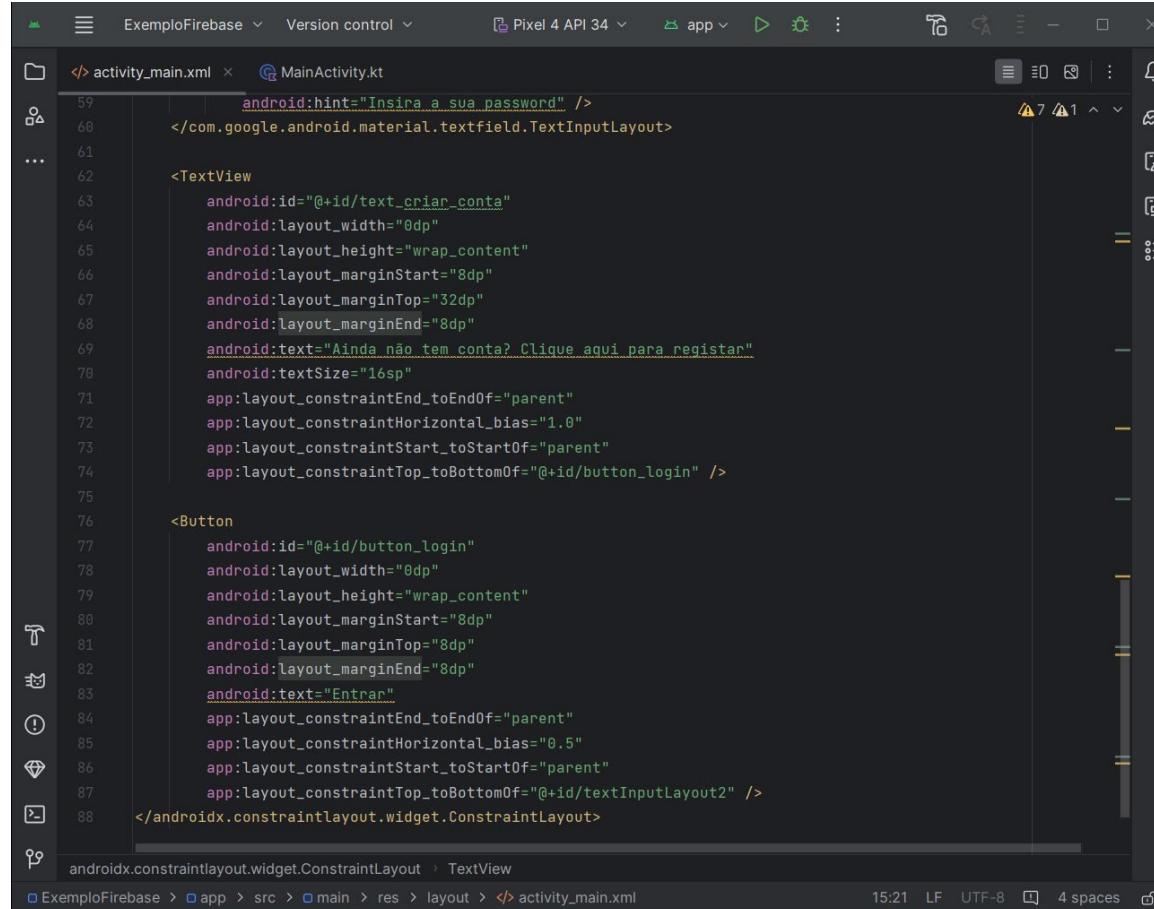
    <TextView
        android:id="@+id/textView"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="8dp"
        android:text="Login"
        android:textAlignment="center"
        android:textSize="34sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_email"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_email"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Insira o seu email" />
    </com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_password"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/edit_email">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_password"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Insira a sua password" />
    </com.google.android.material.textfield.TextInputLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```



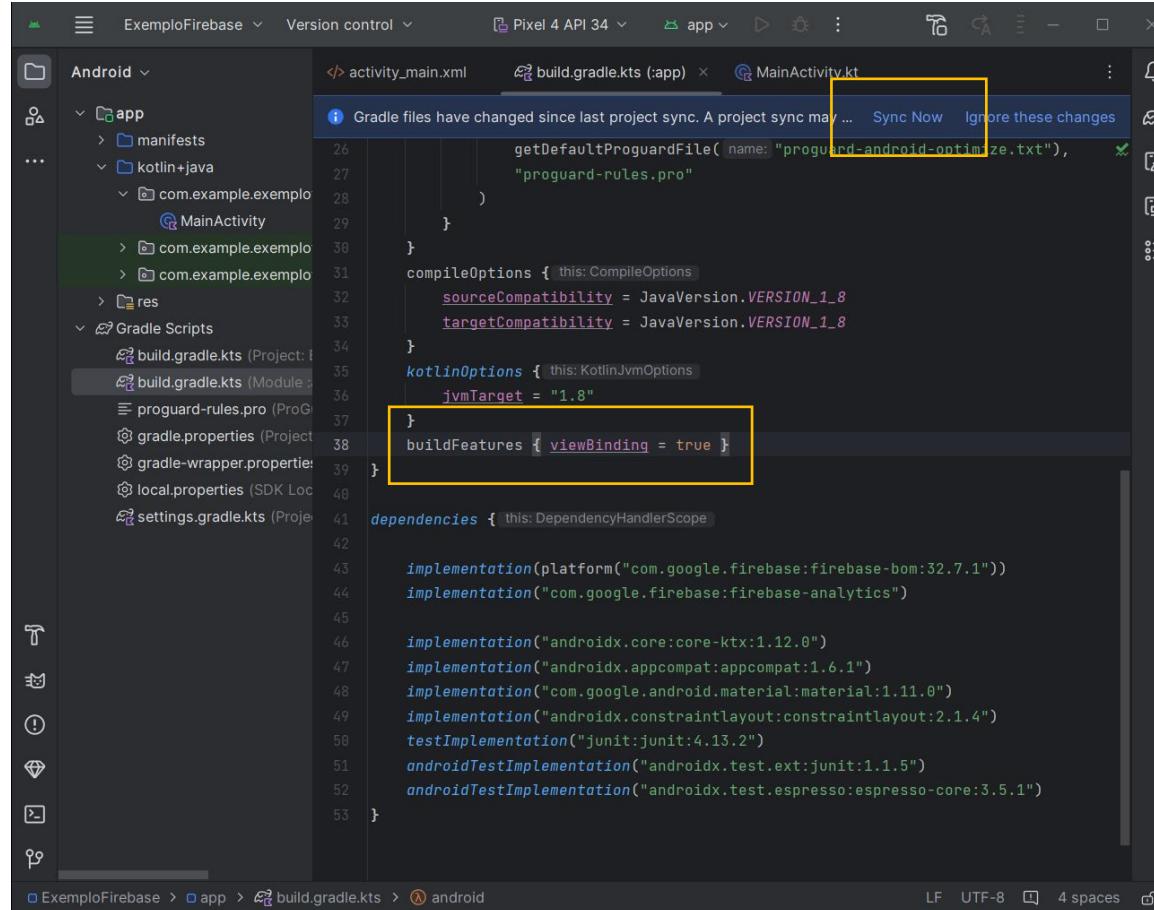
The screenshot shows the Android Studio interface with the file `activity_main.xml` open. The code defines a layout with a `ConstraintLayout` containing a `TextInputLayout`, a `TextView`, and a `Button`. The `TextView` contains a link to register. The `Button` has the text "Entrar".

```
59     android:hint="Insira a sua password" />
60     </com.google.android.material.textfield.TextInputLayout>
61
62     <TextView
63         android:id="@+id/text_criar_conta"
64         android:layout_width="0dp"
65         android:layout_height="wrap_content"
66         android:layout_marginStart="8dp"
67         android:layout_marginTop="32dp"
68         android:layout_marginEnd="8dp"
69         android:text="Ainda não tem conta? Clique aqui para registrar"
70         android:textSize="16sp"
71         app:layout_constraintEnd_toEndOf="parent"
72         app:layout_constraintHorizontal_bias="1.0"
73         app:layout_constraintStart_toStartOf="parent"
74         app:layout_constraintTop_toBottomOf="@+id/button_login" />
75
76     <Button
77         android:id="@+id/button_login"
78         android:layout_width="0dp"
79         android:layout_height="wrap_content"
80         android:layout_marginStart="8dp"
81         android:layout_marginTop="8dp"
82         android:layout_marginEnd="8dp"
83         android:text="Entrar"
84         app:layout_constraintEnd_toEndOf="parent"
85         app:layout_constraintHorizontal_bias="0.5"
86         app:layout_constraintStart_toStartOf="parent"
87         app:layout_constraintTop_toBottomOf="@+id/textInputLayout2" />
88     </androidx.constraintlayout.widget.ConstraintLayout>
```



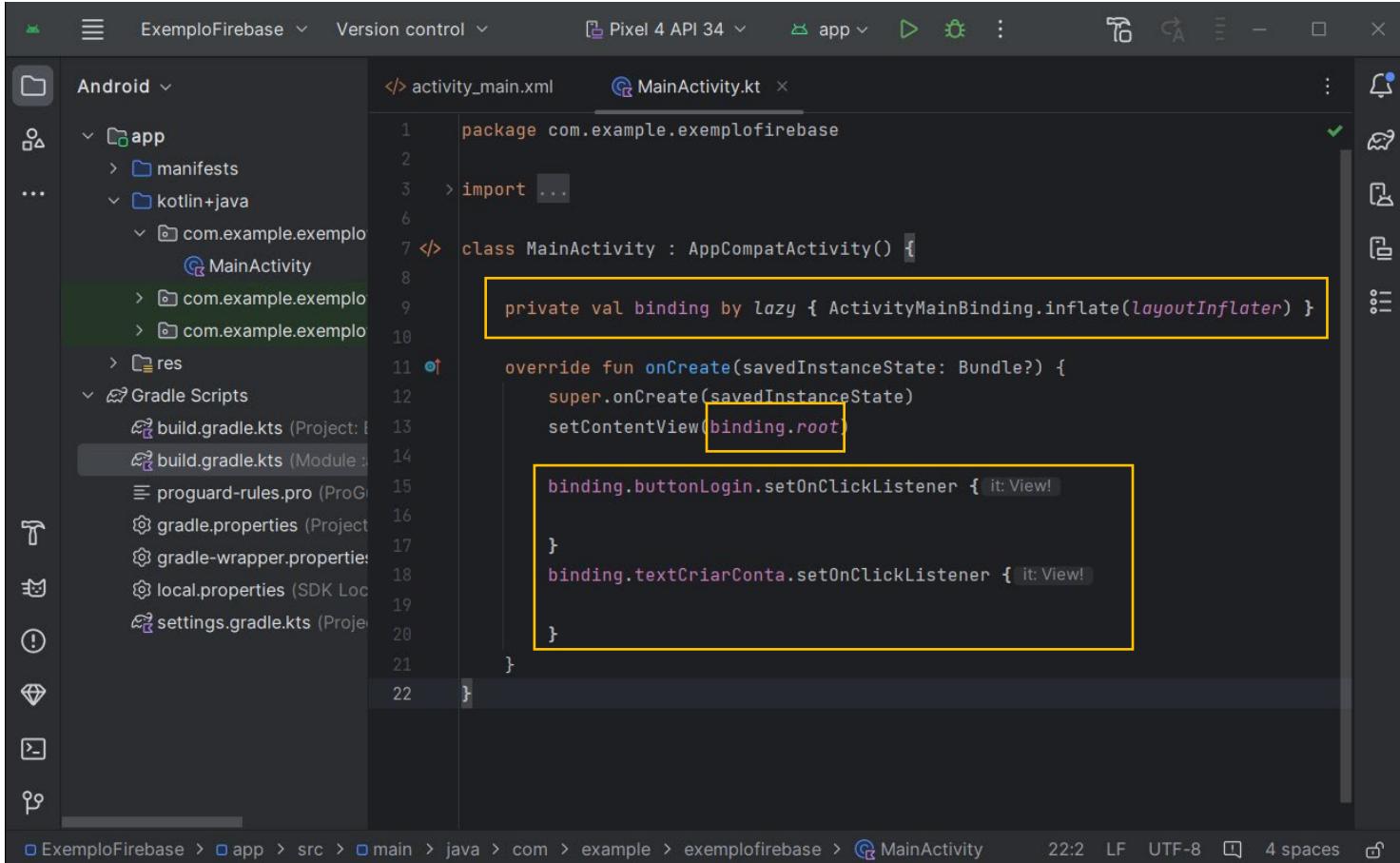
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- Ativamos o viewBinding e passamos para os eventos



The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The code editor displays the file `build.gradle.kts (app)`. A yellow box highlights the top part of the code, which includes the `proguardRules` configuration and the `kotlinOptions` section. Another yellow box highlights the `buildFeatures` section, specifically the `viewBinding = true` line. The code also shows dependency declarations for Firebase and various Android libraries.

```
26     getDefaultProguardFile("proguard-android-optimize.txt"),  
27     "proguard-rules.pro"  
28   )  
29 }  
30 compileOptions { this: CompileOptions  
31   sourceCompatibility = JavaVersion.VERSION_1_8  
32   targetCompatibility = JavaVersion.VERSION_1_8  
33 }  
34 kotlinOptions { this: KotlinJvmOptions  
35   jvmTarget = "1.8"  
36 }  
37 buildFeatures { viewBinding = true }  
38 }  
39 dependencies { this: DependencyHandlerScope  
40  
41   implementation(platform("com.google.firebase:firebase-bom:32.7.1"))  
42   implementation("com.google.firebase:firebase-analytics")  
43  
44   implementation("androidx.core:core-ktx:1.12.0")  
45   implementation("androidx.appcompat:appcompat:1.6.1")  
46   implementation("com.google.android.material:material:1.11.0")  
47   implementation("androidx.constraintlayout:constraintlayout:2.1.4")  
48   testImplementation("junit:junit:4.13.2")  
49   androidTestImplementation("androidx.test.ext:junit:1.1.5")  
50   androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")  
51 }  
52 }  
53 }
```



The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The left sidebar displays the project structure under 'Android'. The main editor window shows the file 'MainActivity.kt'. Two specific sections of the code are highlighted with yellow boxes:

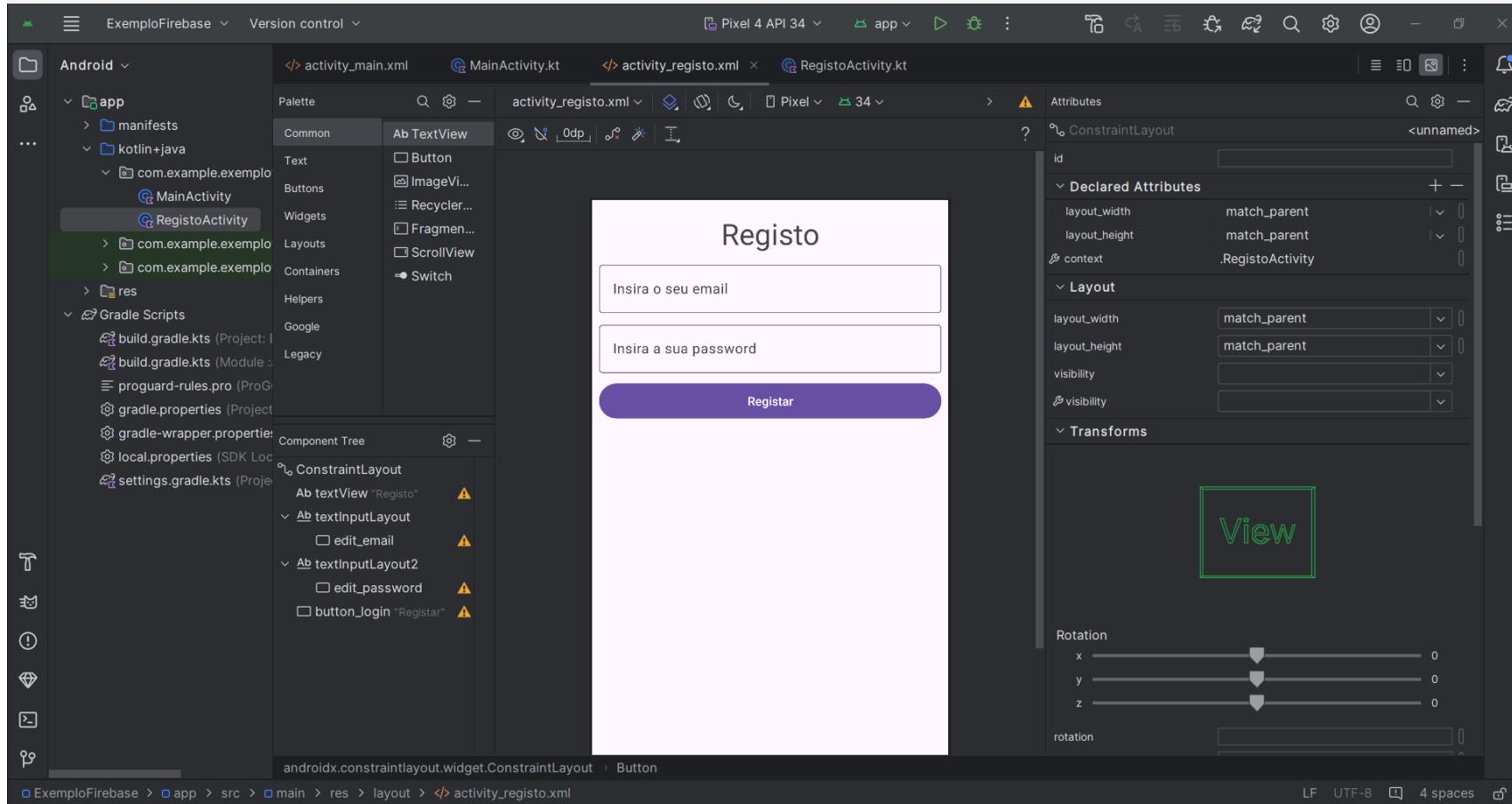
```
1 package com.example.exemplofirebase
2
3 import ...
4
5 </> class MainActivity : AppCompatActivity() {
6
7     private val binding by lazy { ActivityMainBinding.inflate(layoutInflater) }
8
9     override fun onCreate(savedInstanceState: Bundle?) {
10         super.onCreate(savedInstanceState)
11         setContentView(binding.root)
12
13         binding.buttonLogin.setOnClickListener { it: View! }
14
15         binding.textCriarConta.setOnClickListener { it: View! }
16
17     }
18
19 }
20
21
22 }
```

The first highlighted section is around line 7, where the `binding` variable is defined using the `ActivityMainBinding.inflate` function. The second highlighted section is around line 13, where the `setOnClickListener` method is called on the `binding.buttonLogin` and `binding.textCriarConta` objects.



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- Criamos a Activity de Registo, semelhante à de Login





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```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".RegistoActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="8dp"
        android:text="Registo"
        android:textAlignment="center"
        android:textSize="34sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_email"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView" />

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_password"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/edit_email" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".RegistoActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="8dp"
        android:text="Registo"
        android:textAlignment="center"
        android:textSize="34sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView" />

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_email"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Insira o seu email" />
    </com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/edit_password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Insira a sua senha" />
    </com.google.android.material.textfield.TextInputLayout>

</androidx.constraintlayout.widget.ConstraintLayout>
```



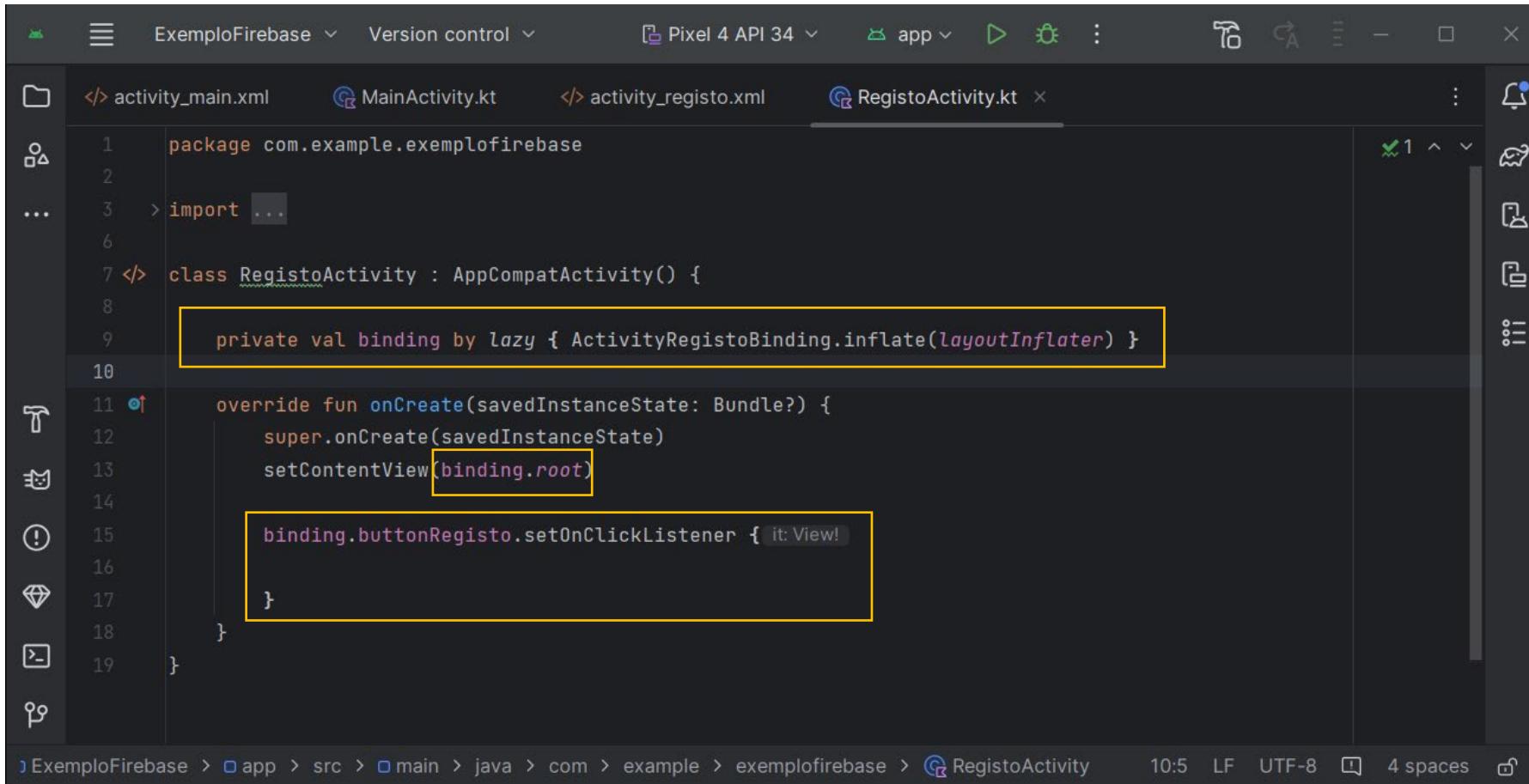
Firebase



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The screenshot shows the Android Studio interface with the file `activity_registro.xml` open. The code defines a ConstraintLayout containing a TextInputLayout and a Button. The button's ID is `@+id/button_registro`.

```
46    android:layout_height="wrap_content"
47    android:layout_marginStart="8dp"
48    android:layout_marginTop="8dp"
49    android:layout_marginEnd="8dp"
50    app:layout_constraintEnd_toEndOf="parent"
51    app:layout_constraintHorizontal_bias="0.5"
52    app:layout_constraintStart_toStartOf="parent"
53    app:layout_constraintTop_toBottomOf="@+id/textInputLayout">
54
55    <com.google.android.material.textfield.TextInputEditText
56        android:id="@+id/edit_password"
57        android:layout_width="match_parent"
58        android:layout_height="wrap_content"
59        android:hint="Insira a sua password" />
60    </com.google.android.material.textfield.TextInputLayout>
61
62    <Button
63        android:id="@+id/button_registro"
64        android:layout_width="0dp"
65        android:layout_height="wrap_content"
66        android:layout_marginStart="8dp"
67        android:layout_marginTop="8dp"
68        android:layout_marginEnd="8dp"
69        android:text="Registrar"
70        app:layout_constraintEnd_toEndOf="parent"
71        app:layout_constraintHorizontal_bias="0.5"
72        app:layout_constraintStart_toStartOf="parent"
73        app:layout_constraintTop_toBottomOf="@+id/textInputLayout2" />
74
75    </androidx.constraintlayout.widget.ConstraintLayout>
76
```



```
ExemploFirebase <|-- app <|-- src <|-- main <|-- java <|-- com <|-- example <|-- exemplofirebase <|-- RegistoActivity.kt
```

```
1 package com.example.exemplofirebase
2
3 > import ...
4
5
6
7 </> class RegistoActivity : AppCompatActivity() {
8
9     private val binding by lazy { ActivityRegistoBinding.inflate(layoutInflater) }
10
11    override fun onCreate(savedInstanceState: Bundle?) {
12        super.onCreate(savedInstanceState)
13        setContentView(binding.root)
14
15        binding.buttonRegistro.setOnClickListener { it: View! }
16
17    }
18
19 }
```

10:5 LF UTF-8 4 spaces



Authentication



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- Para ativar o authentication necessitamos, dentro da consola do Firebase configurar os tipos de autenticação possíveis. Neste exemplo vamos usar apenas email/senha como método de autenticação.



Authentication



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The screenshot shows the Firebase console interface. On the left, there's a sidebar with various services: Criação (Authentication, App Check, Firestore Database, Realtime Database, Extensions, Storage, Hosting, Functions, Machine Learning, Remote Config), Liberar e monitorar (Analytics, Engajamento), and Todos os produtos (Spark, Sem custos financeiros US\$ 0/mês). The main area displays the project 'ExemploFirebase' (Piano Spark) with a 'Visão geral do projeto' card. It features two 3D characters, one holding a tablet and another with a fire icon above their head. Below them is a message 'Aguardando os dados do Analytics...' and a section 'Armazene e sincronize dados de app em milissegundos' with icons of a badge and servers.

This screenshot shows the 'Authentication' section of the Firebase console. The sidebar has 'Authentication' selected. The main content area is titled 'Authentication' with the subtext 'Autenticar e gerenciar usuários a partir de uma variedade de provedores sem código do lado do servidor'. It features a large 'Vamos começar' button. Below it, there's a 'Saiba mais' section with three items: 'Por onde começar? Ver a documentação', 'Como o Authentication funciona? Ver a documentação', and 'De que forma o Authentication pode ser útil para mim? Saiba mais'. At the bottom, there's a 'Ver no YouTube' button next to a thumbnail for a video titled 'Introducing Firebase Authentication' showing various mobile devices.



Authentication



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The screenshot shows the Firebase Authentication console with the 'Sign-in method' tab selected. On the left, there's a sidebar with project management options like 'Criação', 'Liberar e monitorar', 'Analytics', 'Engajamento', and 'Todos os produtos'. The main area is titled 'Authentication' and shows 'Provedores de login'. It features three sections: 'Provedores nativos' (with 'E-mail/senha' highlighted), 'Outros provedores' (including Google, Facebook, Play Games, Game Center, Apple, GitHub, Microsoft, Twitter, and Yahoo), and 'Provedores personalizados' (with OpenID Connect and SAML). Below this is an 'Avançado' section for 'Autenticação multifator por SMS'. A note at the bottom states that MFA and other advanced features are available in the Identity Platform for Google Cloud.

This screenshot shows the same Firebase Authentication console, but the configuration for the 'E-mail/senha' provider has been completed. The 'Ativar' button is now checked and highlighted with a yellow box. A note below it says: 'Permite que os usuários se inscrevam usando o endereço de e-mail e a senha deles. Nossos SDKs também fornecem verificação de endereço de e-mail, recuperação de senha e componentes essenciais para alteração do endereço de e-mail.' A 'Salvar' (Save) button is also highlighted with a yellow box.



Authentication



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The screenshot shows the Firebase Authentication console interface. On the left, there's a sidebar with project navigation (Visão geral do projeto, Atalhos do projeto, Authentication, Extensions, Criação, Liberar e monitorar, Analytics, Engajamento, Todos os produtos). The main area is titled 'Authentication' and has tabs for Users, Sign-in method (which is selected), Templates, Usage, Settings, and Extensões. Under 'Sign-in method', there's a section for 'Provedores de login' (Email/password is listed as active). Below that is an 'Avançado' section for 'Autenticação multifator por SMS', which includes a note about Identity Platform and a 'Fazer upgrade para ativar' button.



Authentication



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- Necessitamos agora adicionar a referência à biblioteca do Authentication ao projeto.
- As bibliotecas estão disponíveis na documentação do Firebase⁽¹⁾

(1) <https://firebase.google.com/docs/android/setup?authuser=0&hl=pt>



Authentication



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The screenshot shows the Firebase documentation for Android. A yellow box highlights the 'Authentication' section under the 'Plataformas e frameworks' heading. The page contains a table of various Firebase libraries and their corresponding Maven coordinates and versions.

Nome	Maven	Versão	Status
AdMob	com.google.android.gms:play-services-ads	22.4.0	✓
Analytics	com.google.firebaseio.firebaseio-analytics-ktx	21.3.0	✓
Provedor personalizado do App Check	com.google.firebaseio.firebaseio-appcheck-ktx	17.0.1	
Provedor de depuração do App Check	com.google.firebaseio.firebaseio-appcheck-debug	17.0.1	
Provedor da Play Integrity do App Check	com.google.firebaseio.firebaseio-appcheck-playintegrity	17.0.1	
App Distribution	com.google.firebaseio.firebaseio-appdistribution	16.0.0-beta10	
API App Distribution	com.google.firebaseio.firebaseio-appdistribution-api-ktx	16.0.0-beta10	
Plug-in do App Distribution	com.google.firebaseio.firebaseio-appdistribution-gradle	4.0.0	
Authentication	com.google.firebaseio.firebaseio-auth-ktx	22.1.2	
Cloud Firestore	com.google.firebaseio.firebaseio-firestore-ktx	24.8.1	
SDK de cliente do Cloud Functions para Firebase	com.google.firebaseio.firebaseio-functions-ktx	20.3.1	
Cloud Messaging	com.google.firebaseio.firebaseio-messaging-ktx	23.2.1	✓
Cloud Storage	com.google.firebaseio.firebaseio-storage-ktx	20.2.1	
Crashlytics	com.google.firebaseio.firebaseio-crashlytics-ktx	18.4.3	✓
Crashlytics NDK	com.google.firebaseio.firebaseio-crashlytics-ndk	18.4.3	✓
Plug-in do Crashlytics	com.google.firebaseio.firebaseio-crashlytics-gradle	2.9.9	✓
Supporte para o módulo de recurso dinâmico	com.google.firebaseio.firebaseio-dynamic-module-support	16.0.0-beta03	

The screenshot shows an Android Studio code editor displaying a build.gradle.kts file. A yellow box highlights the 'implementation("com.google.firebaseio.firebaseio-auth-ktx")' dependency line. The file also contains other dependency declarations like 'implementation("androidx.core:core-ktx:1.12.0")' and 'implementation("com.google.android.material:material:1.11.0")'. The 'Sync Now' button is visible at the top right of the code editor.

```
buildFeatures { viewBinding = true }

dependencies {
    implementation(platform("com.google.firebase:firebase-bom:32.7.1"))
    implementation("com.google.firebaseio.firebaseio-analytics")
    implementation("com.google.firebaseio.firebaseio-auth-ktx")
    implementation("androidx.core:core-ktx:1.12.0")
    implementation("androidx.appcompat:appcompat:1.6.1")
    implementation("com.google.android.material:material:1.11.0")
    implementation("androidx.constraintlayout:constraintlayout:2.1.4")
    testImplementation("junit:junit:4.13.2")
    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")
}
```



Authentication



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```
ExemploFirebase Version control Pixel 4 API 34 app RegistroActivity.kt build.gradle.kts (:app)  
activity_main.xml MainActivity.kt activity_registro.xml  
8 </> class RegistoActivity : AppCompatActivity() {  
9     private val binding by lazy { ActivityRegistoBinding.inflate(layoutInflater) }  
10    private val auth by lazy { FirebaseAuth.getInstance() }  
11  
12    override fun onCreate(savedInstanceState: Bundle?) {  
13        super.onCreate(savedInstanceState)  
14        setContentView(binding.root)  
15  
16        binding.buttonRegistro.setOnClickListener { it: View! ->  
17            val email = binding.editEmail.text.toString()  
18            val passwd = binding.editPassword.text.toString()  
19  
20            auth.createUserWithEmailAndPassword(email, passwd)  
21                .addOnSuccessListener { it: AuthResult! ->  
22                    Toast.makeText(context: this, text: "Registro realizado com sucesso", Toast.LENGTH_SHORT).show()  
23                }  
24                .addOnFailureListener { it: Exception ->  
25                    Toast.makeText(context: this, text: "Erro ao registrar utilizador", Toast.LENGTH_SHORT).show()  
26                }  
27        }  
28    }  
29  
30    }  
31  
32 }  
ExemploFirebase > app > src > main > java > com > example > exemplofirebase > RegistroActivity > onCreate 28:70 LF UTF-8 4 spaces
```

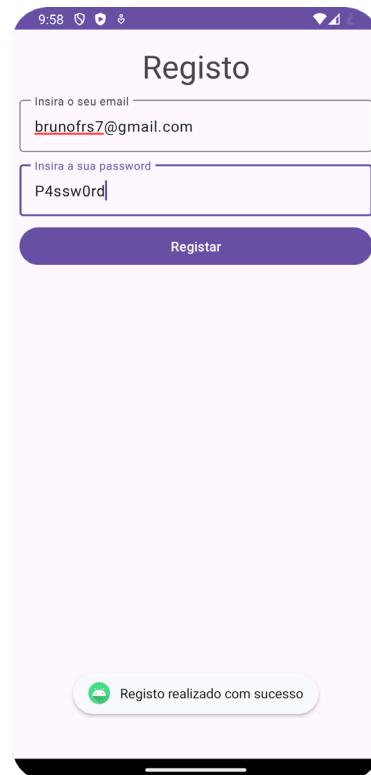


Authentication

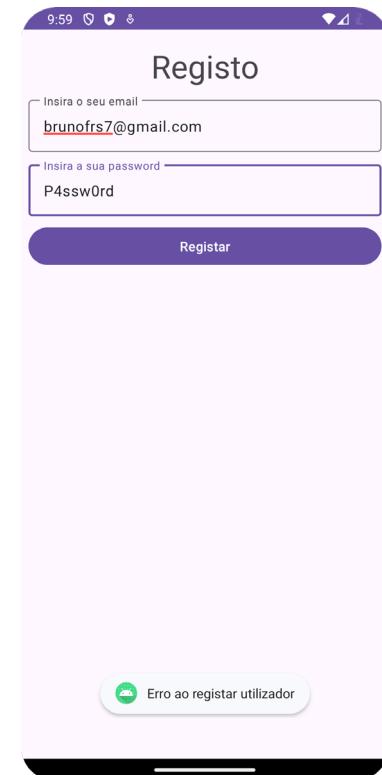


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1^a execução



2^a execução





Authentication



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The screenshot shows the Firebase Authentication console for the project 'ExemploFirebase'. The 'Users' tab is selected. A single user entry is displayed:

Identificador	Provedores	Data de criação	Último login	UID do usuário
brunofrs7@gmail.com	✉	6 de fev. de 2024	6 de fev. de 2024	5ExxI0JaW2TBHDboGuRgbu...



Authentication



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- É ainda possível enviar email de verificação de conta



Authentication



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```
ExemploFirebase Version control Pixel 4 API 34 app C A E T R : ... activity_main.xml MainActivity.kt activity_registro.xml RegistoActivity.kt build.gradle.kts (:app)  
9 </> class RegistoActivity : AppCompatActivity() {  
10  
11     private val binding by lazy { ActivityRegistoBinding.inflate(layoutInflater) }  
12  
13     private val auth by lazy { FirebaseAuth.getInstance() }  
14  
15     override fun onCreate(savedInstanceState: Bundle?) {  
16         super.onCreate(savedInstanceState)  
17         setContentView(binding.root)  
18  
19         binding.buttonRegistro.setOnClickListener { it: View!  
20             val email = binding.editEmail.text.toString()  
21             val passwd = binding.editPassword.text.toString()  
22  
23             auth.createUserWithEmailAndPassword(email, passwd)  
24                 .addOnSuccessListener { it: AuthResult!  
25                     Toast.makeText(context, text: "Registro realizado com sucesso", Toast.LENGTH_SHORT).show()  
26  
27                     auth.getCurrentUser()?.sendEmailVerification()  
28  
29                     finish()  
30                 }  
31                 .addOnFailureListener { it: Exception!  
32                     Toast.makeText(context, text: "Erro ao registrar utilizador", Toast.LENGTH_SHORT).show()  
33                 }  
34     }  
35 }
```



Authentication



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The image displays two side-by-side screenshots of a Gmail inbox. The left screenshot shows an incoming email from 'noreply@example.firebaseio.com' with the subject 'Verify your email for exemplofirebase-cf505'. The email body contains instructions to follow a link to verify the email address. The right screenshot shows the same inbox after the verification link has been clicked, with a message box stating 'Your email has been verified' and 'You can now sign in with your new account'.



Authentication



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The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The main window displays the 'MainActivity.kt' file. The code implements a login functionality using Firebase Authentication:

```
10 </> class MainActivity : AppCompatActivity() {
11
12     private val binding by lazy { ActivityMainBinding.inflate(layoutInflater) }
13     private val auth by lazy { FirebaseAuth.getInstance() }
14
15     override fun onCreate(savedInstanceState: Bundle?) {
16         super.onCreate(savedInstanceState)
17         setContentView(binding.root)
18
19         binding.buttonLogin.setOnClickListener { it: View! -->
20             val email = binding.editEmail.text.toString()
21             val passwd = binding.editPassword.text.toString()
22
23             auth.signInWithEmailAndPassword(email, passwd)
24                 .addOnSuccessListener { it: AuthResult! -->
25                     if (auth.currentUser?.isEmailVerified == true) {
26                         Toast.makeText(context: this, text: "Login OK", Toast.LENGTH_SHORT).show()
27                     } else {
28                         Toast.makeText(context: this, text: "Conta não validada", Toast.LENGTH_SHORT).show()
29                     }
30
31                 .addOnFailureListener { it: Exception -->
32                     Toast.makeText(context: this, text: "Erro no login: ${it.message}", Toast.LENGTH_SHORT).show()
33
34     }
```

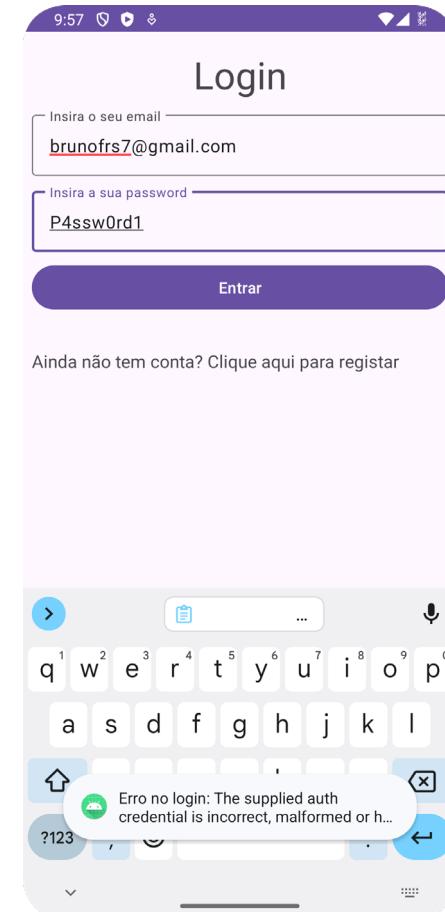
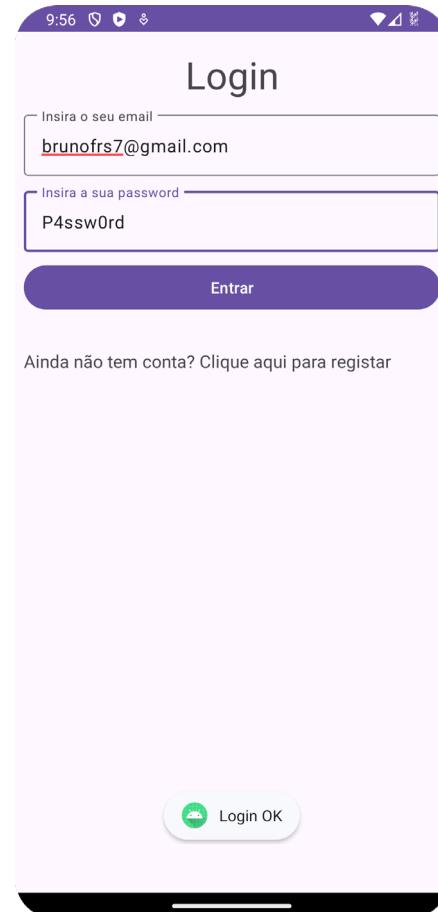
A yellow box highlights the line 'private val auth by lazy { FirebaseAuth.getInstance() }'. Another yellow box highlights the code block starting with 'auth.signInWithEmailAndPassword(email, passwd)'.



Authentication



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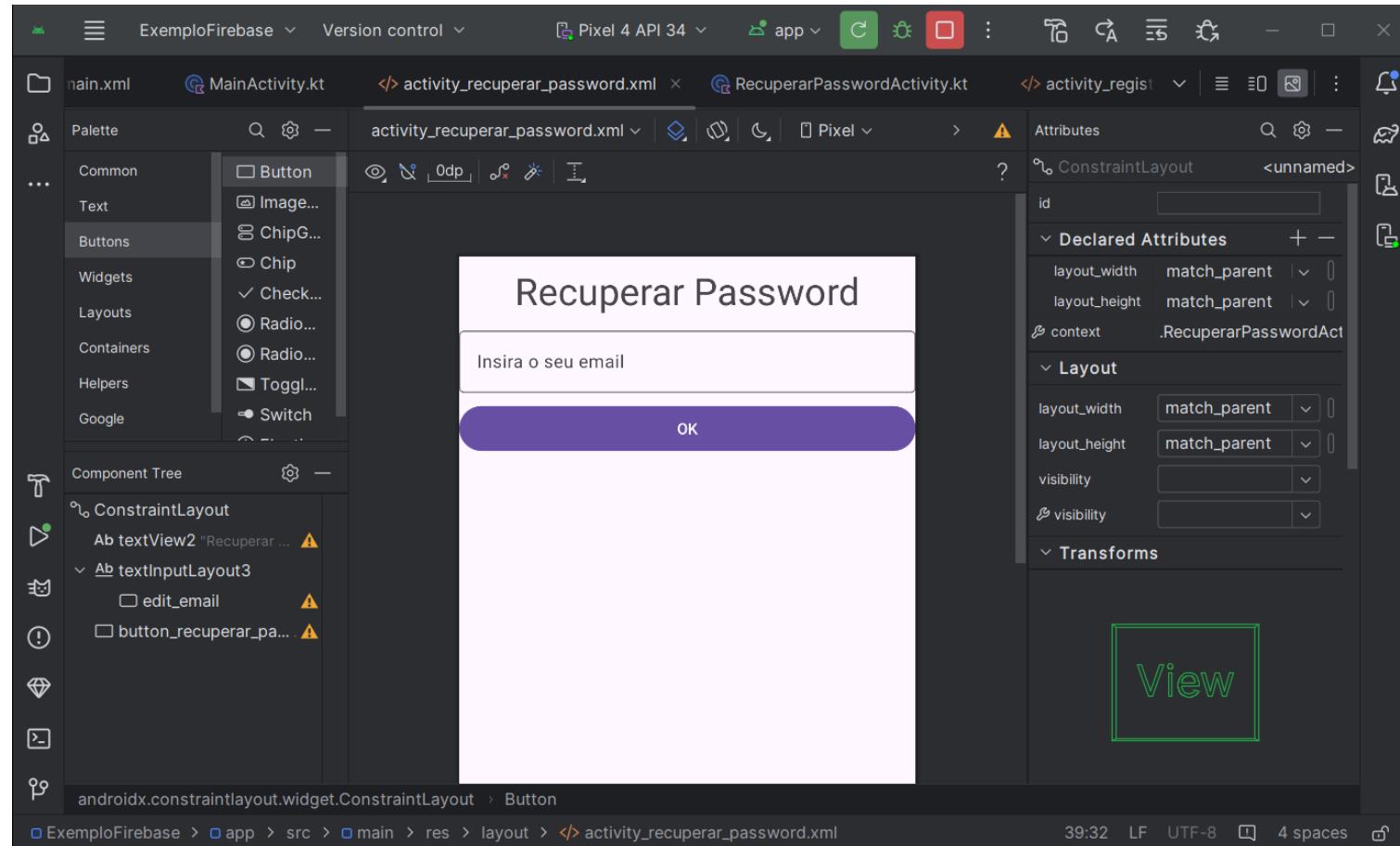
Authentication



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- Vamos adicionar uma nova Activity para recuperação da password

Authentication





Authentication



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```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".RecuperarPasswordActivity">

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        android:text="Recuperar Password"
        android:textSize="34sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/textInputLayout3"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView2">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_email"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Insira o seu email" />
    </com.google.android.material.textfield.TextInputLayout>

    <Button
        android:id="@+id/button_recuperar_password"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        android:text="OK"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textInputLayout3" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="8dp"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.5"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView2">

    <com.google.android.material.textfield.TextInputEditText
        android:id="@+id/edit_email"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Insira o seu email" />
    </com.google.android.material.textfield.TextInputLayout>

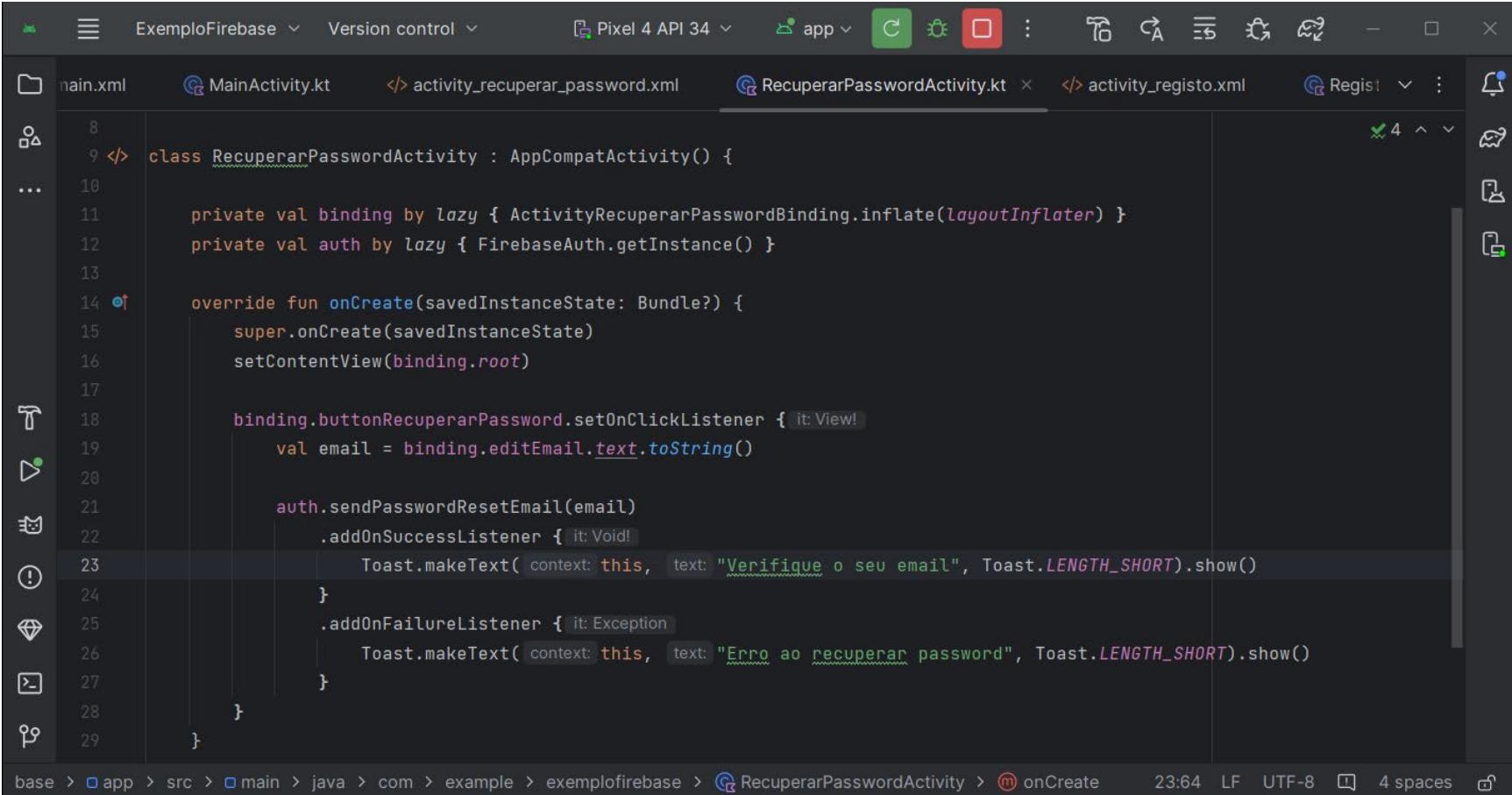
    <Button
        android:id="@+id/button_recuperar_password"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        android:text="OK"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textInputLayout3" />
</androidx.constraintlayout.widget.ConstraintLayout>
```



Authentication



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The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The code editor displays the file 'RecuperarPasswordActivity.kt'. The code implements a button click listener for sending a password reset email:

```
8
9 </> class RecuperarPasswordActivity : AppCompatActivity() {
...
11     private val binding by lazy { ActivityRecuperarPasswordBinding.inflate(layoutInflater) }
12     private val auth by lazy { FirebaseAuth.getInstance() }
13
14     override fun onCreate(savedInstanceState: Bundle?) {
15         super.onCreate(savedInstanceState)
16         setContentView(binding.root)
17
18         binding.buttonRecuperarPassword.setOnClickListener { it: View!
19             val email = binding.editEmail.text.toString()
20
21             auth.sendPasswordResetEmail(email)
22                 .addOnSuccessListener { it: Void!
23                     Toast.makeText(context, "Verifique o seu email", Toast.LENGTH_SHORT).show()
24                 }
25                 .addOnFailureListener { it: Exception
26                     Toast.makeText(context, "Erro ao recuperar password", Toast.LENGTH_SHORT).show()
27                 }
28         }
29     }
}
```

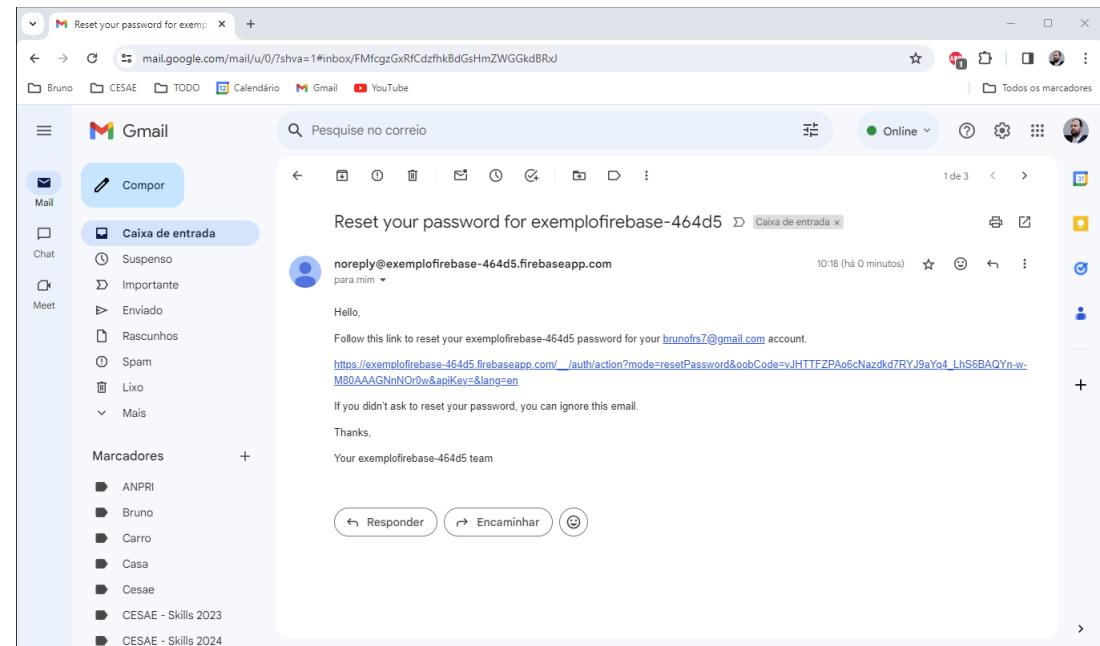
The code uses Firebase's Authentication API to send a password reset email to the user's provided email address.



Authentication



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Authentication



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The image displays two side-by-side screenshots of a web browser window. Both screenshots show the URL `exemplofirebase-cf505.firebaseio.com/_auth/action?mode=resetPassword&oobCode=mEfbz3lmPh8A_jL1EFcBAE2CRVpLnabT2AHa...`.
The left screenshot shows a "Reset your password" form. It has a field labeled "for" with the email "brunofrs7@gmail.com". Below it is a "New password" field containing "P4ssw0rd1". A "SAVE" button is at the bottom right.
The right screenshot shows a confirmation message: "Password changed" and "You can now sign in with your new password".



Cloud Firestore



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- O Cloud Firestore é a base de dados principal do Firebase, tendo como característica principal o facto de ser não relacional (NoSQL).
- Para ativar o Cloud Firestore necessitamos, dentro da consola do Firebase configurar o mesmo.



Cloud Firestore



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A screenshot of the Firebase console interface. On the left, a sidebar lists project services: Authentication, App Check, Firestore Database (which is highlighted with a yellow box and arrow), Realtime Database, Extensions (NOVO), Storage, and Hosting. The main area shows an overview for the project 'ExemploFirebase' (Plano Spark). It features a chart titled 'Analytics' showing 'Usuários ativos por dia' (Active users per day) with a single peak of 1 user on February 4th, and a note 'Sem dados for the last 14 days'. To the right, there's a section for 'Usuários nos últimos 30 minutos' (Users in the last 30 minutes) showing '0' users. A callout box highlights the 'Analytics' chart. At the bottom, there are links to 'Link para a AdMob' and 'Vincular ao Google Play'.



Cloud Firestore



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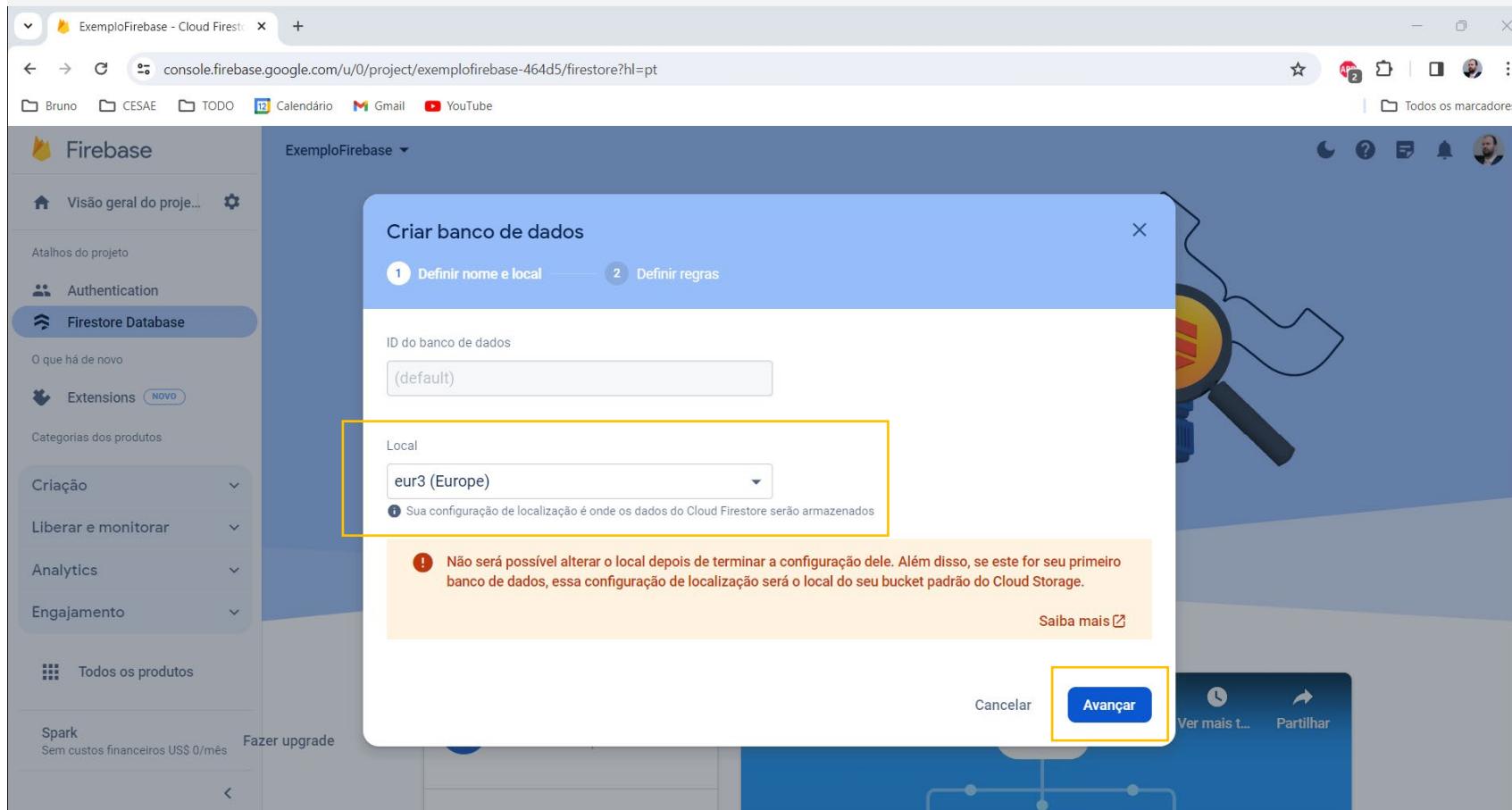
The screenshot shows the Firebase console interface for a project named 'ExemploFirebase'. The left sidebar is open, showing various services: Visão geral do projeto, Atalhos do projeto, Authentication, **Firebase Database** (which is selected and highlighted with a blue background), O que há de novo, Extensions (NOVO), Categorias dos produtos, Criação, Liberar e monitorar, Analytics, Engajamento, Todos os produtos, and Spark (Sem custos financeiros US\$ 0/mês). A 'Fazer upgrade' button is visible at the bottom of the sidebar. The main content area features a large illustration of a stack of blue server racks with a magnifying glass focusing on the top one, which has the Firebase logo. The text 'Cloud Firestore' is prominently displayed, followed by the subtitle 'Atualizações em tempo real, consultas eficientes e escalonamento automático'. Below this is a 'Criar banco de dados' button with a yellow border. At the bottom, there's a 'Saiba mais' section with a 'Por onde começar?' button and a 'Introducing Cloud Firestore' card.



Cloud Firestore



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Cloud Firestore



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The screenshot shows the Firebase Cloud Firestore 'Criar banco de dados' (Create database) dialog box. The first step, 'Definir nome e local' (Define name and location), is completed. The second step, 'Definir regras' (Define rules), is shown with a progress bar. A note says: 'Após definir a estrutura, é preciso criar regras para proteger seus dados.' Below are two options:

- Iniciar no modo de produção (Start in production mode):

Seus dados são particulares por padrão. O acesso de leitura/gravação do cliente vai ser concedido apenas se especificado por suas regras de segurança.
- Iniciar no modo de teste (Start in test mode):

Por padrão, seus dados estão definidos para permitir uma configuração rápida. Porém, você precisa atualizar suas regras de segurança em até 30 dias para permitir o acesso de leitura/gravação do cliente em longo prazo.

A code editor shows a sample security rule:

```
rules_version = '2';

service cloud.firestore {
  match /databases/{database}/documents {
    match /{document=**} {
      allow read, write: if false;
    }
  }
}
```

A note below the code says: 'Todas as leituras e gravações de terceiros vão ser negadas' (All third-party reads and writes will be denied).

At the bottom right of the dialog box is a yellow-bordered 'Criar' (Create) button.



Cloud Firestore



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The screenshot shows the Firebase Cloud Firestore rules editor. The 'Regras' tab is selected. A yellow box highlights the 'Regras' tab in the top navigation bar. Another yellow box highlights the 'allow read, write: if false;' part of the security rule code.

```
rules_version = '2';
service cloud.firestore {
  match /databases/{database}/documents {
    match /{document=**} {
      allow read, write: if false;
    }
  }
}
```

The screenshot shows the Firebase Cloud Firestore rules editor after changes have been made. A yellow box highlights the 'Publicar' (Publish) button in the top right. Another yellow box highlights the updated security rule code that now includes a condition for authenticated users.

```
rules_version = '2';
service cloud.firestore {
  match /databases/{database}/documents {
    match /{document=**} {
      allow read, write: if request.auth.uid != null;
    }
  }
}
```

Permite qualquer leitura e escrita a utilizadores autenticados



Cloud Firestore



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- Quando do registo de um utilizador, serão armazenados em base de dados os dados do mesmo.
- Quando o utilizador se autenticar entra numa Activity com os seus dados, onde pode editar e sair.
- Necessitamos adicionar a referência à biblioteca do Firestore ao projeto.
- As bibliotecas estão disponíveis na documentação do Firebase⁽¹⁾

(1) <https://firebase.google.com/docs/android/setup?authuser=0&hl=pt>



Cloud Firestore



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The screenshot shows the Firebase documentation page for setting up Cloud Firestore. A yellow arrow points from the 'Cloud Firestore' section in the left sidebar to the 'Cloud Firestore' row in the main table. The 'Cloud Firestore' row is highlighted with a yellow box. The table lists various Firebase products and their corresponding Java/Kotlin packages and versions.

Nome do Produto	Java/Kotlin	versão
AdMob	com.google.android.gms.play-services-ads	22.4.0
Analytics	com.google.firebaseio.firebaseio-analytics-ktx	21.3.0
Provedor personalizado do App Check	com.google.firebaseio.firebaseio-appcheck-ktx	17.0.1
Provedor de depuração do App Check	com.google.firebaseio.firebaseio-appcheck-debug	17.0.1
Provedor da Play Integrity do App Check	com.google.firebaseio.firebaseio-appcheck-playintegrity	17.0.1
App Distribution	com.google.firebaseio.firebaseio-appdistribution	16.0.0-beta10
API App Distribution	com.google.firebaseio.firebaseio-appdistribution-api-ktx	16.0.0-beta10
Plug-in do App Distribution	com.google.firebaseio.firebaseio-appdistribution-gradle	4.0.0
Authentication	com.google.firebaseio.firebaseio-auth-ktx	22.1.2
Cloud Firestore	com.google.firebaseio.firebaseio-firestore-ktx	24.8.1
SDK de cliente do Cloud Functions para Firebase	com.google.firebaseio.firebaseio-functions-ktx	20.3.1
Cloud Messaging	com.google.firebaseio.firebaseio-messaging-ktx	23.2.1
Cloud Storage	com.google.firebaseio.firebaseio-storage-ktx	20.2.1
Crashlytics	com.google.firebaseio.firebaseio-crashlytics-ktx	18.4.3
Crashlytics NDK	com.google.firebaseio.firebaseio-crashlytics-ndk	18.4.3
Plug-in do Crashlytics	com.google.firebaseio.firebaseio-crashlytics-gradle	2.9.9
Supporte para o módulo de recurso dinâmico	com.google.firebaseio.firebaseio-dynamic-module-support	16.0.0-beta03

<https://firebase.google.com/docs/android/setup?authuser=0&hl=pt>

The screenshot shows an Android Studio project named 'ExemploFirebase'. The 'build.gradle.kts' file is open, showing the Gradle configuration. Two specific dependency lines are highlighted with yellow boxes:

```
implementation("com.google.firebase:firebase-firebase-auth-ktx")
implementation("com.google.firebase:firebase-firebase-firestore-ktx")
```

A yellow arrow points from the first highlighted line to the 'Cloud Firestore' row in the Firebase documentation screenshot above.



Cloud Firestore



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```
ExemploFirebase Version control Pixel 4 API 34 app C - X
activity_registro.xml RegistroActivity.kt build.gradle.kts (app)

9
10 </> class RegistroActivity : AppCompatActivity() {
11
12     private val binding by lazy { ActivityRegistroBinding.inflate(layoutInflater) }
13
14     private val auth by lazy { FirebaseAuth.getInstance() }
15     private val db by lazy { FirebaseFirestore.getInstance() }
16
17     override fun onCreate(savedInstanceState: Bundle?) {
18         super.onCreate(savedInstanceState)
19         setContentView(binding.root)
20
21         binding.buttonRegistro.setOnClickListener { it: View! -
22             val email = binding.editEmail.text.toString()
23             val passwd = binding.editPassword.text.toString()
24
25             auth.createUserWithEmailAndPassword(email, passwd)
26                 .addOnSuccessListener { it: AuthResult! -
27                     Toast.makeText(context, "Registro realizado com sucesso", T
28
29                     auth.currentUser?.sendEmailVerification()
30
31                     gravarUtilizadorDB(email)
32
33                     finish()
34
35                 .addOnFailureListener { it: Exception -
36                     Toast.makeText(context, "Erro ao registrar utilizador", Toa
37
38
39     }
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59 }
```

```
ExemploFirebase Version control Pixel 4 API 34 app C - X
activity_registro.xml RegistroActivity.kt build.gradle.kts (app)

34
35
36     .addOnFailureListener { it: Exception -
37         Toast.makeText(context, "Erro ao registrar utilizador", Toa
38
39
40
41     private fun gravarUtilizadorDB(email: String) {
42         val uid = auth.currentUser?.uid
43
44         val dados = mapOf(
45             "nome" to "",
46             "email" to email
47         )
48
49         db.collection(collectionPath: "utilizadores") CollectionReference
50             .document(uid.toString()) DocumentReference
51             .set(dados) Task<Void>
52                 .addOnSuccessListener { it: Void! -
53
54
55                     .addOnFailureListener { it: Exception -
56
57
58
59 }
```



Cloud Firestore



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The screenshot shows the Firebase Authentication console. On the left, there's a sidebar with icons for Authentication, Sign-in method, Templates, Usage, Settings, and Extensões. The main area is titled "Authentication" and shows a table with one user entry:

Identificador	Provedores	Data de criação	Último login	UID do usuário
brunofrs7@gmail.com	✉	12 fev. de 2024	12 fev. de 2024	w1frRUuyU5MnAxBABT0hiyla...

Below the table, there's a snippet of Java code:val dados = mapOf("nome" to "", "email" to email)
db.collection("utilizadores").document(uid.toString()).set(dados)

The screenshot shows the Cloud Firestore console. On the left, there's a sidebar with icons for Visão geral do projeto, Atalhos do projeto, Authentication, and Firestore Database. The main area is titled "Cloud Firestore" and shows a document structure under the "utilizadores" collection:

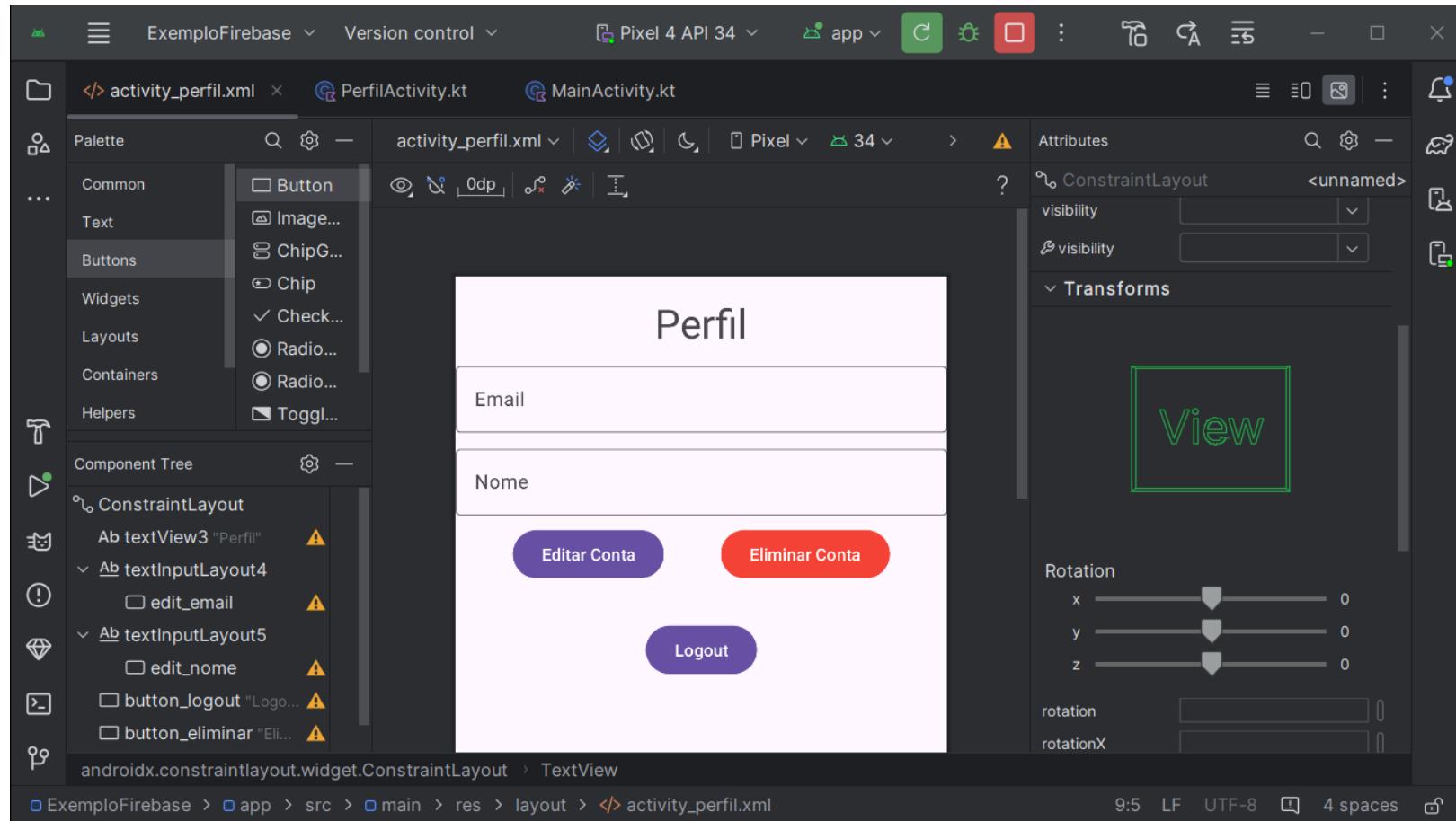
```
(default) → utilizadores → w1frRUuyU5MnAxBABT0hiylaGRT2  
+ Iniciar coleção → utilizadores → w1frRUuyU5MnAxBABT0hiylaGRT2  
+ Adicionar documento → w1frRUuyU5MnAxBABT0hiylaGRT2  
+ Iniciar coleção → utilizadores → w1frRUuyU5MnAxBABT0hiylaGRT2  
+ Adicionar campo → email: "brunofrs7@gmail.com"  
name: ""
```



Cloud Firestore



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Cloud Firestore



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```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".PerfilActivity">

    <TextView
        android:id="@+id/textView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="16dp"
        android:text="Perfil"
        android:textSize="34sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/textInputLayout4"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView3">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_email"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Email" />
    </com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/textInputLayout5"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textInputLayout4">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_nome"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Nome" />
    </com.google.android.material.textfield.TextInputLayout>

    <Button
        android:id="@+id/button_logout"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
        android:text="Logout"
        android:layout_constraintEnd_toEndOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".PerfilActivity">

    <com.google.android.material.textfield.TextInputEditText
        android:id="@+id/edit_email"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Email" />
</com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
        android:id="@+id/textInputLayout5"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textInputLayout4">

        <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/edit_nome"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Nome" />
    </com.google.android.material.textfield.TextInputLayout>

    <Button
        android:id="@+id/button_logout"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
        android:text="Logout"
        android:layout_constraintEnd_toEndOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```



Cloud Firestore



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```
<?xml version="1.0" encoding="utf-8"?>
<layout>
    <ConstraintLayout>
        <Button
            android:id="@+id/button_logout"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="8dp"
            android:backgroundTint="#F44336"
            android:text="Logout"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.5"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/button_editar" />

        <Button
            android:id="@+id/button_eliminar"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="8dp"
            android:backgroundTint="#F44336"
            android:text="Eliminar Conta"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.5"
            app:layout_constraintStart_toEndOf="@+id/button_editar"
            app:layout_constraintTop_toBottomOf="@+id/textInputLayout5" />

        <Button
            android:id="@+id/button_editar"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="8dp"
            android:backgroundTint="#F44336"
            android:text="Editar Conta"
            app:layout_constraintEnd_toStartOf="@+id/button_eliminar"
            app:layout_constraintHorizontal_bias="0.5"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/textInputLayout5" />
    </ConstraintLayout>
</layout>
```

File: ExemploFirebase > app > src > main > res > layout > activity_perfil.xml

```
class PerfilActivity : AppCompatActivity() {
    private val binding by lazy { ActivityPerfilBinding.inflate(layoutInflater) }
    private val auth by lazy { FirebaseAuth.getInstance() }
    private val db by lazy { FirebaseFirestore.getInstance() }

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(binding.root)

        loadData()
    }

    binding.buttonEditar.setOnClickListener { it: View! }

    binding.buttonEliminar.setOnClickListener { it: View! }

    binding.buttonLogout.setOnClickListener { it: View! }

    private fun loadData() {
    }
}
```

File: ExemploFirebase > app > src > main > java > com > exemplofirebase > PerfilActivity.java



Cloud Firestore



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The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The 'PerfilActivity.kt' file is the active editor, displaying Java code for retrieving user data from a Firestore collection. A yellow rectangular selection highlights the line of code: `db.collection("utilizadores").document(uid.toString()).get()`. The code block is as follows:

```
private fun loadData() {
    val uid = auth.currentUser?.uid

    db.collection("utilizadores").document(uid.toString()).get()
        .addOnSuccessListener { it: DocumentSnapshot? ->
            val email = it?.data?.get("email")
            val nome = it?.data?.get("nome")

            binding.editEmail.setText(email.toString())
            binding.editNome.setText(nome.toString())
        }
        .addOnFailureListener { it: Exception? }
}
```

The bottom status bar of the IDE shows the path: main > java > com > example > exemplofirebase > PerfilAc. The status bar also indicates the file is 41:18 (666 chars, 17 line breaks), uses LF line endings, is in UTF-8 encoding, and has 4 spaces.



Cloud Firestore



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The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The code editor displays the file 'PerfilActivity.kt'. The code is as follows:

```
binding.buttonEditar.setOnClickListener { it: View! ->
    val uid = auth.currentUser?.uid
    val email = binding.editEmail.text.toString()
    val nome = binding.editNome.text.toString()

    val dados = mapOf(
        "email" to email,
        "nome" to nome
    )

    db.collection("utilizadores")
        .document(uid.toString())
        .update(dados) Task<Void!
        .addOnSuccessListener { it: Void! ->
            Toast.makeText(context, "Atualizado", Toast.LENGTH_SHORT).show()
        }
        .addOnFailureListener { it: Exception -
            Toast.makeText(context, "Erro a atualizar a conta", Toast.LENGTH_S
        }
}
```

A yellow box highlights the line `.update(dados)`. The status bar at the bottom of the screen shows the file path as `main > java > com > example > exemplofirebase > PerfilActivity > onCreate`, and the time as 44:52.

NOTA: o email só está a ser alterado na base de dados e não no authentication



Cloud Firestore



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```
ExemploFirebase > Version control > Pixel 4 API 34 > app > PerfilActivity.kt
```

```
activity_perfil.xml PerfilActivity.kt MainActivity.kt
```

```
42 }  
43  
44     binding.buttonEliminar.setOnClickListener { it: View! }  
45         val uid = auth.currentUser?.uid  
46         db.collection( collectionPath: "utilizadores" ) CollectionReference  
47             .document(uid.toString()) DocumentReference  
48             .delete() Task<Void!>  
49             .addOnSuccessListener f it:Void!  
50                 auth.currentUser?.delete()  
51                     Toast.makeText( context: this, text: "Conta eliminada com sucesso", Toast.LENGTH_SHORT )  
52                     finish()  
53             }  
54             .addOnFailureListener { it: Exception  
55                 Toast.makeText( context: this, text: "Erro a eliminar a conta", Toast.LENGTH_SHORT )  
56             }  
57 }  
58  
59     binding.buttonLogout.setOnClickListener { it: View! }  
60         auth.signOut()  
61         finish()  
62 }  
63 }  
64 }
```



Storage



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- O Storage é o repositório de ficheiros do Firebase.
- Para o ativar necessitamos, dentro da consola do Firebase configurar o mesmo.



Storage



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The screenshot shows the Firebase console interface for a project named "ExemploFirebase". The left sidebar lists various services: Authentication, Firestore Database, O que há de novo, Extensions (NOVO), Criação (Authentication, App Check, Firestore Database, Realtime Database, Extensions (NOVO), Storage, Hosting, Functions, Machine Learning), and Spark (Sem custos financeiros US\$ 0/mês). A yellow box highlights the "Storage" option under the "Criação" section. The main area displays two 3D characters, one holding a tablet, and a yellow Firebase logo above them. Below the characters, the text "Aguardando os dados do Analytics..." is visible. At the bottom, a banner states "Armazene e sincronize dados de app em milissegundos".



Storage



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The screenshot shows the Firebase Storage console for the project 'ExemploFirebase'. The left sidebar has 'Storage' selected. The main area features a large 'Storage' heading and a description: 'Armazenar e recuperar arquivos gerados pelo usuário, como imagens, áudio e vídeos, sem o código do servidor'. A 'Vamos começar' button is highlighted with a yellow box. To the right is a graphic of a folder containing files like a lock icon, a photo, and a document, with a snowflake icon below it. Below the main section are 'Saiba mais' links for 'Por onde começar?' and 'Como o Storage funciona?'. A small video thumbnail at the bottom right shows three phones connected to a central cloud icon.



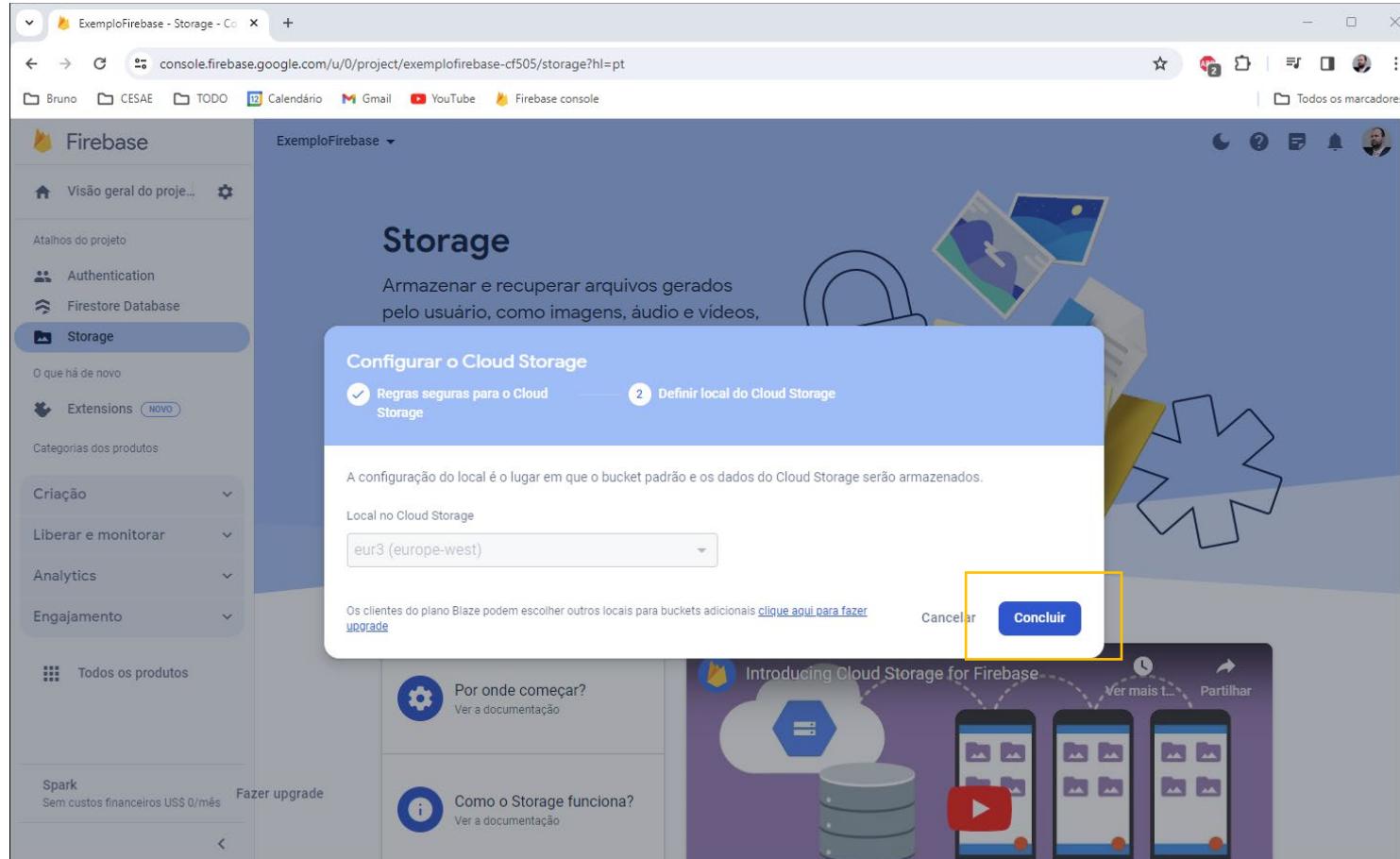
The screenshot shows the 'Configurar o Cloud Storage' (Configure Cloud Storage) dialog box in the Firebase console. The dialog is divided into two main sections: '1 Regras seguras para o Cloud Storage' (1 Secure rules for Cloud Storage) and '2 Definir local do Cloud Storage' (2 Define Cloud Storage location). The first section contains instructions and two radio button options: 'Iniciar no modo de produção' (Start in production mode) and 'Iniciar no modo de teste' (Start in test mode). The 'Iniciar no modo de produção' option is selected. Below it is a code editor showing a JSON-based security rules configuration. A tooltip on the right side of the code editor states: 'Todas as leituras e gravações de terceiros serão negadas' (All third-party reads and writes will be denied). At the bottom of the dialog are 'Cancelar' (Cancel) and 'Próxima' (Next) buttons, with the 'Próxima' button highlighted by a yellow box.



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```
rules_version = '2';

// Craft rules based on data in your Firestore database
// allow write: if firestore.get(
//   /databases/(default)/documents/users/$(request.auth.uid)).data.isAdmin;
service firebase.storage {
  match /b/{bucket}/o {
    match /{allPaths=**} {
      allow read, write: if false;
    }
  }
}
```

```
rules_version = '2';

// Craft rules based on data in your Firestore database
// allow write: if firestore.get(
//   /databases/(default)/documents/users/$(request.auth.uid)).data.isAdmin;
service firebase.storage {
  match /b/{bucket}/o {
    match /{allPaths=**} {
      allow read, write: if request.auth.uid != null;
    }
  }
}
```

Permite qualquer leitura e escrita
a utilizadores autenticados



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The screenshot shows the Firebase documentation for Android setup. On the left, there's a sidebar with navigation links like 'Fundamentos', 'Comece a usar o Firebase', 'Gerencie seus projetos do Firebase', 'Plataformas e frameworks', and 'Protótipo e teste com o Emulator'. The main content area lists various Firebase libraries with their versions and download links. A yellow box highlights the 'Cloud Storage' row, which has the version '20.2.1'. To the right, there's a sidebar with instructions for adding Firebase to an Android project. On the far right, there's a snippet of the 'build.gradle.kts' file for an Android project. A yellow box highlights the 'Sync Now' button at the top of the code editor.

<https://firebase.google.com/docs/android/setup?authuser=0&hl=pt>

The screenshot shows an Android Studio code editor displaying the 'build.gradle.kts' file for an Android project named 'ExemploFirebase'. The file contains code for setting up dependencies, including 'implementation("com.google.firebase:firebase-storage-ktx")'. A yellow box highlights this specific line of code. At the top of the code editor, there are two buttons: 'Sync Now' and 'Ignore these changes'. Another yellow box highlights the 'Sync Now' button.



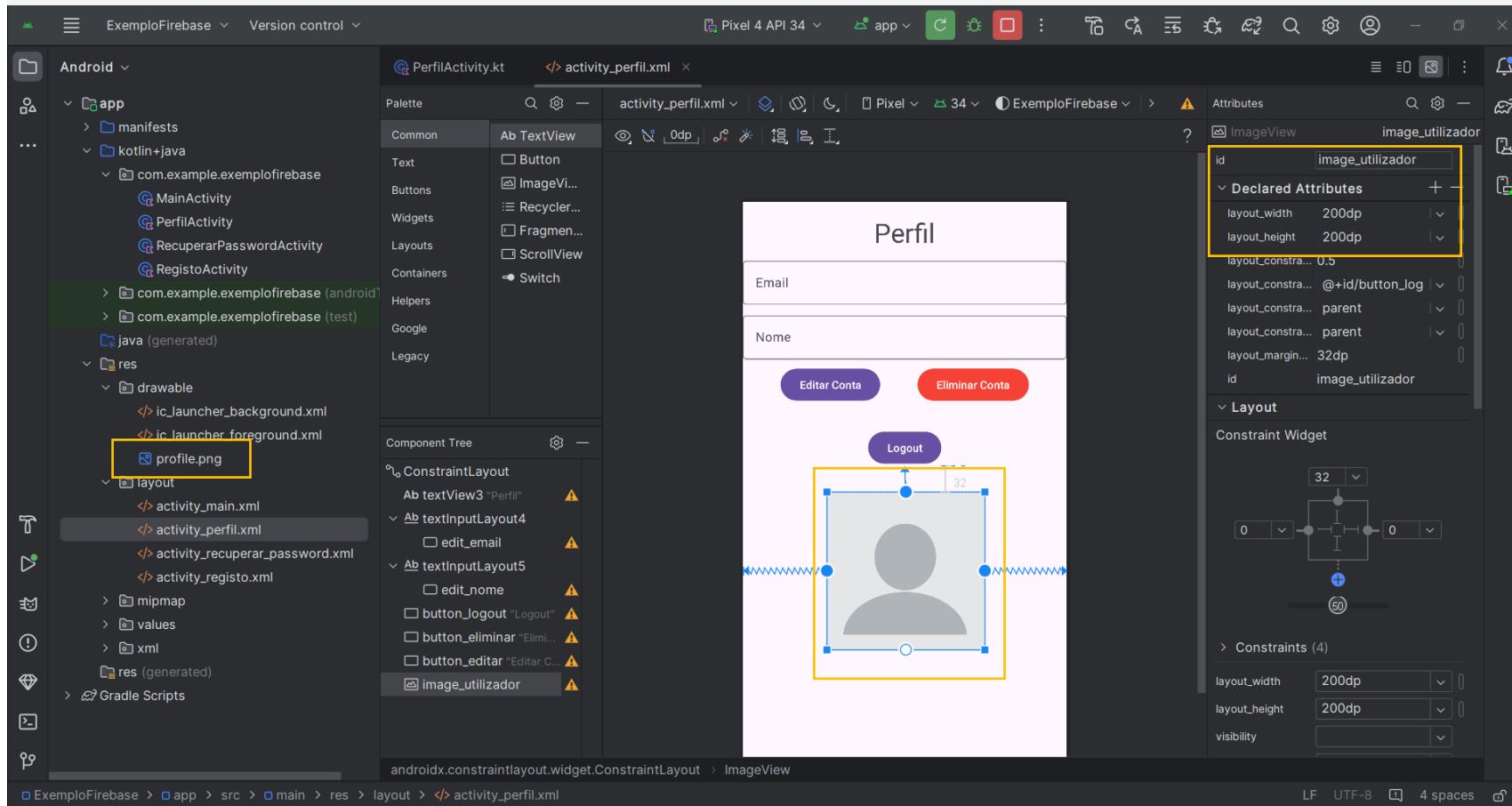
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- Adicionamos ao utilizador uma foto

Storage

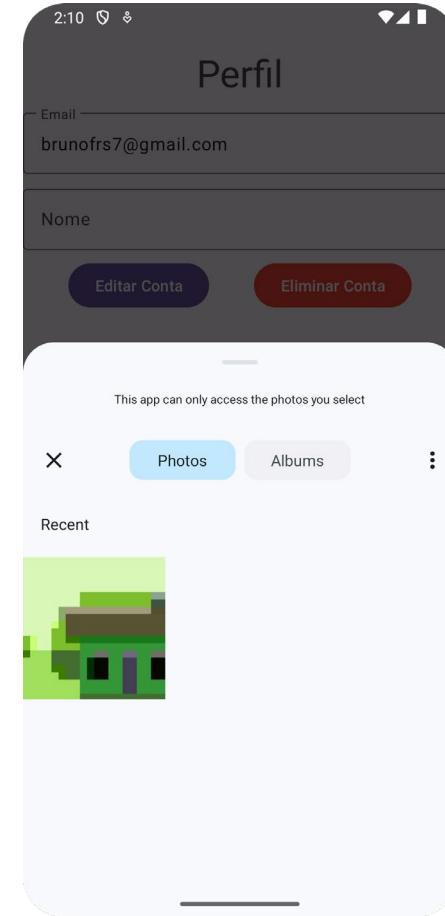
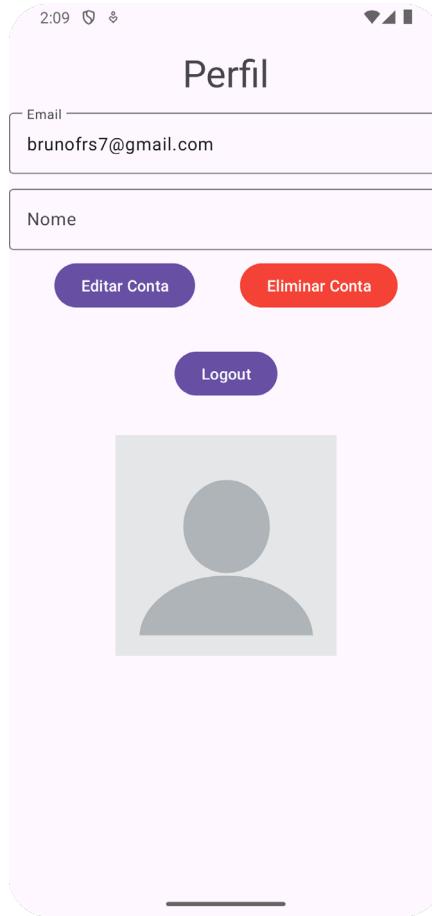




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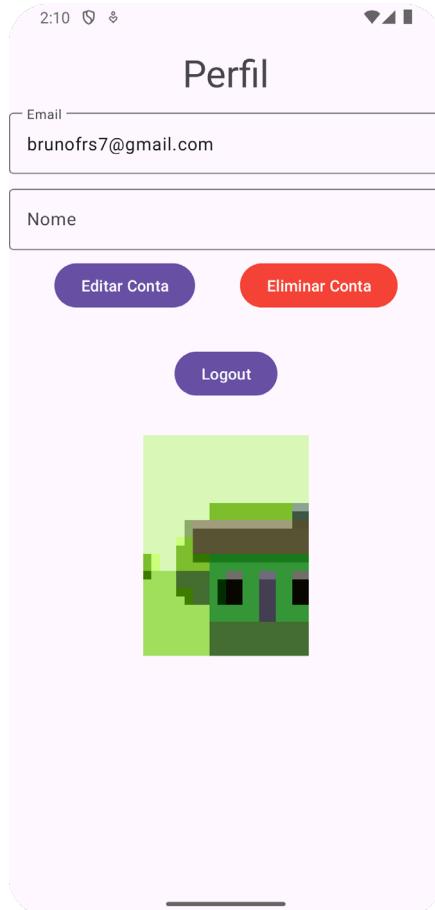




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The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The left sidebar displays the project structure, including the 'app' module with Java files like MainActivity, PerfilActivity, RecuperarPasswordActivity, and RegistroActivity. The 'activity_perfil.xml' layout file is selected in the list. The main editor window shows the 'PerfilActivity.kt' code:

```
setContentView(binding.root)
loadData()

val selecionaImagemGaleria =
    registerForActivityResult(ActivityResultContracts.GetContent()) { it: Uri? }
    binding.imageUtilizador.setImageURI(it)
    if (it != null) {
        val uid = auth.currentUser?.uid
        storage.getReference(location: "utilizadores").child(uid.toString()).StorageReference
            .putFile(it) UploadTask
            .addOnSuccessListener { it: UploadTask.TaskSnapshot!
                it.metadata?.reference?.downloadUrl?.addOnSuccessListener { it: Uri!
                    Toast.makeText(
                        context: this,
                        text: "Download URL: ${it}",
                        Toast.LENGTH_SHORT
                    ).show()
                }
            }
    }
}

binding.imageUtilizador.setOnClickListener { it: View!
    selecionaImagemGaleria.launch(input: "image/*")
}

binding.buttonEditar.setOnClickListener { it: View!
    val uid = auth.currentUser?.uid
}
```

A yellow box highlights the code for selecting an image from the gallery and uploading it to Firebase Storage. Another yellow box highlights the code for setting up a click listener on the image view.



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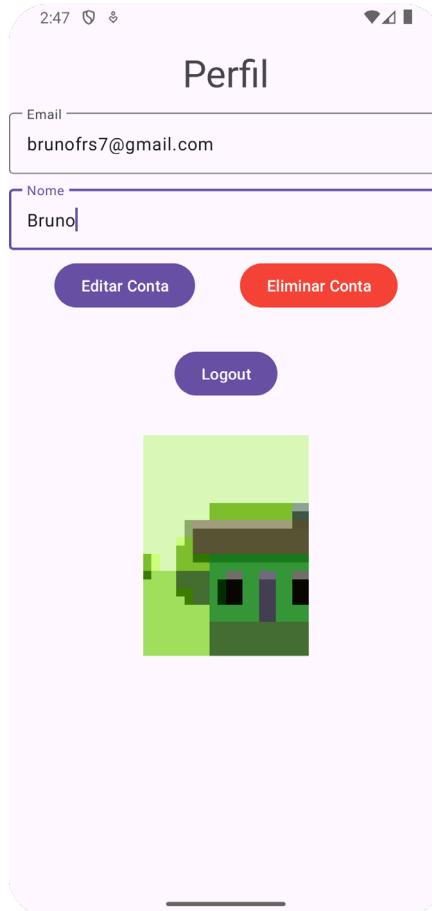
- Armazenamos também o URL da imagem na base de dados



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The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The left sidebar displays the file structure under 'Android'. The main editor window shows the 'PerfilActivity.kt' file, specifically the 'onCreate' method. A yellow box highlights the code segment responsible for uploading a profile photo and updating the user's document in Firestore.

```
if (it != null) {
    val uid = auth.currentUser?.uid
    storage.getReference().child("utilizadores").child(uid.toString()).putFile(it)
        .addOnSuccessListener { it: UploadTask.TaskSnapshot! ->
            it.metadata?.reference?.downloadUrl?.addOnSuccessListener { it: Uri! ->
                Toast.makeText(
                    context: this,
                    text: "Download URL: ${it}",
                    Toast.LENGTH_SHORT
                ).show()
            }
        }
    val dados = mapOf(
        "foto" to it,
    )
    db.collection("utilizadores").document(uid.toString()).update(dados)
        .addOnSuccessListener { it: Void! ->
            Toast.makeText(context: this, text: "Atualizado", Toast.LENGTH_SHORT).show()
        }
        .addOnFailureListener { it: Exception! ->
            Toast.makeText(context: this, text: "Erro a atualizar a conta", Toast.LENGTH_SHORT).show()
        }
}
```



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- Para apresentar fotos através de um URL vamos utilizar a biblioteca Picasso (1).

(1) <https://github.com/square/picasso>



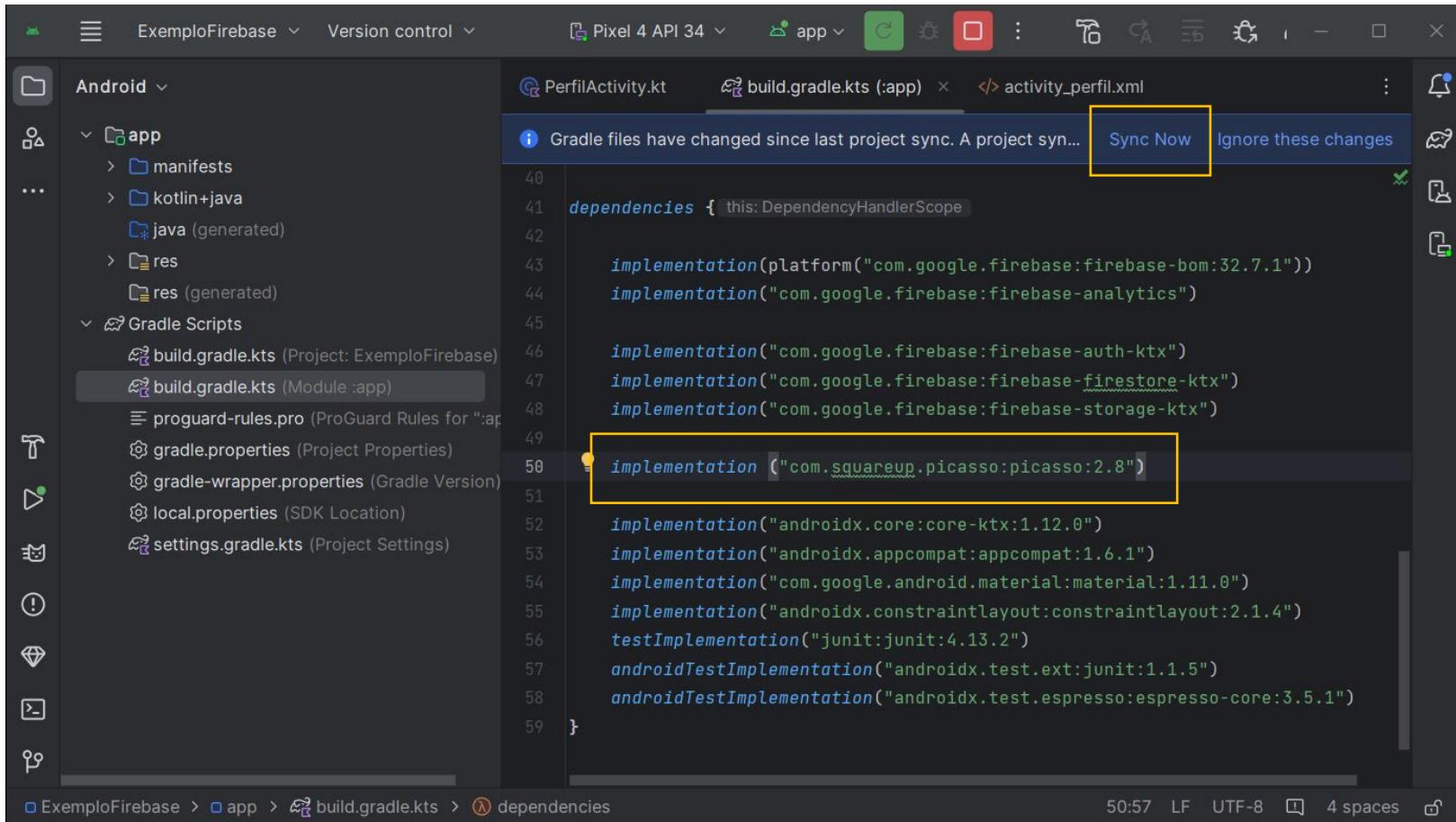
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The screenshot shows a web browser window with the URL github.com/square/picasso. The page displays the README content for the Picasso library. The title 'Picasso' is prominently displayed, followed by the subtitle 'A powerful image downloading and caching library for Android'. Below the text is a large image of a smartphone screen showing a grid of various Picasso sample images, which are abstract, multi-colored artworks. At the bottom of the page, there is a link 'For more information please see [the website](#)' and a 'Download' button.

Storage



The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The left sidebar shows the project structure under 'Android'. The main editor window displays the 'build.gradle.kts' file for the ':app' module. A yellow box highlights the line 'implementation ("com.squareup.picasso:picasso:2.8")'. Above the editor, a notification bar says 'Gradle files have changed since last project sync. A project sync...' with buttons for 'Sync Now' and 'Ignore these changes', where 'Sync Now' is highlighted with a yellow box. The code in the file includes dependencies for Firebase and Picasso.

```
dependencies { this:DependencyHandlerScope

    implementation(platform("com.google.firebase:firebase-bom:32.7.1"))
    implementation("com.google.firebase:firebase-analytics")

    implementation("com.google.firebase:firebase-auth-ktx")
    implementation("com.google.firebase:firebase-firebasestore-ktx")
    implementation("com.google.firebase:firebase-storage-ktx")

    implementation ("com.squareup.picasso:picasso:2.8")

    implementation("androidx.core:core-ktx:1.12.0")
    implementation("androidx.appcompat:appcompat:1.6.1")
    implementation("com.google.android.material:material:1.11.0")
    implementation("androidx.constraintlayout:constraintlayout:2.1.4")
    testImplementation("junit:junit:4.13.2")
    androidTestImplementation("androidx.test.ext:junit:1.1.5")
    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")
}
```



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The screenshot shows the Android Studio interface with the project 'ExemploFirebase' open. The left sidebar displays the project structure under 'Android'. The main editor window shows the file 'PerfilActivity.kt' with the following code:

```
binding.buttonLogout.setOnClickListener { it: View! auth.signOut() finish() } private fun loadData() { val uid = auth.currentUser?.uid db.collection("utilizadores").document(uid.toString()).get().addOnSuccessListener { it: DocumentSnapshot! val email = it.data?.get("email") val nome = it.data?.get("nome") val foto = it.data?.get("foto").toString() if(foto.isNotEmpty()){ Picasso.get().load(foto).into(binding.imageUtilizador) } binding.editEmail.setText(email.toString()) binding.editNome.setText(nome.toString()) }.addOnFailureListener { it: Exception } }
```

A yellow rectangular box highlights the line of code `val foto = it.data?.get("foto").toString()`. The status bar at the bottom indicates the file is 'PerfilActivity.kt' and the line number is '116'.