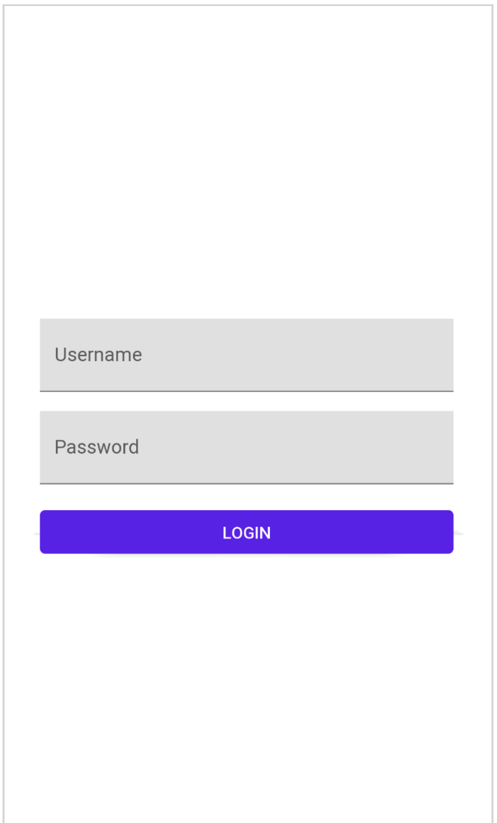
Building Layout

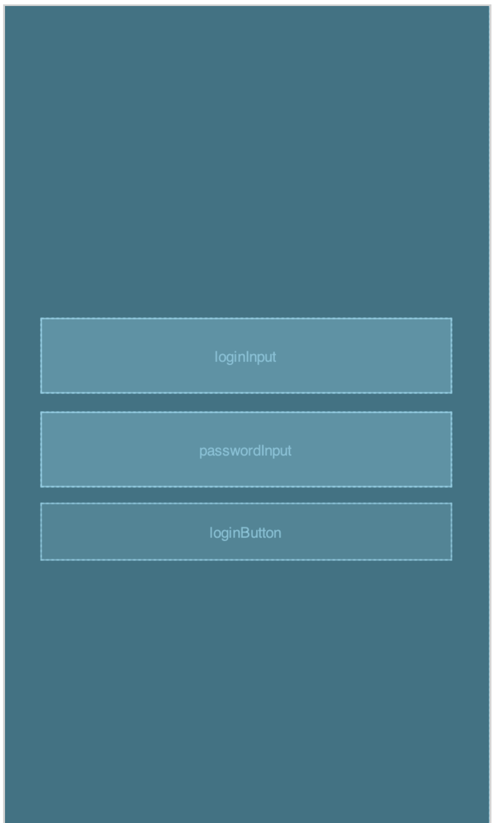
This lesson will cover how to create a layout for the login screen, which consists of username input field, password input field and login button.

WE'LL COVER THE FOLLOWING

Final result preview

To make it easier to understand what we want to achieve, here is a preview of the layout that we are going to build.





Root layout

Let’s create a new *activity_login.xml* layout file inside *app/src/main/res/layout* folder. As a root layout, we are going to use `ConstraintLayout`:

```
<androidx.constraintlayout.widget.ConstraintLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
        xmlns:app="http://schemas.android.com/apk/res-auto"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_login.xml

Input fields

While Android SDK provides EditText view as an input field, we are going to use `TextInputLayout` and its direct child `TextInputEditText` from Material Components library because of richer API and better visual parity with Material Design.

Let’s declare username `TextInputLayout` and `TextInputEditText` inside `ConstraintLayout` along with some specific XML attributes:

- `id` attribute is used to uniquely identify and reference to this view
- `hint` attribute shows input field hint text

```
...
<com.google.android.material.textfield.TextInputLayout
        android:id="@+id/textUsernameLayout"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Username">
    <com.google.android.material.textfield.TextInputEditText
            android:id="@+id/loginInput"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />
</com.google.android.material.textfield.TextInputLayout>
...
```

activity_login.xml

Note: All the above attributes use `android` namespace, which means those attributes are defined in Android SDK.

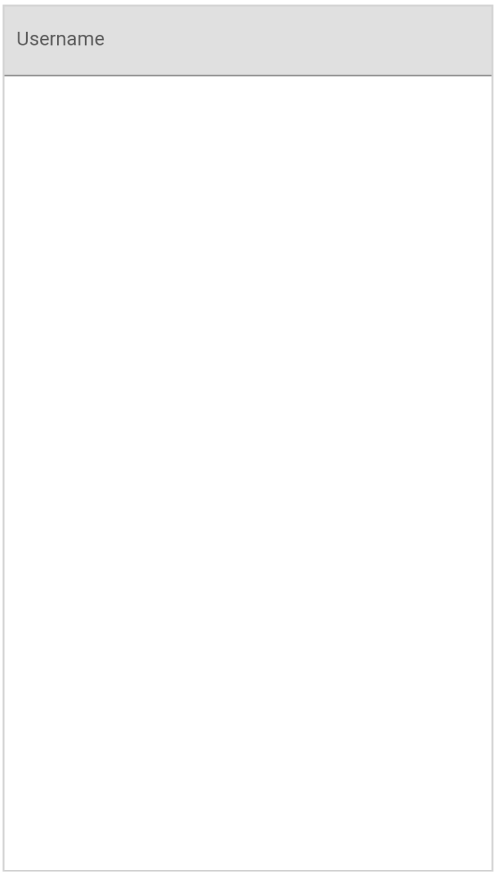
To align `TextInputLayout` we need to use `ConstraintLayout` attributes which are defined in `ConstraintLayout` library namespace and to access them we will use the `app` namespace:

- `layout_constraintStart_toStartOf` attribute declares a constraint to align the start of the view to the start of the `ConstraintLayout`
- `layout_constraintEnd_toEndOf` attribute declares a constraint to align the end of the view to the end of the `ConstraintLayout`
- `layout_constraintTop_toTopOf` attribute declares a constraint to align the top of the view to the top of the `ConstraintLayout`

```
...
<com.google.android.material.textfield.TextInputLayout
        android:id="@+id/textUsernameLayout"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Username"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent">
    ...
</com.google.android.material.textfield.TextInputLayout>
...
```

activity_login.xml

Here is a preview of the layout.



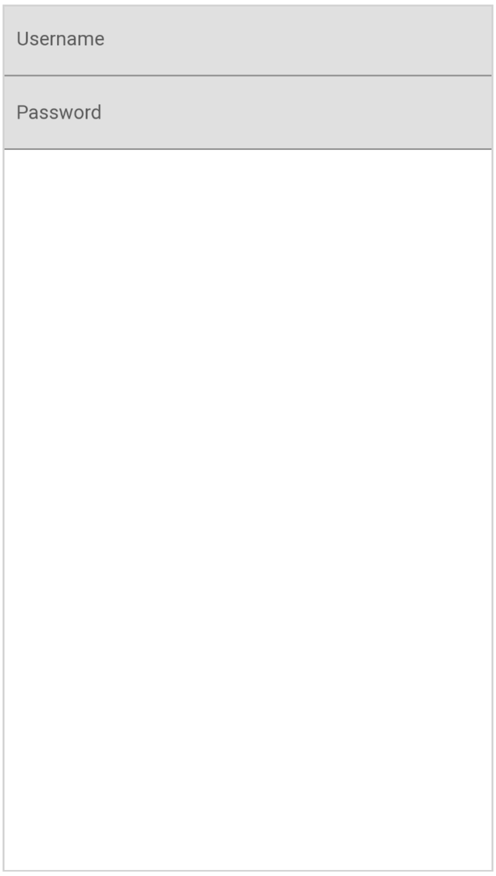
Let’s add a password input field and place it under the username input field. Both *username* and *password* input fields are very similar. The difference is in the following attribute:

- `layout_constraintTop_toBottomOf` attribute declares a constraint to align the top of the *password layout* to the bottom of the *username layout* using `textUsernameLayout` id as a reference

```
...
<com.google.android.material.textfield.TextInputLayout
        android:id="@+id/textPasswordInput"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textUsernameLayout">

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

</com.google.android.material.textfield.TextInputLayout>
...
```

activity_login.xml

Here is a preview of the layout.



Button

The next step is to add the *login button* below the *password layout*.

While Android SDK provides Button view as an input field, we are going to use `MaterialButton` from Material Components library because of the richer API and better visual parity with Material Design.

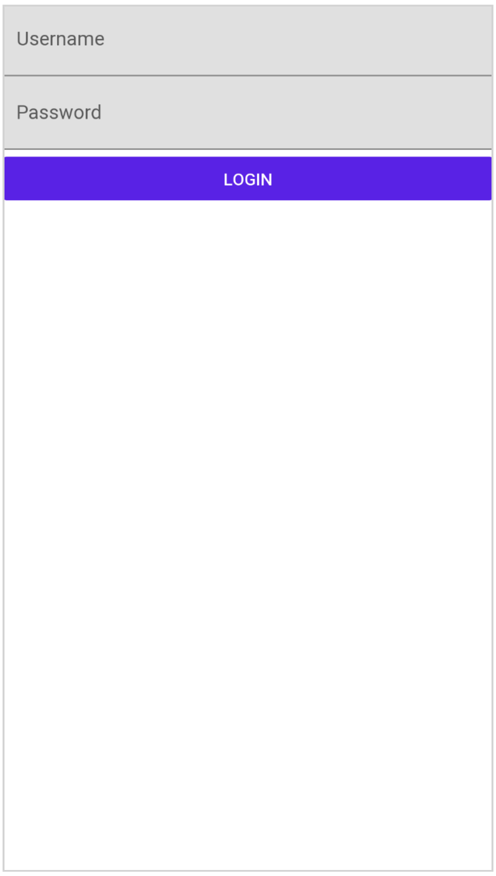
Most of the attributes of the `MaterialButton` will be familiar at this point. The main difference is:

- `layout_constraintTop_toBottomOf` attribute declares a constraint to align the top of the *login button* to the bottom of the *password layout* using `textPasswordInput` id as a reference
- `text` attribute shows button text

```
...
<com.google.android.material.button.MaterialButton
        android:id="@+id/loginButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Login"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textPasswordInput" />
        app:layout_constraintTop_toBottomOf="@+id/textPasswordInput" />
...
```

activity_login.xml

Here is a preview of the layout.



Alignment

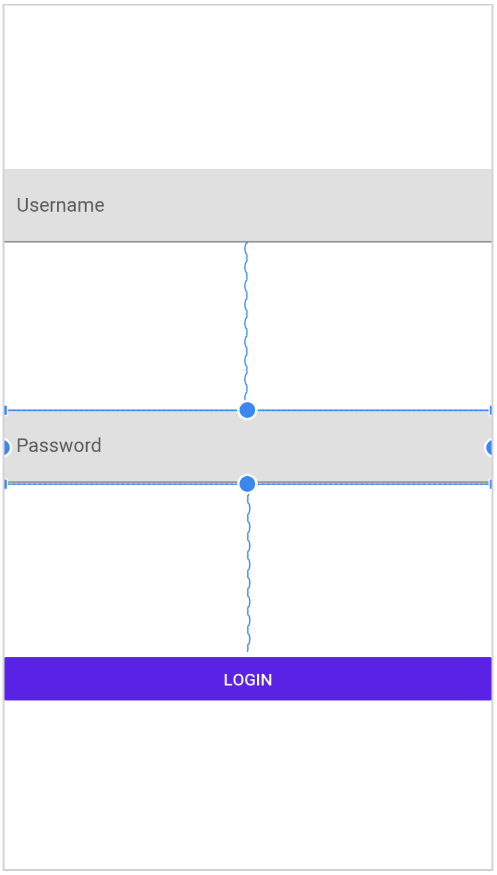
To align *username layout*, *password layout* and *login button* in the center of the screen we form a chain - a group of views that are linked to each other.

Let's constrain the *bottom of top component* to the *top of bottom component* to distribute components vertically across the whole screen.

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

    <com.google.android.material.textfield.TextInputLayout
            android:id="@+id/textUsernameLayout"
            app:layout_constraintBottom_toTopOf="@+id/textPasswordInput"
            ...>

        <com.google.android.material.textfield.TextInputEditText
                .../>

    </com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
            android:id="@+id/textPasswordInput"
            android:id="@+id/textPasswordInput"
            app:layout_constraintBottom_toTopOf="@+id/loginButton"
            ...>

        <com.google.android.material.textfield.TextInputEditText
                .../>

    </com.google.android.material.textfield.TextInputLayout>

<com.google.android.material.button.MaterialButton
        android:id="@+id/loginButton"
        app:layout_constraintBottom_toBottomOf="parent"
        .../>

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

activity_login.xml

Here is a preview of the layout.



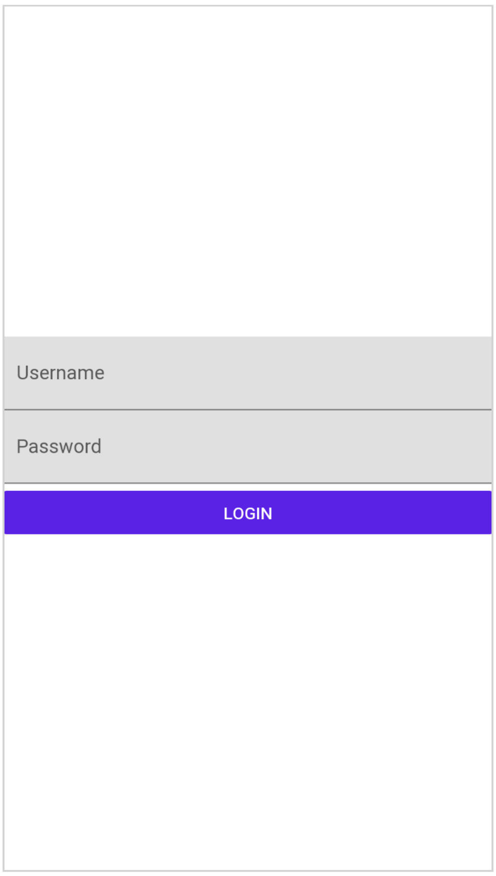
The final step is to apply a chain style to pack our views together:

- `layout_constraintVertical_chainStyle` attribute is used to apply a particular distribution style for the chain

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

    <com.google.android.material.textfield.TextInputLayout
            android:id="@+id/textUsernameLayout"
            app:layout_constraintBottom_toTopOf="@+id/textPasswordInput"
            app:layout_constraintVertical_chainStyle="packed"
            app:layout_constraintVertical_chainStyle="packed"
            ...>

        <com.google.android.material.textfield.TextInputEditText
                ...>

    </com.google.android.material.textfield.TextInputLayout>

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

activity_login.xml

Here is a preview of the layout.



Margins

To add a bit of space between *username layout*, *password layout* and *login button* the following attributes can be used:

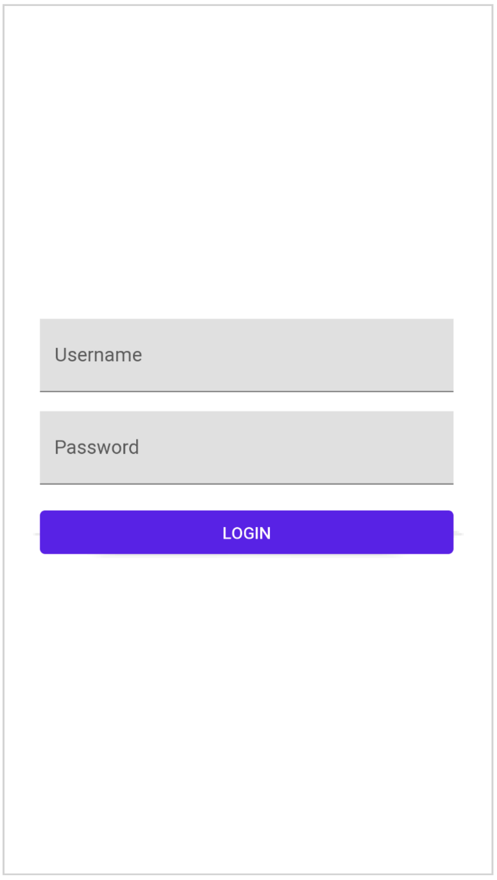
- `layout_marginStart`
- `layout_marginEnd`
- `layout_marginTop`
- `layout_marginBottom`

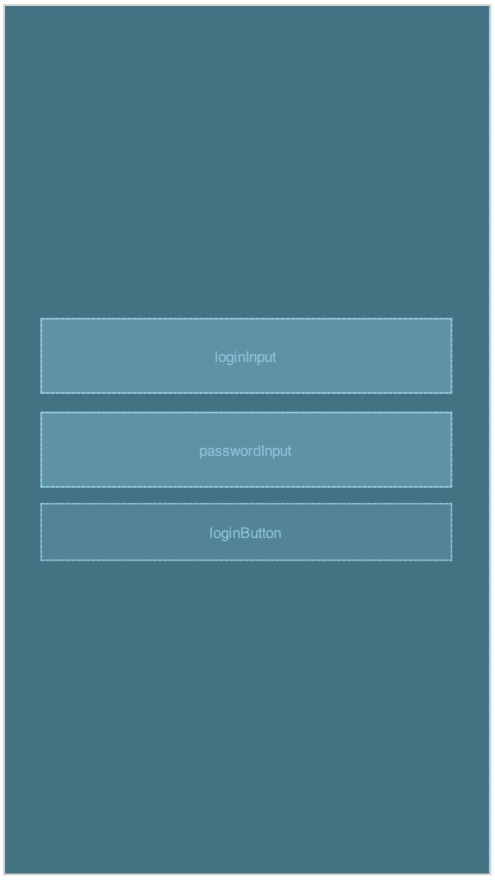
These attributes add a specified *dp* value of margin to the start, end, top or bottom of the component respectively.

```xml
<androidx.constraintlayout.widget.ConstraintLayout
        xmlns:android="http://schemas.android.com/apk/res/android"
        xmlns:app="http://schemas.android.com/apk/res-auto"
        android:layout_width="match_parent"
        android:layout_height="match_parent">

    <com.google.android.material.textfield.TextInputLayout
            android:id="@+id/textUsernameLayout"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginStart="32dp"
            android:layout_marginEnd="32dp"
            android:hint="Username"
            app:layout_constraintBottom_toTopOf="@+id/textPasswordInput"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_chainStyle="packed">

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

    </com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.textfield.TextInputLayout
            android:id="@+id/textPasswordInput"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginStart="32dp"
            android:layout_marginTop="16dp"
            android:layout_marginEnd="32dp"
            android:hint="Password"
            app:layout_constraintBottom_toTopOf="@+id/loginButton"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/textUsernameLayout">

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

    </com.google.android.material.textfield.TextInputLayout>

    <com.google.android.material.button.MaterialButton
            android:id="@+id/loginButton"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginStart="32dp"
            android:layout_marginTop="16dp"
            android:layout_marginEnd="32dp"
            android:text="Login"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/textPasswordInput"/>

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

activity_login.xml

Here is a preview of the layout.





If you want to learn more about the constraint layout, check out developer.android.com.

In the next lesson, we will cover how to declare activity and refine the user interface for better keyboard support.