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第 13 课：应用界面设计 🔖

了解界面最佳做法以及如何使您的应用遵循 Material Design 准则。

4 项活动 · 1 个测验

13

第 13 课：应用程序 UI 设计

Badge earned!
View profile

✅ **Material 组件基础知识**
📍 Codelab   ⌄

✅ **Material 结构和布局**
📍 Codelab   ⌄

✅ **通过颜色、高度和类型来设置 Material 主题**
📍 Codelab   ⌄

④ **Android 样式设置：常见主题属性**   ⌄

测验

Navigate Code Analyze Refactor Build Run Tools VCS Window Help   shrine - ShrineApplication.kt [shrine.app]

ain ⟩ java ⟩ com ⟩ google ⟩ codelabs ⟩ mdc ⟩ kotlin ⟩ shrine ⟩ application ⟩ 🅖 ShrineApplication   📱 app ▾   📱 Pixel 4 XL API 29 ▾

LoginFragment.kt × | ImageRequester.kt × | ShrineApplication.kt × | NavigationIconClickListener.kt × | ProductCardRecyclerViewAdapter.kt × | ProductC

```kotlin
package com.google.codelabs.mdc.kotlin.shrine.application

import ...

class ShrineApplication : Application() {
    companion object {
        lateinit var instance: ShrineApplication
            private set
    }

    override fun onCreate() {
        super.onCreate()
        instance = this

        AppCompatDelegate.setCompatVectorFromResourcesEnabled(true)
    }
}
```

Project tree (partial):
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Activity
gationHost
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uctCardViewHolder
uctGridFragment
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roduct_grid_fragment.xml
taggered_product_card_first.xml
taggered_product_card_second.xml
taggered_product_card_third.xml

```kotlin
package com.google.codelabs.mdc.kotlin.shrine.network

import ...

/**
 * A product entry in the list of products.
 */
class ProductEntry(
        val title: String, dynamicUrl: String, val url: String, val price: String, val description: String) {
    val dynamicUrl: Uri = Uri.parse(dynamicUrl)

    companion object {
        /**
         * Loads a raw JSON at R.raw.products and converts it into a list of ProductEntry objects
         */
        fun initProductEntryList(resources: Resources): List<ProductEntry> {
            val inputStream = resources.openRawResource(R.raw.products)
            val jsonProductsString = inputStream.bufferedReader().use(BufferedReader::readText)
            val gson = Gson()
            val productListType = object : TypeToken<ArrayList<ProductEntry>>() {}.type
            return gson.fromJson<List<ProductEntry>>(jsonProductsString, productListType)
        }
    }
}
```

Project tree (partial):
ogle.codelabs.mdc.kotlin.shrine
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igationHost
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uctCardViewHolder
uctGridFragment
uctGridItemDecoration
ogle.codelabs.mdc.kotlin.shrine (androidTes
ogle.codelabs.mdc.kotlin.shrine (test)
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or
le
backdrop.xml
login_fragment.xml
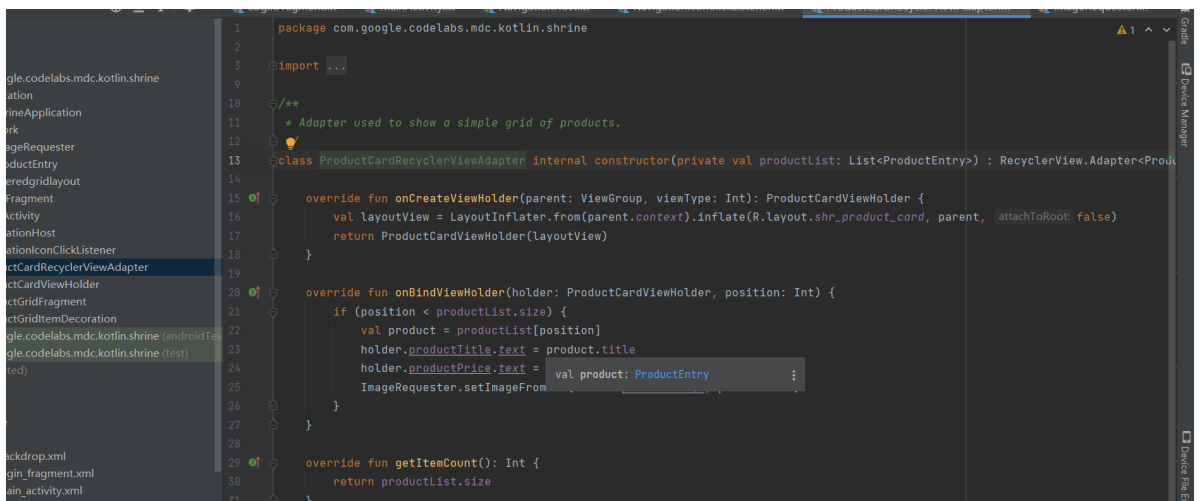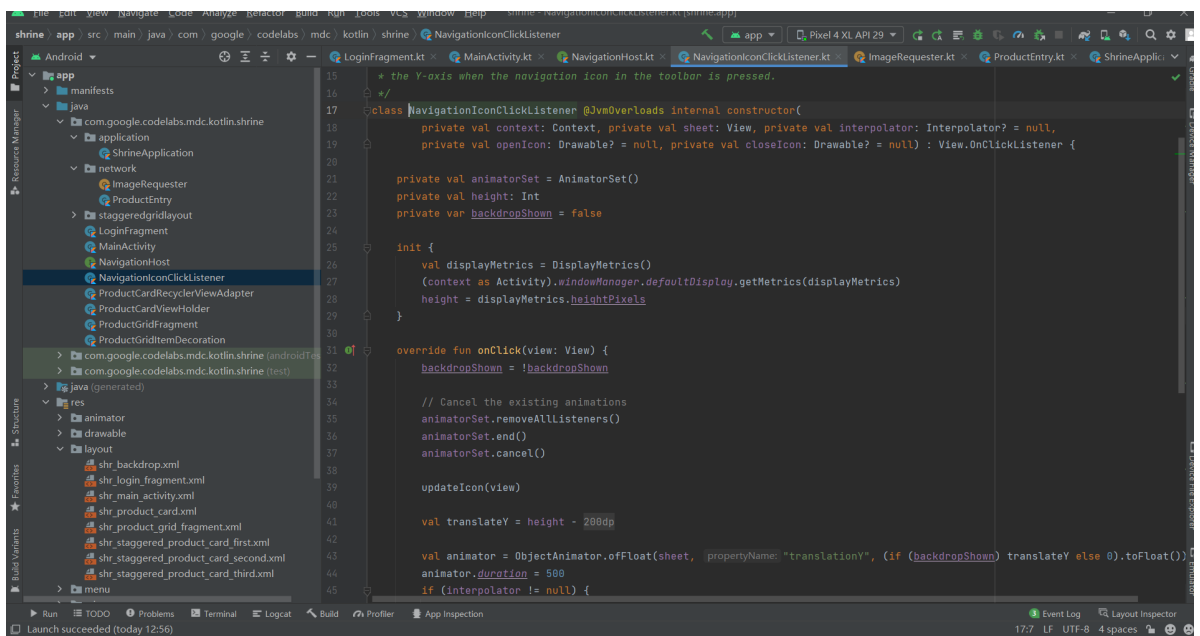main_activity.xml

```kotlin
13      * Fragment representing the login screen for Shrine.
14      */
15     class LoginFragment : Fragment() {
16
17         override fun onCreateView(
18             inflater: LayoutInflater, container: ViewGroup?, savedInstanceState: Bundle?): View? {
19             // Inflate the layout for this fragment
20             val view = inflater.inflate(R.layout.shr_login_fragment, container, attachToRoot: false)
21
22             // Set an error if the password is less than 8 characters.
23             view.next_button.setOnClickListener { it: View!
24                 if (!isPasswordValid(password_edit_text.text)) {
25                     password_text_input.error = "Password must contain at least 8 characters."
26                 } else {
27                     password_text_input.error = null // Clear the error
28                     (activity as NavigationHost).navigateTo(ProductGridFragment(), addToBackstack: false) // Navigate to the next Fragm
29                 }
30             }
31
32             // Clear the error once more than 8 characters are typed.
33             view.password_edit_text.setOnKeyListener { _, _, _ ->
34                 if (isPasswordValid(password_edit_text.text)) {
35                     password_text_input.error = null //Clear the error
36                 }
37                 false   ^setOnKeyListener
38             }
39             return view
40         }
```
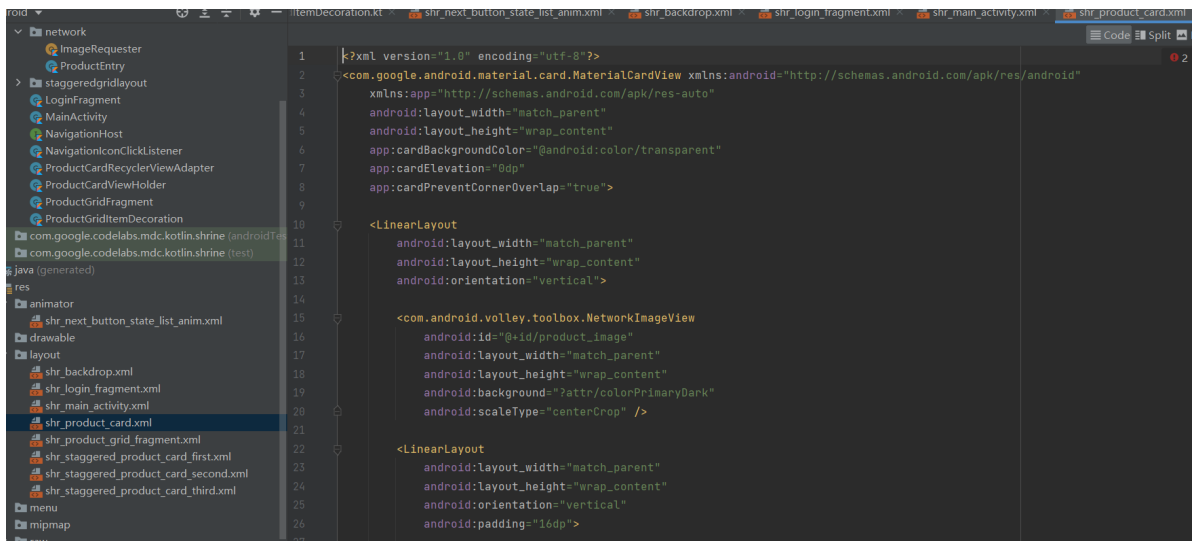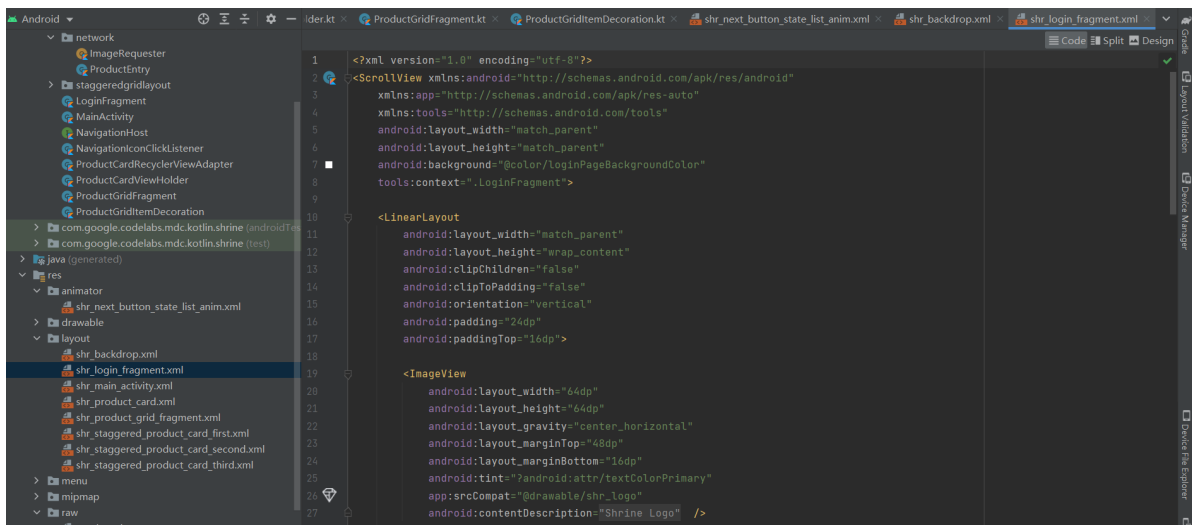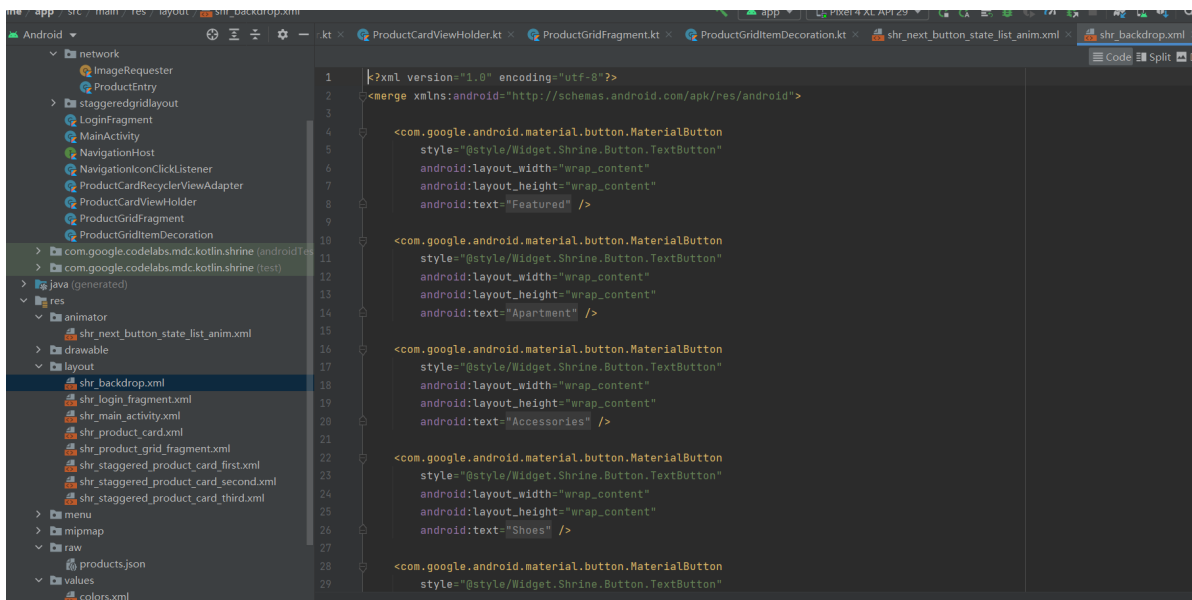


```kotlin
15      * the Y-axis when the navigation icon in the toolbar is pressed.
16      */
17     class NavigationIconClickListener @JvmOverloads internal constructor(
18             private val context: Context, private val sheet: View, private val interpolator: Interpolator? = null,
19             private val openIcon: Drawable? = null, private val closeIcon: Drawable? = null) : View.OnClickListener {
20
21         private val animatorSet = AnimatorSet()
22         private val height: Int
23         private var backdropShown = false
24
25         init {
26             val displayMetrics = DisplayMetrics()
27             (context as Activity).windowManager.defaultDisplay.getMetrics(displayMetrics)
28             height = displayMetrics.heightPixels
29         }
30
31         override fun onClick(view: View) {
32             backdropShown = !backdropShown
33
34             // Cancel the existing animations
35             animatorSet.removeAllListeners()
36             animatorSet.end()
37             animatorSet.cancel()
38
39             updateIcon(view)
40
41             val translateY = height - 200dp
42
43             val animator = ObjectAnimator.ofFloat(sheet, propertyName: "translationY", (if (backdropShown) translateY else 0).toFloat())
44             animator.duration = 500
45             if (interpolator != null) {
```

```kotlin
1      package com.google.codelabs.mdc.kotlin.shrine
2
3      import ...
9
10     /**
11      * Adapter used to show a simple grid of products.
12      */
13     class ProductCardRecyclerViewAdapter internal constructor(private val productList: List<ProductEntry>) : RecyclerView.Adapter<Prod
14
15         override fun onCreateViewHolder(parent: ViewGroup, viewType: Int): ProductCardViewHolder {
16             val layoutView = LayoutInflater.from(parent.context).inflate(R.layout.shr_product_card, parent, attachToRoot: false)
17             return ProductCardViewHolder(layoutView)
18         }
19
20         override fun onBindViewHolder(holder: ProductCardViewHolder, position: Int) {
21             if (position < productList.size) {
22                 val product = productList[position]
23                 holder.productTitle.text = product.title
24                 holder.productPrice.text =          val product: ProductEntry
25                 ImageRequester.setImageFrom
26             }
27         }
28
29         override fun getItemCount(): Int {
30             return productList.size
31         }
```

```kotlin
package com.google.codelabs.mdc.kotlin.shrine

import ...

class ProductCardViewHolder(itemView: View) : RecyclerView.ViewHolder(itemView) {

    var productImage: NetworkImageView = itemView.findViewById(R.id.product_image)
    var productTitle: TextView = itemView.findViewById(R.id.product_title)
    var productPrice: TextView = itemView.findViewById(R.id.product_price)
}
```

```kotlin
    }

    override fun onCreateView(
            inflater: LayoutInflater, container: ViewGroup?, savedInstanceState: Bundle?): View? {
        // Inflate the layout for this fragment with the ProductGrid theme
        val view = inflater.inflate(R.layout.shr_product_grid_fragment, container, attachToRoot: false)

        // Set up the tool bar
        (activity as AppCompatActivity).setSupportActionBar(view.app_bar)
        view.app_bar.setNavigationOnClickListener(NavigationIconClickListener(
                activity!!,
                view.product_grid,
                AccelerateDecelerateInterpolator(),
                ContextCompat.getDrawable(context!!, R.drawable.shr_branded_menu), // Menu open icon
                ContextCompat.getDrawable(context!!, R.drawable.shr_close_menu))) // Menu close icon

        // Set up the RecyclerView
        view.recycler_view.setHasFixedSize(true)
        val gridLayoutManager = GridLayoutManager(context, spanCount: 2, RecyclerView.HORIZONTAL, reverseLayout: false)
        gridLayoutManager.spanSizeLookup = object : GridLayoutManager.SpanSizeLookup() {
            override fun getSpanSize(position: Int): Int {
                return if (position % 3 == 2) 2 else 1
            }
        }
        view.recycler_view.layoutManager = gridLayoutManager
        val adapter = StaggeredProductCardRecyclerViewAdapter(
                ProductEntry.initProductEntryList(resources))
        view.recycler_view.adapter = adapter
        val largePadding = 30dp
```

```kotlin
package com.google.codelabs.mdc.kotlin.shrine

import ...

/**
 * Custom item decoration for a vertical [ProductGridFragment] [RecyclerView]. Adds a
 * small amount of padding to the left of grid items, and a large amount of padding to the right.
 */
class ProductGridItemDecoration(private val largePadding: Int, private val smallPadding: Int) : RecyclerView.ItemDecoration() {

    override fun getItemOffsets(outRect: Rect, view: View,
                               parent: RecyclerView, state: RecyclerView.State) {
        outRect.left = smallPadding
        outRect.right = largePadding
    }
}
```

```xml
<?xml version="1.0" encoding="utf-8"?>
<selector xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">

    <!-- Pressed state -->
    <item
        android:state_enabled="true"
        android:state_pressed="true">
        <set>
            <objectAnimator
                android:duration="100"
                android:propertyName="translationZ"
                android:valueTo="2dp"
                android:valueType="floatType" />
            <objectAnimator
                android:duration="0"
                android:propertyName="elevation"
                android:valueTo="6dp"
                android:valueType="floatType" />
        </set>
    </item>

    <!-- Hover state. This is triggered via mouse. -->
    <item
        android:state_enabled="true"
        android:state_hovered="true">
        <set>
            <objectAnimator
                android:duration="100"
                android:propertyName="translationZ"
```

```xml
<?xml version="1.0" encoding="utf-8"?>
<merge xmlns:android="http://schemas.android.com/apk/res/android">

    <com.google.android.material.button.MaterialButton
        style="@style/Widget.Shrine.Button.TextButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Featured" />

    <com.google.android.material.button.MaterialButton
        style="@style/Widget.Shrine.Button.TextButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Apartment" />

    <com.google.android.material.button.MaterialButton
        style="@style/Widget.Shrine.Button.TextButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Accessories" />

    <com.google.android.material.button.MaterialButton
        style="@style/Widget.Shrine.Button.TextButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Shoes" />

    <com.google.android.material.button.MaterialButton
        style="@style/Widget.Shrine.Button.TextButton"
```

Screenshot 2 — shr_login_fragment.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<ScrollView 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"
    android:background="@color/loginPageBackgroundColor"
    tools:context=".LoginFragment">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:clipChildren="false"
        android:clipToPadding="false"
        android:orientation="vertical"
        android:padding="24dp"
        android:paddingTop="16dp">

        <ImageView
            android:layout_width="64dp"
            android:layout_height="64dp"
            android:layout_gravity="center_horizontal"
            android:layout_marginTop="48dp"
            android:layout_marginBottom="16dp"
            android:tint="?android:attr/textColorPrimary"
            app:srcCompat="@drawable/shr_logo"
            android:contentDescription="Shrine Logo" />
```

Screenshot 3 — shr_product_card.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<com.google.android.material.card.MaterialCardView 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="wrap_content"
    app:cardBackgroundColor="@android:color/transparent"
    app:cardElevation="0dp"
    app:cardPreventCornerOverlap="true">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical">

        <com.android.volley.toolbox.NetworkImageView
            android:id="@+id/product_image"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:background="?attr/colorPrimaryDark"
            android:scaleType="centerCrop" />

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical"
            android:padding="16dp">
```

Screenshot 1 — shr_product_grid_fragment.xml

shrine › app › src › main › res › layout › shr_product_grid_fragment.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<FrameLayout 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"
    android:clipChildren="false"
    android:clipToPadding="false"
    tools:context=".ProductGridFragment">

    <LinearLayout
        style="@style/Widget.Shrine.Backdrop"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center_horizontal"
        android:orientation="vertical"
        android:paddingTop="88dp">

        <include layout="@layout/shr_backdrop" />
    </LinearLayout>

    <com.google.android.material.appbar.AppBarLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:elevation="0dp">

        <androidx.appcompat.widget.Toolbar
            android:id="@+id/app_bar"
```

Screenshot 2 — shr_staggered_product_card_first.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<com.google.android.material.card.MaterialCardView xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="wrap_content"
    android:layout_height="match_parent"
    app:cardBackgroundColor="@android:color/transparent"
    app:cardElevation="0dp"
    app:cardPreventCornerOverlap="true"
    app:contentPaddingTop="72dp">

    <!-- Product card layout used in MDC-103 and onward -->
    <LinearLayout
        android:layout_width="188dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="26dp"
        android:layout_marginLeft="26dp"
        android:orientation="vertical">

        <com.android.volley.toolbox.NetworkImageView
            android:id="@+id/product_image"
            android:layout_width="match_parent"
            android:layout_height="140dp"
            android:background="?attr/colorPrimaryDark"
            android:scaleType="centerCrop" />

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical"
```

Screenshot 3 — shr_staggered_product_card_second.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<com.google.android.material.card.MaterialCardView xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="wrap_content"
    android:layout_height="match_parent"
    app:cardBackgroundColor="@android:color/transparent"
    app:cardElevation="0dp"
    app:cardPreventCornerOverlap="true"
    app:contentPaddingTop="56dp">

    <!-- Product card layout used in MDC-103 and onward -->
    <LinearLayout
        android:layout_width="188dp"
        android:layout_height="wrap_content"
        android:layout_marginEnd="26dp"
        android:layout_marginRight="26dp"
        android:orientation="vertical">

        <com.android.volley.toolbox.NetworkImageView
            android:id="@+id/product_image"
            android:layout_width="match_parent"
            android:layout_height="140dp"
            android:background="?attr/colorPrimaryDark"
            android:scaleType="centerCrop" />

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical"
```

Editor 1 — shr_staggered_product_card_third.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<com.google.android.material.card.MaterialCardView xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="165dp"
    android:layout_height="match_parent"
    app:cardBackgroundColor="@android:color/transparent"
    app:cardElevation="0dp"
    app:cardPreventCornerOverlap="true"
    app:contentPaddingTop="152dp">

    <!-- Product card layout used in MDC-103 and onward -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical">

        <com.android.volley.toolbox.NetworkImageView
            android:id="@+id/product_image"
            android:layout_width="match_parent"
            android:layout_height="247dp"
            android:background="?attr/colorPrimaryDark"
            android:scaleType="centerCrop" />

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical"
            android:padding="16dp">
```

Editor 2 — colors.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <color name="colorPrimary">#E0E0E0</color>
    <color name="colorPrimaryDark">#FBB8AC</color>
    <color name="colorAccent">#FEDBD0</color>
    <color name="textColorPrimary">#442C2E</color>
    <color name="toolbarIconColor">@color/textColorPrimary</color>
    <color name="loginPageBackgroundColor">#FFFFFF</color>
    <color name="productGridBackgroundColor">#FFFBFA</color>
    <color name="textInputOutlineColor">#FBB8AC</color>
</resources>
```

Editor 3 — dimens.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <dimen name="shr_product_grid_spacing">16dp</dimen>
    <dimen name="shr_product_grid_spacing_small">4dp</dimen>
    <dimen name="shr_product_card_image_height">108dp</dimen>

    <dimen name="shr_product_grid_reveal_height">200dp</dimen>

    <!-- Dimens for staggered asymmetric grid layout cards-->
    <dimen name="shr_staggered_product_grid_spacing_large">30dp</dimen>
    <dimen name="shr_staggered_product_grid_spacing_small">26dp</dimen>
    <dimen name="shr_staggered_product_grid_margin_top_first">72dp</dimen>
    <dimen name="shr_staggered_product_grid_margin_top_second">56dp</dimen>
    <dimen name="shr_staggered_product_grid_margin_top_third">152dp</dimen>
    <dimen name="shr_staggered_product_grid_card_width_portrait">165dp</dimen>
    <dimen name="shr_staggered_product_grid_card_height_portrait">247dp</dimen>
    <dimen name="shr_staggered_product_grid_card_width_landscape">188dp</dimen>
    <dimen name="shr_staggered_product_grid_card_height_landscape">140dp</dimen>
</resources>
```

```
2
3      <!-- Base application theme. -->
4      <style name="Theme.Shrine" parent="Theme.MaterialComponents.Light.NoActionBar">
5          <!-- Customize your theme here. -->
6          <item name="colorPrimary">@color/colorPrimary</item>
7          <item name="colorPrimaryDark">@color/colorPrimaryDark</item>
8          <item name="colorAccent">@color/colorAccent</item>
9          <item name="android:windowLightStatusBar" tools:targetApi="m">true</item>
10         <item name="android:textColorPrimary">@color/textColorPrimary</item>
11     </style>
12
13     <style name="Widget.Shrine.TextInputLayout" parent="Widget.MaterialComponents.TextInputLayout.OutlinedBox">
14         <item name="hintTextAppearance">@style/TextAppearance.Shrine.TextInputLayout.HintText</item>
15         <item name="hintTextColor">@color/textColorPrimary</item>
16         <item name="android:paddingBottom">8dp</item>
17         <item name="boxStrokeColor">@color/textInputOutlineColor</item>
18     </style>
19
20     <style name="TextAppearance.Shrine.TextInputLayout.HintText" parent="TextAppearance.MaterialComponents.Subtitle2">
21         <item name="android:textColor">?android:attr/textColorPrimary</item>
22     </style>
23
24     <style name="Widget.Shrine.Button" parent="Widget.MaterialComponents.Button">
25         <item name="android:textColor">?android:attr/textColorPrimary</item>
26         <item name="backgroundTint">?attr/colorPrimaryDark</item>
27         <item name="android:stateListAnimator" tools:ignore="NewApi">
28             @animator/shr_next_button_state_list_anim</item>
29         </item>
30     </style>
```

Project tree (left panel):

- NavigationHost
- NavigationIconClickListener
- ProductCardRecyclerViewAdapter
- ProductCardViewHolder
- ProductGridFragment
- ProductGridItemDecoration
- com.google.codelabs.mdc.kotlin.shrine (androidTes
- com.google.codelabs.mdc.kotlin.shrine (test)
- java (generated)
- res
  - animator
    - shr_next_button_state_list_anim.xml
  - drawable
  - layout
    - shr_backdrop.xml
    - shr_login_fragment.xml
    - shr_main_activity.xml
    - shr_product_card.xml
    - shr_product_grid_fragment.xml
    - shr_staggered_product_card_first.xml
    - shr_staggered_product_card_second.xml
    - shr_staggered_product_card_third.xml
  - menu
  - mipmap
  - raw
    - products.json
  - values
    - colors.xml
    - dimens.xml
    - strings.xml
    - styles.xml
  - res (generated)
- Gradle Scripts