



**//ENGINEERING SMART  
//BUILDING DUMB**

**SERVER-DRIVEN APP DEVELOPMENT**

# allo!

I'm **Brandon John-Freso**

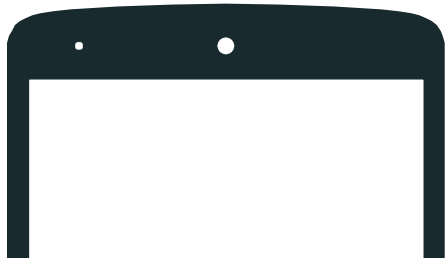
Senior Android Engineer @ WeWork

Formerly @ OkCupid



1

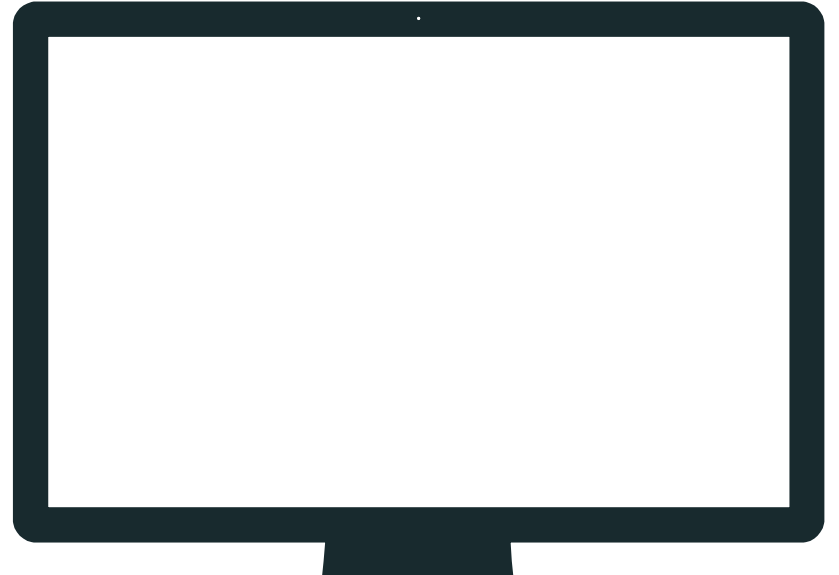
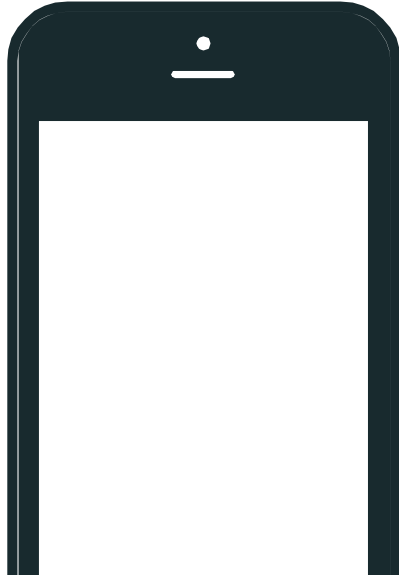
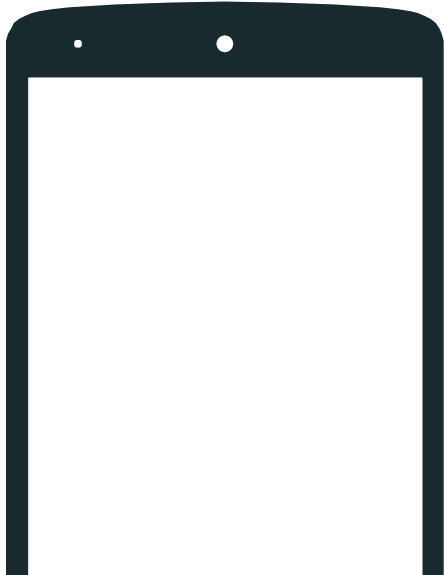
Your app is too  
damn **smart.**



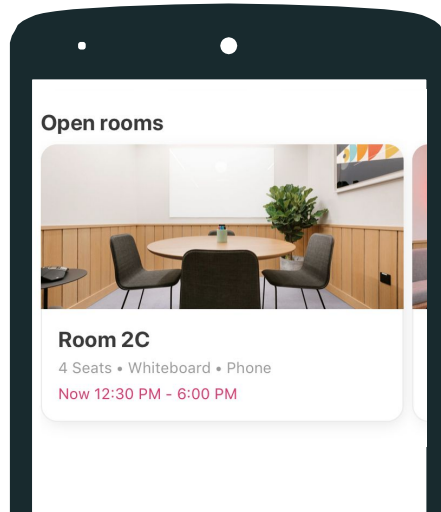


**Give** a person a fish and you feed them for a day. **Teach** a person to fish and they're gonna screw the pooch.

# How did we get here?



**1 color change**  
**= 40,320 minutes**



*(...4 weeks)*

2

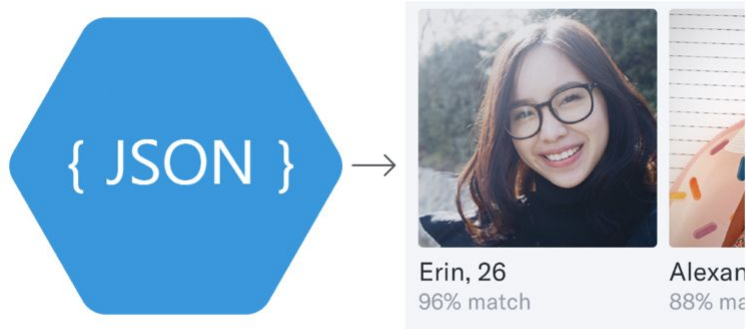
**Server-Side**

**Rendering**

**Thin Clients**

# 1

## DISPLAY DATA



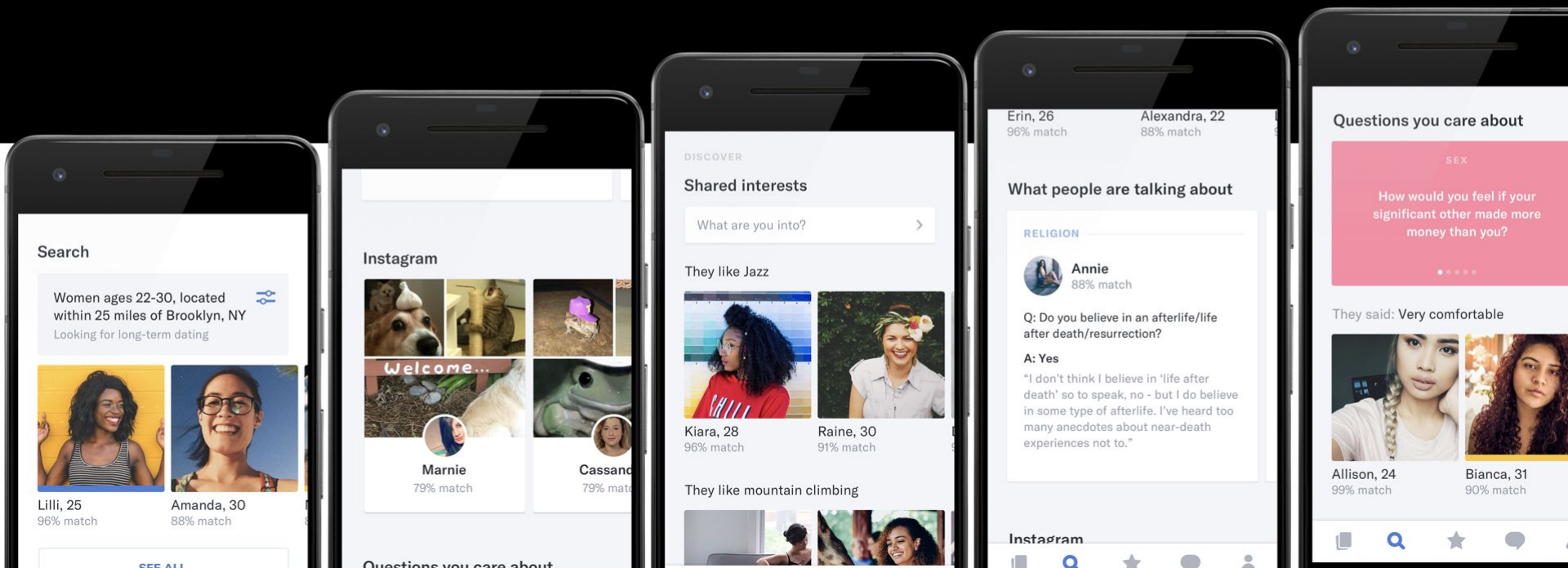
# 2

## HANDLE INPUT

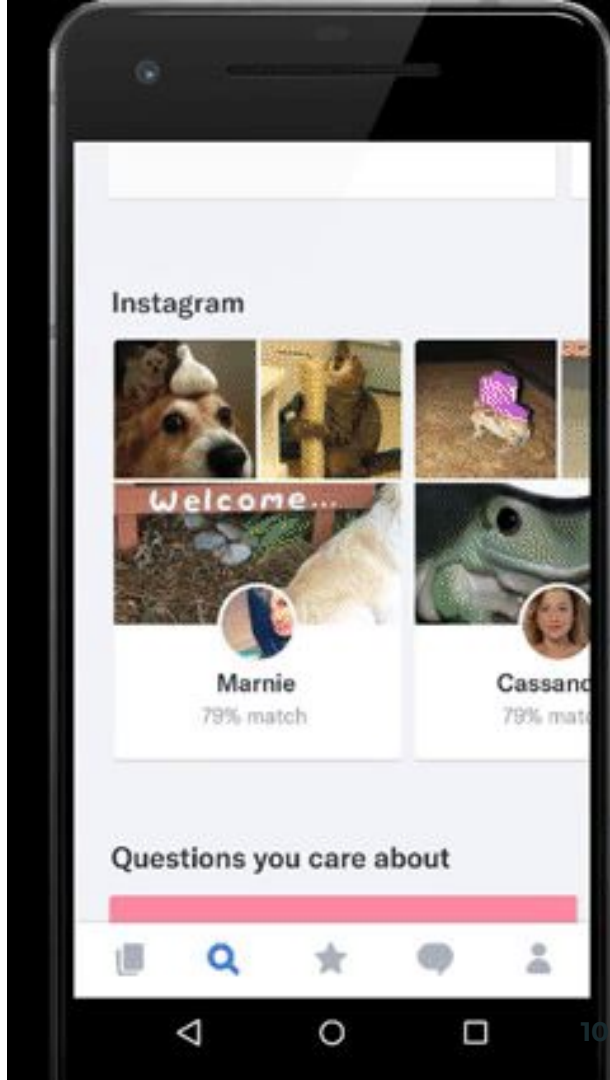




# CASE STUDY: DISCOVERY



**Remotely  
configurable  
dynamic  
layouts +  
behavior**

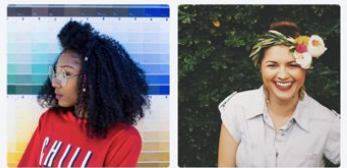


- [underwater](#)
- [Underwater Basket Weaving](#)
- [Breathing Underwater](#)
- [Underwater Photography](#)

### Shared interests

What are you into?

### They like Jazz



Kiara, 28  
96% match

Raine, 30  
91% match

### Questions you care about

SEX

How would you feel if your significant other made more money than you?

•••••

They said: Very comfortable



#### RELIGION

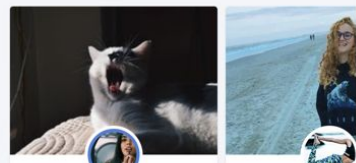
**Annie**  
88% match

Q: Do you believe in an afterlife/life after death/resurrection?

A: Yes

"I don't think I believe in 'life after death' so to speak, no - but I do believe in some type of afterlife. I've heard too many anecdotes about near-death experiences not to."

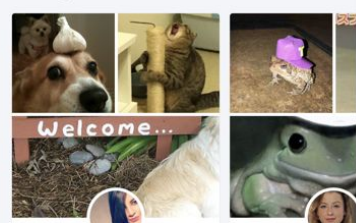
### Snapshots



**Lydia**  
"A large and tired boy taking a nap in the sun. Exquisite."

**Sarah**  
"A large and tired taking a nap in Exquisite."

### Instagram



**Marnie**

**Cassand**

### Search

Women ages 22-30, located within 25 miles of Brooklyn, NY  
Looking for long-term dating

**Lilli, 25**  
96% match

**Amanda, 30**  
88% match

[SEE ALL](#)

### Highest matches



**Erin, 26**  
96% match

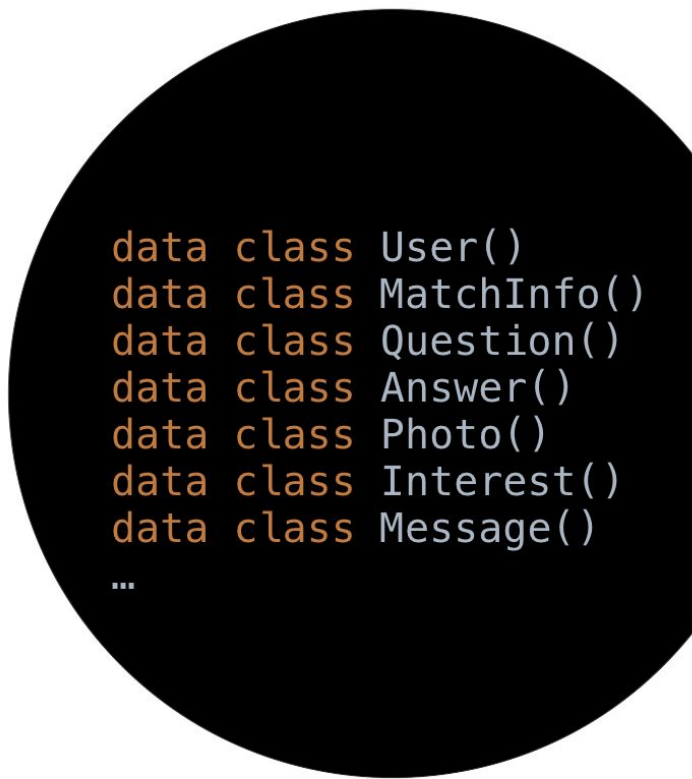
**Alexandra, 22**  
88% match

**Chantal, 26**  
95% match

**Tamar, 27**  
89% match

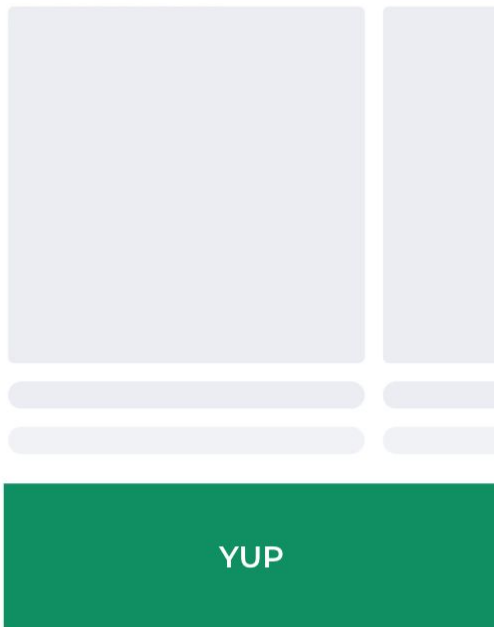
**Chelsea, 28**  
94% match

[KEEP BROWSING MATCHES](#)

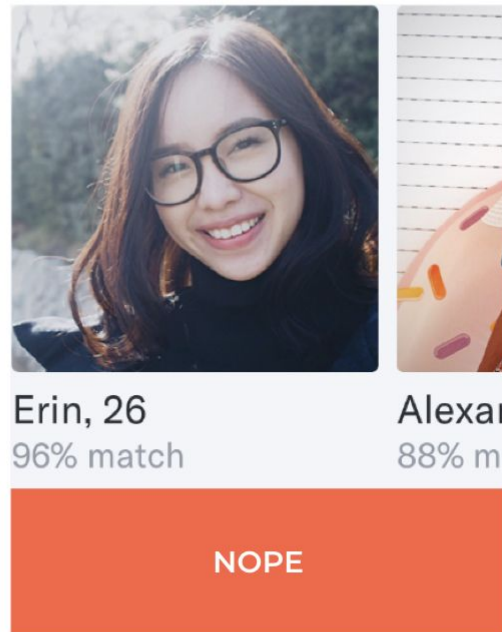


UI is  
inherently  
entity  
agnostic.

Think **layouts**



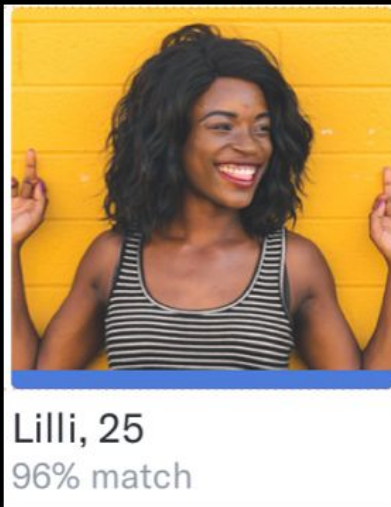
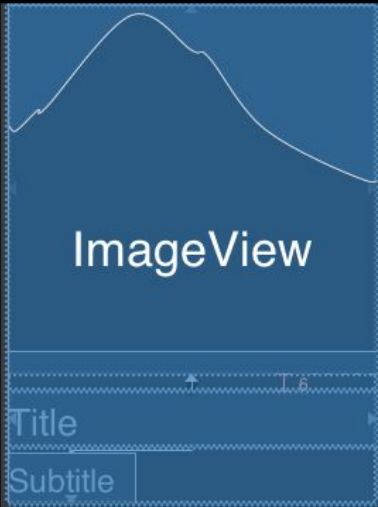
Not **users**



```

class PictureTitleSubtitleViewModel(
    val model: PictureTitleSubtitle
) : BaseDiscoveryViewModel() {
    val picture: String? = model.pictureUrl
    val cornerRadius: Int = 3dp
    val titleTextColor: Int? = model.title?.parseColor()
    val subtitleTextColor: Int? = model.subtitle?.parseColor()
    val bottomBorderColor: Int? = model.pictureBottomBorderColor?.parseColor()
    val title: OkText? = model.title
    val subtitle: OkText? = model.subtitle
    var action: OkAction? = model.action
    fun emitModelAction() {
        viewModelActionSubject.onNext(model.action)
    }
}

```



```

<layout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:bind="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools">

    <data>
        <variable
            name="viewModel"
            type="com.okcupid.okcupid.native_packages.discovery.viewModels.PictureTitleSubtitleViewModel"/>
    </data>

    <android.support.constraint.ConstraintLayout
        android:layout_width="130dp"
        android:layout_height="wrap_content"
        android:focusable="true"
        android:onClick="@{() -> viewModel.emitModelAction()}">

        <android.support.v7.widget.CardView...>

        <View
            android:id="@+id/v_bottom_border"
            android:background="@{viewModel.bottomBorderColor}"
            android:layout_width="match_parent"
            android:layout_height="8dp"
            android:layout_gravity="bottom" />

        <TextView
            android:id="@+id/tv_title"
            app:okText="@{viewModel.title}"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_marginTop="6dp"
            android:ellipsize="end"
            android:fontFamily="sans-serif-medium"
            android:lines="1"
            android:maxLines="1"
            android:textSize="15sp"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/image_view_picture"
            tools:text="Title" />

        <TextView...>

    </android.support.constraint.ConstraintLayout>
</layout>

```

# Create layout- based models

```
open class LayoutData(
    SerializedName("action") val action: OkAction?
    SerializedName("id") val id: String?
)

data class PictureTitleSubtitle(
    SerializedName("picture_url") val pictureUrl: String?
    SerializedName("picture_bottom_border_color") val pictureBottomBo
    SerializedName("title") val title: OkText?
    SerializedName("subtitle") val subtitle: OkText?
) : LayoutData()

data class TileAvatarText(
    SerializedName("avatar_url") val avatarUrl: String?
    SerializedName("top_text") val topText: OkText?
    SerializedName("bottom_text") val bottomText: OkText?
    SerializedName("background_color") val backgroundColor: OkRGBA?
    SerializedName("top_tile_url") val topTileUrl: String?
) : LayoutData()

data class AvatarThreeText(
    SerializedName("title") val title: OkText?
    SerializedName("top_text") val topText: OkText?
    SerializedName("middle_text") val middleText: OkText?
    SerializedName("bottom_text") val bottomText: OkText?
    SerializedName("accent_color") val accentColor: OkRGBA?
) : LayoutData()

data class ThreeTileAvatarText(
    SerializedName("top_right_tile_url") val topRightTileUrl: String?
    SerializedName("avatar_url") val avatarUrl: String?,
    SerializedName("bottom_text") val bottomText: OkText?,

//More layout params...
```

**But serious,  
what is state?**

```
data class DiscoveryState(val isLoading: Boolean = false,  
                          val currentPageIndex: Int = 0,  
                          val isLoggedIn: Boolean = true,  
                          val layouts: List<LayoutData>? = null)
```

# The Action in Interaction.

```
{  
  type: 'ADD_TODO',  
  payload: {  
    text: 'Do something.'  
  }  
}
```

```
sealed class Action  
data class NavigateTo(val path: String)  
data class LikeUser(val id:String )  
data class BlockUser(val id:String)  
data class ReportUser(val id:String)
```



# How do we modify state?

A reducer.

```
Class DiscoveryReducer : Reducer<DiscoveryState> {
    fun reduce(state: DiscoveryState, action: Action): DiscoveryState {
        return when (action) {
            is INITIALIZE_DISCOVERY_STATE -> {
                DiscoveryState()
            }
            is UPDATE_STATUS -> {
                state.copy(status = action.status)
            }
            is GET_LAYOUT_SUCCESS -> {
                state.copy(layoutData = state.layoutData?.map {
                    if (it.sectionId == action.payload.section.sectionId) action.payload.section
                    else it
                })
            }
        }
    }
}
```

# Use polymorphic deserialization

```
RuntimeAdapterFactory
.of(LayoutData::class.java, "layout")
.registerSubtype(PictureTitleSubtitle::class.java)
.registerSubtype(OneTileAvatarText::class.java)
.registerSubtype(AvatarThreeText::class.java)
.registerSubtype(ThreeTileAvatarText::class.java)
.registerSubtype(EmptyState::class.java)
```

```
interface DiscoveryAPI {
    @POST("/1/discovery")
    fun getLayoutData(
        @Body supportedLayouts: SupportedLayouts
    ): Single<List<LayoutData>>
```

# Parse actions into subtypes.

```
RuntimeAdapterFactory  
  .of(OkAction::class.java, "type")  
  .registerSubtype(NAVIGATE_TO::class.java)  
  .registerSubtype(GET_SECTION::class.java)  
  .registerSubtype(GET_SECTION_ROW::class.java)  
  .registerSubtype(NAVIGATE_TO_INTEREST::class.java)  
  .registerSubtype(NAVIGATE_TO_MATCH_FILTERS::class.java)
```

# Bind the action to your view and ...

```
<variable  
    type="viewModels.PictureTitleSubtitleViewModel"/>  
  
<android.support.constraint.ConstraintLayout  
    android:onClick="@{() -> viewModel.emitModelAction()}">  
  
    fun emitModelAction() {  
        viewModelActionSubject.onNext(model.action)  
    }
```

```
▼ 1 {7}
  ▼ subtitle {2}
    text : 76% match
    ► text_color {4}

    picture_url : https://k1.okccdn.com/php/load\_okc\_image.php/images/225x225/225x225/223x0/1125x902/2/8329705882572159189.webp?v=2

    layout : PictureTitleSubtitle
    id    : 14116586731704798092

  ▼ picture_bottom_border_color {4}
    blue : 255
    green : 100
    red   : 0
    alpha : 1

  ► title {2}
  ► action {2}
```

3

# Common Mistakes

3

Q&A