13

Dependency Injection with Dagger, Hilt, and Koin

Activity 13.01 – Injected repositories

Solution

Perform the following steps to complete the activity:

1. Create a new Android Studio project with an **Empty** activity.
2. Let's start by adding the versions of the libraries that we will need to `gradle/libs.versions.toml`:

   ```
   [versions]
   …
   ksp = "2.0.21-1.0.25"
   hilt = "2.56.2"
   viewModelCompose = "2.8.7"
   retrofit="2.9.0"
   retrofitGson="2.6.2"
   gson="2.10.1"
   ```

3. Now, let's add the right plugins and libraries in the same file:

   ```
   [libraries]
   …
   androidx-viewmodel-compose = { group = "androidx.lifecycle",
   ```

```
    name = "lifecycle-viewmodel-compose",
        version.ref = "viewModelCompose" }
hilt-android = { group = "com.google.dagger",
    name = "hilt-android", version.ref = "hilt" }
hilt-android-compiler = { group = "com.google.dagger",
    name = "hilt-android-compiler", version.ref = "hilt" }
hilt-android-testing = { group = "com.google.dagger",
    name = "hilt-android-testing", version.ref = "hilt" }
squareup-retrofit = { group = "com.squareup.retrofit2",
    name = "retrofit", version.ref = "retrofit" }
squareup-retrofit-gson = { group = "com.squareup.retrofit2",
    name = "converter-gson", version.ref = "retrofitGson" }
gson = { group = "com.google.code.gson", name = "gson",
    version.ref = "gson" }

[plugins]
…
ksp = { id = "com.google.devtools.ksp", version.ref = "ksp" }
hilt = { id = "com.google.dagger.hilt.android",
    version.ref = "hilt" }
```

4. Next, add the `ksp` and `hilt` plugins to the root `build.gradle.kts` file, but do not apply them:

```
plugins {
    …
    alias(libs.plugins.ksp) apply false
    alias(libs.plugins.hilt) apply false
}
```

5. Next, add the `ksp` and `hilt` plugins to `app/build.gradle.kts`:

```
plugins {
    …
    alias(libs.plugins.ksp)
    alias(libs.plugins.hilt)
}
```

6. In app/build.gradle.kts, configure the Compose version with the following code snippet:

```
android {
    composeOptions {
        kotlinCompilerExtensionVersion = "1.5.4"
    }
}
```

7. Now, let's add the dependencies to app/build.gradle.kts:

```
dependencies {
    …
    implementation(libs.androidx.viewmodel.compose)
    implementation(libs.hilt.android)
    ksp(libs.hilt.android.compiler)
    implementation(libs.squareup.retrofit)
    implementation(libs.squareup.retrofit.gson)
    implementation(libs.gson)
    …
    androidTestImplementation(
        libs.hilt.android.testing
    )
}
```

8. In the app module, create a package called api.
9. In the api package, create a class called Post that represents the Post JSON object received from the internet:

```
data class Post(
    @SerializedName("id") val id: Long,
    @SerializedName("userId") val userId: Long,
    @SerializedName("title") val title: String,
    @SerializedName("body") val body: String
)
```

10. In the api package, create an interface called PostService that will be used to fetch data from the internet:

```
interface PostService {

    @GET("posts")
    suspend fun getPosts(): List<Post>
}
```

11. Create a `repository` package:
12. In the `repository` package, create a `PostRepository` interface that will contain a method that fetches a list of `Post` objects:

```
interface PostRepository {

    suspend fun getPosts(): List<Post>
}
```

13. Create an implementation of `PostRepository` that will use `PostService` to fetch the list of `Post` objects:

```
class PostRepositoryImpl(
    private val postService: PostService
) : PostRepository {
    override suspend fun getPosts(): List<Post> {
        return postService.getPosts()
    }
}
```

14. Create a `PostViewModel` class and, inside this class, define a `PostUi` data class that will have a title and a body:

```
class PostViewModel : ViewModel() {
    …
    data class PostUi(
        val title: String = "",
        val body: String = ""
    )
}
```

15. Inside the `PostViewModel` class, create a `State` class that will hold the list of `PostUi` objects:

```
class PostViewModel : ViewModel() {
    …
    data class State(
        val posts: List<PostUi> = emptyList()
    )
    …
}
```

16. Modify `PostViewModel` by adding the `HiltViewModel` annotation and then define the `StateFlow` properties, which are meant to hold the list of posts. Then, add the `PostRepository` dependency and load the list of posts:

```
@HiltViewModel
class PostViewModel @Inject constructor(
    private val postRepository: PostRepository
) : ViewModel() {

    private val _state =
        MutableStateFlow<State>(State())
    val state: StateFlow<State> = _state

    init {
        viewModelScope.launch {
            _state.emit(
                State(
                    postRepository.getPosts().map {
                        PostUi(
                            title = it.title,
                            body = it.body
                        )
            }))
        }
    }
    …
}
```

17. In `MainActivity`, create the `PostScreen` function, which is meant to render the list of posts from the `State` object:

```
@Composable
fun PostScreen(
    state: PostViewModel.State,
    modifier: Modifier
) {
    LazyColumn(modifier = modifier.fillMaxSize()) {
        items(state.posts.size) {
            val index = it
            Column(modifier = Modifier.padding(4.dp))
            {
                Text(text = state.posts[index].title)
                Text(text = state.posts[index].body)
            }
        }

    }
}
```

18. In `MainActivity`, create the `Post` function, which will take the state from the `PostViewModel` object and use it for `PostScreen`:

```
@Composable
fun Post(
    postViewModel: PostViewModel,
    modifier: Modifier
) {
    PostScreen(
        state = postViewModel
            .state.collectAsState().value,
        modifier = modifier
    )
}
```

19. Modify `MainActivity` to add the `AndroidEntryPoint` annotation and the `setContent` function to call the `Post` function:

```
@AndroidEntryPoint
class MainActivity : ComponentActivity() {
    override fun onCreate(savedInstanceState: Bundle?)
    {
        super.onCreate(savedInstanceState)
        enableEdgeToEdge()
        setContent {
            Activity1301Theme {
                Scaffold(
                    modifier = Modifier.fillMaxSize()
                ) { innerPadding ->
                    Post(
                        postViewModel = viewModel(),
                        modifier = Modifier
                            .padding(innerPadding)
                   )
                }
            }
        }
    }
}
```

20. Create a class called `MainApplication`, which will extend `Application`, and annotate it with `HiltAndroidApp`:

```
@HiltAndroidApp
class MainApplication : Application()
```

21. Modify `AndroidManifest.xml` to add the `INTERNET` permission:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest … >
    …
    <uses-permission
        android:name="android.permission.INTERNET"/>
    …
</manifest>
```

22. In `AndroidManifest.xml`, modify the `application` tag to add the `MainApplication` class defined earlier:

```
    <application
        android:name=".MainApplication"
        …
        >
```

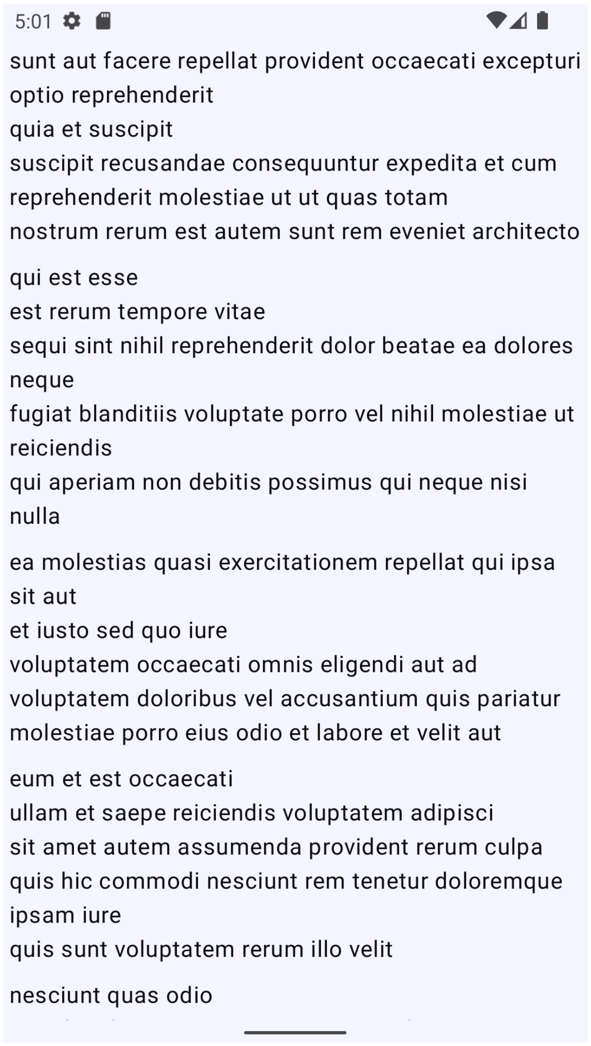
23. In the `api` package, create a class called `NetworkModule` that will hold the network-related dependencies:

```
@Module
@InstallIn(SingletonComponent::class)
class NetworkModule {

    @Singleton
    @Provides
    fun provideRetrofit(): Retrofit {
        return Retrofit.Builder()
            .baseUrl(
               "https://jsonplaceholder.typicode.com/"
            )
            .addConverterFactory(
                GsonConverterFactory.create()
            )
            .build()
    }

    @Singleton
    @Provides
    fun providePostService(retrofit: Retrofit):
        PostService
    {
        return retrofit.create<PostService>(
            PostService::class.java
        )
    }
}
```

24. In the `repository` package, create a class called `RepositoryModule` that will hold the `PostRepository` dependency:

```
@Module
@InstallIn(SingletonComponent::class)
class RepositoryModule {

    @Singleton
    @Provides
    fun providePostRepository(
        postService: PostService
    ): PostRepository {
        return PostRepositoryImpl(postService)
    }
}
```

If we run the app now, we should see the following screen:



5:01

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Figure 13.6 – Output of Activity 13.01

25. In the androidTest folder, create a DummyRepository class, which will hold fake data for each Post object:

```
class DummyRepository : PostRepository {

    override suspend fun getPosts(): List<Post> {
        return listOf(
            Post(1L, 1L, "Title 1", "Body 1"),
            Post(2L, 1L, "Title 2", "Body 2"),
            Post(3L, 1L, "Title 3", "Body 3")
        )
    }
}
```

26. In the androidTest folder, create a TestRepositoryModule class, which will replace the PostRepository instance from RepositoryModule with DummyRepository:

```
@Module
@TestInstallIn(
    components = [SingletonComponent::class],
    replaces = [RepositoryModule::class]
)
class TestRepositoryModule {

    @Singleton
    @Provides
    fun providePostRepository(): PostRepository {
        return DummyRepository()
    }
}
```

27. Create a class called MainActivityUiTest that will be annotated with HiltAndroidTest and use ComposeContentTestRule from createComposeRule and HiltAndroidRule:

```
@HiltAndroidTest
@RunWith(AndroidJUnit4::class)
class MainActivityUiTest {
    @get:Rule
    var hiltRule = HiltAndroidRule(this)

    @get:Rule
    val composeRule = createComposeRule()
}
```

28. In `MainActivityUiTest`, add a test method that will check that the content displayed on the screen is coming from `DummyRepository`:

```
@HiltAndroidTest
@RunWith(AndroidJUnit4::class)
class MainActivityUiTest {
    …
    @Test
    fun testDisplaysPosts() {
        val scenario =
            launch(MainActivity::class.java)
        scenario.moveToState(Lifecycle.State.RESUMED)
        composeRule
            .onNodeWithText("Title 1")
            .assertIsDisplayed()
        composeRule.onNodeWithText("Body 1")
            .assertIsDisplayed()
        composeRule
            .onNodeWithText("Title 2")
            .assertIsDisplayed()
        composeRule.onNodeWithText("Body 2")
            .assertIsDisplayed()
        composeRule
            .onNodeWithText("Title 3")
            .assertIsDisplayed()
        composeRule.onNodeWithText("Body 3")
            .assertIsDisplayed()
    }
}
```

29. Create a class called `HiltTestRunner` that will use `HiltTestApplication` as the application class to be initialized when the test is run:

```
class HiltTestRunner : AndroidJUnitRunner() {

    @Throws(Exception::class)
    override fun newApplication(
        cl: ClassLoader?,
        className: String?,
        context: Context?
    ): Application? {
        return super.newApplication(
            cl,
            HiltTestApplication::class.java.name,
            Context
        )
    }
}
```

30. Modify `app/build.gradle.kts` to point to the previously defined `HiltTestRunner` class:

```
android {
    …
    defaultConfig {
        …
        testInstrumentationRunner =
            "com.packt.android.HiltTestRunner"
    }
}
```

If we run `testDisplayPosts` from `MainActivityUiTest` at this point, our test should pass because we have successfully swapped `PostRepositoryImpl` with `DummyRepository`.