MOBILE PROGRAMMING

INTRODUCTION

ROBBY TAN

Prerequisites

- Basic Programming
- Object-Oriented Programming

Tools

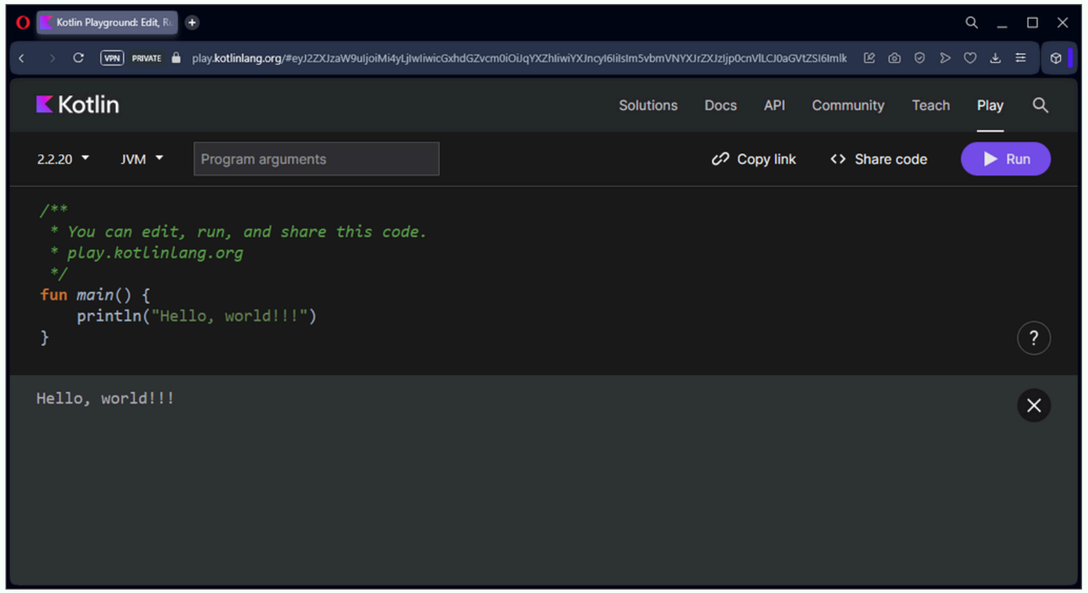
- Browser
- Internet connection
- Android Studio

Kotlin Programming

Play Kotlin

https://play.kotlinlang.org

- *Code convention* pada Kotlin sama dengan Java.
  - ***variable*** & ***method***: **camelCase**
    - showInfo()
    - birthDate
  - ***Class name***: ***First letter of each word >> uppercase***
    - Person
    - MainActivity
- Deklarasi *function/ method* menggunakan *keyword* **fun**.



Variable and Data Type

- Kotlin data type
  - Number: Byte, Short, Int, Long
  - Floating-point: Float, Double
  - Boolean
  - String
- Deklarasi variabel menggunakan *keyword* **var** dan **val**.

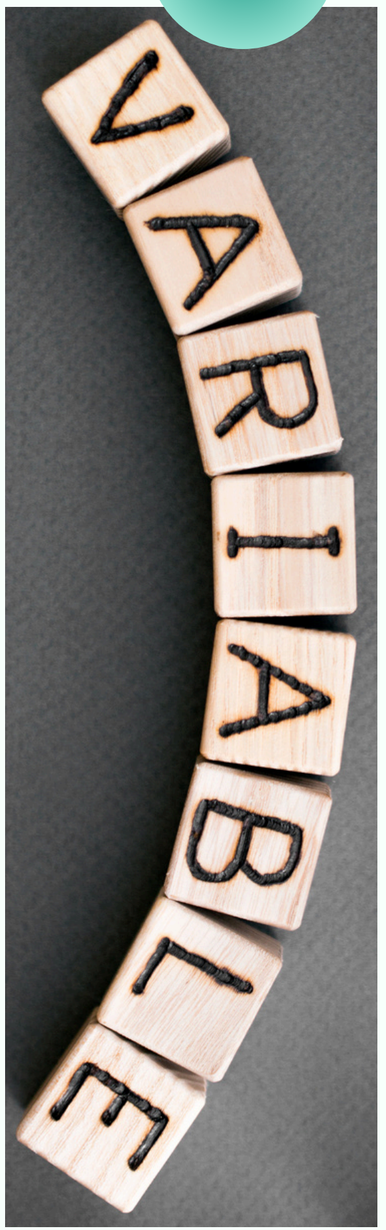
```
var myMoney: Double = 2_000_000_000
val firstName: String = “Robby”
```

```
1.  fun main() {
2.      val byteValue: Byte =  Byte.MAX_VALUE
3.      val shortValue: Short = Short.MAX_VALUE
4.      val intValue: Int = Int.MAX_VALUE
5.      val longValue: Long = Long.MAX_VALUE
6.      val floatValue: Float = 3.14f
7.      val doubleValue: Double = 2096.98198752
8.      val name: String = "Robby"
9.      println("Byte val: $byteValue, short val: $shortValue")
10.     println("Int val: $intValue, long val: $longValue")
11.     println(String.format("Float val: %f; Double val: %f", floatValue, doubleValue))
12.     println("My name is $name")
13. }
```

Kotlin Type Inference

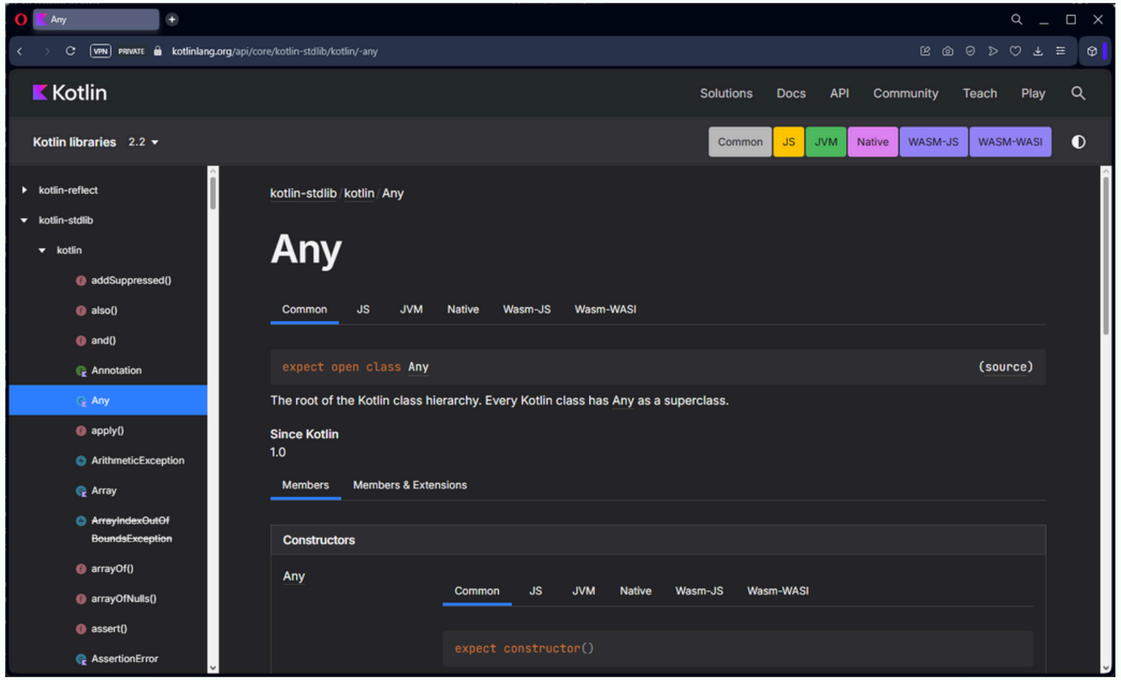
- *Compiler* pada Kotlin memiliki kemampuan untuk mendefinisikan tipe data meskipun tidak didefinisikan secara eksplisit.

```
1.  fun main() {
2.      val number = 250
3.      val firstName = "John"
4.      println(String.format("Type for variable number is %s, Value = %d", number::class.simpleName, number))
5.      println(String.format("Type for variable firstName is %s, Value = %s", firstName::class.simpleName, firstName))
6.  }
```



Kotlin Superclass: Any

- **Any** adalah induk dari seluruh *class* pada Kotlin.
- Padanan pada Java: **Object** *class*.



Kotlin Function

- Function pada Kotlin dideklarasikan dengan menggunakan *keyword* **fun**.
- Function pada Kotlin secara *default* me-*return* **Unit** meskipun tidak ditulis secara eksplisit (**void** pada Java).

```
1.  fun main() {
2.      println(hello("Robby Tan"))
3.      sum(25, 111)
4.  }
5.
6.  fun hello(name: String): String {
7.      return "Hello $name. Welcome to Kotlin Programming"
8.  }
9.
10. fun sum(a: Int, b: Int) {
11.     print("Sum of $a and $b is ${a + b}.")
12. }
```

Kotlin Named Arguments & Default Value

- Kita dapat mengubah urutan input *arguments* dengan menggunakan ***named arguments*** (baris ke-3).
- *Named arguments* disesuaikan dengan nama variabel yang dibuat pada fungsi.

```
1.  fun main() {
2.      introduce("Richard Smith", "Soccer")
3.      introduce(hobby = "Fishing", name = "John Doe")
4.      drive("Sport Center")
5.      drive()
6.  }
7.
8.  fun introduce(name: String, hobby: String): Unit {
9.      println("Hello. My name is $name. My hobby is $hobby")
10. }
11.
12. fun drive(destination: String = "Home") {
13.     println("Command accepted. We are going to $destination")
14. }
```

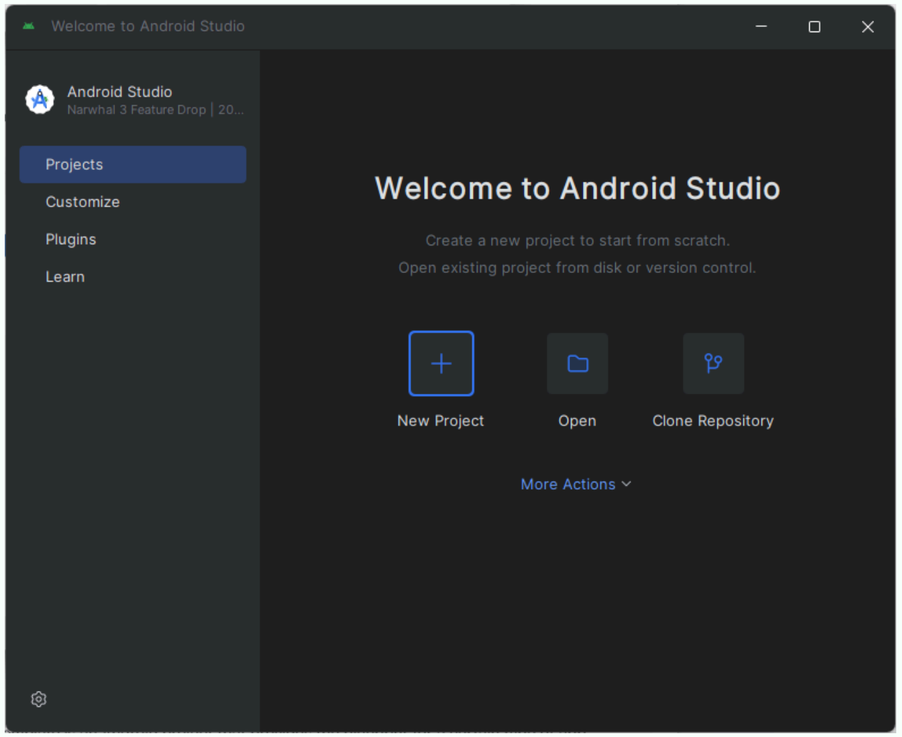
Android Studio

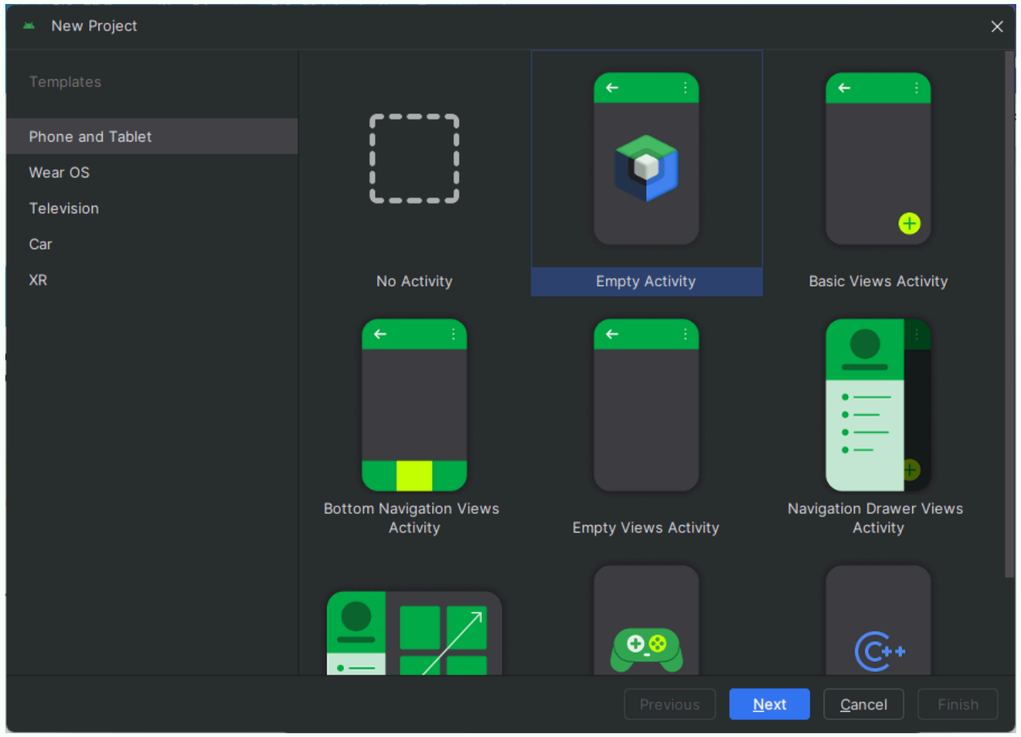
Android Studio System Requirements

- 64-bit Microsoft® Windows® 8/10/11
- x86_64 CPU architecture; 2nd generation Intel Core or newer, or AMD CPU with support for a Windows Hypervisor
- 8 GB RAM or more
- 8 GB of available disk space minimum (IDE + Android SDK + Android Emulator)
- Download link: https://developer.android.com/studio#get-android-studio

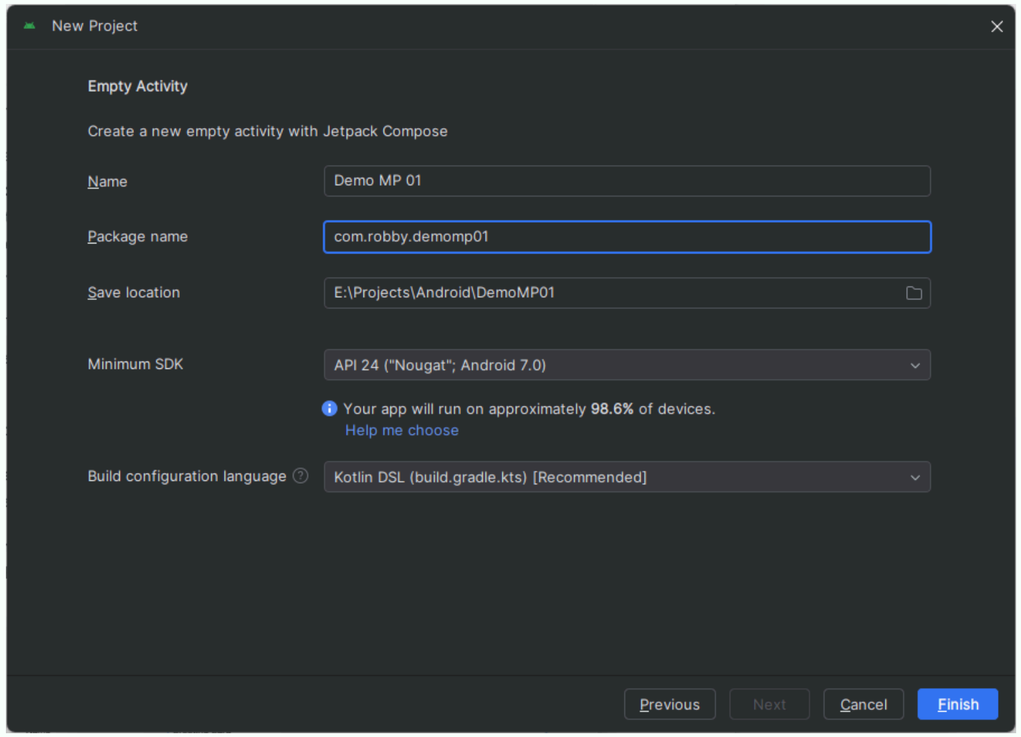
First Android App

Create Android Project



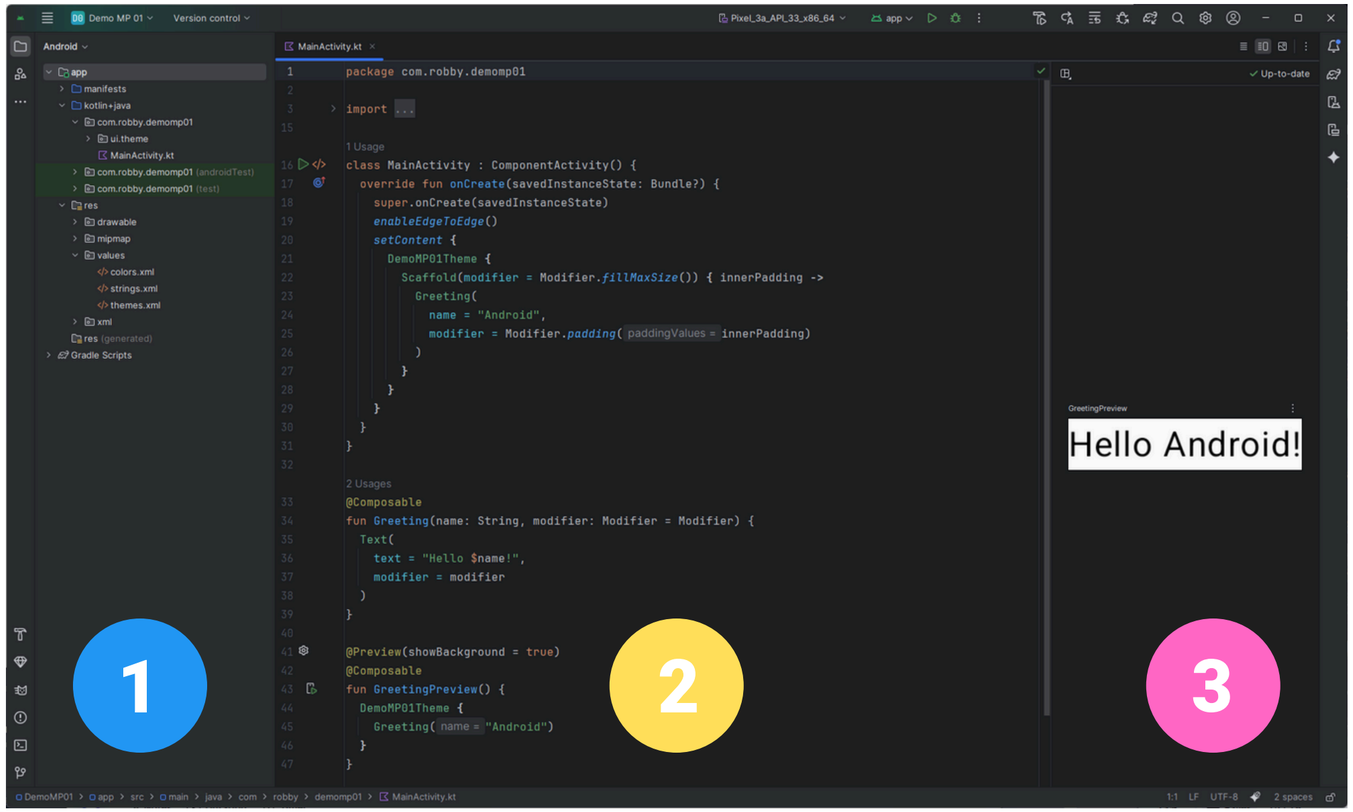


Android Project Name and Settings



- Penamaan *package name* >> ***reverse domain***.
- *Package name* bersifat **unik** untuk setiap aplikasi.
- SDK yang di-*install* sebaiknya adalah SDK yang paling umum digunakan oleh pengguna.
- Proses *build gradle* membutuhkan koneksi internet dan **relatif memakan waktu**.

Android Project Name and Settings



1. *Project view* >> berisi struktur *folder* dan *file* dari proyek Android
2. Android *source code*
3. Hasil *preview* berdasarkan *source code* (didapat setelah proses *build* & *refresh*)

Source Code Explanation (1/2)

```
1.  class MainActivity : ComponentActivity() {
2.    override fun onCreate(savedInstanceState: Bundle?) {
3.      super.onCreate(savedInstanceState)
4.      enableEdgeToEdge()
5.      setContent {
6.        DemoMP01Theme {
7.          Scaffold(modifier = Modifier.fillMaxSize()) { innerPadding ->
8.            Greeting(
9.              name = "Android",
10.             modifier = Modifier.padding(innerPadding)
11.           )
12.         }
13.       }
14.     }
15.   }
16. }
```

- **MainActivity**
  - *subclass* dari ComponentActivity (**Jetpack Compose**)
  - dahulu *subclass* dari AppCompatActivity (**Android Legacy**)
- **onCreate()**
  - *entry point* (***main***) aplikasi Android
  - enableEdgetoEdge()
    - pengaturan aplikasi sehingga menggunakan seluruh area dari layar
  - setContent()
    - Fungsi untuk mendefinisikan layout UI aplikasi
    - Fungsi yang dipanggil wajib memiliki anotasi @Composable

Source Code Explanation (2/2)

```
1.  class MainActivity : ComponentActivity() {
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14.     }
15.   }
16. }
```

```
1.  @Composable
2.  fun Greeting(name: String, modifier: Modifier = Modifier) {
3.    Text(
4.      text = "Hello. My name is $name!",
5.      modifier = modifier
6.    )
7.  }
```

- **onCreate()** cont.
  - DemoMP01Theme >> tema aplikasi (Theme.kt)
  - Scaffold
    - *composable* yang menyediakan struktur tata letak dasar untuk layar (e.g. top bar, bottom bar, FAB)
    - Modifier.fillMaxSize() >> pengisi ke seluruh layar
    - Greeting
      - Fungsi ***composable***
      - Mengisi parameter name dari fungsi Greeting

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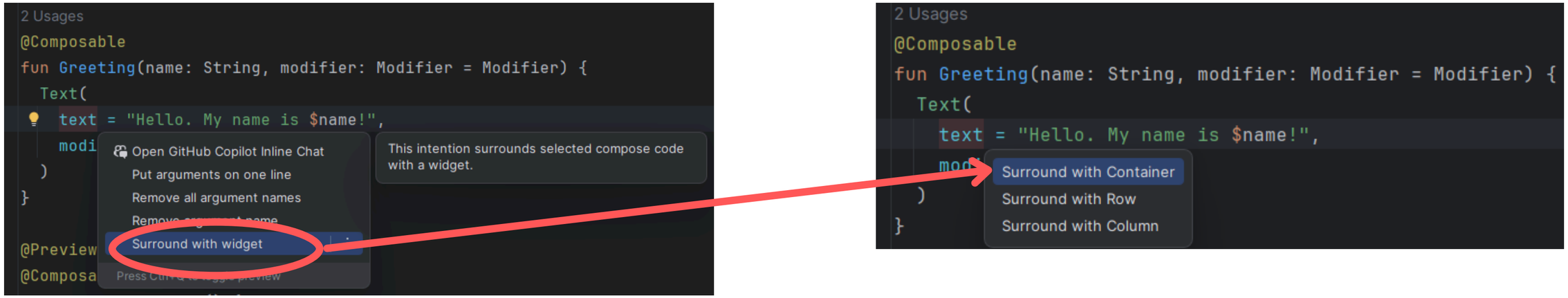
Change Background with Surface



- Penambahan container untuk composable/ component Text
  - Alt + Enter pada atribut text
  - Pilih Surround with widget >> Surround with Container
- Default Container yang diberikan adalah Box. Ubah menjadi Surface.

Change Background with Surface: Result

```
1.  @Composable
2.  fun Greeting(name: String, modifier: Modifier = Modifier) {
3.    Surface(color = Color.Yellow) {
4.      Text(
5.        text = "Hello. My name is $name!",
6.        modifier = modifier
7.      )
8.    }
9.  }
```

- Note:
  - *Class* **Color** untuk *property* color berada pada *package* **androidx.compose.ui.graphics.Color**

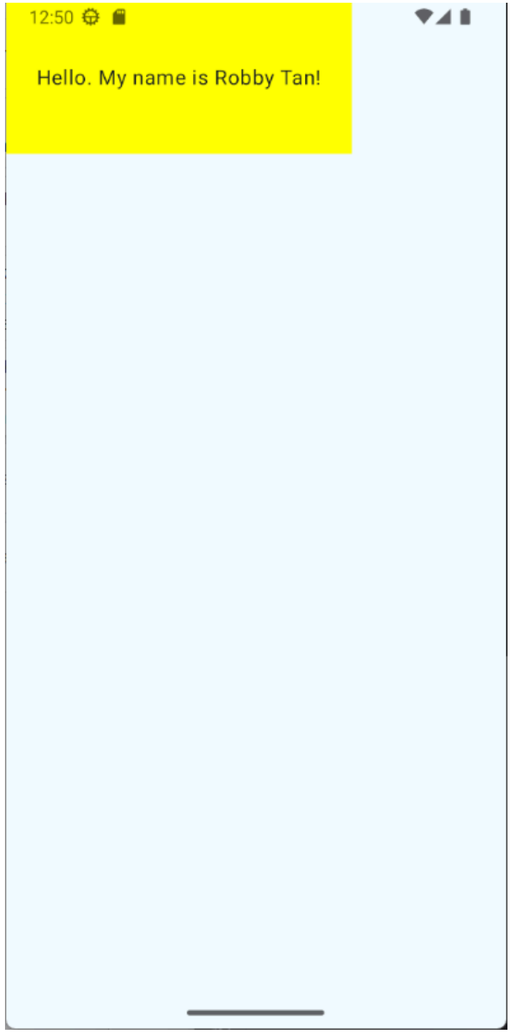
Add Padding

```
1.  @Composable
2.  fun Greeting(name: String, modifier: Modifier = Modifier) {
3.    Surface(color = Color.Yellow) {
4.      Text(
5.        text = "Hello. My name is $name!",
6.        modifier = modifier.padding(24.dp)
7.      )
8.    }
9.  }
```

- Note:
  - dp berada pada *package* **androidx.compose.ui.unit.dp**
- Penulisan padding
  - 24.dp >> all padding (start, top, end, bottom)
  - 24.dp, 10.dp >> horizontal and vertical
  - 8.dp, 9.dp, 10.dp, 11.dp >> start, top, end, bottom

Deployment

- Emulator
- Real device using phone or WiFi
  - Cable
    - install Google USB Driver
    - Activate developer mode >> USB debugging
    - Reference: https://developer.android.com/codelabs/basic-android-kotlin-compose-connect-device#2
  - WiFi
    - Same network
    - Activate developer mode >> Wireless debugging
    - Scan QR with phone
    - Reference: https://developer.android.com/codelabs/basic-android-kotlin-compose-connect-device#4



Thank You

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