Kotlin Types for Java Developers

Chandra Sekar
@iChanSek

Type System in Java

Type System in Java

- Primitive Types

Type System in Java

- Primitive Types
- Class Types

Primitive Types

Primitive Types - Java

Primitive Types - Java

- long

Primitive Types - Java

- long
- int

Primitive Types - Java

- long
- int
- short

Primitive Types - Java

- long
- int
- short
- byte

Primitive Types - Java

- long
- int
- short
- byte
- char

Primitive Types - Java

- long
- int
- short
- byte
- char
- double

Primitive Types - Java

- long
- int
- short
- byte
- char
- double
- float

Primitive Types - Java

- long
- int
- short
- byte
- char
- double
- float
- boolean

Primitive Types - Kotlin

Primitive Types - Kotlin

- Long

Primitive Types - Kotlin

- Long
- Int

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- Long
- Int
- Short

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- Long
- Int
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- Byte

Primitive Types - Kotlin

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- Boolean

Primitive Types - Comparison

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Java	Kotlin

Primitive Types - Comparison

Java		Kotlin
long	=	Long

Primitive Types - Comparison

Java		Kotlin
long	=	Long
int	=	Int

Primitive Types - Comparison

Java		Kotlin
long	=	Long
int	=	Int
short	=	Short

Primitive Types - Comparison

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int	=	Int
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long	=	Long
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boolean	=	Boolean

Wrapper Types - Java

Wrapper Types - Java

- Long

Wrapper Types - Java

- Long
- Integer

Wrapper Types - Java

- Long
- Integer
- Short

Wrapper Types - Java

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- Integer
- Short
- Byte

Wrapper Types - Java

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- Byte
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Primitive Types - Comparison

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Java	Kotlin	Java(Wrappers)

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long	=	Long	~	Long

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Example - Primitive Type

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```
int x = 10;          // Java - Primitive int
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```
int x = 10;                // Java - Primitive int

// is Same as
val x: Int = 10            // Kotlin - Primitive int
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Example - Primitive Type

```
int x = 10;                // Java - Primitive int

// is Same as
val x: Int = 10            // Kotlin - Primitive int

// Even more simpler way
val x = 10                 // Kotlin - Type inferred as Int
```

Example - Wrapper Type

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```
Integer x = new Integer(10);        // Java - Wrapper Type
Integer y = 10;                     // Java - Wrapper Type (Auto Boxing)
```

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Integer x = new Integer(10);        // Java - Wrapper Type
Integer y = 10;                     // Java - Wrapper Type (Auto Boxing)

// Lets assume they are same as
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// then, how to represent this in Kotlin?
Integer z = null;
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- If you want to assign null, then you have to declare them as nullable.
- Syntax - postfix corresponding type with ‘?’
- Example - Int?, String?, User?

Back to Previous Example

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```
// then, how to represent this in Kotlin?
Integer z = null;
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Back to Previous Example

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// then, how to represent this in Kotlin?
Integer z = null;


// And, the answer is
val z: Int? = null
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Primitive Types - Comparison

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Primitive Types - Comparison

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- Kotlin doesn’t have Primitive types explicitly.
- Kotlin compiler chooses Primitive type when the type is mentioned as non nullable.
- If the type is mentioned as nullable, Kotlin compiler treats it as a wrapper type.

Class Types

Class Types - Java

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- class String

Class Types - Java

- class String
- interface CharSequence

Class Types - Java

- class String
- interface CharSequence
- enum Color

Class Types - Java

- class String
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Class Types - Java

- class String
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Object is common to all.

Supermost Type

Supermost Type

Object (in Java)

Supermost Type

Object (in Java)

is Same as

Supermost Type

Object (in Java)

is Same as

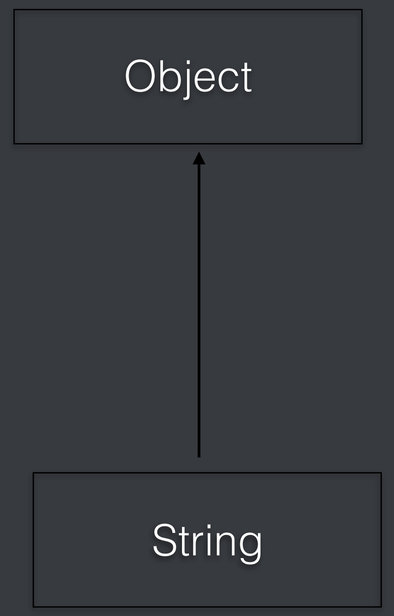
Any (in Kotlin)

Type Hierarchy - Java

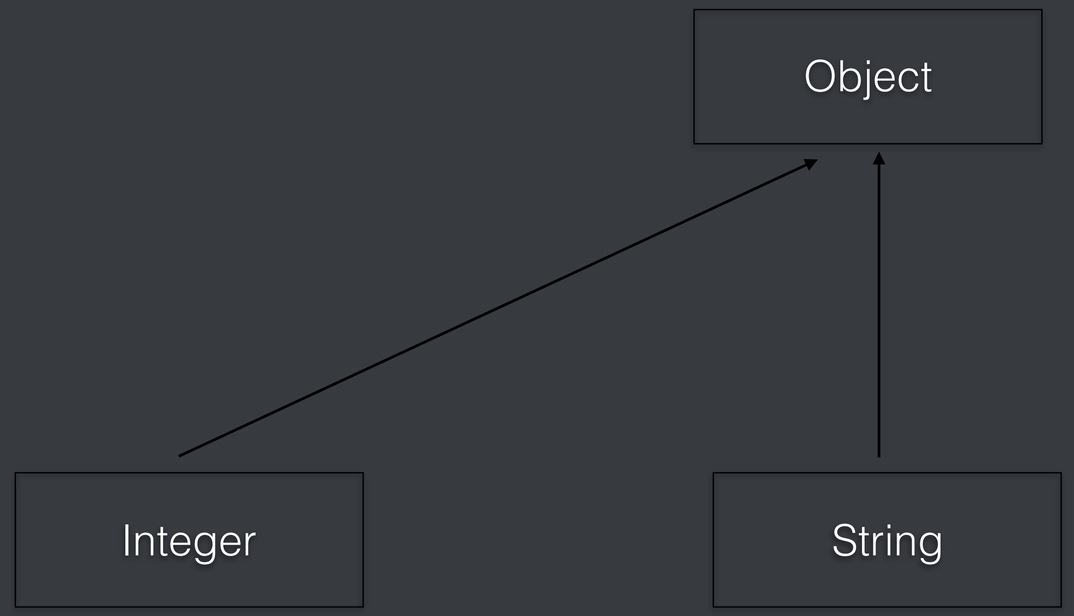
Type Hierarchy - Java

Object

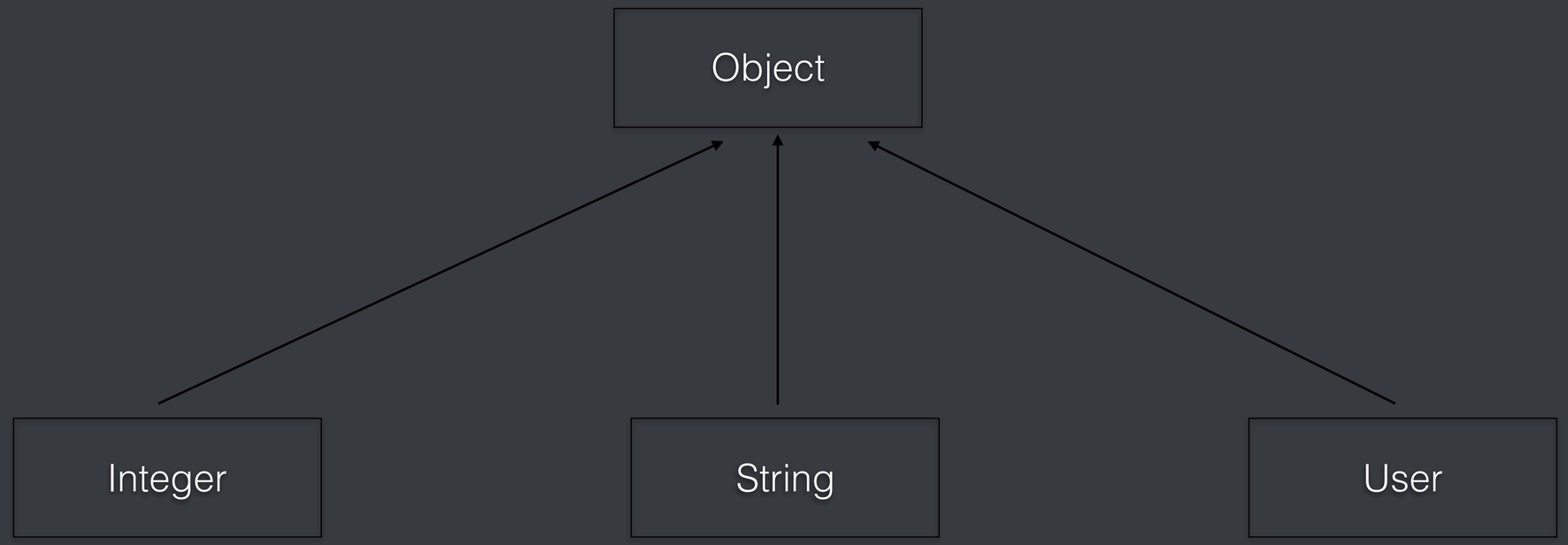
Type Hierarchy - Java



Type Hierarchy - Java



Type Hierarchy - Java

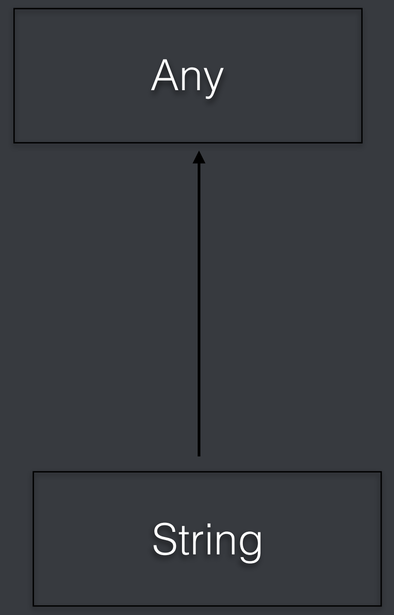


Type Hierarchy - Kotlin

Type Hierarchy - Kotlin

Any

Type Hierarchy - Kotlin



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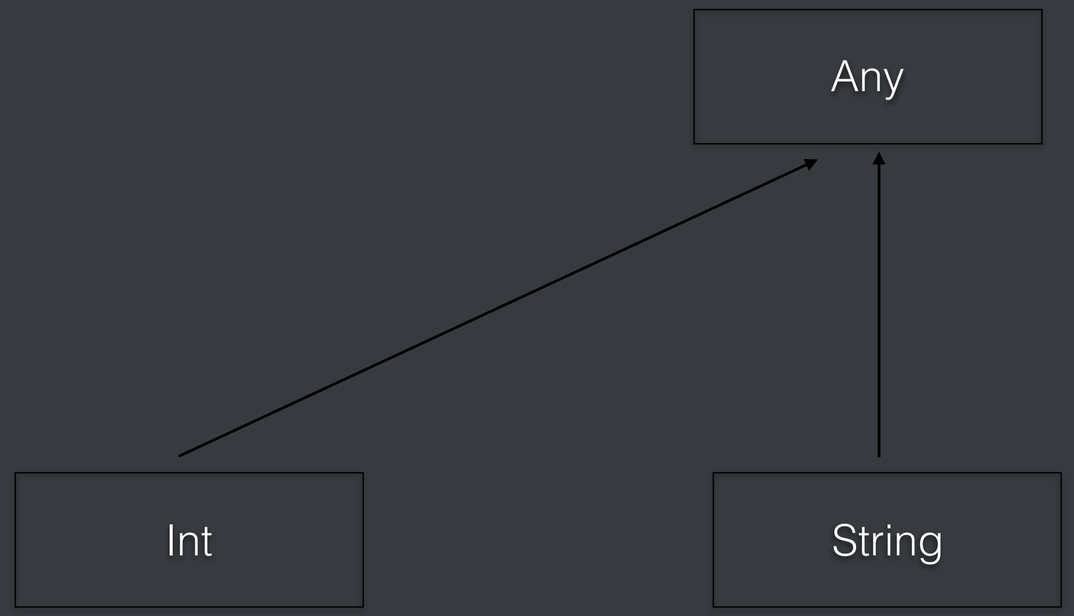

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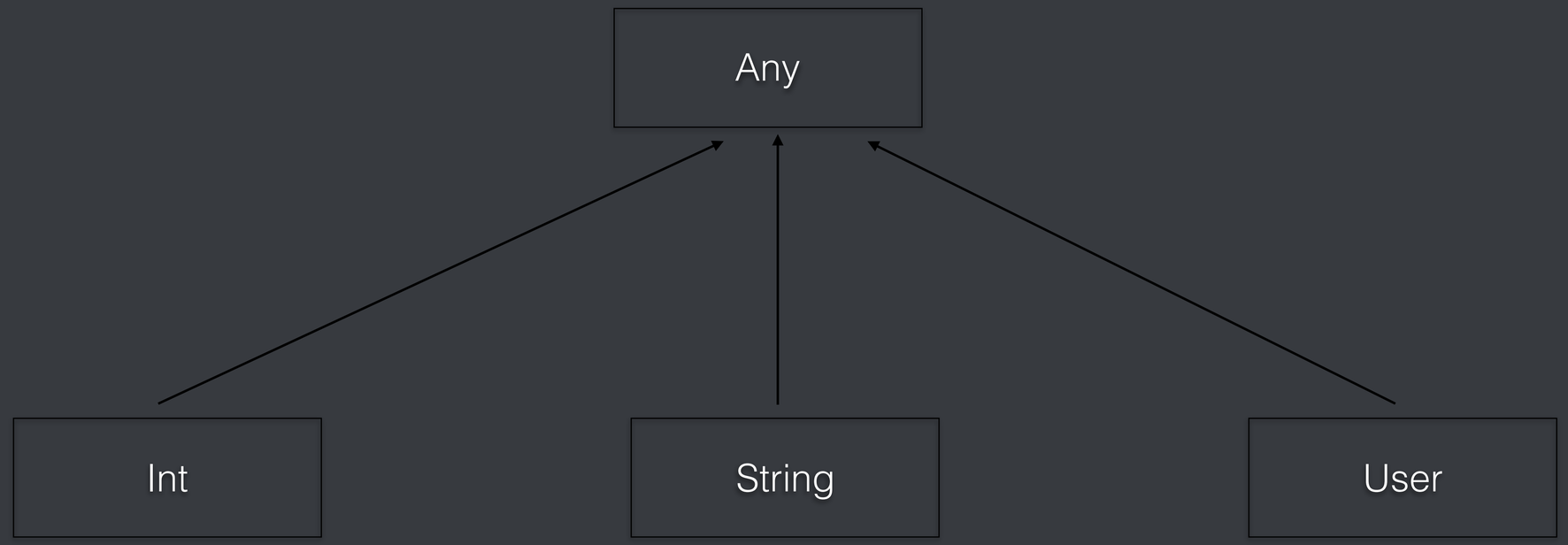

Examples

Examples

```
Object obj = new Object();
Object user = new User();
Object str = "Test";
Object integer = 10;
```

Examples

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Object user = new User();
Object str = "Test";
Object integer = 10;
```

```
val any = Any()
val user: Any = User()
val str: Any = "Test"
val int: Any = 10
```

Examples

```
Object obj = new Object();
Object user = new User();
Object str = "Test";
Object integer = 10;
```

```
val any = Any()
val user: Any = User()
val str: Any = "Test"
val int: Any = 10
```

```
User user = new User();
String str = "Test";
Integer i = 10;
```

Examples

```
Object obj = new Object();
Object user = new User();
Object str = "Test";
Object integer = 10;
```

```
val any = Any()
val user: Any = User()
val str: Any = "Test"
val int: Any = 10
```

```
User user = new User();
String str = "Test";
Integer i = 10;
```

```
val user: User = User()
val str: String = "Test"
val i: Int = 10
```

Examples

```
Object obj = new Object();
Object user = new User();
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User user = new User();
String str = "Test";
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```

```
val user: User = User()
val str: String = "Test"
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val user = User()
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```
User user = new User();
String str = "Test";
Integer i = 10;
```

```
val user: User = User()
val str: String = "Test"
val i: Int = 10
```

```
val user = User()
val str = "Test"
val i = 10
```

Type Inferrence

Examples (with null)

Examples (with null)

```
Object obj = null;
User user = null;
String str = null;
Integer i = null;
```

Examples (with null)

```
Object obj = null;
User user = null;
String str = null;
Integer i = null;
```

```
val any: Any = null
val user: User = null
val str: String = null
val i: Int = null
```

Examples (with null)

```
Object obj = null;
User user = null;
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Examples (with null)

```
Object obj = null;
User user = null;
String str = null;
Integer i = null;
```

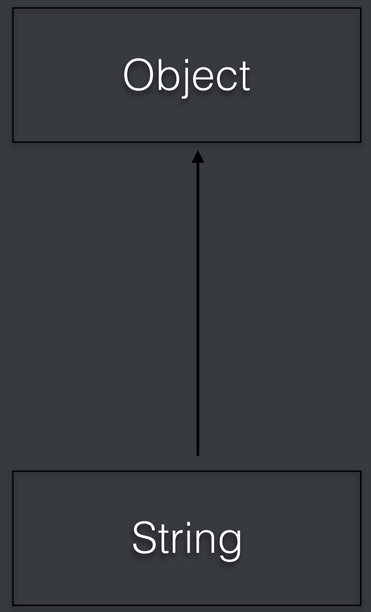
```
val any: Any? = null
val user: User? = null
val str: String? = null
val i: Int? = null
```

Type Hierarchy (Final) - Java

Type Hierarchy (Final) - Java

Object

Type Hierarchy (Final) - Java



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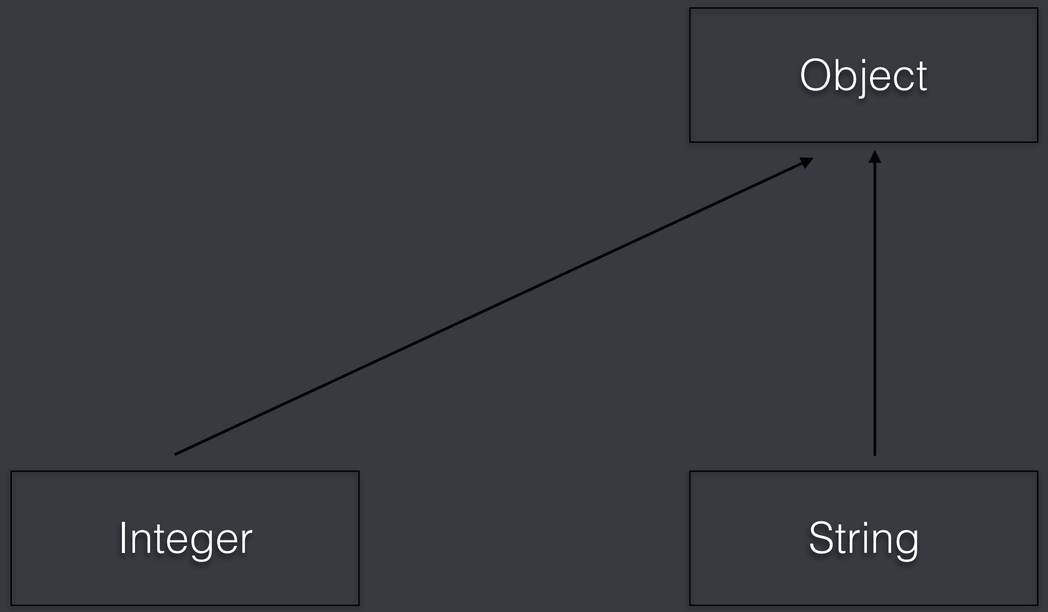

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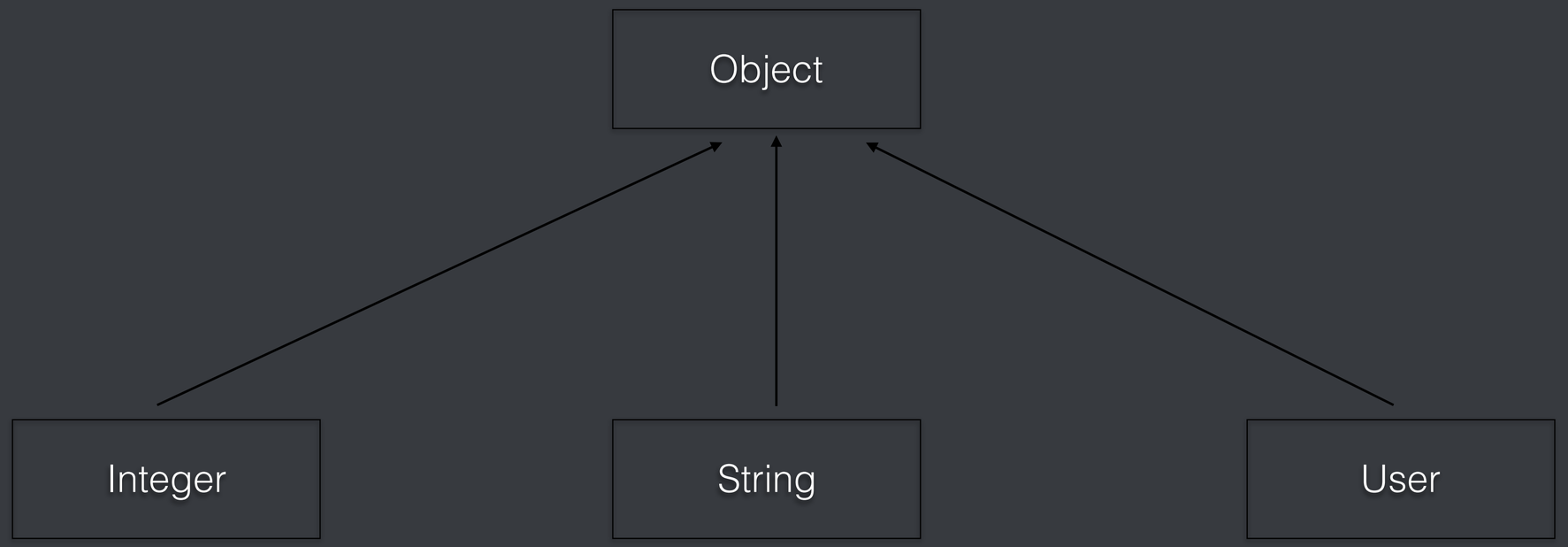

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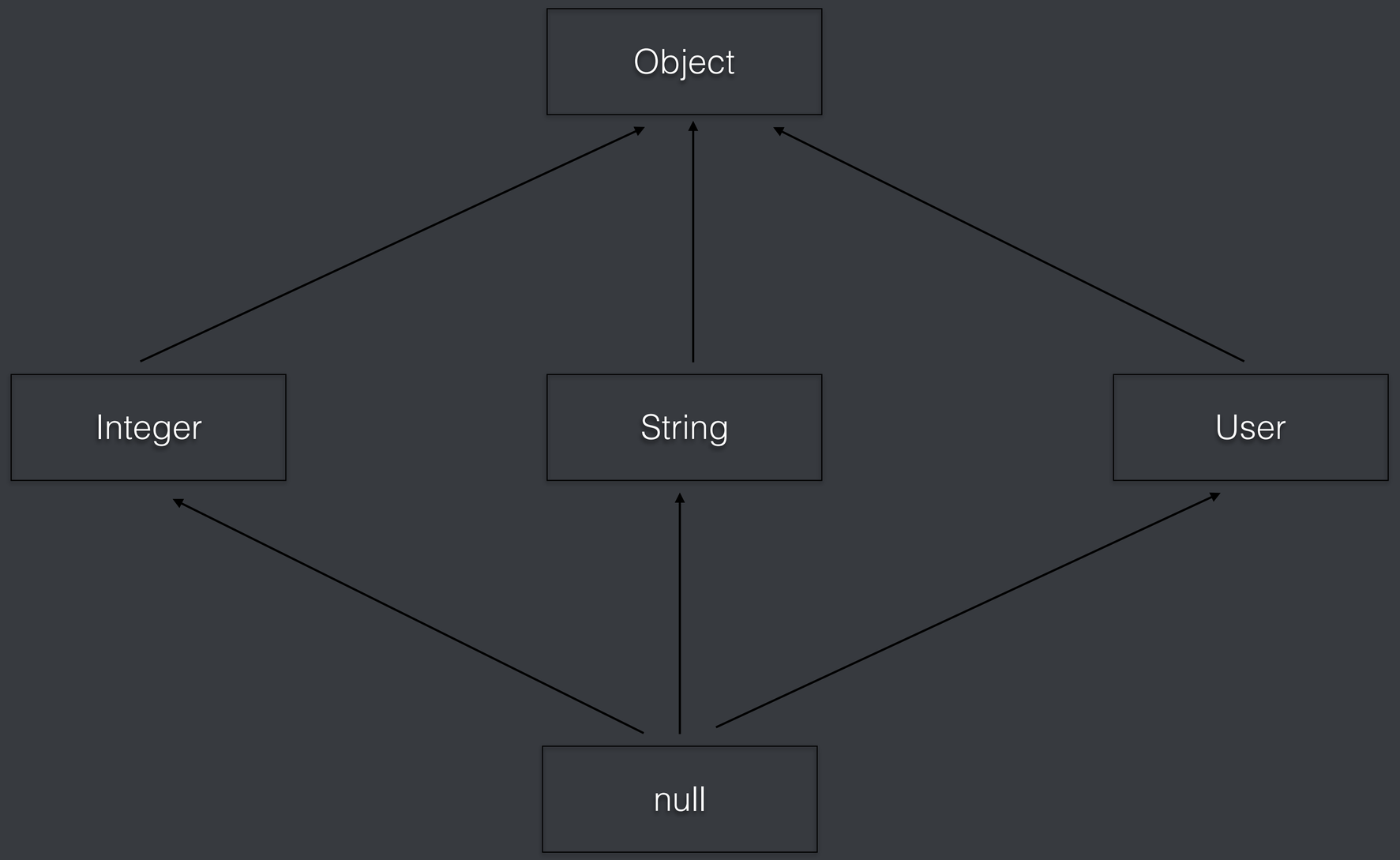

Type Hierarchy - Kotlin

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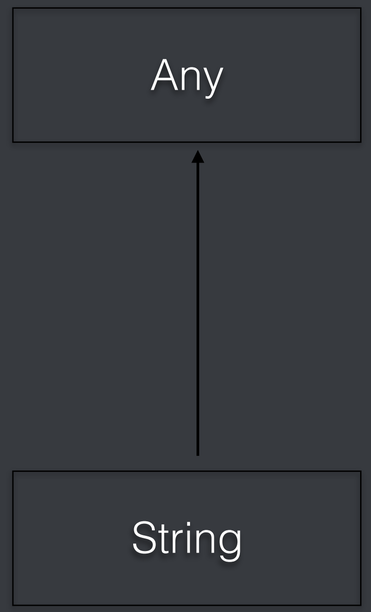

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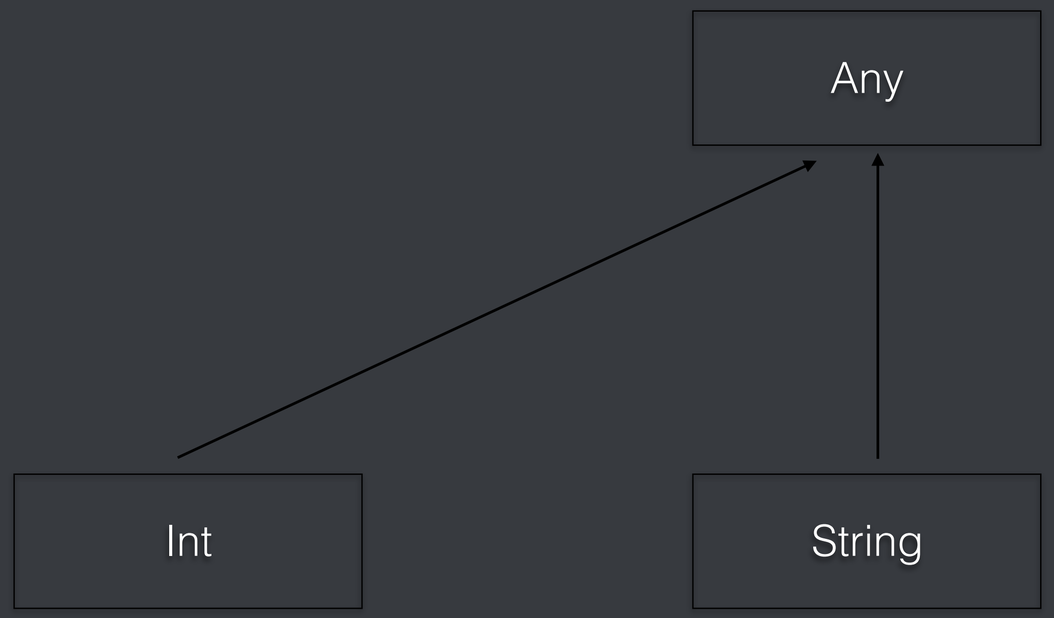

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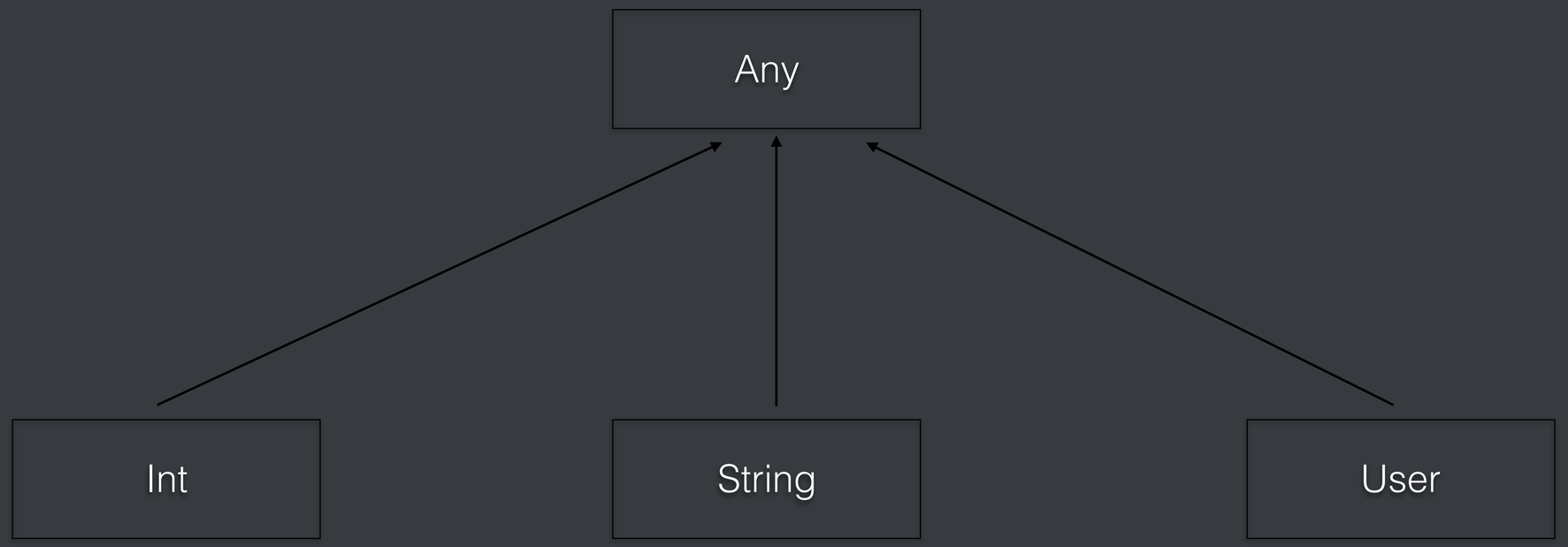

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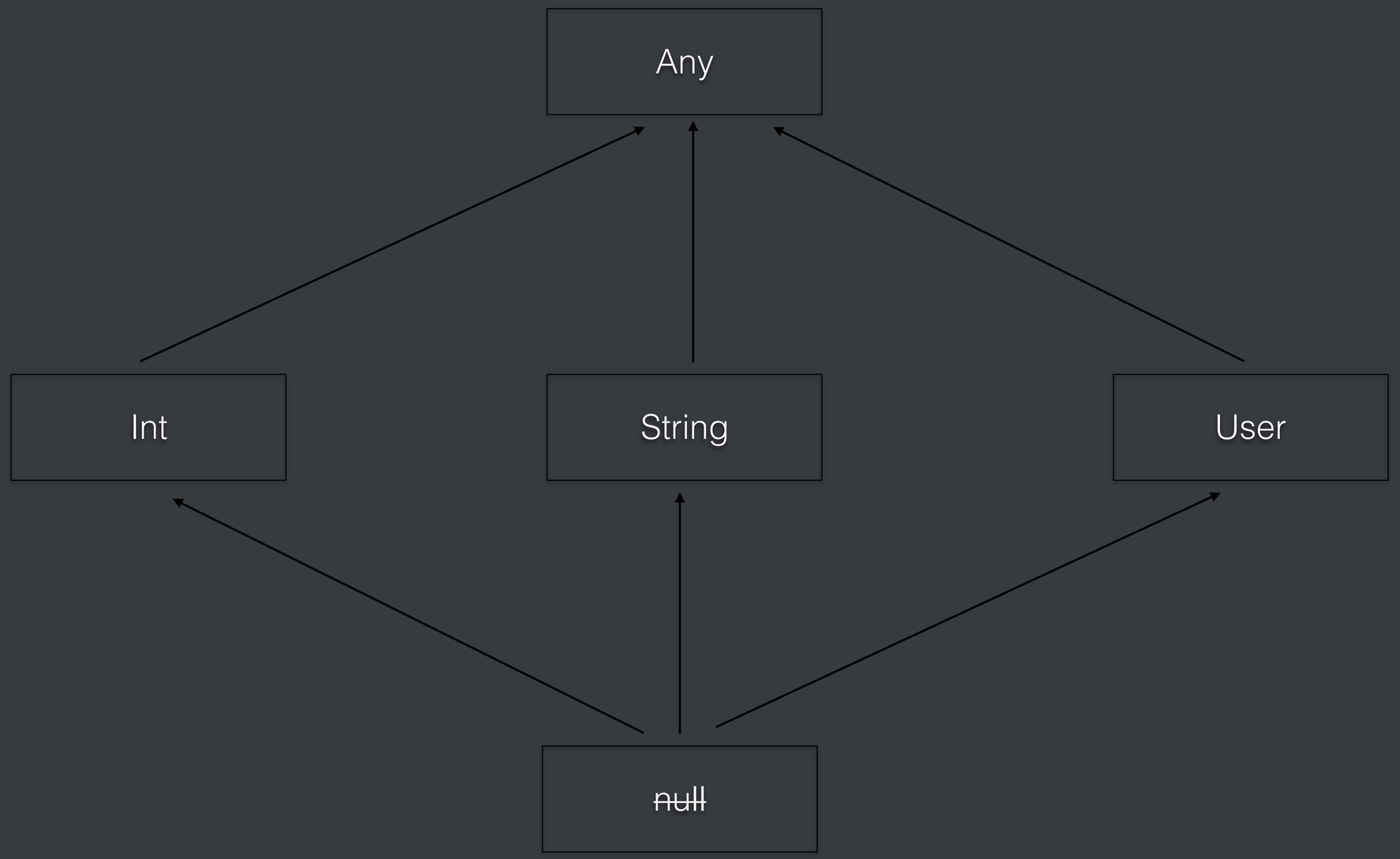

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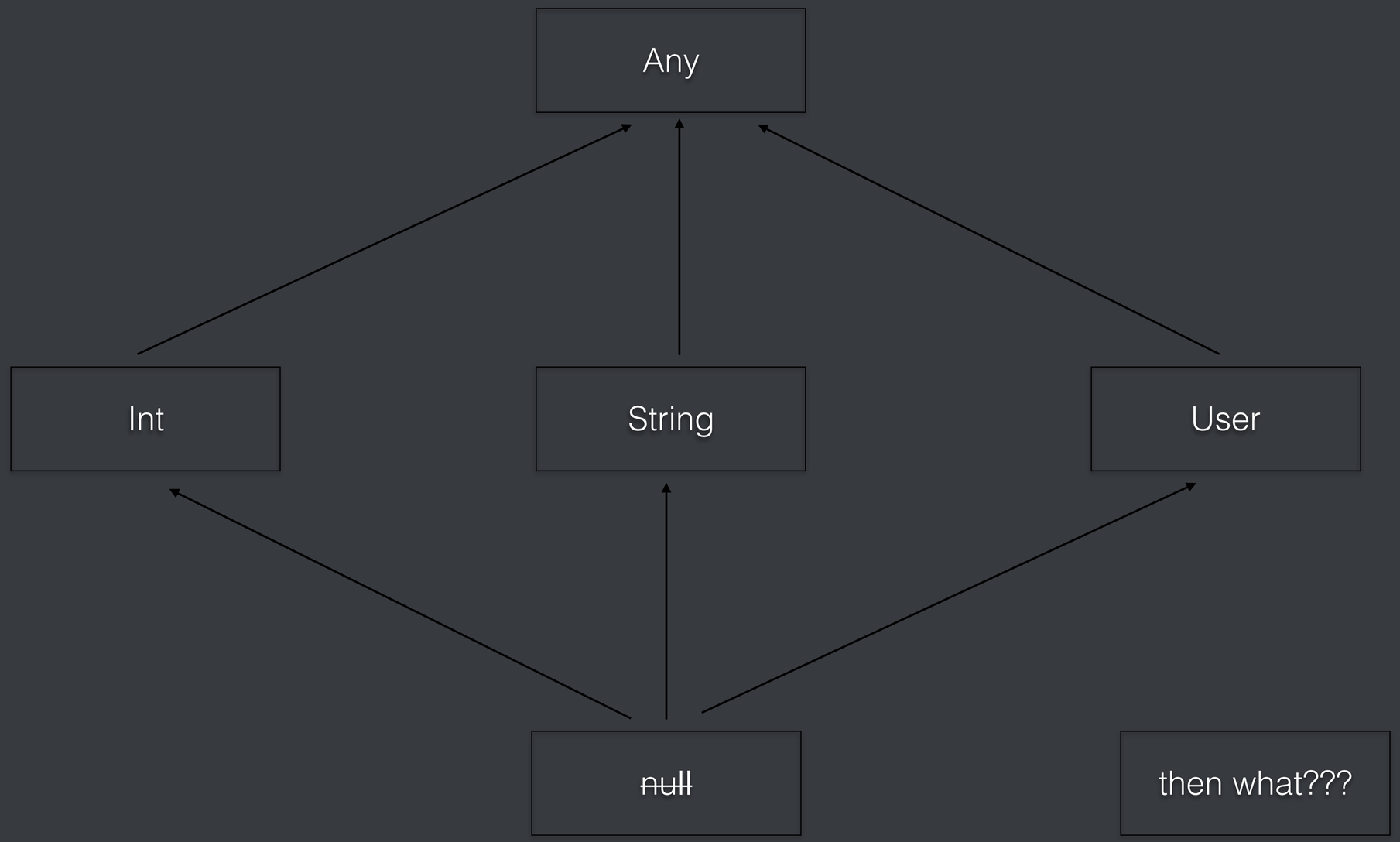

Nothing Type

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- Should be used to mark any code that can never be reached.

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- Should be used to mark any code that can never be reached.
- We can also use it while type inference.

Examples - Nothing Type

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```
val s = person.name ?: throw IllegalArgumentException("Name required")
println(s)     // 's' is known to be initialized at this point
```

Examples - Nothing Type

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val s = person.name ?: throw IllegalArgumentException("Name required")
println(s)     // 's' is known to be initialized at this point


val x = null            // 'x' has type `Nothing?`
val l = listOf(null)   // 'l' has type `List<Nothing?>

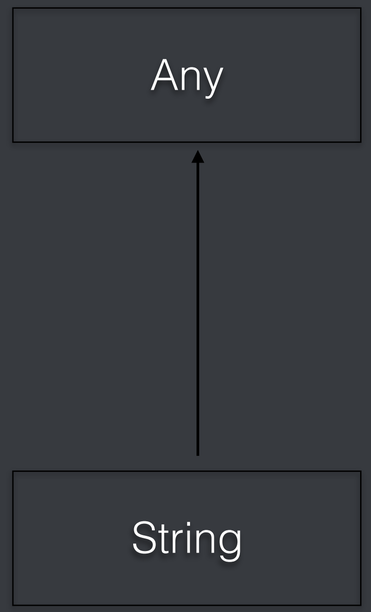
var user: User? = x
```

Type Hierarchy - Kotlin

Type Hierarchy - Kotlin

Any

Type Hierarchy - Kotlin



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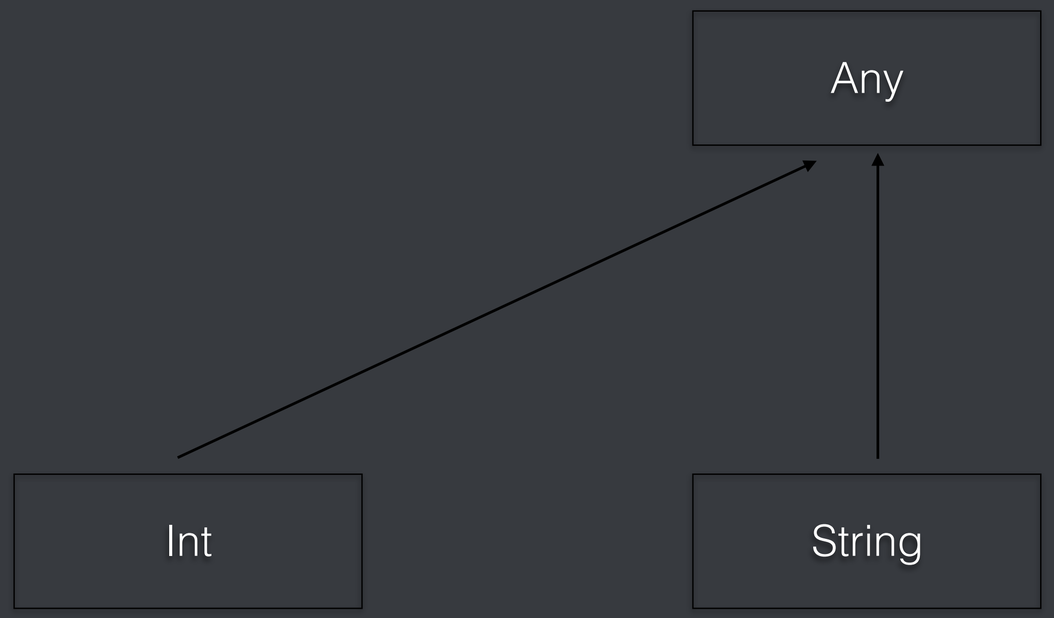

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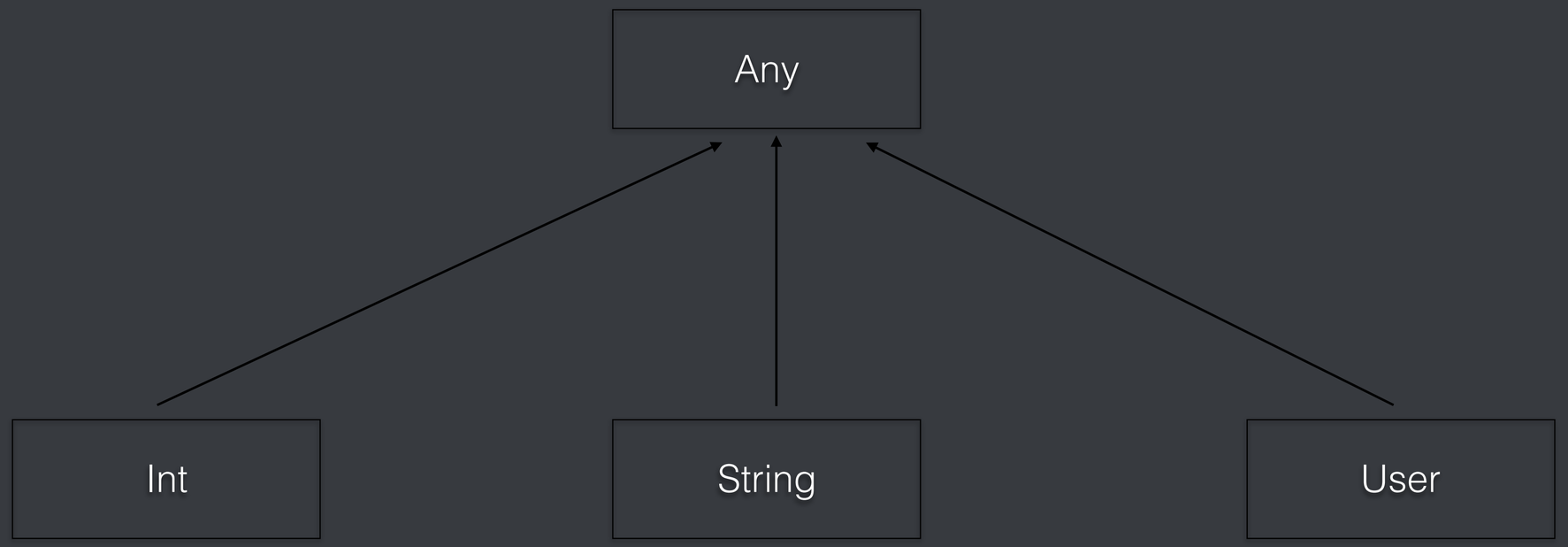

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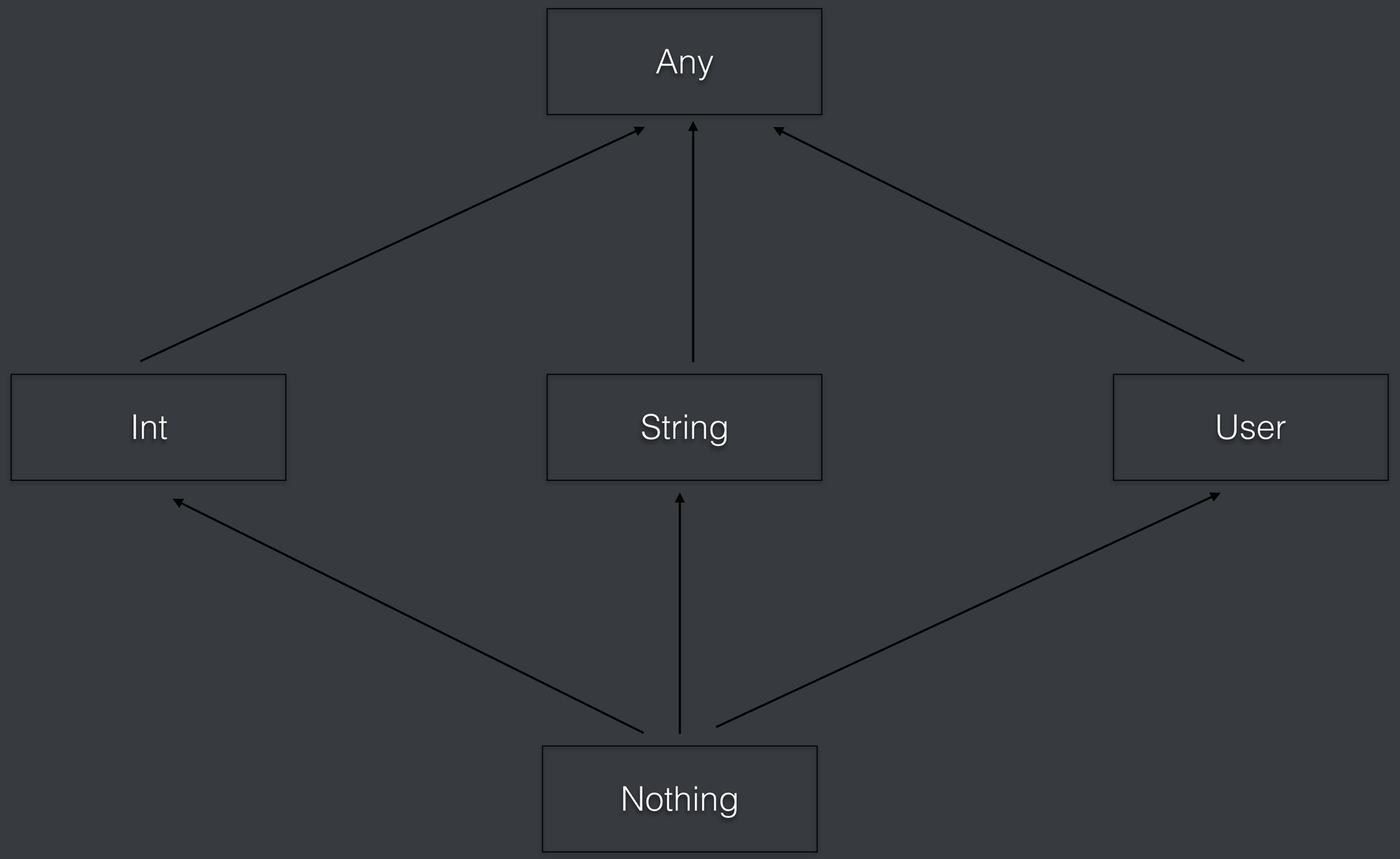

Type Hierarchy - with null - Kotlin

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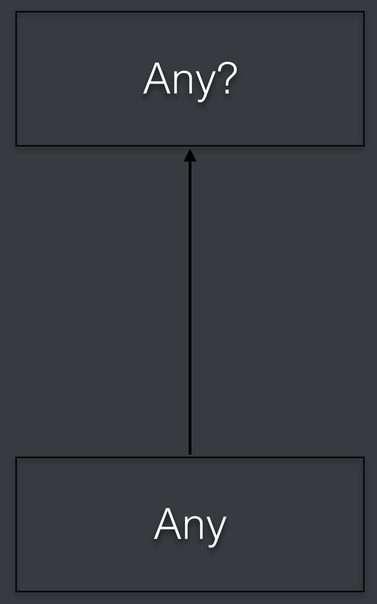

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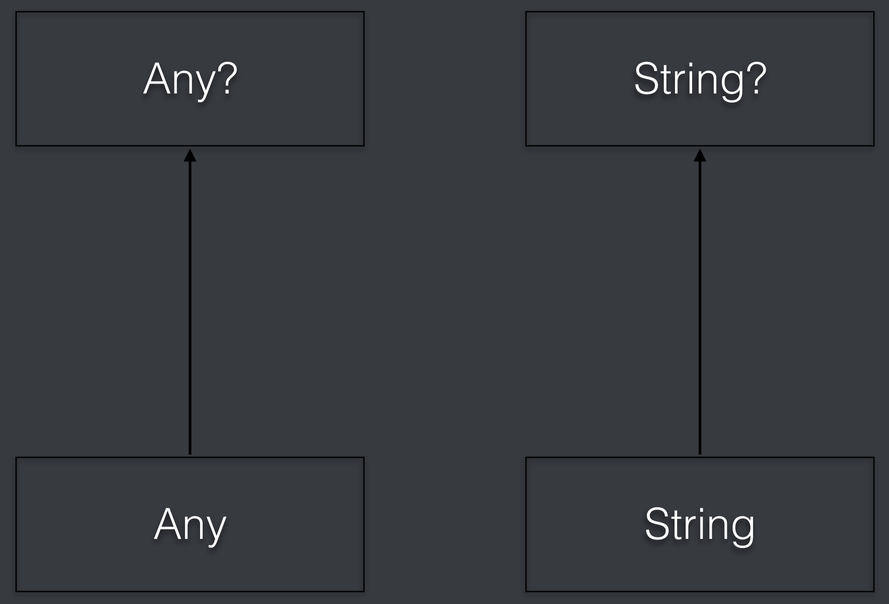

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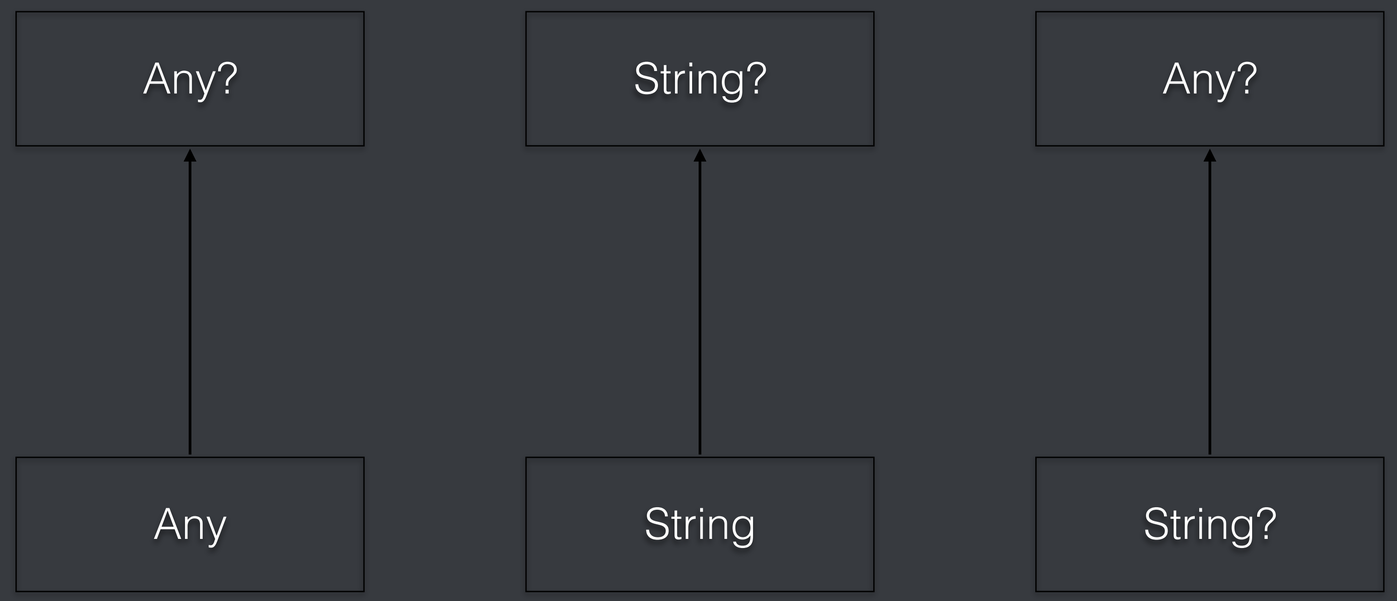

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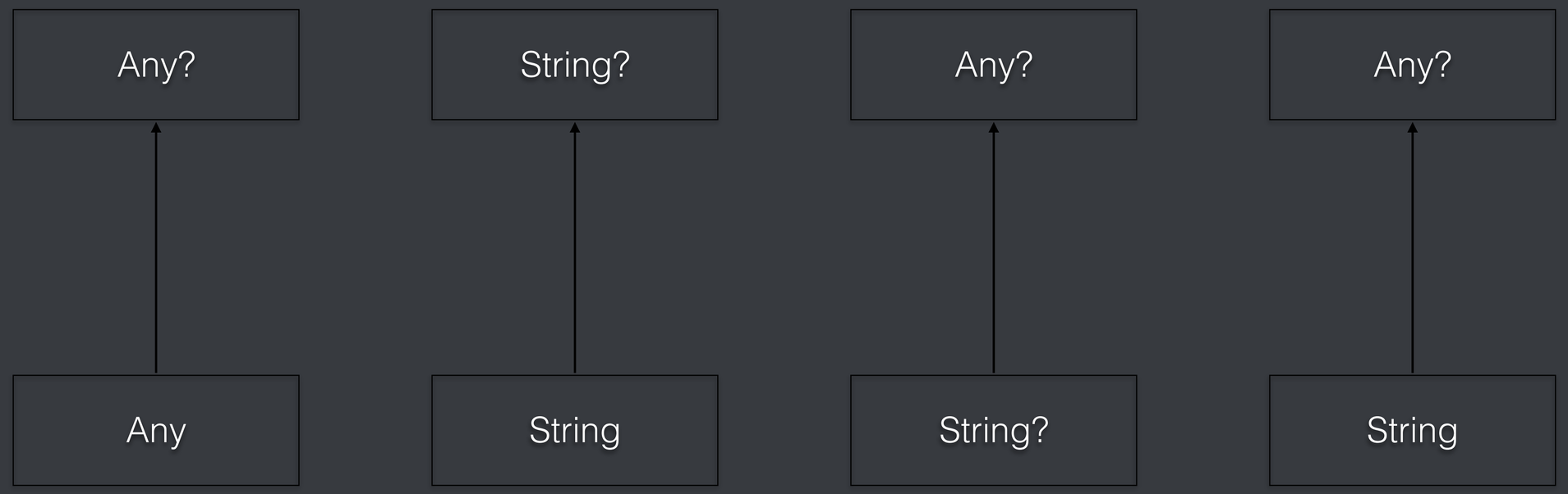

Type Hierarchy (Final) - Kotlin

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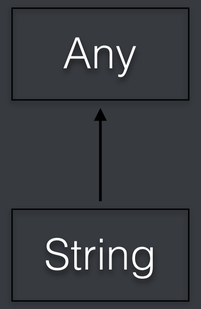
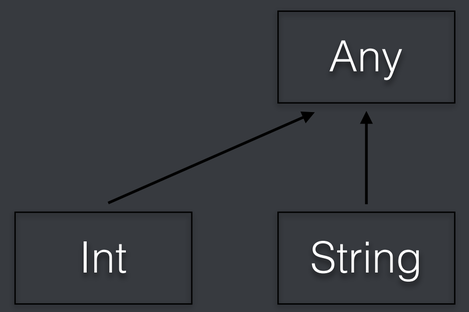


Type Hierarchy (Final) - Kotlin



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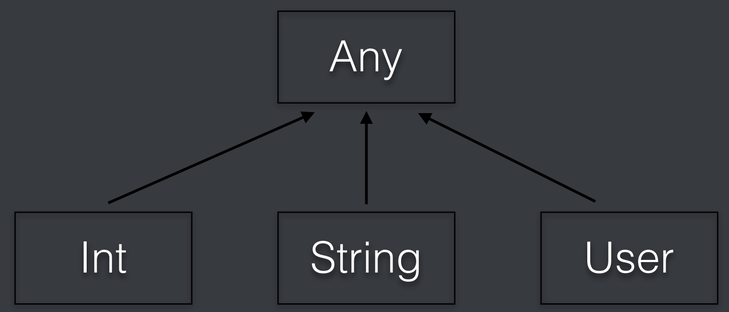

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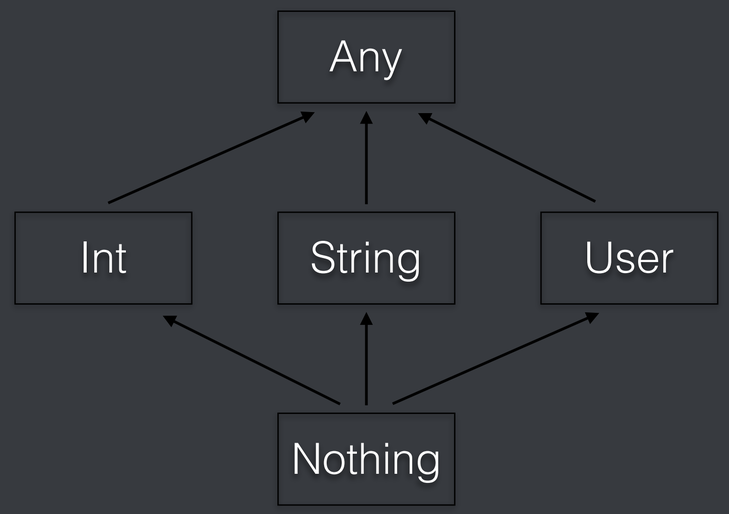

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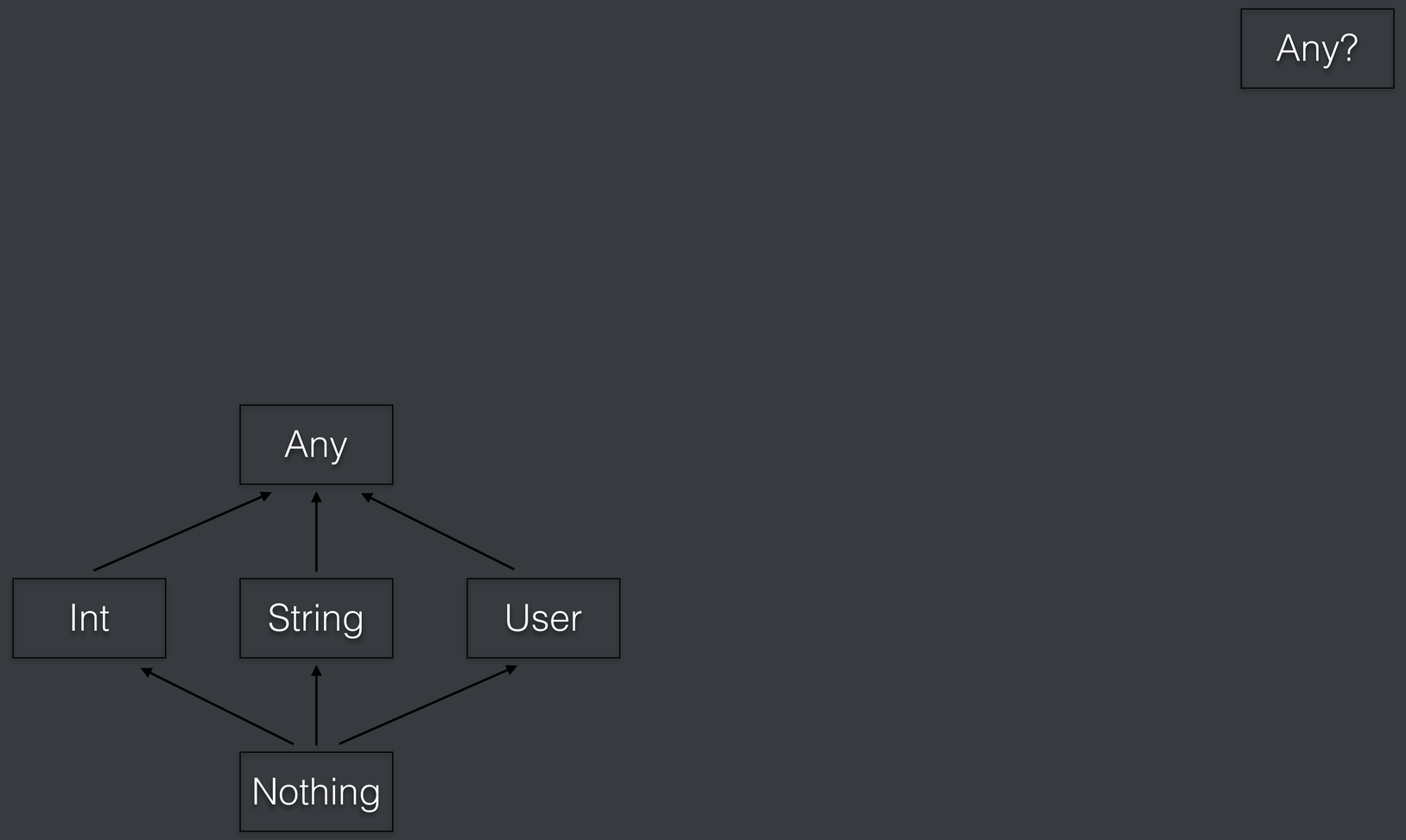

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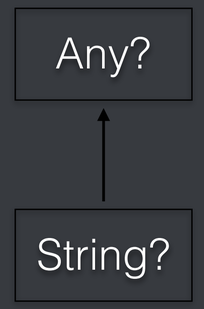

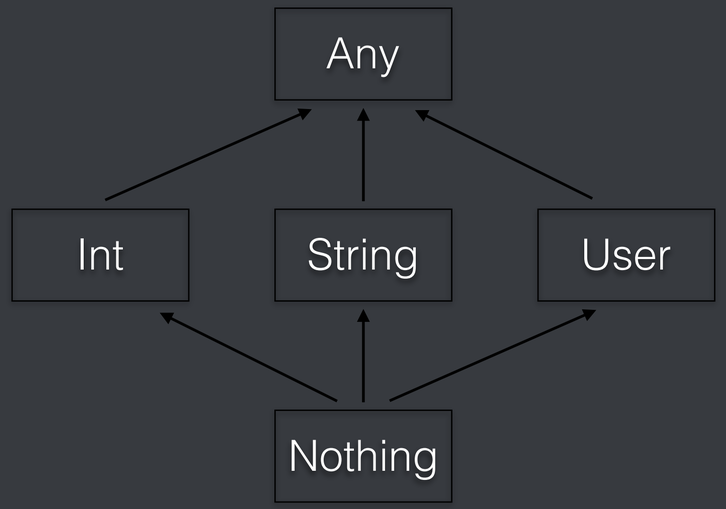

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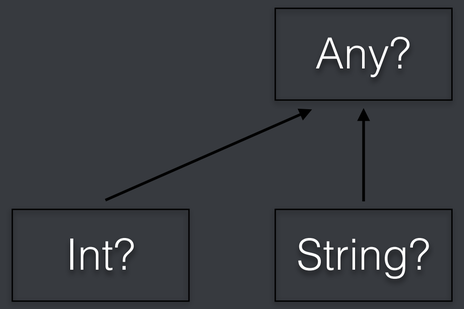

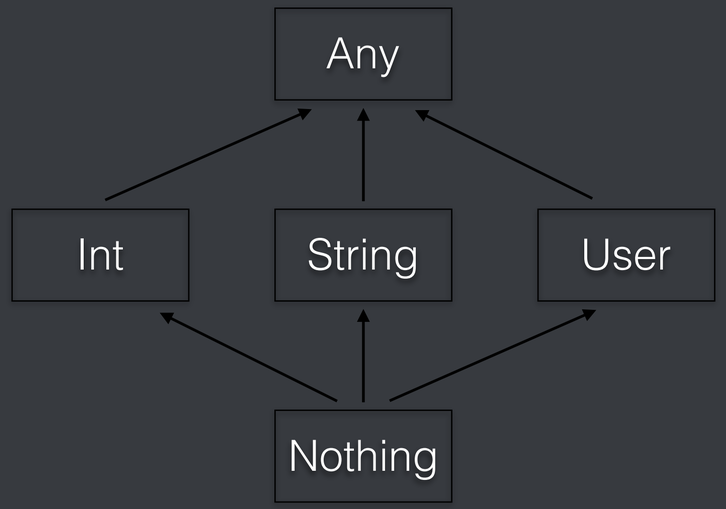

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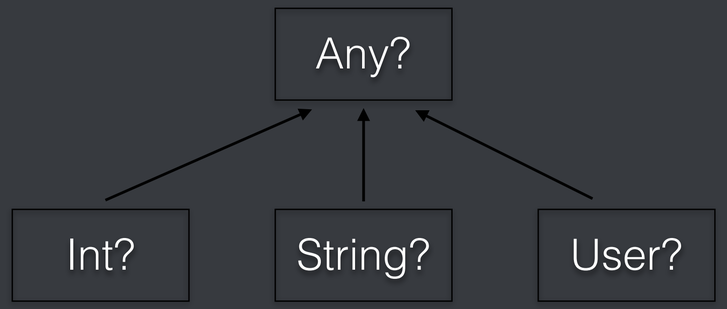

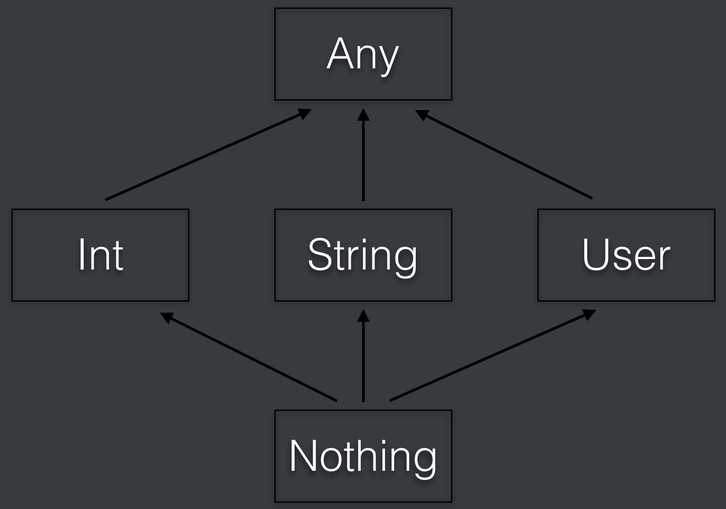

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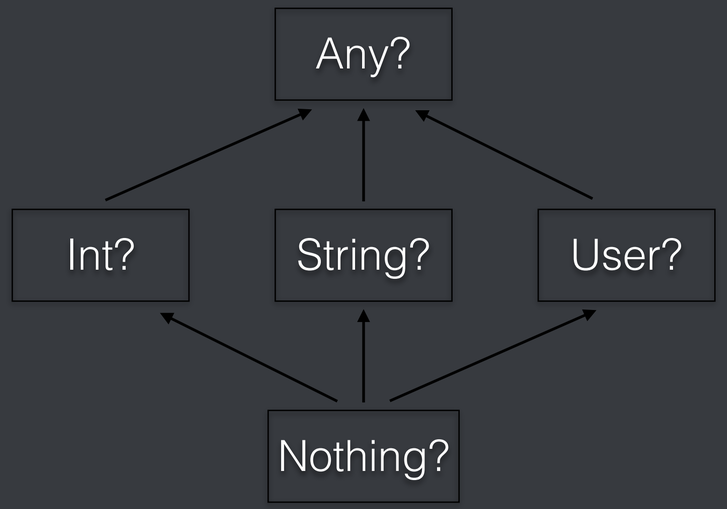

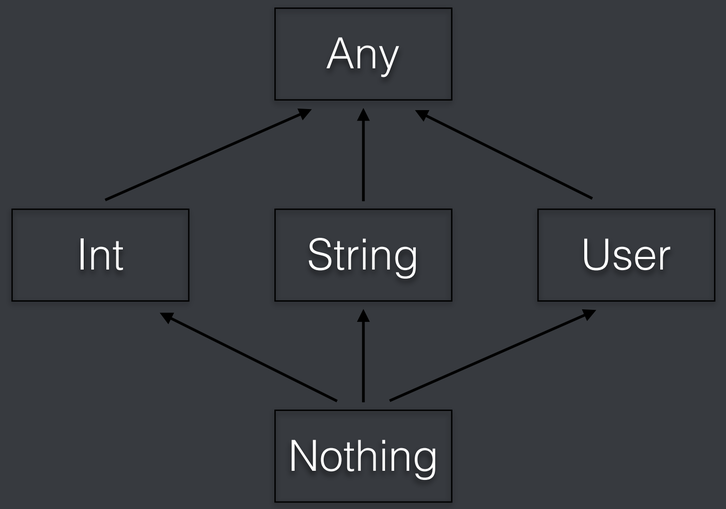

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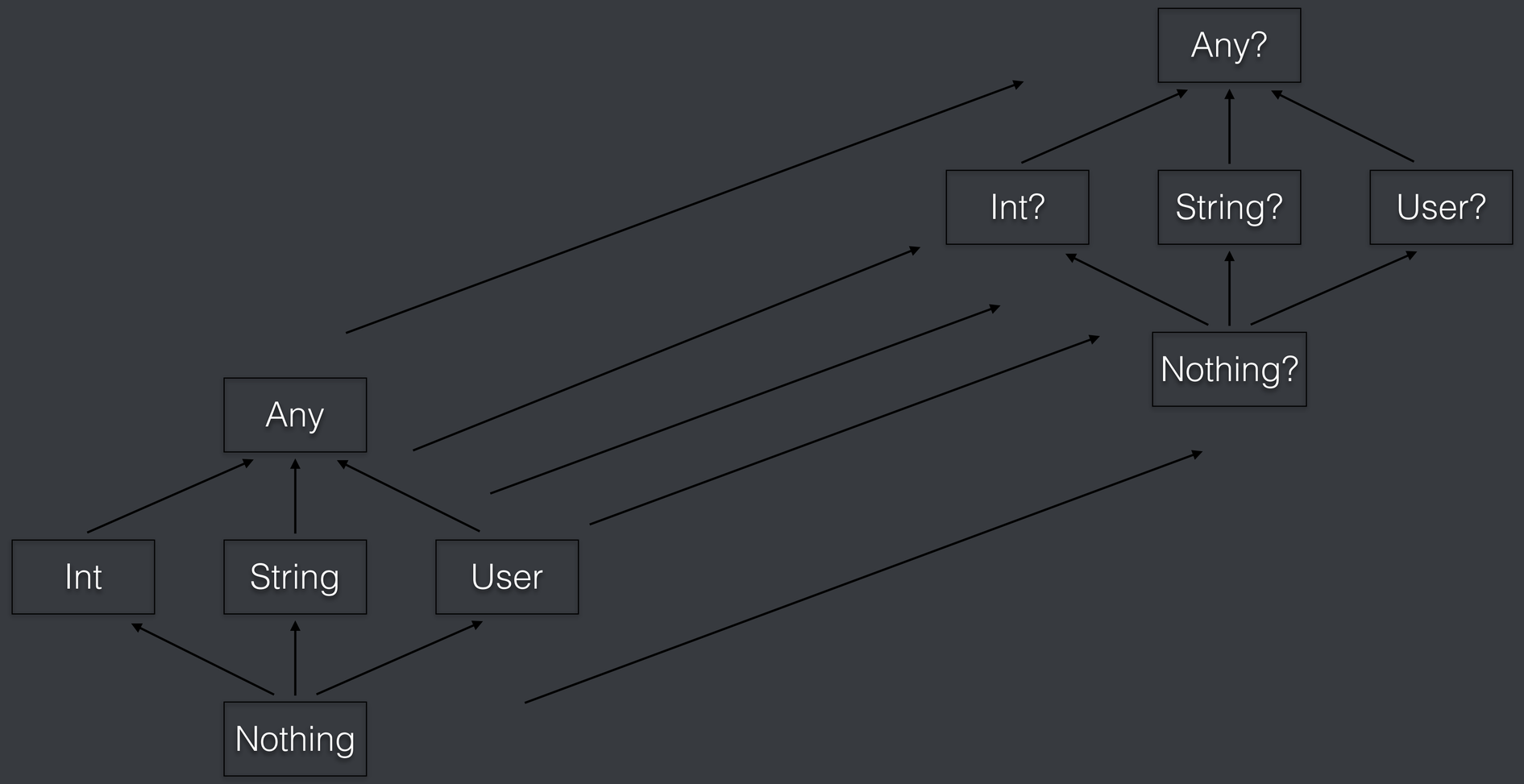

void == Unit

Examples - void and Unit

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```
private void test() {}

private void test() {
    return;
}
```

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private void test() {
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```

```
private fun test(): Unit {}

private fun test(): Unit {
    return Unit
}

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```

Array Type

Array Type

Array Type

- Kotlin has no [] syntax for creating Arrays.

Array Type

- Kotlin has no [] syntax for creating Arrays.
- Instead it has a special classs called Array<T>

Examples - Array Type

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String[] names = new String[10];
String[] colors = new String[] {"Red", "Green", "Blue"};
```

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String[] names = new String[10];
String[] colors = new String[] {"Red", "Green", "Blue"};
```

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val names: Array<String> = emptyArray()
val colors: Array<String> = arrayOf("Red", "Green", "Blue")
val nulls: Array<String?> = arrayOfNulls(10)
```

Examples - Array of Primitive Type

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int[] numbers = new int[10];
int[] nums = new int[] {1, 2, 3, 4, 5};
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} Integer[]

} int[]

Nullable Types in Java

Nullable Types - Interoperability

Nullable Types - Interoperability

Since Java doesn’t have nullable types, we need to take extra care of our code while taking adventage of interoperability.

Nullable Types - Interoperability

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```
// Test.java
public class Test {
    public String test() {
        return null;
    }
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```

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// TestKotlin.kt
class Test {
    private test() {
        val test = Test()
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This will lead to NPE

How to avoid such NPE?

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Now no NPE as it fails at Compile Time

Take Away

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- Nullable and Non-Nullable values are two separate types.
- By default all types are Non-Nullable.
- Type and Type? are not same.

Take Away - Continued…

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- Object in Java is same as Any in Kotlin.

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Take Away - Continued…

- Object in Java is same as Any in Kotlin.
- void in Java is same as Unit in Kotlin.
- Nothing is not same as Unit or void.
- Nothing is converted into void in byte code level as JVM doesn’t has it.
- Always annotate your Java types to avoid NPE in Kotlin world.

Thank You

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