✅ Kotlin Fundamentals Short Notes

🔹 Basics and Variable Types

```
val a : Int = 5
var new : String = "Hey"
val floatNum : Float = 10.0022f
val check : Boolean = true
val e: Double = 10.91
```

- val = immutable variable (cannot be reassigned)
- var = mutable variable (can be reassigned)
- Kotlin supports type inference: val abc = 12 automatically detects Int

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🔹 String Operations

```
val text = "Hello my name is Mishad"
println(text.uppercase())
println(text.lowercase())
println(text + "\tHe he")
```

- uppercase() / lowercase() convert case
- Concatenation with +
- \t, \n for tab and newline

Multi-line String:

- ```
  val test = """|Line1\n|Line2""".trimMargin()
  ```
  Use triple quotes for raw strings
- trimMargin() removes prefix from each line
  ```

🔹 Conditional Logic

✅ If-Else

```
val result = if (number > 5) "Greater" else "Smaller"
```

- Can be used as an expression to assign values

✅ When Expression

- ```
  val result = if (number > 5) "Greater" else "Smaller"

  when (day) {
      1 -> println("Saturday")
      else -> println("Invalid")
  }
  ```
  Kotlin's alternative to switch-case
- Supports multiple conditions per case: 1, 2 -> ...

🔹 Boolean Logic

if (a > 0 && b > 0) { ... }

if (!(a > 0)) { ... }

- && = AND, || = OR, ! = NOT

🔹 Arithmetic Operations

- ```
  val a = 120
  val b = 20
  println(a + b)
  println(a - b)
  println(a * b)
  println(a / b)
  println(a % b)
  ```
  Basic arithmetic: +, -, *, /, %

🔹 Functions

```
fun name() = println("Mishad")
fun userName(name: String): String = name
fun sum(a: Int, b: Int): Int = a + b
fun mood(mood: String = "Angry") { println(mood) }
```

- Functions with default parameters
- Return type must be declared unless it's Unit

🔹 Arrays, Lists, and Maps

✅ Immutable List

Immutable List:

```
val name = listOf("Sakif", "Saif")
```

Mutable List:

```
val section = arrayListOf("Sec A", "Sec B")
section.add("Sec C")
```

Immutable Map:

```
val rollName = mapOf(1 to "Mishad")
```

Mutable Map:

```
val food = hashMapOf(1 to "Milk")
food[2] = "Banana"
food.remove(1)
```

🔹 Loops

```
for (item in section) println(item)
for ((key, value) in food) println("$key $value")

var x = 5
while (x > 0) {
    println(x)
    x--
}
```

🔹 lateinit Keyword

```
lateinit var f: String
```

- Used for non-null vars that will be initialized later
- Only allowed for mutable var, not val
- Only works with non-primitive types (not Int, Float, etc.)

✅ Example:

```
class Person {
    lateinit var name: String
    fun inputName() { name = "Sakif" }
    fun printName() {
        if (::name.isInitialized) println("Name is $name")
        else println("Not initialized")
    }
}
```

🔹 String Functions and Manipulations

```
val str = "Hello World Its Me"
str.contentEquals("Hello World It Me")
str.contains("Itss")
str.subSequence(0, 5)
str.toString()
```

- contentEquals() checks exact content
- contains() checks substring
- subSequence(start, end) extracts part

🧠 Extra Kotlin Concepts (Not in Code But Useful)

- **Null Safety:** var name: String? = null
- **Smart Casts:** Kotlin automatically casts after null-check
- **Elvis Operator:** val len = name?.length ?: 0
- **Safe Call:** name?.length avoids NPE