Android Development with Kotlin
Lab. 1.

ObjectivesKotlin basics

- Variables (`val` vs. `var`), string templates, ranges
- Functions
  - Compact functions, lambdas
- Arrays, lists and their transformations
  - listOf, mutableListOf, arrayOf, Array, intArrayOf, IntArray, ...
  - filter, map, forEach, any, all, sortedBy

1. Write a main function that adds two values (immutable variables) and prints the result using a **String template** in the following format: 2 + 3 = 5.

A *template expression* starts with a dollar sign ($) and can be a simple value (`$ value`) or an expression inside curly braces (`${expression}`).

2. Write a main function that declares an immutable list (`listOf`) `daysOfWeek` containing the days of the week.

- Use a for loop that iterates over the list and prints the list to the standard output.
- Use a list **filter** to print the days starting with letter 'T'
- Use a list **filter** to print the days containing the letter 'e'
- Use a list **filter** to print all the days of length 6 (e.g. Friday)

3. Write a function that checks whether a number is prime or not. Write a main function that prints prime numbers within a **range**.

4. Write an `encode` and a corresponding `decode` function that encodes and respectively decodes the characters of a string. You may use any encoding strategy.

- Test your functions!
- Write a **higher-order function** (take a function as parameter) that encodes or decodes a message. Call this function twice. Once for encoding and once for decoding a message.

```
fun messageCoding(msg: String, func: (String) -> String): String
```

5. Write a **compact function** that prints the even numbers from a list. Use a list filter!

Compact function = single-expression function
Ex. `fun double(x: Int):Int = x * 2`

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6. The **`map()`** performs the same transformation on every list item and returns the result list. Using map, perform the following operations:

- Double the elements of a list of integers and print it.
- Print the days of week capitalized (e.g. MONDAY for Monday)
- Print the first character of each day capitalized (e.g. m for Monday)
- Print the length of days (number of characters, e.g. Monday → 6)
- Compute the average length of days (in number of characters)

7. **Mutable lists.**

- Convert the `daysOfWeek` immutable list into a mutable one. Remove all days containing the letter `'n'`, then print the mutable list. You should get this result:

```
[Tuesday, Thursday, Friday, Saturday]
```

- Print each element of the list in a new line together with the index of the element (convert the list to list with index using the `withIndex()` function!). You should get the following result:

```
Item at 0 is Tuesday
Item at 1 is Thursday
Item at 2 is Friday
Item at 3 is Saturday
```

- Sort the result list alphabetically! You should get the following result:

```
[Friday, Saturday, Thursday, Tuesday]
```

8. **Arrays**.

- Generate an array of 10 random integers between 0 and 100, and use `forEach` to print each element of the array in a new line.
- Print the array sorted in ascending order!
- Check whether the array contains any even number!
- Check whether all the numbers are even!
- Calculate the average of generated numbers and print it using `forEach`!