Exercise 2

Functions & Recursion in Scala

- Last Week Recap
- Functions
- Problem: Loops are not welcomed in Functional Programming but then how to do iterative works?
- Solution: Recursions

Classwork

In this lab, you will be exploring the fundamentals of functions in Scala. You will learn about the syntax of function definitions, practice how to pass arguments to functions and using recursion (a function calling itself) for doing the works of iterative nature.

Homework

1. Write a Scala program that defines a function called ***addition*** which takes two integer arguments and returns their sum using **recursion**. Test your function with some sample inputs.
2. Write a Scala program that defines a function called ***subtraction*** which takes two integer arguments and returns their difference by using the ***addition*** *function* defined above. Test your function with some sample inputs.
3. Write a Scala program that defines a function called ***multiplication*** which takes two integer arguments and returns their product by using the ***addition*** function defined above. Test your function with some sample inputs.
4. Write a Scala program that defines a function called ***division*** which takes two integer arguments and returns their quotient by using the ***subtraction*** functions defined above. If the second argument is zero, return an error message. Test your function with some sample inputs.
5. Write a Scala program that defines a function called ***factorial*** which takes a non-negative integer as its argument and returns its factorial. Use **recursion** to implement the function. Test your function with some sample inputs.
6. Write a Scala program that defines a function called ***isPrime*** which takes a non-negative integer as its argument and returns true if the number is prime, and false otherwise. Test your function with some sample inputs.
7. How the memory is impacted by loops and recursions? Explain your answer with supportive examples.
8. What is a difference between local scope and global scope of variables (i.e. *var/val*)? Support your arguments with examples. [Hint: “Closure” concept in Class Lectures]

Deliverable

Deliverable: Submit a single scala code file with "*.scala*" extension, and write your Name and Student ID in the code as a comment. The whole deliverable must be well commented and supported with descriptions where required.
Deadline: 31.03.2023 12:00 am [Before Next Friday Session]
Submission: (session respective) Return box on Moodle.
Estimated workload: <= 2 hours
Warning: This is individual work. Strict actions will be taken for plagiarism!

Deliverables for Exercise 2:

1. Implementation of the homework part.

Note:
Make sure to follow the Scala style guide and use appropriate naming conventions for variables, functions, and classes. Your code should be well-organized, well-documented, and easy to read.