Eastern Mediterranean University

Department of Computer Engineering

# CMxE 318: In-Class Workshop

**May 30th, 2025**

**Instructor:**   **Behnam Bojnordi Arbab**

***Name/Surname | Student #***

**Student 1:**

**Student 2:**

**Student 3:**

**Student 4:**

**Student 5:**

**Student 6:**

## Instructions to Students::

* ***Discuss the tasks within your groups.***
* ***Use*** [***slides***](https://staff.emu.edu.tr/behnamarbab/en/teaching/cmpe318/lecture-notes) ***provided, textbooks, credible internet sources, or any other resources to assist your answers.***
* ***Write down your group's answers clearly.***
* ***100 Minutes to submit your answers on Teams.***
* ***You may submit both the Digital and/or On-paper (scanned) answers together as a .zip file.***
* ***Any other questions? Do it anyhow you want!***

## 🧪 Part 1: Programming Tasks in Lua

📌 *Instruction to students:* For each task, please submit a separate .lua file. Make sure your codes work.

### ✍️ Tasks:

1. **Hello, Lua!**
   * Print “Hello, World” to the console.
2. **Variables and Types**
   * Create variables of types: number, string, boolean, and nil.
   * Print their types.
3. **Control Structures**
   * Write a Lua function that returns the largest of three numbers using if-elseif-else.
4. **Loops**
   * Use a for loop to calculate the sum of integers from 1 to 100.
   * Use a while loop to do the same.
5. **Functions**
   * Write a recursive function to calculate the factorial of a number.
6. **Tables**
   * Create a table representing a student with name, ID, and a list of grades.
   * Write a function to compute and print the average grade.
7. **Closures**
   * Write a function make\_counter that returns another function. Each call to that inner function should increase and return a counter.

## 📘 Part 2: Language Design Analysis

📌 *Instruction to students:* For each question below, **search** and write your answers. Focus on **Lua**. Try to use terms from programming languages theory. Try to keep fewer than 50 words for each answer.

### ❓ Language Design Questions (based on Chapters 1–11, 15)

1. **Chapter 1 – Language Evaluation**
   * Is Lua a readable language? Why?
   * Is Lua easy to write in (writable)? Give examples.
2. **Chapter 2 – Evolution of Languages**
   * What kind of applications was Lua originally designed for?
   * What makes it different from languages like Python or JavaScript?
3. **Chapter 3 – Syntax and Semantics**
   * Does Lua syntax follow any particular formal grammar (like BNF)?
   * What are the semantics of Lua variables and expressions?
4. **Chapter 4 – Lexical and Syntax Analysis**
   * How does Lua treat identifiers and keywords? Are they case-sensitive?
   * What happens when you type something Lua doesn’t recognize?
5. **Chapter 5 – Names, Bindings, Type Checking, Scope**
   * Are Lua variables statically or dynamically typed?
   * What kind of scoping does Lua use? Give an example.
   * What is a closure in Lua, and how does it relate to scope?
6. **Chapter 6 – Data Types**
   * What are the basic data types in Lua?
   * How are tables used to simulate more complex structures (like objects)?
7. **Chapter 7 – Expressions**
   * Does Lua allow implicit type conversions? Is this good or bad?
   * How does Lua handle operations between strings and numbers?
8. **Chapter 8 – Statements**
   * What control flow statements does Lua provide?
   * Can you create your own control structures in Lua using functions?
9. **Chapter 9 – Subprograms**
   * How does Lua support first-class functions?
   * Are parameters passed by value or by reference?
10. **Chapter 10 – Implementing Subprograms**
    * What is a closure in Lua, and how does it behave during execution?
    * How does Lua handle function environments?
11. **Chapter 11 – Abstract Data Types**
    * Lua has no classes—how does it support object-oriented programming?
    * What are metatables, and how are they used?
12. **Chapter 15 – Functional Programming**
    * Is Lua a functional programming language?
    * How can you use anonymous functions and higher-order functions in Lua?

## 🧾 Bonus Challenge:

Compare Lua with a language you already know (e.g., Python, C, JavaScript). Write about:

* 3 things Lua does differently
* 2 things Lua makes easier or harder
* 1 thing you liked or disliked