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 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