Please ask your questions and participate in the class discussion to understand the questions.
You are expected to solve the homework questions individually. You may discuss the materials with others to enhance your understanding. However, **do not copy**. Follow the submission and grading policies. Show all steps with your solutions for full/partial points.

NAME & WSU ID: Total Points: 50

Write your name & WSU ID. Otherwise, up to 5% marks may be subtracted.

1. (6 points) Consider a multilevel computer with different interpreters at Levels 1, 2, and 3. An interpreter between Levels 1 and 2 takes 4 instructions to process one instruction. However, an interpreter between Levels 2 and 3 takes 3 instructions to process one instruction. One instruction at Level 1 takes 1 nanoseconds to execute. How long does it take for an instruction at Levels 2 and 3?

2. (7 points) Briefly describe at least seven major components and/or control signals used to implement a full LEGv8 Datapath.

3. (2+2 = 4 points) (a) What is pipelining? (b) Why pipelining is important?

4. (3x3 = 9 points) With examples, describe three types of LEGv8 instructions used to implement a full LEGv8 Datapath.

5. (24 points) With a schematic diagram describe the activities of a full LEGv8 Datapath while executing R-type, Load & Store, and Branch instructions. Show all required Datapath components and control signals. Do not copy/paste the diagram. *(List the assumptions, if you make any.)* [Points: schematic diagram 10 points, description 5 points, and activities executing instructions 3x3.]