Week 1

Challenges

ECE 410/510
Spring 2025

Instructions:

- The challenges below are for you to delve deeper into the subject matter and to test your own knowledge.
- Try to solve at least one problem per week. More is obviously better.
- Post your solution(s) in the #weekly-challenges Slack channel so everybody can appreciate what you did, ask questions, and make comments.
- Document everything for your portfolio and make any code available on Github.

Challenge #1

Go to the IEEE International Roadmap for Devices and Systems (IRDS) website (https://irds.ieee.org) and browse through the "Beyond CMOS" 2023 update roadmap to get a sense of the variety of devices that are being considered for beyond Moore technologies:
https://irds.ieee.org/images/files/pdf/2023/2023IRDS_BC.pdf
Read as long as your interest lasts.

Challenge #2

Read the following paper:
James P. Crutchfield, William L. Ditto, Sudeshna Sinha; Introduction to Focus Issue: Intrinsic and Designed Computation: **Information Processing in Dynamical Systems—Beyond the Digital Hegemony**. *Chaos* 1 September 2010; 20 (3): 037101. https://doi.org/10.1063/1.3492712

Challenge #3

Use the power of the internet and of LLMs to identify a physical system that solves differential equations inherently, through its physical properties, without executing instructions as a traditional processor does.