

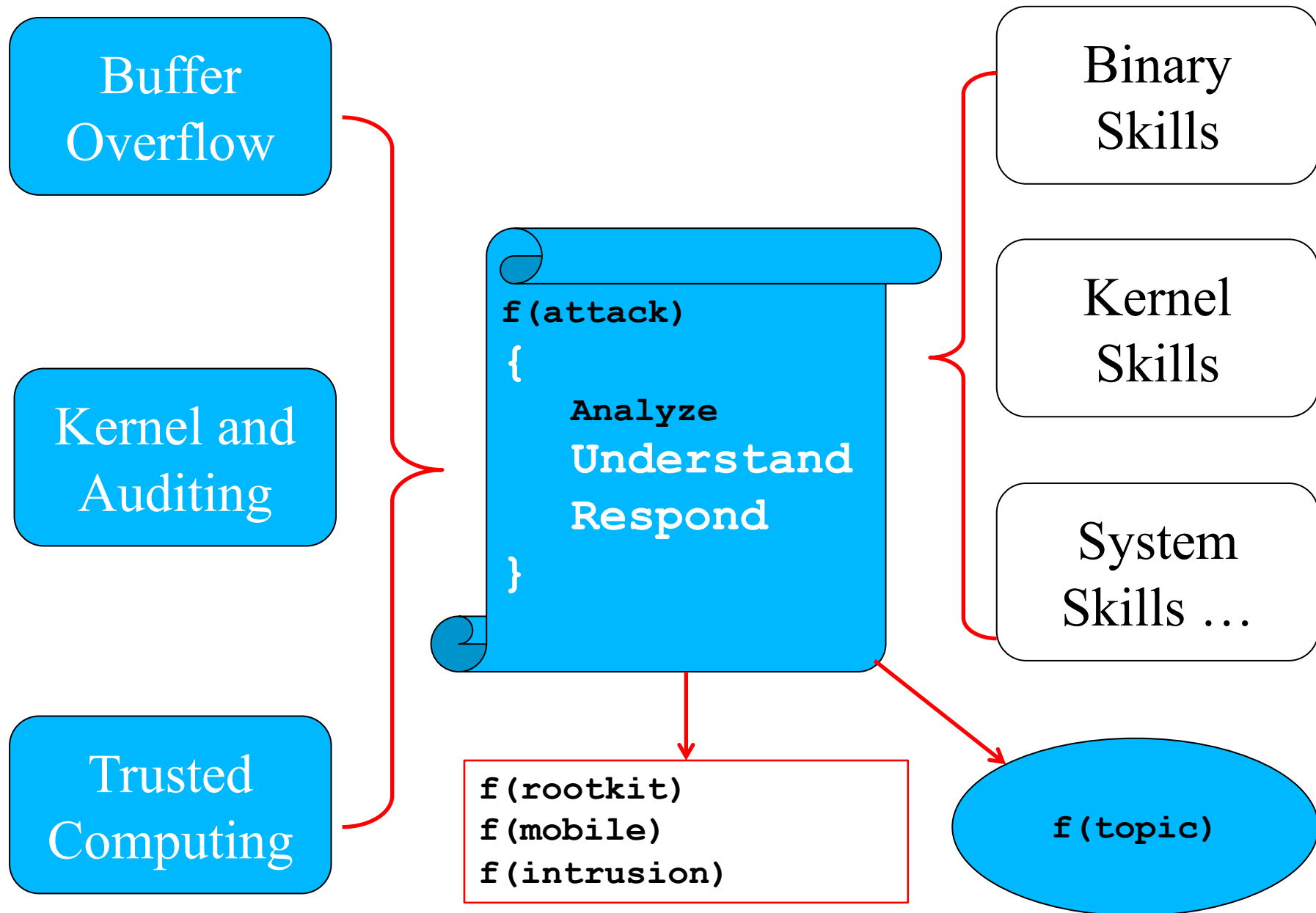
# CS5231: Systems Security

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## Lecture 10: Summary

# About This Module

- Principle and practice of systems security
  - Understanding security principles through practice
  - Learning skills of programming, system administration, and etc.
- Research frontier of systems security

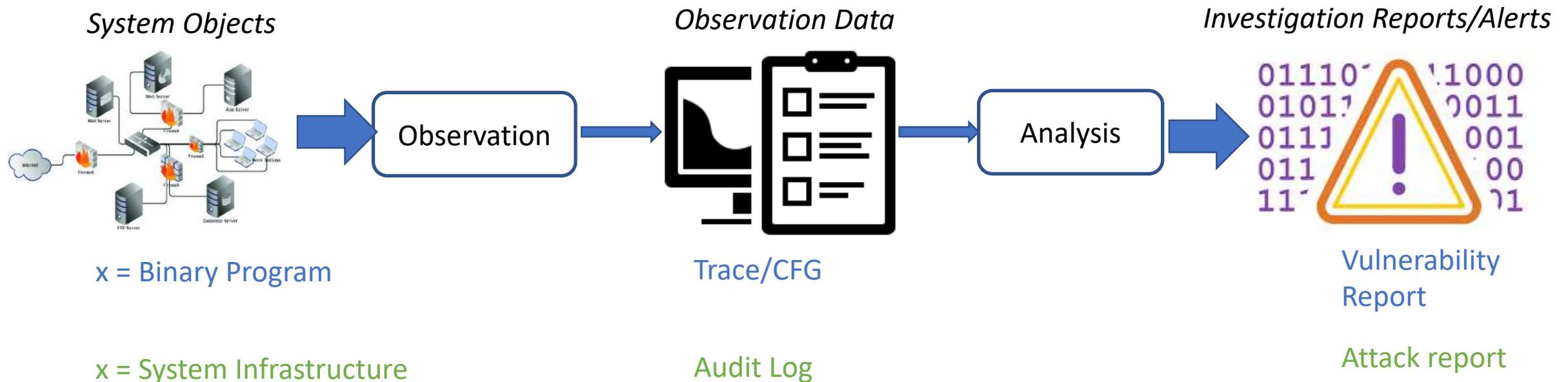


# We are Building a Function

- $\mathcal{F}(x) = :$ 
  - Analysis: Understand how  $x$  works
  - Attack: Break  $x$  to do something not allowed by design
  - Defense: Break the attack
- So far, we have applied  $\mathcal{F}()$ :
  - $\mathcal{F}(\text{binary})$
  - $\mathcal{F}(\text{web})$
  - $\mathcal{F}(\text{mobile})$

# Our Final Project

- Phase 1:  $y = \text{Observation of } x$
- Phase 2: Analysis of  $y$

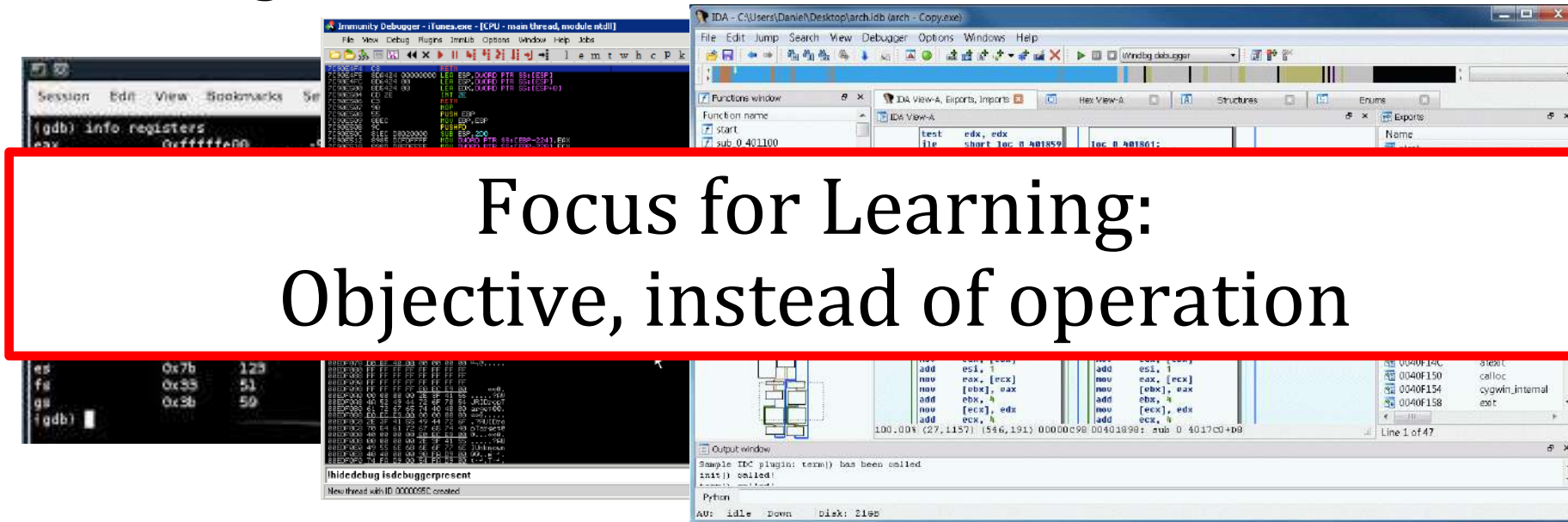


# How to Manage Details?

- Dilemma
  - We need to access details to understand the problem
  - Details will get out-of-dated soon
- What is our solution?
  - Focus on the goals (what do we need), instead of detailed operations (how to get it)

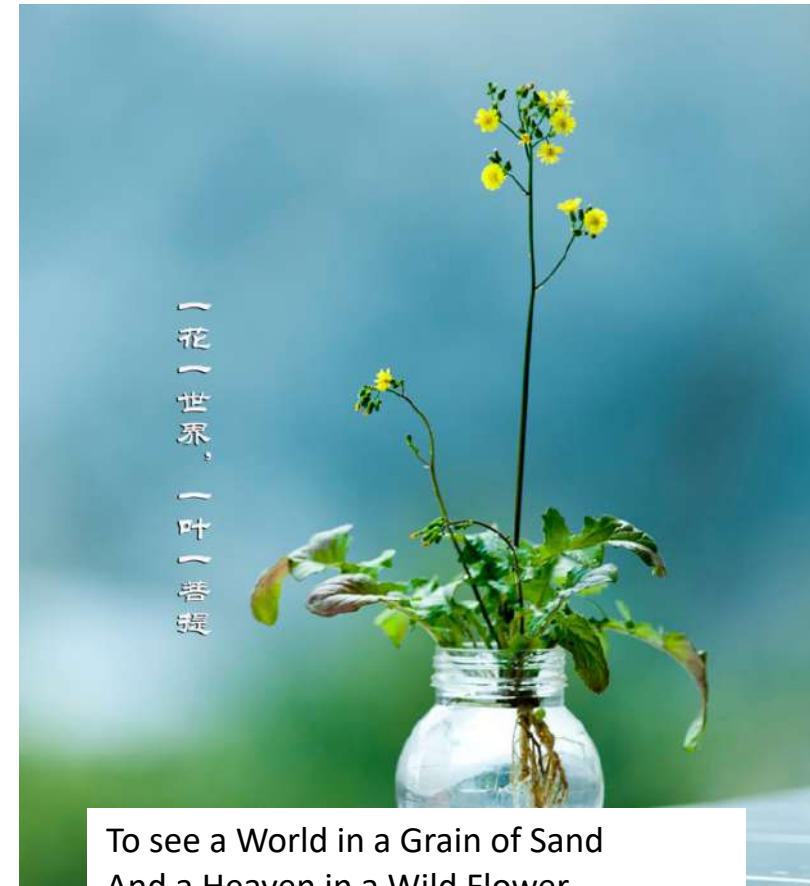
# Challenges

- Fast changing landscape in computer science, especially security
  - Knowledge and tools are out-of-dated soon



# Simplicity & Concept

- Reach deep concepts via simplest examples possible
- Practice tasks using simple tools



To see a World in a Grain of Sand  
And a Heaven in a Wild Flower,  
Hold Infinity in the palm of your hand  
And Eternity in an hour.  
——William Blake



# Practical Skills in Cyber Security

- Cyber security operations depends heavily on practical skills.
  - Malware analysis
  - Intrusion response



- Strong practical skills also deepen learning of cyber security knowledges
  - Seeing concepts in action

# Spirit over Skill

- Philosophy of Chinese martial art
  - Spirit, instead of fist and sword



以柔克刚

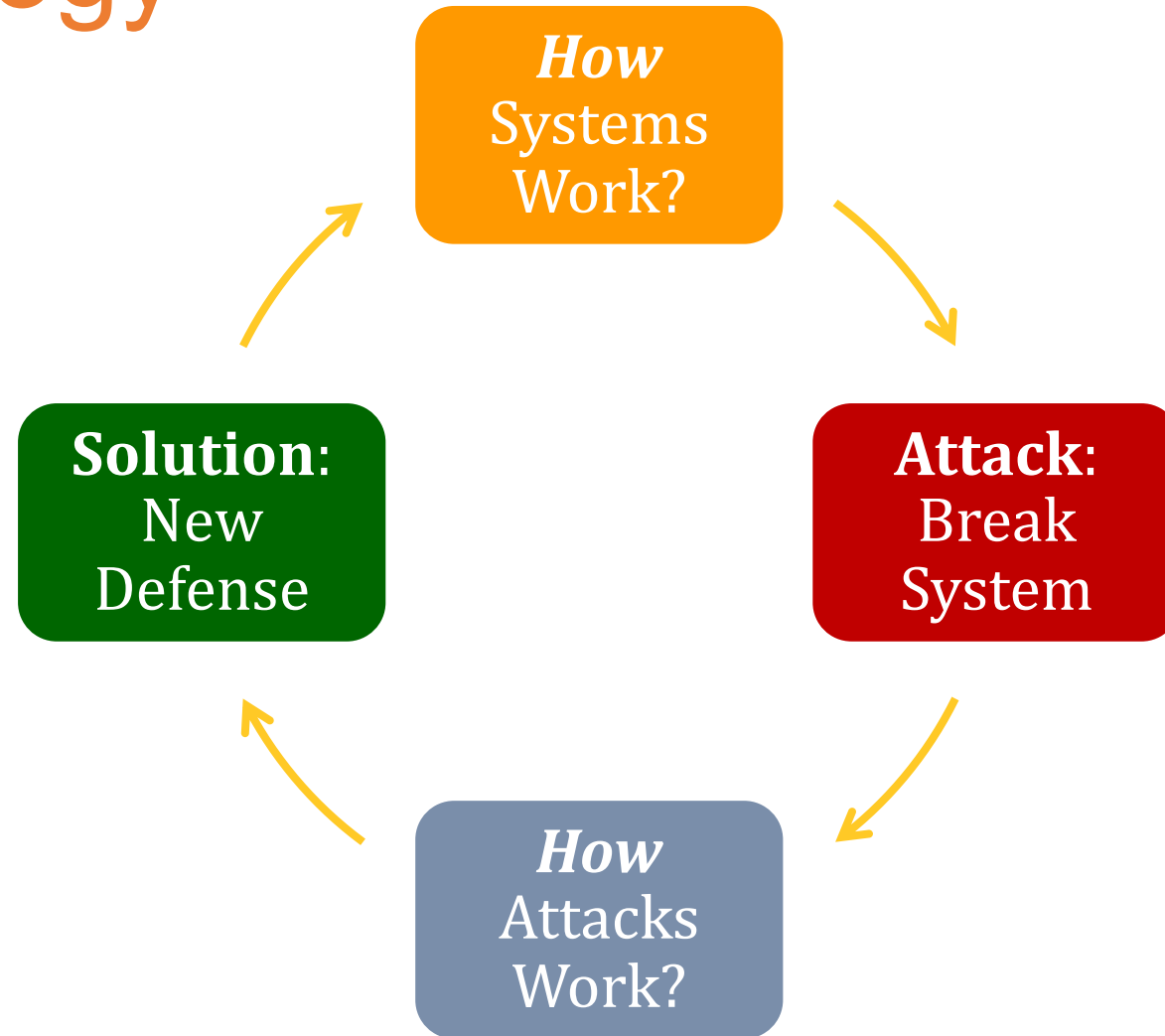
Counter force with agility.

以不变应万变

Counter changes with a constant principle.

- In Security: “What to do” over “how to do it”
  - **Practice**, and more importantly, **REFLECT**.

# Methodology



# MOOC vs. University Education

- Photography vs. painting



- **MOOC** **UNIVERSITY**  
Tool → Technique → Tao

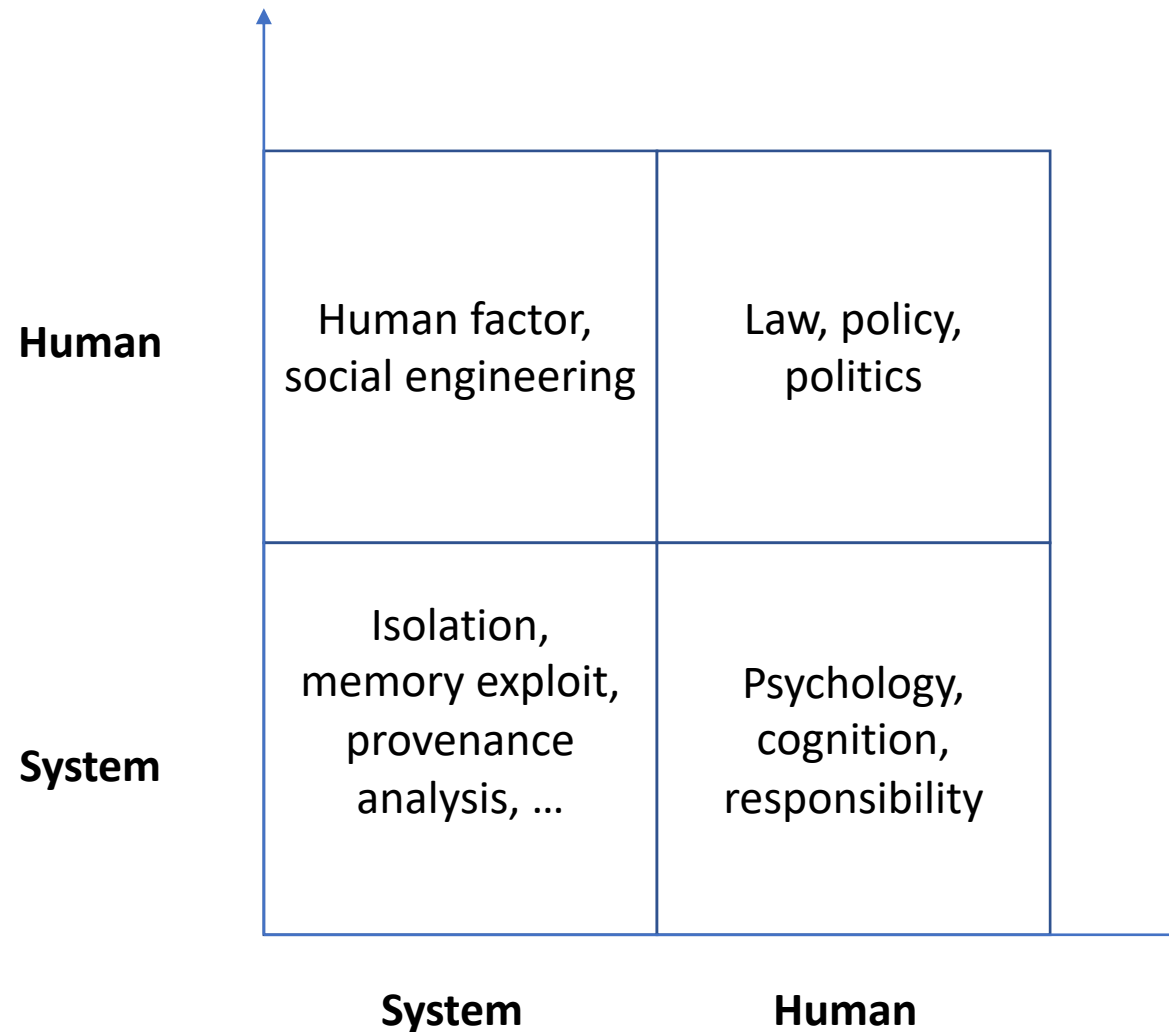
# What is the implication of ChatGPT?



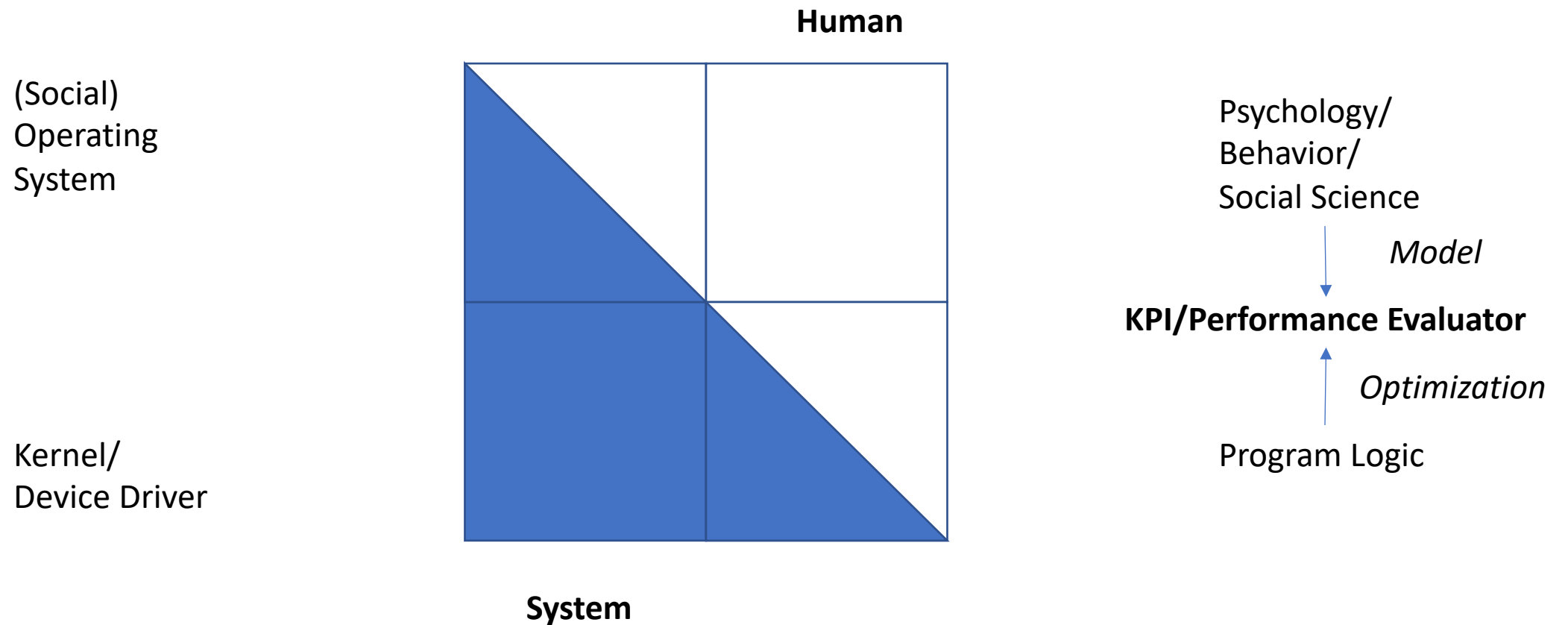


# What is our learning objective?

# Dimensions of System Research



# (Social) Operating System





# Knowledge/Skills Beyond Computing



What's in common to achieve excellence?



Don't focus on direct target.

Controlled relaxation and flexibility



# Stay Curious!



Understanding systems 理解系统

Abstracting knowledge 提炼知识

Connecting facts 参悟规律