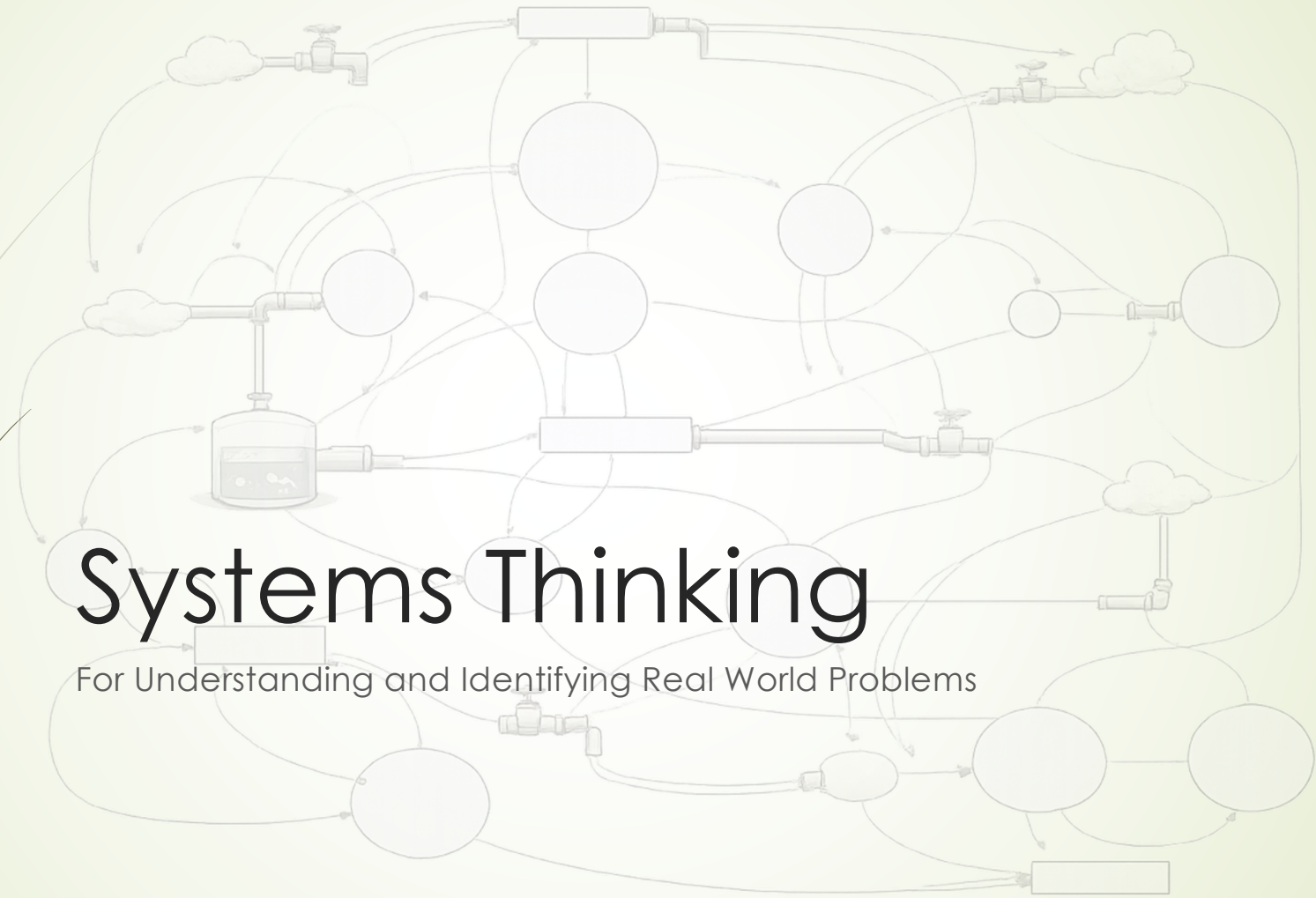


Systems Thinking

For Understanding and Identifying Real World Problems

Why This Lecture Matters

- Problems don't exist in isolation
- Most failures are systemic
- Seeing the system changes what's possible

What's going on today?

Why Systems Matter

Anatomy of a System

System traps

Your Advantage


Meet Your New Teams!

Game Time


BE
HERE.
BYU VS UTAH
SAT, JAN. 24TH | 3:30PM | MARRIOTT CENTER
GET TICKETS

Follow up

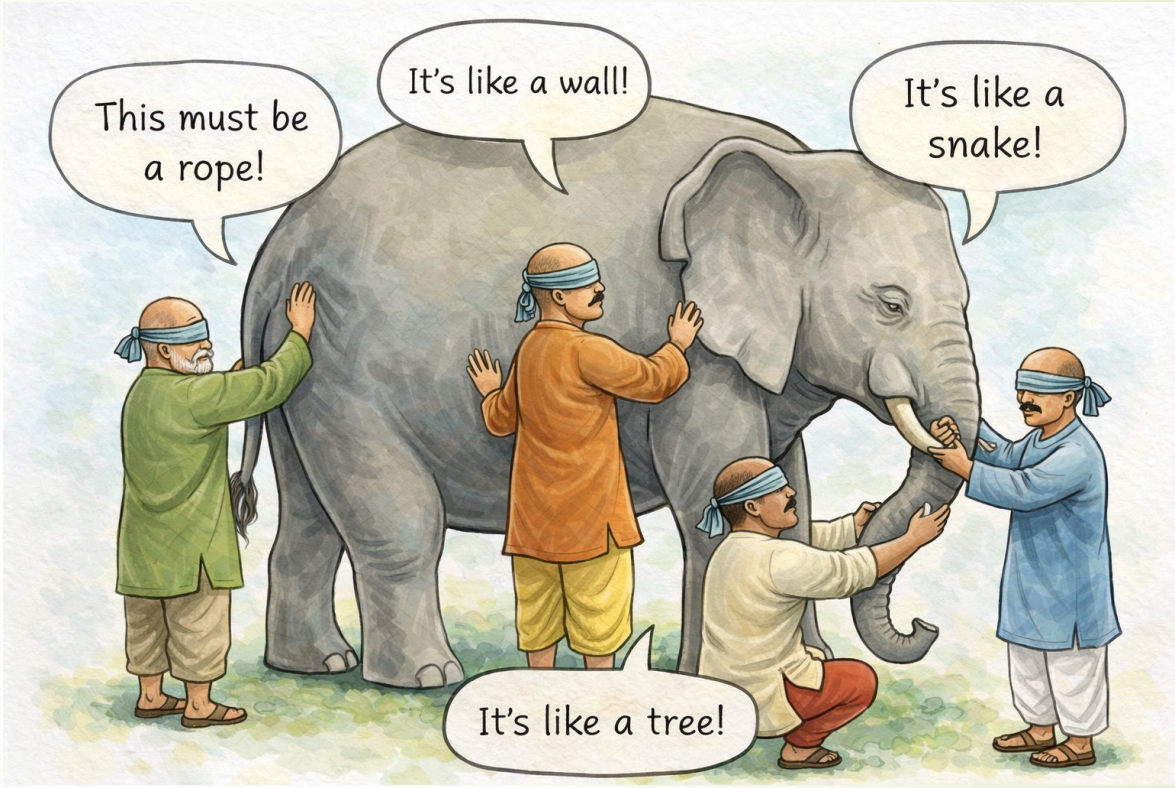
- What Surprised You?

Rethinking Systems

Most failures aren't because people are stupid or unethical. It's because they don't understand the systems that they're in.

My Guess

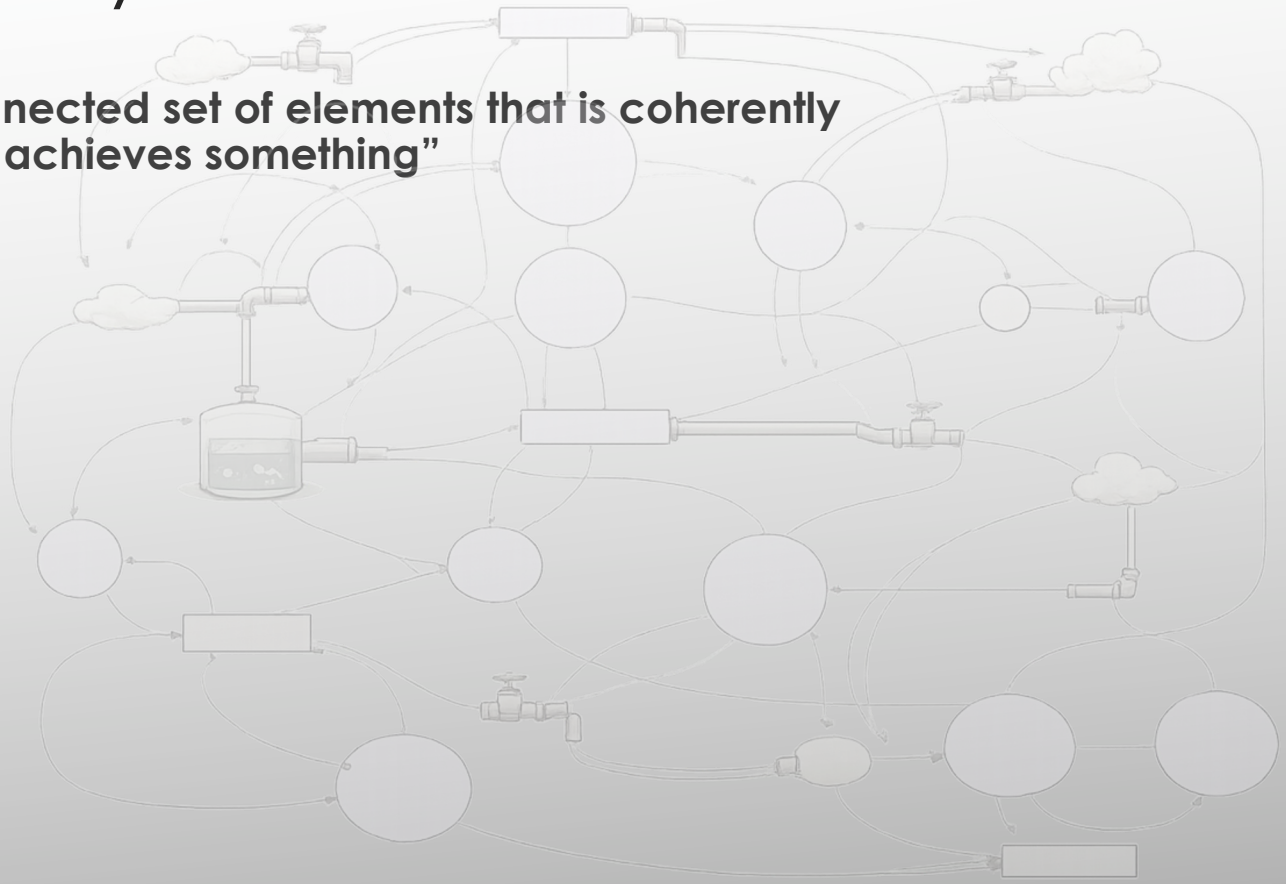
- Almost no one questioned the system itself
- If you can't see the system, you can't see the space of possible actions



What is a System?

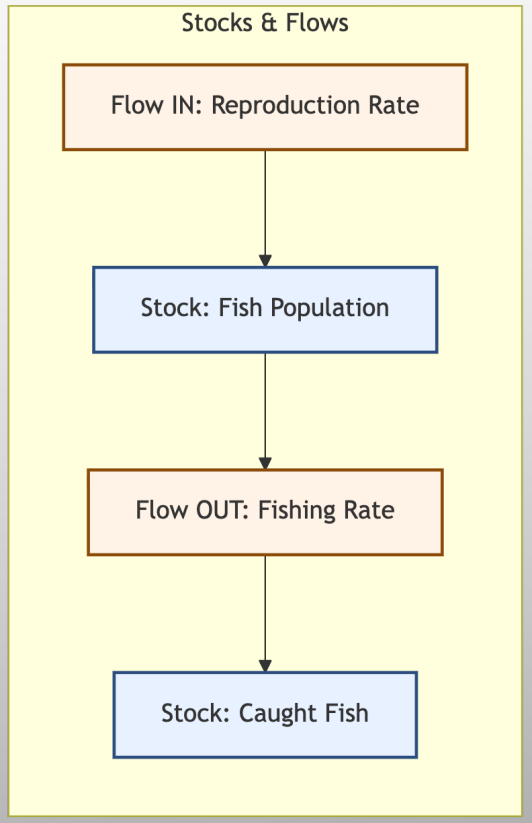
"A System is an interconnected set of elements that is coherently organized in a way that achieves something"

- Elements
- Connections
- Goal or Purpose



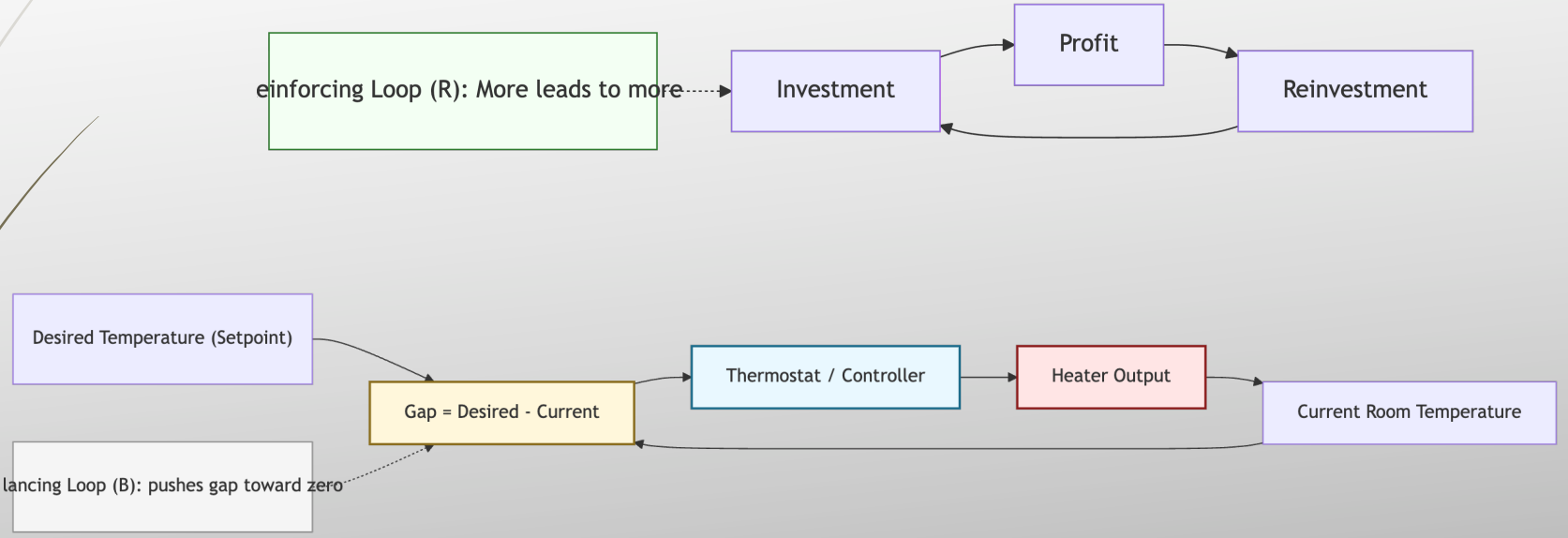
Anatomy of a System – Stocks & Flows

- Stocks – the memory of the history of changing flows in the system

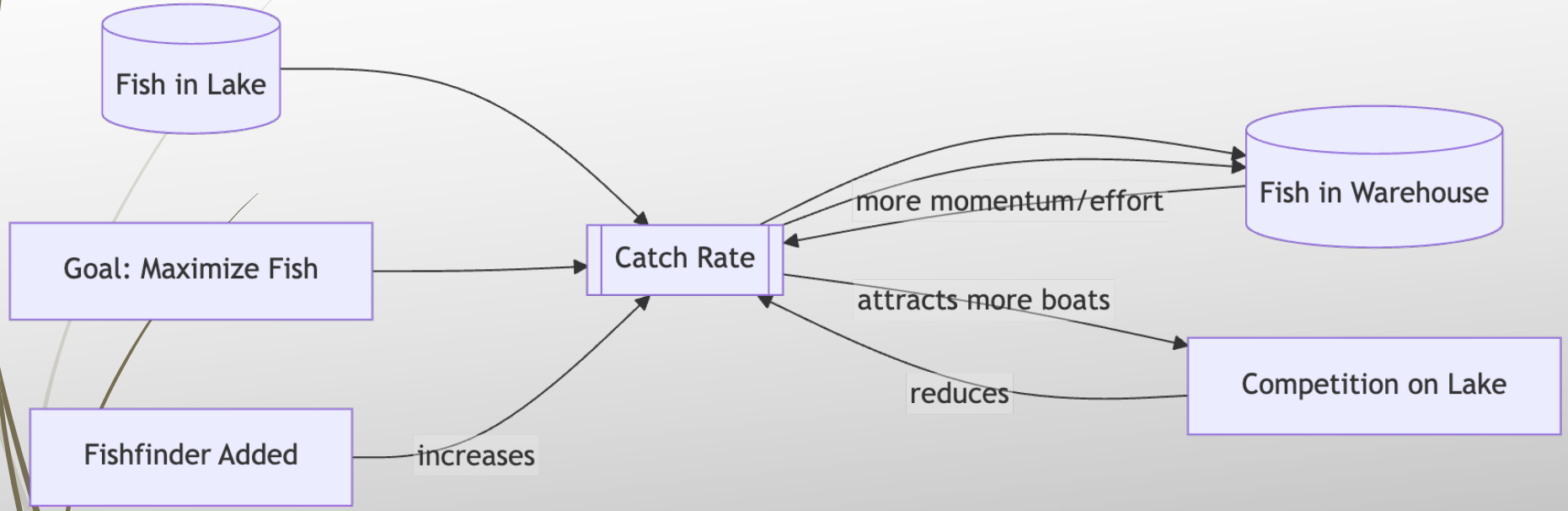


Anatomy of a System – Feedback Loops

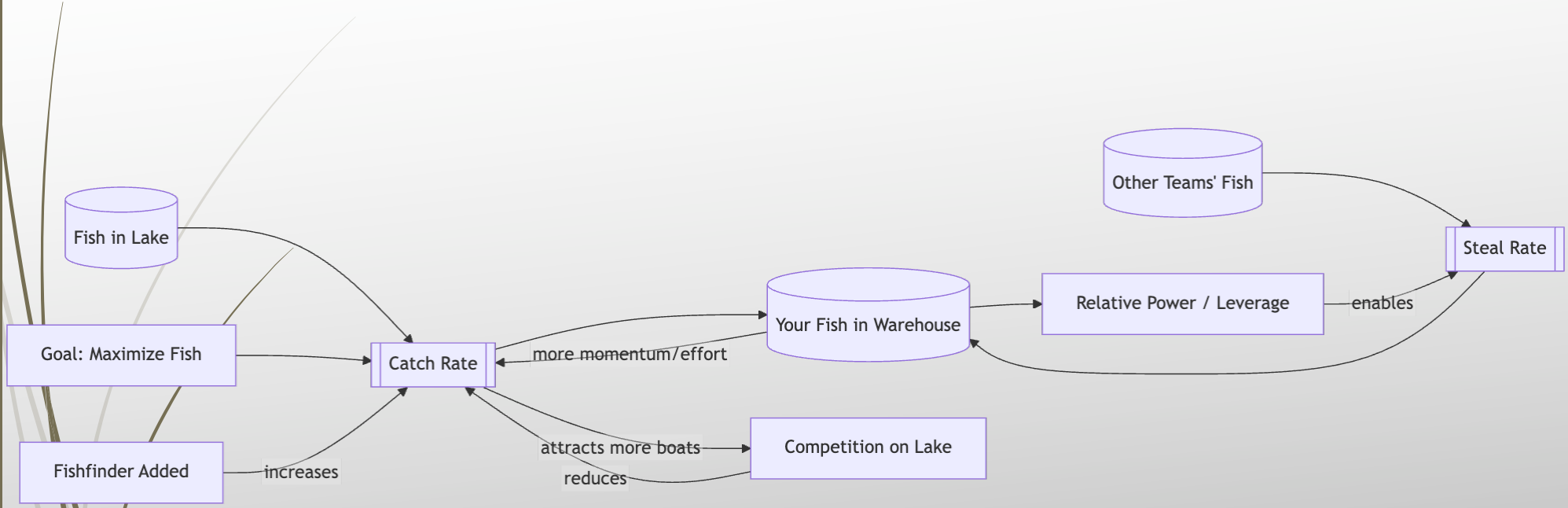
- How changes to the stock influence the flows that go back into the stock



System Examples - Fish



System Examples - Fish



System Traps

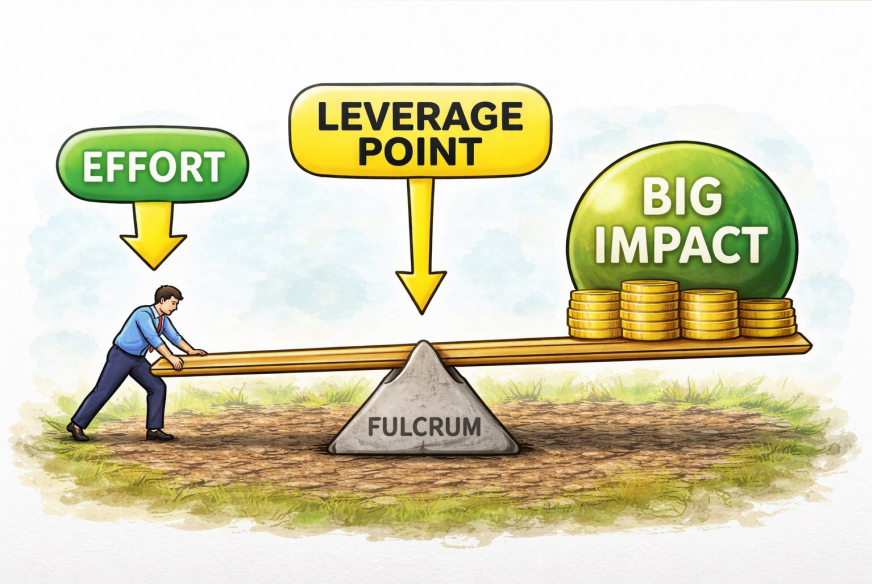
- Bounded Rationality
- Rule Beating
- Success to the Successful
- Tragedy of the Commons

Don't Blame People

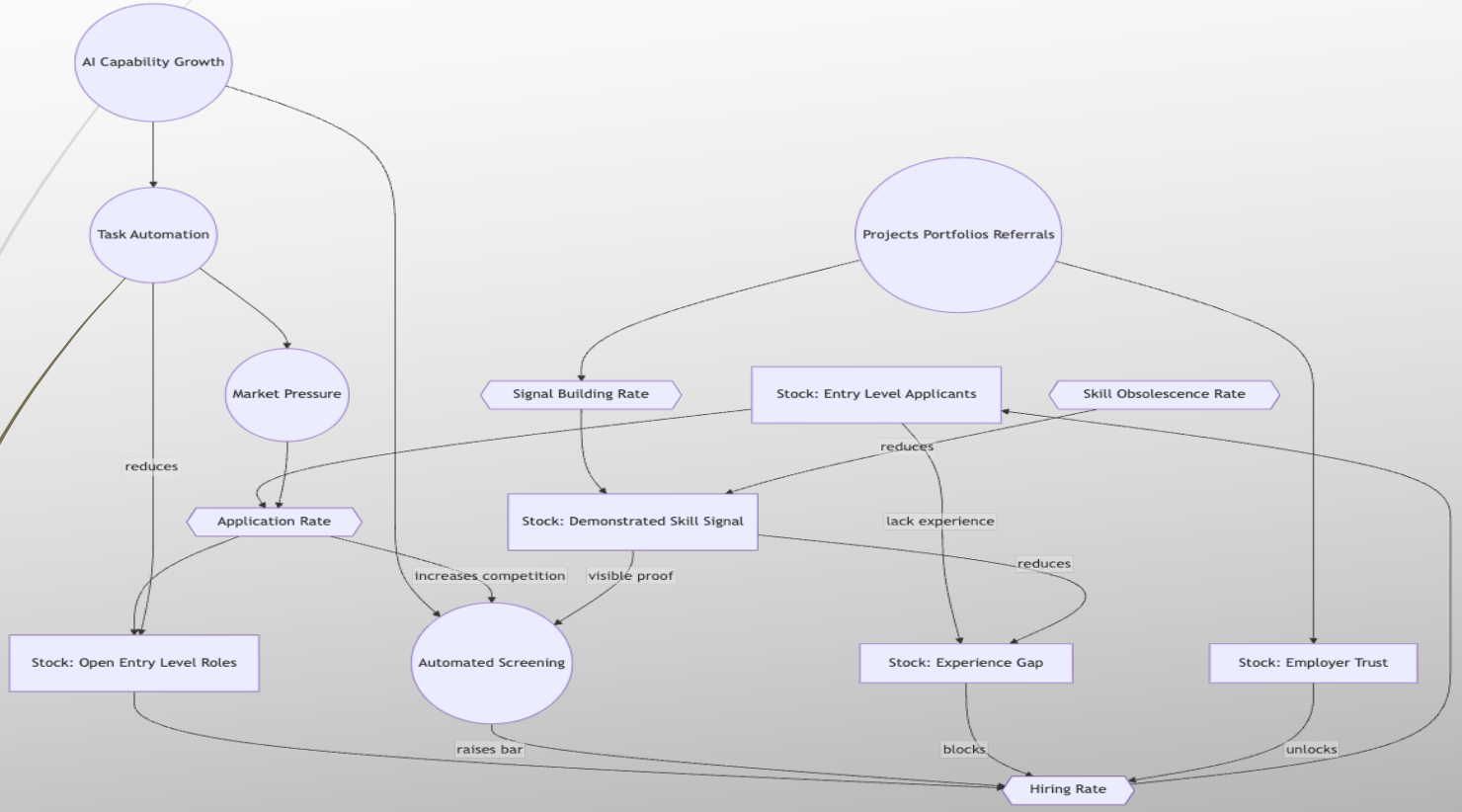
- Systems Shape Behavior
- **"For if you suffer your people to be ill-educated, and their manners to be corrupted from their infancy, and then punish them for those crimes to which their first education disposed them, what else is to be concluded from this, but that you first make thieves and then punish them"**

Leverage Points: Interacting with & Changing a System

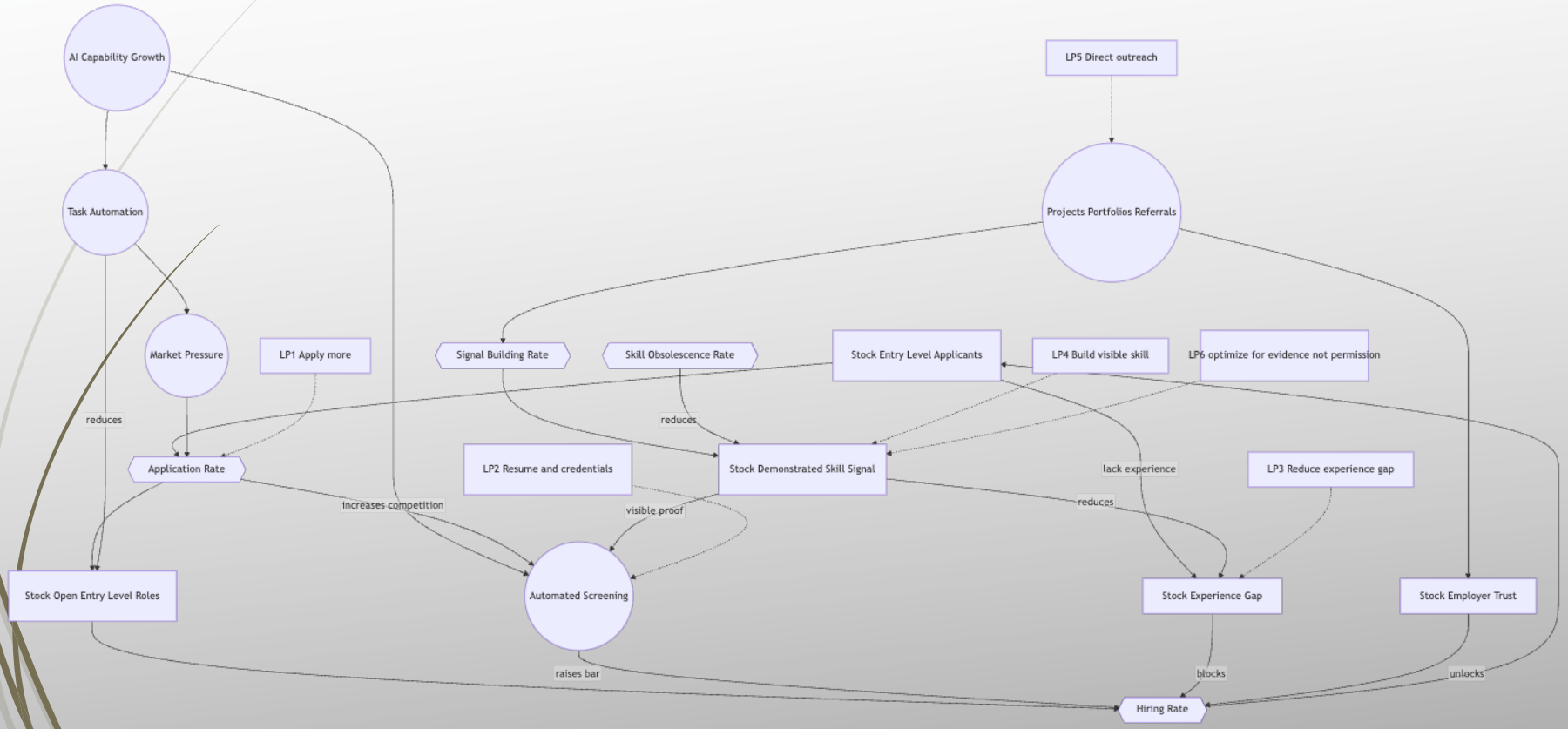
- **Surface-level leverage**
  - Parameters
  - Thresholds
  - Numbers
- **Structural leverage**
  - Feedback loops
  - Incentives
  - Information flows
- **Deep leverage**
  - Goals
  - Rules
  - Assumptions / paradigms



System Examples - Hiring



System Examples - Hiring

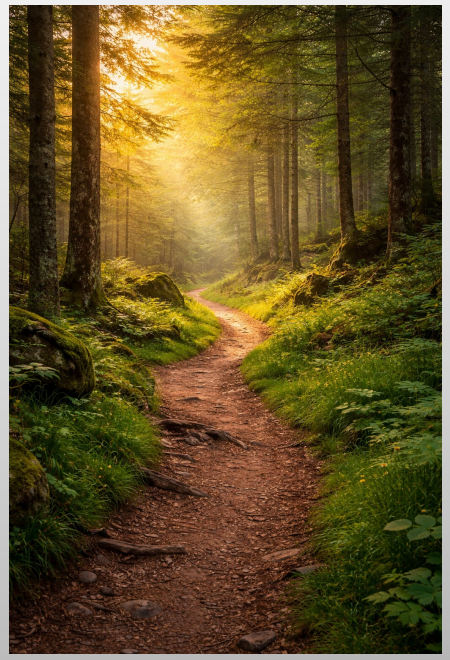


Why This Matters for IS Students

- IS or CS?
- AI Has Changed the Terrain
  - Codifiable work gets cheaper
  - Judgement and framing remain scarce
- Information flow **is** leverage
- Orchestration is greater than execution

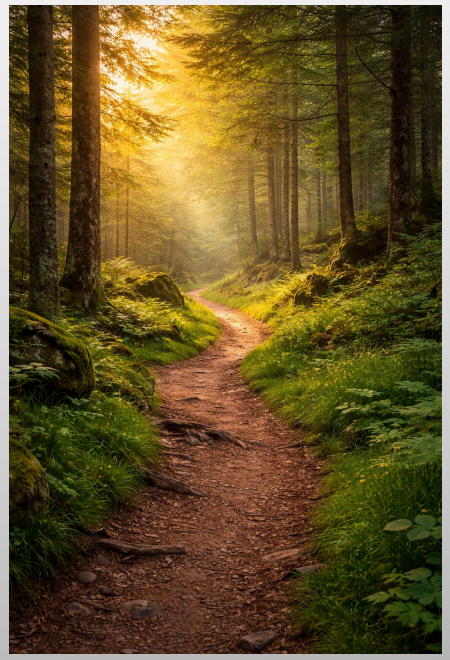
Systems Thinking Leads to Problem Solving

- Seeing systems reveals problems
- Problems no longer look so random
- This is essentially what effective product teams do



AI Conversation This Week

- Talk about the lectures in general (of course)
- Take some time to really dig into a system. Have the LLM help you model/visualize it with markdown/mermaid diagrams.
- Identify the different leverage points in the system.



What's Next?

You've learned about	Next Lecture
Incorrect Mental Models (Lecture 1)	Identifying Problems Worth Solving
How/Why thinking fails, and how to counteract those failures (Lecture 2)	Understanding what problems may benefit from AI/Agentic workflows
How to create more accurate mental models and identify problems/solutions with understanding systems (Lecture 3)	**Homework:** Use system thinking to identify 3 potential problems you think would be interesting to try to solve. 90-second pitches for each problem need to be ready to pitch to your team next lecture!