



# Beyond CS240

# Software

Program, Application, Algorithm

Programming Language

Compiler/Interpreter

Operating System

Instruction Set Architecture

Microarchitecture

Digital Logic

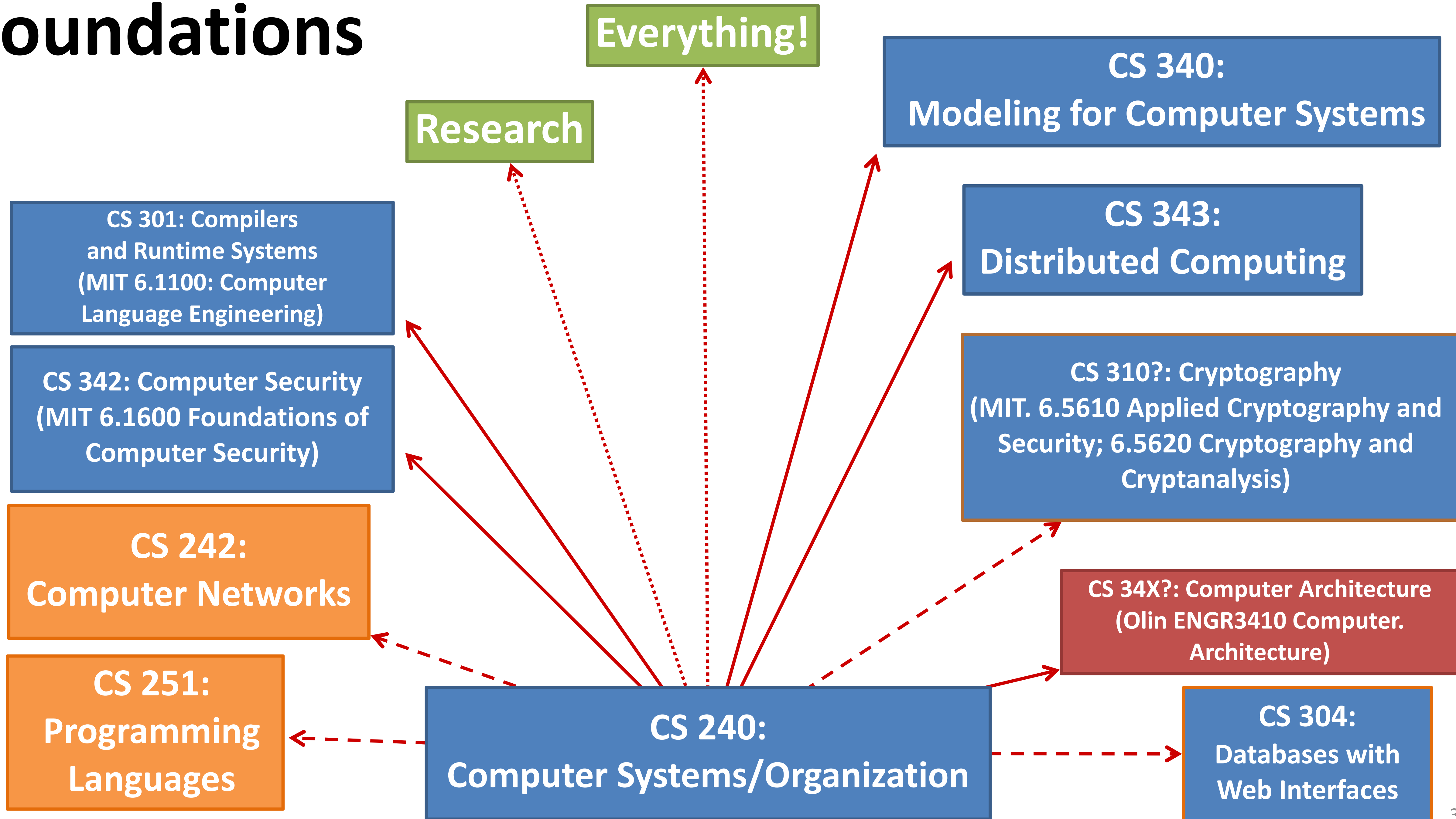
Devices (transistors, etc.)

Solid-State Physics

# Hardware

Think about how much more you know about *how computer work* compared to the start of the semester!

# Foundations



# Big Ideas in CS, Systems, and beyond

## Abstraction

Abstraction is beautiful and empowering,  
but real abstractions have leaks and wrinkles.

## Representation

Representations have costs  
but allow us to build useful things.

## Translation

Between layers of abstraction.  
Structured computation.

## Performance

Memory: clever, imperfect abstraction.  
Tiny code changes, huge impact.

## Security + Reliability

Trickiest exploits & errors  
involve multiple layers, even hardware!

These things matter more every day.

Thank you for thinking  
and learning with me  
this semester!