

## CSE 142

### What is Computer Science?

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### What is Computer Science?

- What do you think it is?



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### What is Computer Science?

- What some people say:
  - "Computation"
  - "Formal system"
  - "Abstraction"
  - "Building computers"
  - "Programming", "Software Development", "Software Engineering"
  - ...
- Often it come down to *modeling*

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### What is a Model?

- Model: one thing that represents some other thing
  - A toy ship models a real ship
- Blueprints model a house
  - A doll house also models a house!
- A set of equations might model an ecosystem



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## What is modeling?

- What are some more examples of models?
- *Why* do people make models?

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## Programming as Modeling

- Take something real (bank, ship, house, University)
- Make a model in software of its objects, parts, relationships, etc.
- Or... take something imaginary (video game world, scientific theory)
  - Even though imaginary, it has objects, features, parts, relationships, etc.
- Make a model in software of its (imaginary) objects, etc.
- Philosophical question: is the model itself real?

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## What Can Get Modeled?

- Objects
- Parts of Objects
- Data
- Features
- Actions
- States
- Changes over time
- Patterns
- Relationships between the above
- ....

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## Overview of CSE 142

- We'll learn how to model...
  - Objects
  - Relationships
  - Patterns
  - Data
  - Computation
- ...while learning how to create software systems using the Java programming language

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## The World of Objects

- The *object* is the basic unit of modeling in modern programming systems.
- We'll learn to think about *properties* and *responsibilities* of objects
  - Properties: information relevant to the object
  - Responsibilities: tasks an object performs
- We'll learn to think about how objects relate to each other in a system
- Note: Modeling the world with objects in software is called *object-oriented programming*.

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## Student Example

- You are a student
- Let's model a *student object* in the context of a course registration system
- Name examples of relevant properties:

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## Student Example (cont.)

- What are some responsibilities (tasks) for the student in a course registration system?

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## Retail Store Example

- Let's model a system to store inventory of a retail store that sells men's and women's shoes
- Give some examples of objects in the system

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### Retail Store Example (cont.)

- Object   Properties   Responsibilities

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### Summary

- Building a piece of software is a form of modeling
- Model-building is a common human activity
- Modeling involves identifying objects and discovering their properties and relationship
- Modeling the world with objects in software is called object-oriented programming.

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