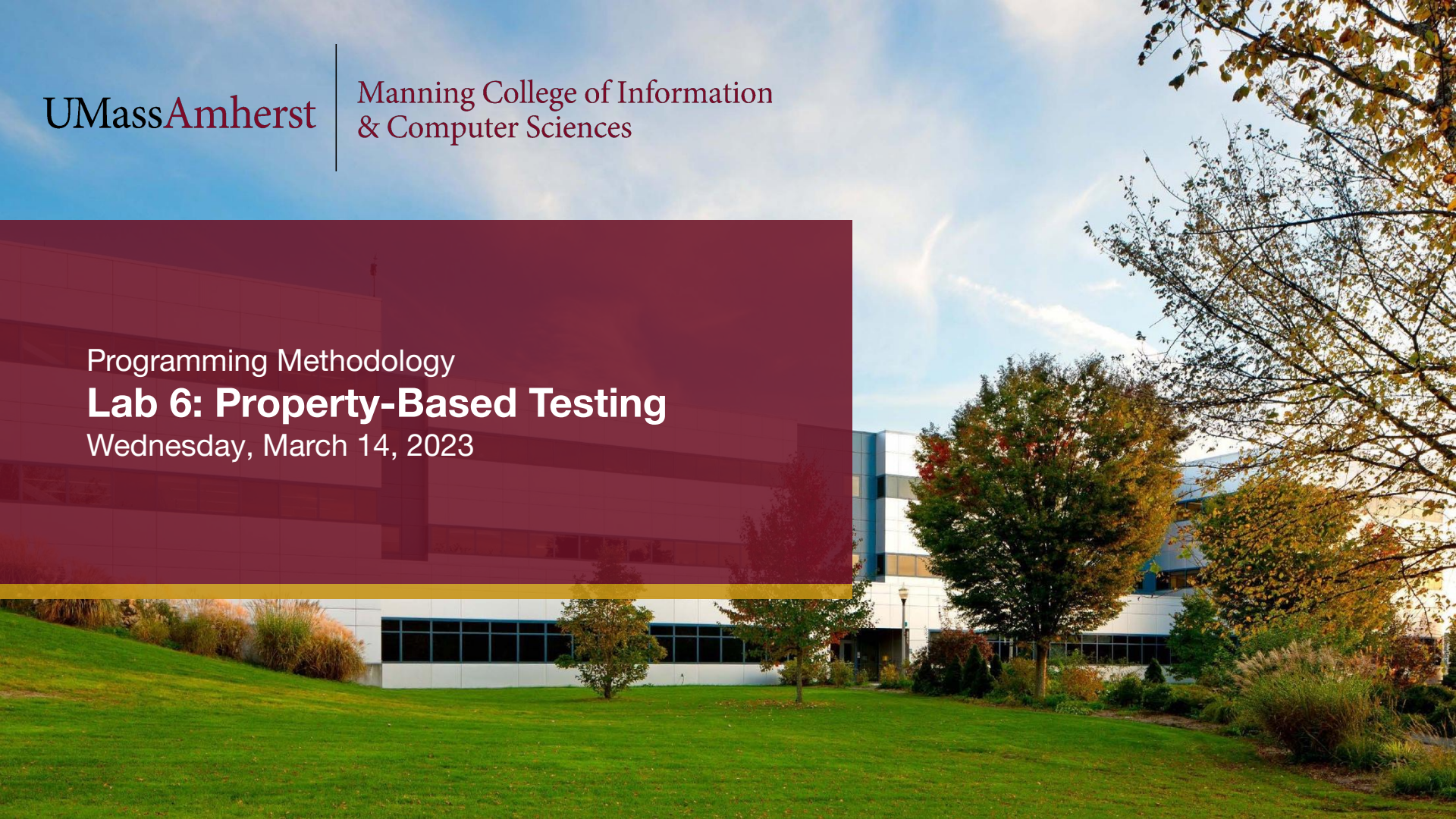


UMassAmherst | Manning College of Information & Computer Sciences

Programming Methodology

Lab 6: Property-Based Testing

Wednesday, March 14, 2023

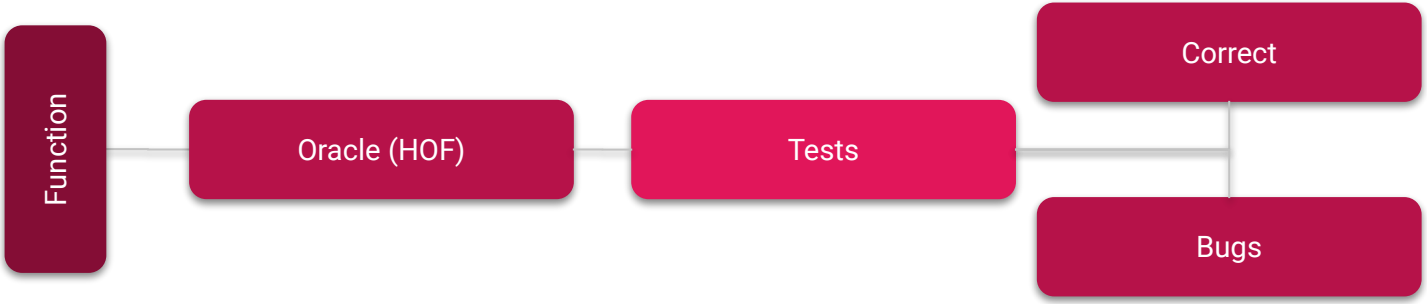
Property-Based Testing

Used when a problem has **more than one** right answer

Steps to Property-Based Testing:

1. Start with a valid input to your problem
2. Run the algorithm on that input
3. Check that the result has all necessary characteristics

Oracle Functions



Exercise: Permutations

A function **genArray**(n: number): number[][] is supposed to generate an n × n array of numbers such that each row and column is a permutation of the numbers from 0 to n-1. Assume n is nonnegative.

Write an oracle that accepts the function genArray as input.

Use higher-order functions when appropriate. Try to write your implementation in $O(n^2)$.

Exercise: OOP

Think back to lecture where you discussed the shapes classes.
Before we start with this exercise, please familiarize yourself yourself for a few minutes with the code in the starter code. It should seem familiar to you.

Uncomment and run the three examples and make sure you understand!

- Your TA will demonstrate this.

Implement a **class** Translate whose constructor takes a shape and a change in x and change in y value. When the draw method is called with a CanvasRenderingContext2D (ctx) and a color, shift the canvas by dx and dy using ctx.translate, draw the shape on the moved canvas, and move the canvas back to the starting position.

Now run `npm run start`. You'll know your code is correct by the image.