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Slide 2

Repetition — Recap/Review
Ability to repeat an operation, either a fixed number of times or until some condition is true is critical to many if not most interesting(?) uses of computers.
How to express repetition? all sufficiently powerful programming languages provide at least one way, and many provide several, many based on recursion and/or loops. Often more than one type of loop.

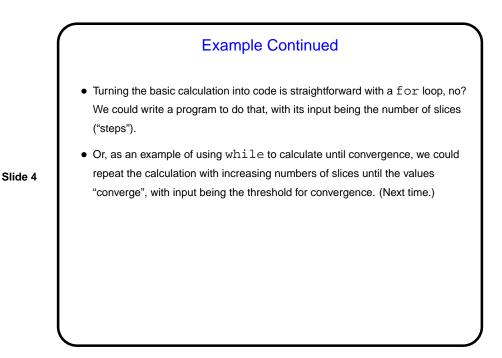
Loops — Another Example

• As you might have learned in a calculus course, the area under the curve

 $4/(1+x^2)$

in the interval $0\leq x\leq 1$ turns out to be $\pi.$ (If you don't remember/understand this, okay to take it on faith — key point for us is what we do with this mathematical fact.)

 So one way of approximating π is to approximate this area, which can be done with "numerical integration" — split the area into many small slices, all the same width, approximate the area of each slice by its width times the function value at the midpoint of the slice, and sum these areas.



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