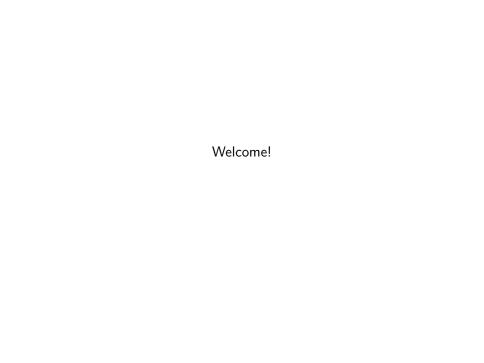
ECON 210: Section 1

Marcelo Sena

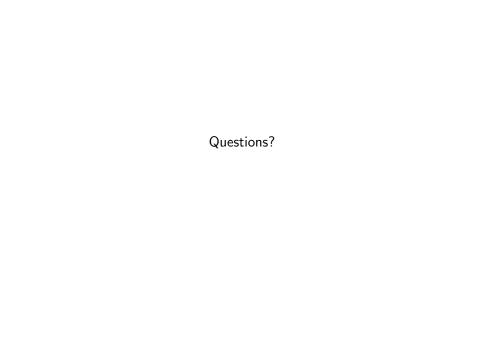


Logistics

- Section times: Fridays, 3:00pm-4:50pm, Lathrop 014
- Office hours: Mondays 5:30pm-7:30pm
 - https://stanford.zoom.us/my/marcelosena
 - ▶ Passcode: 307321
- E-Mail: msena@stanford.edu
- Grading:
 - ▶ 25% Psets: problem sets due by TA section time.
 - 75% Take-home exam
- Highly recommended to work in groups for Psets (up to 5 in a group)
- All material will be posted on Canvas.

About the sections

- ► TA sections are meant to review material and develop dynamic programming skills (widely applicable!)
- Typically we go over conceptual material + solve problems (with coding)
- Bring computers if possible!
- Ask questions!
- Feedback is always welcome



Ready to start some dynamic programming!

Plan for Today

- ► A bit on coding
- Finite-horizon deterministic dynamic programming problem
- ► Break
- Code the solution

A bit on coding

- Programming camp material uploaded on Canvas
- For Python and Julia, QuantEcon is a nice reference for Economists. https://quantecon.org

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- Does your algorithm change if we add a coin with face value 9?

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- Suppose coins available have face value $d = \{1, 5, 10, 25\}$.
- Think about an algorithm that solves this problem.
- Does your algorithm change if we add a coin with face value 9?
- Does your algorithm work to change 387498327489?

We want to find a general solution.

We will formalize the problem and apply dynamic programming principles.

- Break down the problem into easier sub-problems.
- Solve the easier sub-problems.

How can we write the probem recursively?

Let

- ightharpoonup C(p) be the minimum number of coins to change a face value of p.
- Let $x \in d$ be used in the optimal solution.

What is the relationship between C(p) and C(p-x)?

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$$C(p) = 1 + \min_{d_i \in d} C(p - d_i) \tag{1}$$

$$\implies C(p) = 1 + C(p - x)$$
 (2)