



Evolutionary Game Theory

CAAM 210

Outline

function evodriver

- runs evo for values specified in notes

function evo(M,N,b,gen)

- calls score, advance, evodisp to play game and display colored matrices
- creates and plots fraction of cooperators plot

function S = score(A, b)

- called at each iteration, calculates score of each player

function An = advance(S, A)

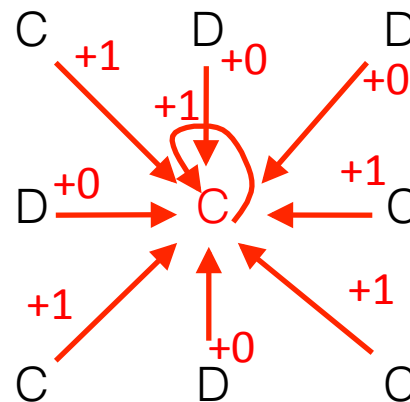
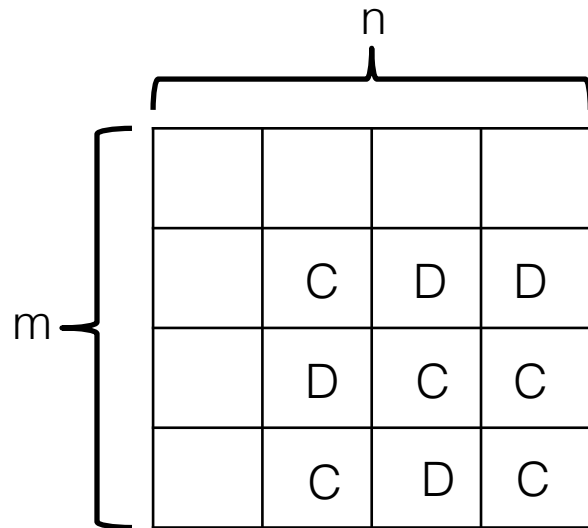
- called at each iteration, for every player finds the neighbor with the highest score, and changes the player's identity to the winning neighbor's identity

function evodisp(A, An)

- creates color "slice" matrix for display

Scoring

C vs. C -> each receives 1
 C vs. D -> C receives 0 and D receives b ($b > 1$, $b = 1.9$)
 D vs. D -> each receives 0







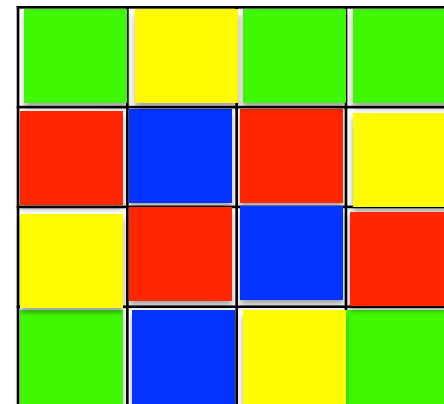
C scores 5
this round

- At each round, every player's score is calculated in this manner.
- Each player also plays themselves.
- Players on the edges play fewer than central players

Advancing

- After the score is calculated at each round, each player takes the identity of the neighbor (including themselves) with the *highest score* on the last round. If the highest scorer was a defector, the player under consideration becomes a defector, etc.
- The grid is *colored* to represent the change in identity of each player at each iteration, as follows:

	C remains C
	D remains D
	C becomes D
	D becomes C



*fine print: this is just an example.
Don't try to figure out the logic
behind it – there isn't any.*

How to color?

- using `image` on a matrix, for example `image(M)` will produce a colored plot such as those found in the notes.
- RGB triples can be used to encode the colors.
- The matrix has 3 “slices”. In other words, it is a “stack” of the $m \times n$ matrices you have worked with in this class to date. Each slice encodes one of the R, G, or B values.



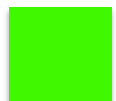
RGB: 0 0 1



RGB: 1 0 0



RGB: 1 1 0



RGB: 0 1 0

```
>> M = rand(50,50,3);  
>> image(M)
```

