Contents

```
%
% Dan Calderon, CAAM 210, Spring 2010, HW 14
%
```

evodriver1.m

```
%calls on evo,

% sets sizes and b (and a plotflag)
% in order to generate the necessary plots.

function evodriver
```

```
evo(67,67,1.9,40)


return
```

evo.m

evo delegates to three subfunctions score(A,b) which calculates the score for each entry in A advance(S,A) which uses the score to determine the next generation evodisp(A,An) which compares the prev. generation to current to generate representative colors for the state

```
function evo(M,N,b,gen)
```

```
FC = zeros(1,gen);

A = ones(M,N); % M-by-N starting template
A((M+1)/2,(N+1)/2) = 0;

%A = round(rand(M,N)/1.8);

for itc = 1:gen, % play for gen generations
```

```
    clf

    S = score(A,b);    % living are red

    An = advance(S,A);

    FC(itc) = sum(sum(A))/(M*N);

    if itc == gen

        figure()

        if M == 199
            evodisp(A,An);

            title(['Generation ' num2str(itc)],'fontsize',16)
            axis off
        else

            plot(1:itc,FC)

            mstring = num2str(M);
            nstring = num2str(N);
            bstring = num2str(b);
            tstring = ['M = ' mstring ', N = ' nstring ', b = ' bstring];
            title(tstring,'fontsize',16)
            xlabel('Generation','fontsize',16)
            ylabel('Fraction of Cooperators','fontsize',16)
            axis on

        end

    end

    A = An;


end


return
```

score.m

```
% calculates the score for each entry in A
```

```
function S = score(A,b)
```

```
S = A;

M = size(A,1);
N = size(A,2);

for i=2:M-2, % dead border
for j=2:N-2,

    nC = sum(sum(A(i-1:i+1,j-1:j+1)));   % # of C neighbors

    % if C but
       if A(i,j) == 1,   % lonely or crowded die
          S(i,j) = nC;
       else
           S(i,j) = nC*b;
       end

end
end



return
```

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advance.m

```
%uses the score to determine the next generation
%
%step in time
```

```
function An = advance(S,A)
```

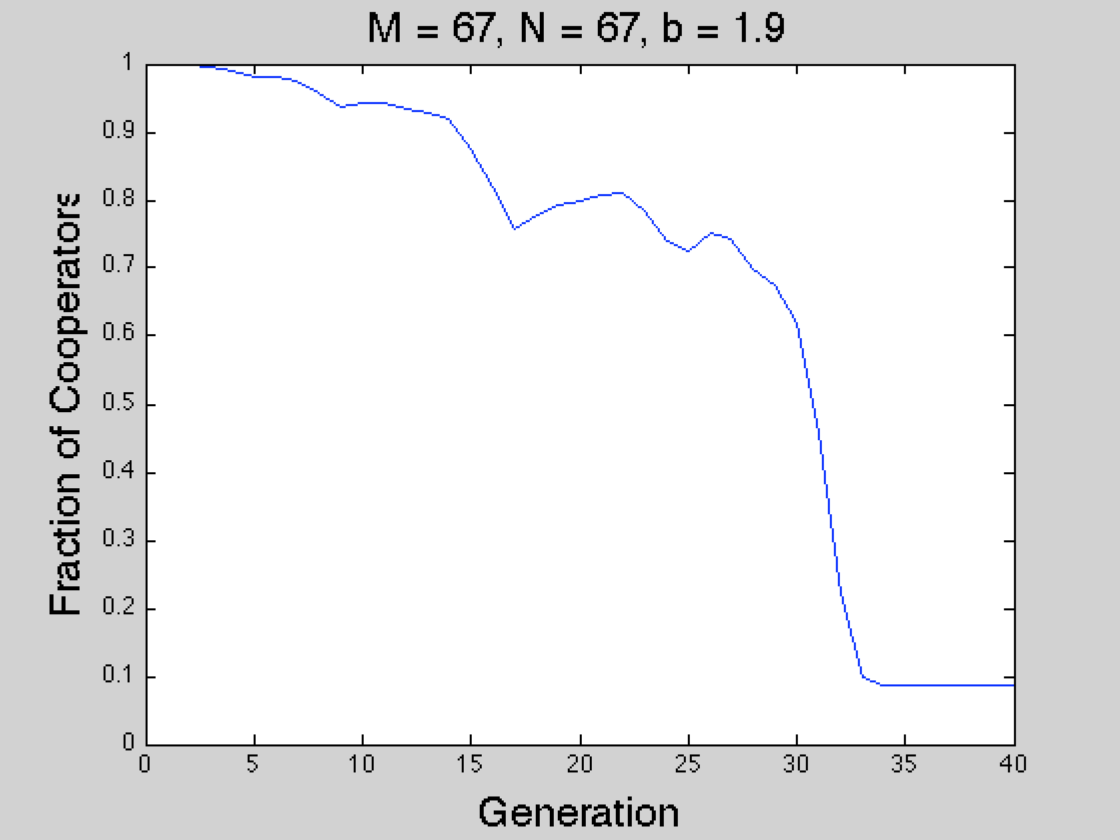
```
An = A;

M = size(A,1);
N = size(A,2);
```

```
for i=2: M-2, % dead border
for j=2: N-2,

    Amax = max(max(S(i-1:i+1,j-1:j+1))); % # of living neighbors

    [indx, indy] = find(S == Amax);

    if S(i,j) < Amax,            % if alive but
          % lonely or crowded die
          An(i,j) = A(indx(1),indy(1));
    end

end
end

return
```

evodisp.m

paints a square blue when C remains C paints a square red when D remains D paints a square yellow when C becomes D paints a square green when D becomes C

```
function evodisp(A,An)

map = [0 0 1; 1 0 0; 1 1 0; 0 1 0];

colormap(map)

display = An;

display(display == A & display ==1) = 1;

display(display == A & display ==0) = 2;

display(display ~= A & display ==0) = 3;

display(display ~= A & display ==1) = 4;

set(gcf,'doublebuffer','on'); % kill flicker

axis off

image(display)


return
```



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