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% Lab Section #202
% Project 2: Chaos Game, Spring 2019

%%
function [x,y] = BarnsleysFern(prevPoint)
%creates the Barnsley's Fern

%Input: prevPoint - 2 by 1 vector of real numbers that shows (x,y)
%          coordinates of the previously chosen point.
%Return: x - the x coordinate of the next point.
%        y - the y coordinate of the next point.

% citing the wikipedia page for Barnsleys Fern and looking at the python
% code to figure out how this is supposed to work. The date of the
% citation is 3-10-19.

% indexing into previous point and renaming to make it easier to code the
% if statement
prevX = prevPoint(1);
prevY = prevPoint(2);

% creating a randi command to find a random integer value between 1 and 100.
r = randi([1,100]);

% writing an if statement based off of the value of r
if r == 1 % represents the function that happens 1 percent of the time
    x = 0;
    y = 0.16.* prevY;
elseif r<=86 % represent the function that happens 85 percent of the time
    x = .85.*prevX + 0.04.*prevY;
    y = -.04.*prevX + .85.*prevY +1.6;
elseif r<=93 % represents a function that happens 7 percent of the time
    x = .2.*prevX - 0.26.*prevY;
    y = .23.*prevX + .22.*prevY +1.6;
else % represents a function that happens 7 percent of the time
    x = -.15.*prevX + .28.*prevY;
    y = .26.*prevX + .24.*prevY + .44;
end

end
```