1 Structure and structure array

Implement the following function for creating a structure for square data:

```matlab
function Sqr= MakeSquare(x, y, L)
    % Sqr is a square with
    % Sqr.x (x-coordinate of lower left corner) assigned x
    % Sqr.y (y-coordinate of lower left corner) assigned y
    % Sqr.length assigned L
```

Write a code fragment to create a structure array of length 5 where each component in the array is a structure containing square data. Make effective use of your function `MakeSquare`. Let all the x- and y-coordinates be random in (0,9) and let the $k$th square have length $k$.

2 Cell array of cards

If you haven’t completed `MyShuffle` from last week, be sure to do it now:

```matlab
function sd= MyShuffle(d)
    % d is a one-dimensional cell array
    % sd is the cell array after shuffling d
    % The shuffle comprises two steps:
    % - randomly cut the deck into 2 parts. I.e., the position of the cut is random.
    % - interleave the cards from the two parts until the part with fewer
    %   cards have been completely incorporated. It is up to you whether
    %   to start from the top or the bottom.
```

Implement the following function:

```matlab
function sd = Cut3(d)
    % d is a one-dimensional cell array whose length is a multiple of 4.
    % sd is the cell array after cutting the deck (d) by taking half the cards from
    % the middle of the deck and putting that half on top.
```

3 Designing Classes

Complete this problem after the next lecture. You will submit your answers to this problem on paper (typed or handwritten) at the beginning of next week’s discussion section.

This problem is about generating ideas, not writing code. For each design problem below, focus on what data (properties) are required and what actions may be performed on that data. (Later we will work on turning ideas into code—for this problem do not write any code.)

3.1 Design a Fraction class

(a) What makes up a Fraction? (There are at least two properties.)
(b) What actions can you perform on a Fraction or multiple Fractions? (Give at least four actions.)

3.2 Design a Facebook Profile class

(a) What does a Facebook Profile contain? (Give at least four example properties and specify their type.)
(b) What actions can you perform on or perform using one or more Facebook Profiles? (Give at least eight example actions.)