

Assume there is a list of 1,000 balls. The balls are either white or black, with the number of white and black balls being equal. They are randomly ordered in the list. Consider the following two methods of finding a white ball.

LV METHOD

Point to a random ball. If it is white, then exit. If it is black, then repeat (e.g. choose another random ball, and test). The procedure returns the number of tries until a white ball is found.

MC METHOD

Point to a random location in the list. If the ball in that location is white, then return 1.

If it is black, then examine the next item in the list. If it is white, return 2, and if it is black, continue with the next item in the list.

Continue examining the items in the list sequentially for at most k tries or until a white ball is found. If the end of the list is reached, go to the beginning.

When a white ball is found, return the number of balls examined. If no white ball is found after k tries, return 0.

PROBLEM 7-1 (2/2 points)

Suppose method LV is running 1000 times and we plot the number of times it took 1 step, 2 steps, 3 steps, etc.

Here is some pseudocode for the above situation:

```
histogram = [ 0 for i in range(1,1000)] # intialize the list to be all zeros


for i in range(1000):

    result = LV()

    histogram[ result ] += 1

plot( histogram )
```

The shape of the resulting plot will be:

- ☐ Straight line with slope k
- ☐ Straight line with slope $-k$
- ☒ Exponentially decreasing 
- ☐ Exponentially decreasing with a spike at 0
- ☐ Exponentially increasing
- ☐ Exponentially increasing with a spike at 0

PROBLEM 7-2 (2/2 points)

Suppose method MC is running 1000 times and we plot the number of times it took 1 step, 2 steps, 3 steps, etc.

Here is some pseudocode for the above situation:

```
histogram = [ 0 for i in range(1,1000)] # intialize the list to be all zeros


for i in range(1000):

    result = MC()

    histogram[ result ] += 1

plot( histogram )
```

The shape of the resulting plot will be:

- ☐ Straight line with slope k
- ☐ Straight line with slope $-k$
- ☐ Exponentially decreasing
- ☒ Exponentially decreasing with a spike at 0 
- ☐ Exponentially increasing
- ☐ Exponentially increasing with a spike at 0

Final Check

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You have used 1 of 2 submissions



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