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# ShowRandomWalk.py
""" Estimates the average number of hops required
for the
robot to reach the boundary."""

from random import randint as randi

def
RandomWalk(L):
    """
    Returns the number of steps required to comple a
random walk
    in one dimension.

    Simulates a one-dimensional  random walk that
continues until
    the absolute value of the x-coordinate of the robot
    equals L.


Precondition: L is a positive int.
    """
    # Initialize the hop counter and
the current location
    hops = 0; x = 0
    while abs(x) < L:
        r = randi(0,1)

 if r==0:
           x += 1
        else:
           x -= 1
        hops += 1
    return
hops


def AveRandomWalk(L,n):
    """
    Retruns the Average number of hops
required to complete random walk on a length-L
    runway. n is the number of trials.


Precondition: L and n are positive ints.
    """
    s = 0   # Running sum

for k in range(0,n):
         s += RandomWalk(L)
    return float(s)/float(n)

#Demo Script

if __name__ == '__main__':
    # Report the average number of hops required
    # to complete
the random walk for L = 5,10,15,...,40.
    n = 1000  # Number of trials
    print '\nL   =
Length of the runway'
    print 'Ave = Average number of hops required to complete the walk\n'

   print '   L      Ave '
    print '--------------'
    for L in range(5,45,5):
        print
'  %2d   %6.1f' %(L,AveRandomWalk(L,n))
    print '\n Averages based on %1d trials.\n' %n
```