

Predictions

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Question...

How often does the very first step (or, the first edge reached) match the final direction? It depends on the size... what is n ?

$j=n+1$

↓

1	2	3	4	5	6	7	8	9	10	11
-	-	-	-	-	X	-	-	-	-	-

A Single Trial (1)

```
j=n+1
#
if random() $<$ 0.5: # very first step
    j+=1
else:
    j-=1
#
while 1 $\leq$ j $\leq$ m:
    ...
```

A Single Trial (2)

```
...
veryFirstStep=(j-(n+1))
#
while 1<=j<=m:
    ...
    if veryFirstStep== 1 and j==m+1:
        print 'Match!'
    if veryFirstStep==-1 and j==0:
        print 'Match!'
```

Many Trials

```
match=0
#####
trial=1
while trial<=numtrials:
    ...
    trial+=1
#####
print 'match %', (100.0*match)/numtrials
#
```

Many Sizes

```
n=1
while n<=25:
    #
    match=0
    ...
    print n, (100.0*match)/numtrials
    #
    n+=1
#
```

Write the Results to a File

```
python first.py > first.txt
```

... or ...

IDLE

- Highlight All and Copy
- Spreadsheet then Paste
- Text → Table

Gnuplot Script

```
set terminal png
set output "first.png"
set ylabel "Observed Match %"
set yrange[50:100]
plot "first.txt" with linespoints pt 5 notitle
```

... or ...

Spreadsheet

First Edge Reached

```
# j=n+1
j=m
while 1<=j<=m:
    if random()<0.5:
        j+=1
    else:
        j-=1
if j==m+1:
    print 'Match!'
```

Lab Assignment: Predictions

- Run 10,000 trials for each $n \leq 25$.
- Report the predictive value of the very first step.
 - Sketch a plot.
 - What happens as n grows?
- The horizontal axis is n , the size, and the vertical axis is the observed percent of trials where the direction of the very first step matches the final direction of our walk.
- Report the predictive value of the first edge reached, too.
 - Sketch another plot.
 - Now what happens as n grows?