**INFO 6205**

**Program Structures & Algorithms**

**Summer Full 2018**

**Assignment 1**

Random walk describes a path that consists of a succession of random steps on same mathematical space such as the integers.

In this assignment, I ran the experiment for various steps to note or deduce any useful expression out of it.

1. **CONCLUSION:**

Some useful abbreviations:

* d – Distance from the origin to the final point.
* n – Number of steps the person has taken.
* l – Length of each step.

I have deduced to an expression given below:

**d =**

I ran the experiment for various lengths like 1,2,3,4,5. While doing the experiment the mean distance that was calculated each time for certain steps was forming a sequence.

Experiments taken: **100** each time.

Steps Increased **50** in each iteration of the experiment.

I have repeated it for five lengths and for each 30 experiments.

Total Experiments: 5 \*30 \*100

1. Graph of various lengths is given below:



Please find the screenshot of the values below:



Let’s take an example to prove the equation :

**Example 1:**

Take length **=** 1

In the screenshot, when I have taken:

Steps taken: 100

Experiments: 100

The mean distance: 8.660252301

According to my equation:

**d =**

d = ?

l = 1(Length of each step)

n = 100

d = 1 \*

d = 1 \* 10

d = 10

Distance through random numbers = 8.67

Distance through the equation = 10

Both are almost same as we are taking the approximate amount, so it is equal.

**Example 2:**

Take length **=** 2

In the screenshot, when I have taken:

Steps taken: 1400

Experiments: 100

The mean distance: 74.8615764595434

According to my equation :

**d =**

d = ?

l = 2(Length of each step)

n = 1400

d = 2 \*

d = 2 \* 37.4165738677

d = 74.8331477355

Distance through random numbers = 74.86

Distance through the equation = 74.83

Both are almost same as we are taking the approximate amount, so it is equal.

**Hence Proved**