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**Program Structures & Algorithms**

**Fall 2021**

**Assignment No. 1**

* **Task**

**Question:**

**Imagine a drunken man who, starting out leaning against a lamp post in the middle of an open space, takes a series of steps of the same length: 1 meter. The direction of these steps is randomly chosen from North, South, East or West. After n steps, how far (d), generally speaking, is the man from the lamp post?**

**Procedure:**

1. **Implement all blank methods in RandomWalk.java**
2. **Pass all the unit tests**
3. **Draw conclusion on the relationship between the number of steps (n) and the distance from the origin (d)**
4. **Prove the conclusion with graphs**

* **Relationship Conclusion:**
* **Evidence to support the conclusion:**

1. **Output**

**As there are total 990 numbers for distance, I just give two snapshots here, which are the beginning and the ending of the results.**

**图形用户界面, 文本, 应用程序

描述已自动生成**

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1. **Graphical Representation**

**The dot graph observed:**

**图表

描述已自动生成**

**And then I plot the line of (orange line) with the observed points:**

**图表

描述已自动生成**

**I find that the orange line can describe the blue points observed, meaning that the relationship between d and n is .**

* **Unit tests result:**

图形用户界面, 应用程序

描述已自动生成**All 6 unit tests are pass and none of code is modified:**

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