Welcome to CMSC 326!

CMSC 326 Simulation

Today

- Random walks
- Simulation code
- Environment setup
- In-class coding exercise

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Random Walks
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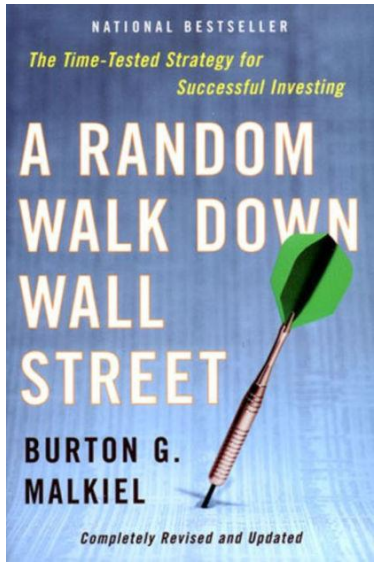
Why Random Walks?

- Random walks are important in many domains
  - Understanding the stock market
  - Modeling diffusion processes
  - Foraging Behavior
  - Google page rank algorithm



- Good illustration of how to use simulations to understand things

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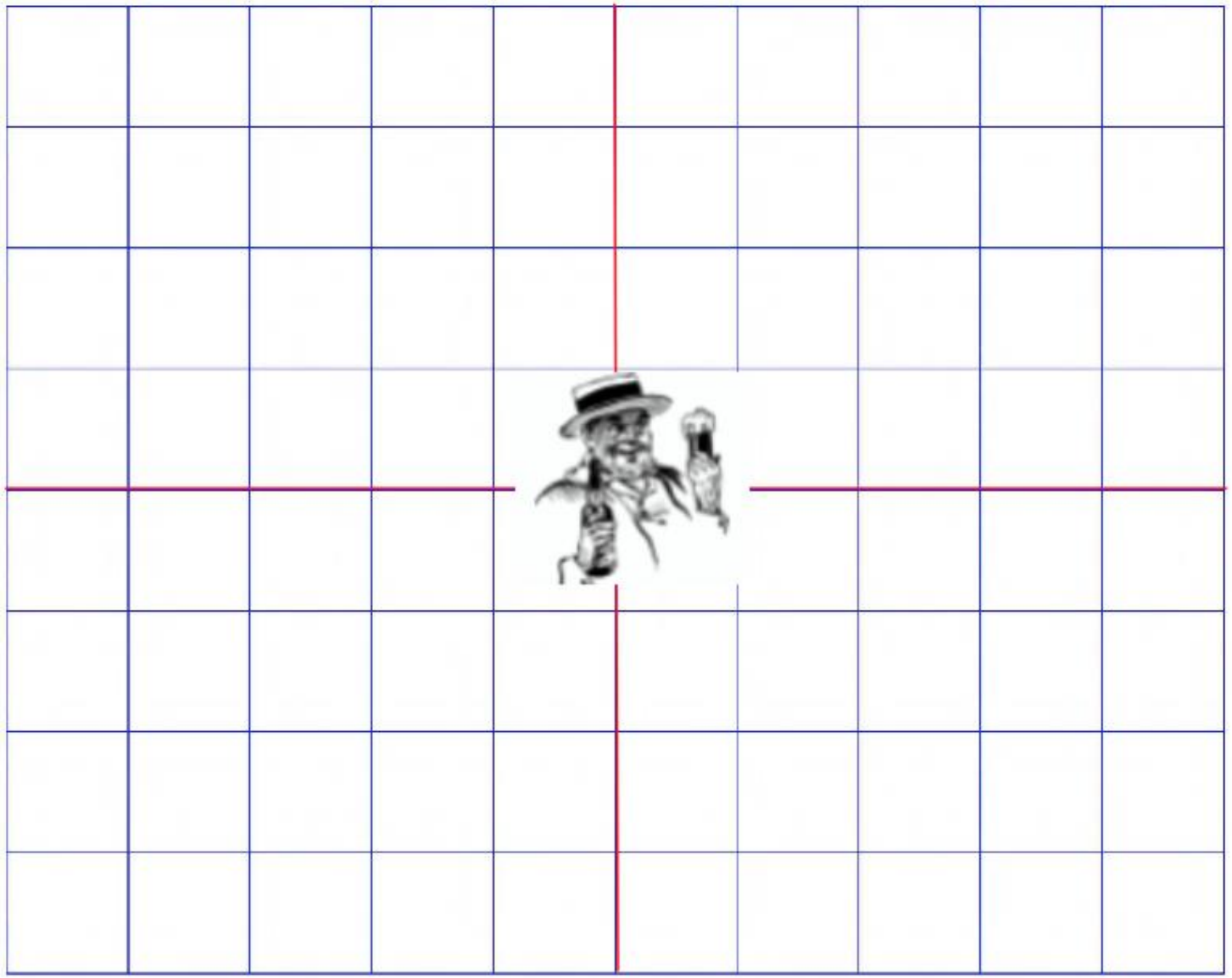
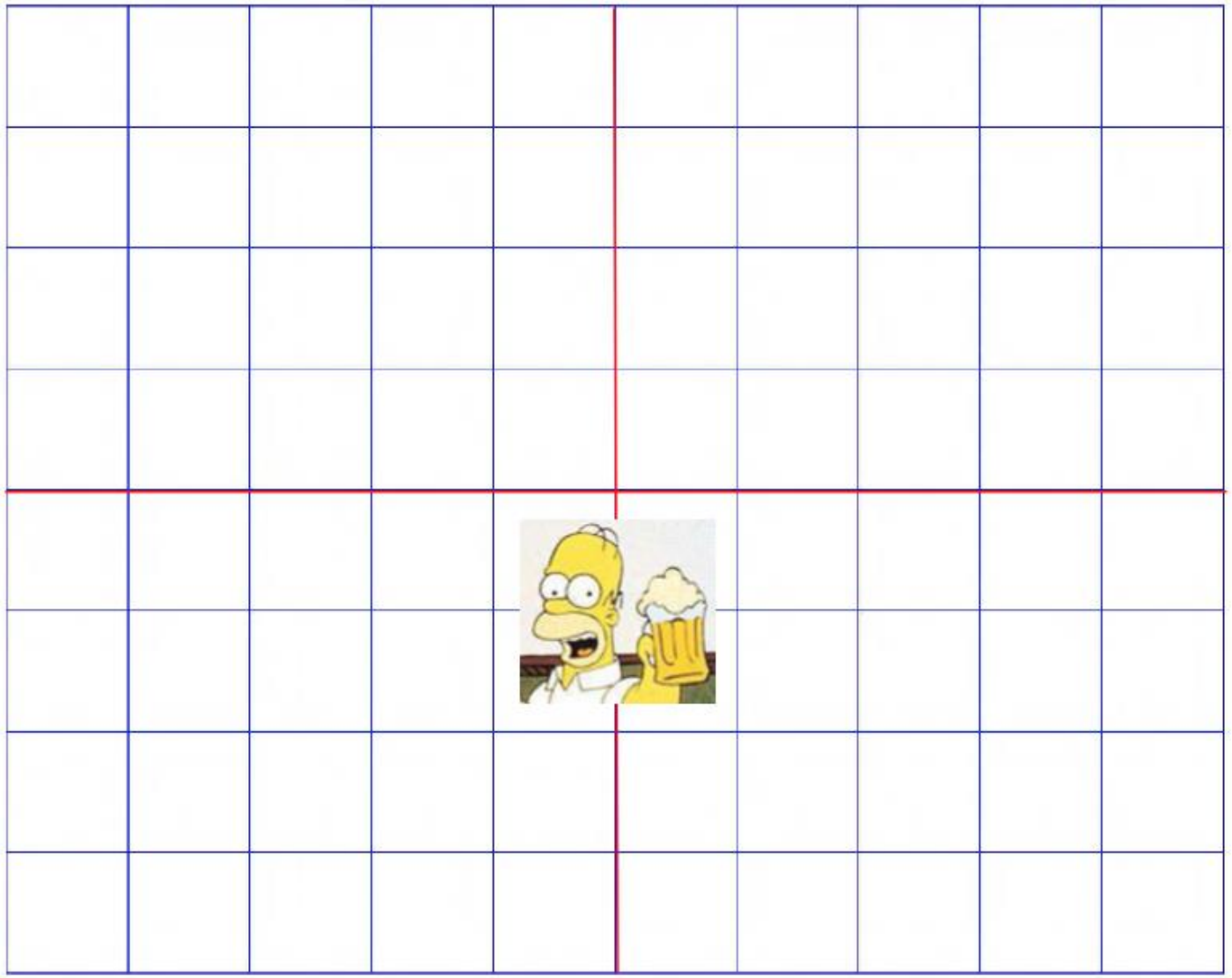
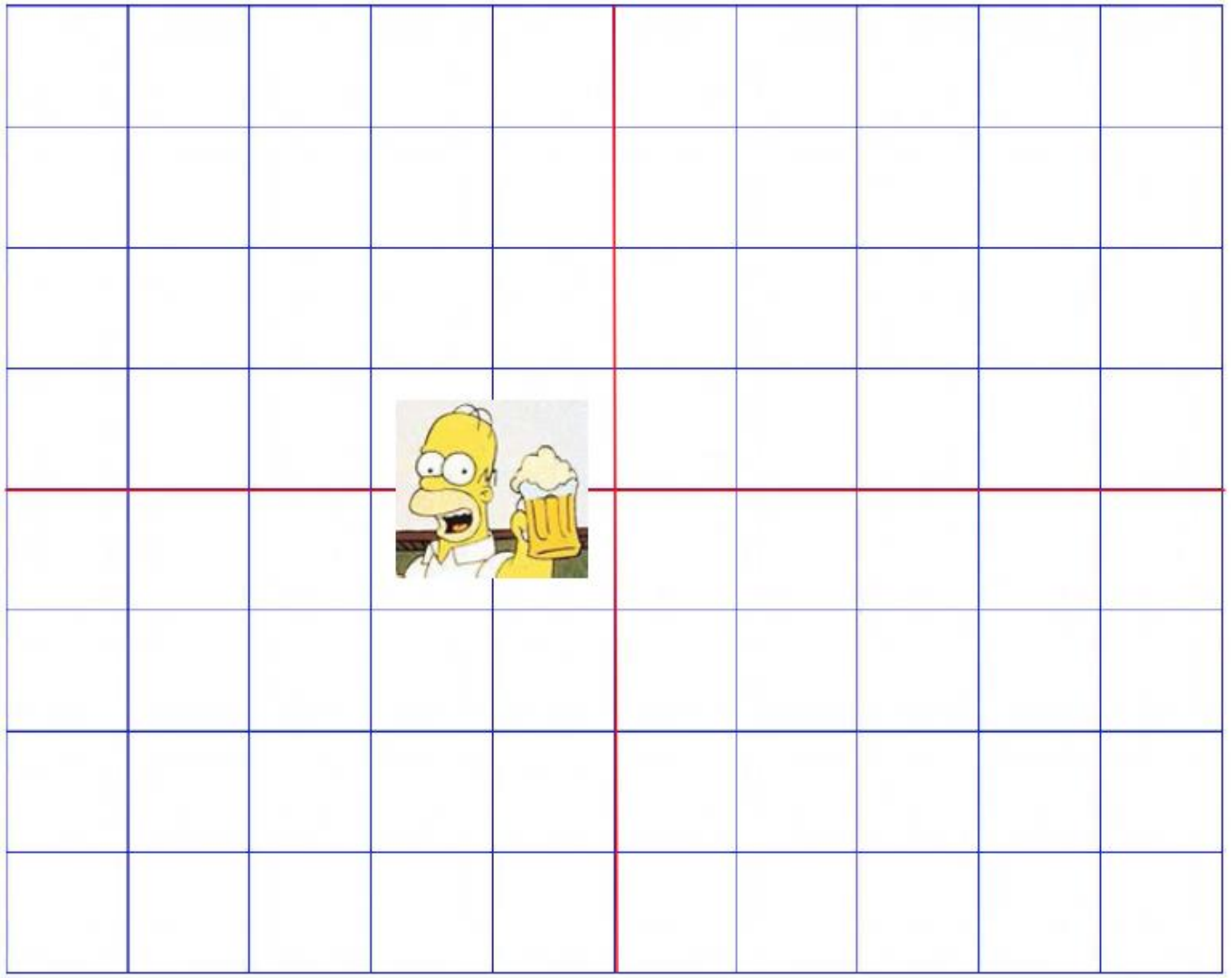
Drunkard's Walk



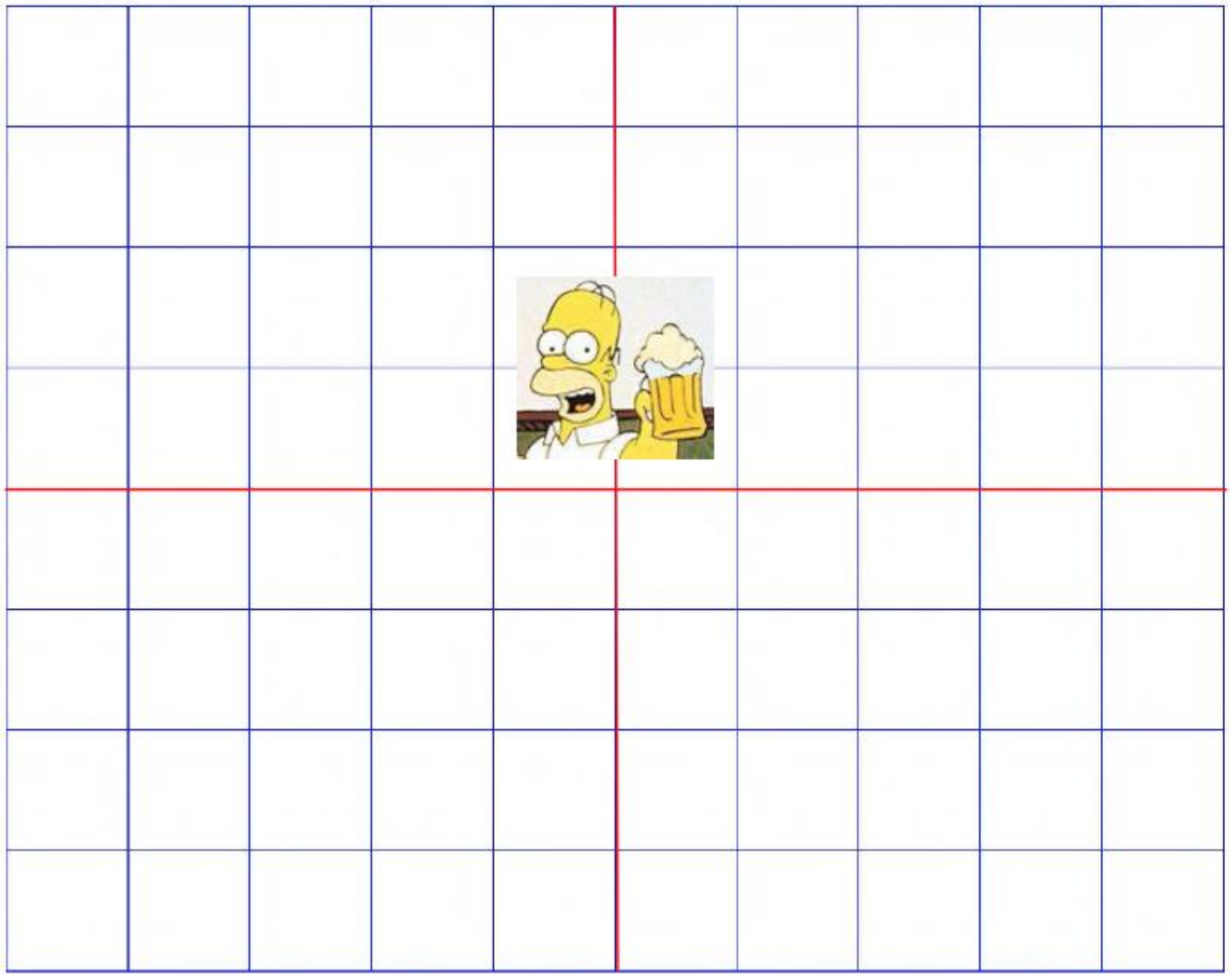
One Possible First Step



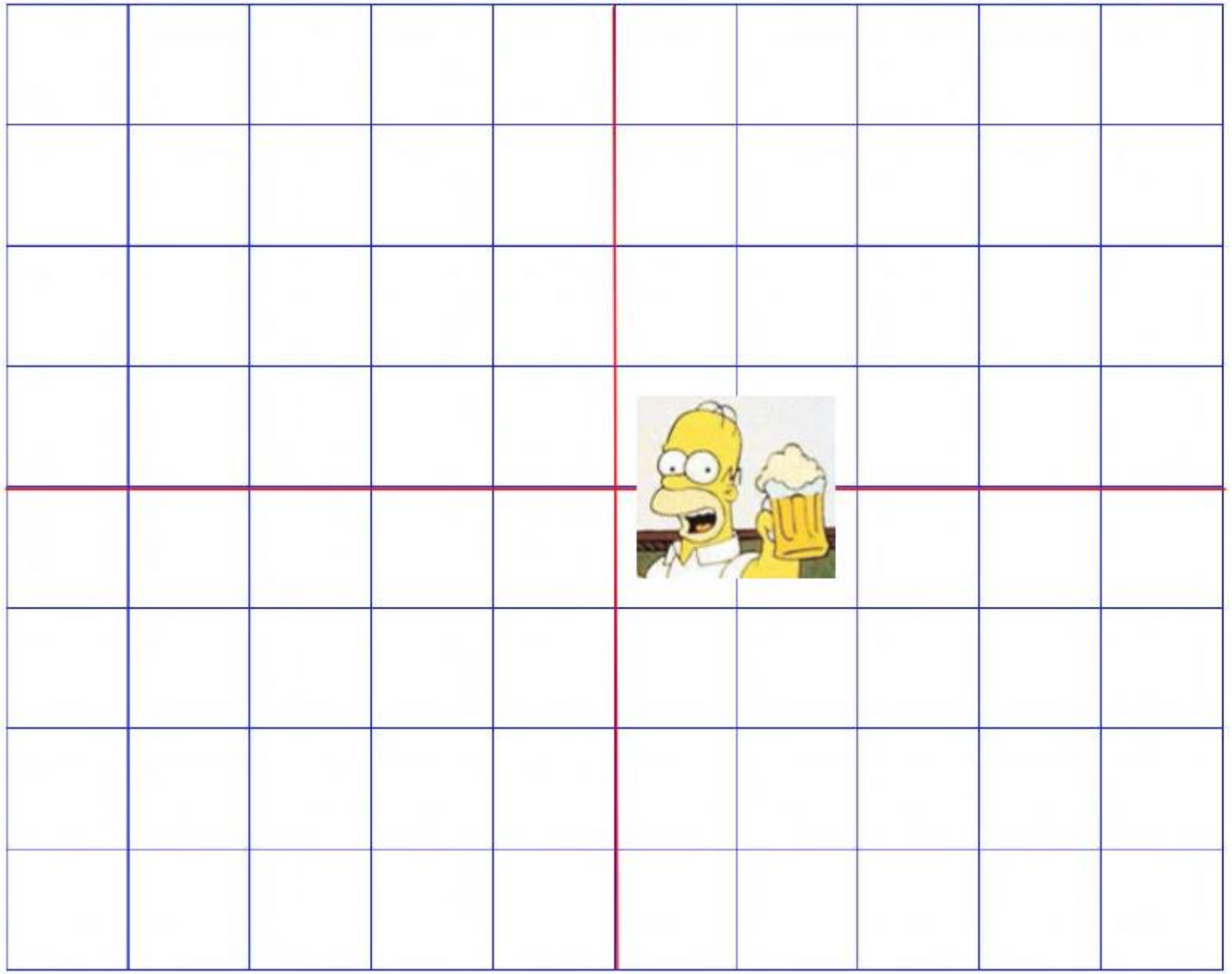
Another Possible First Step



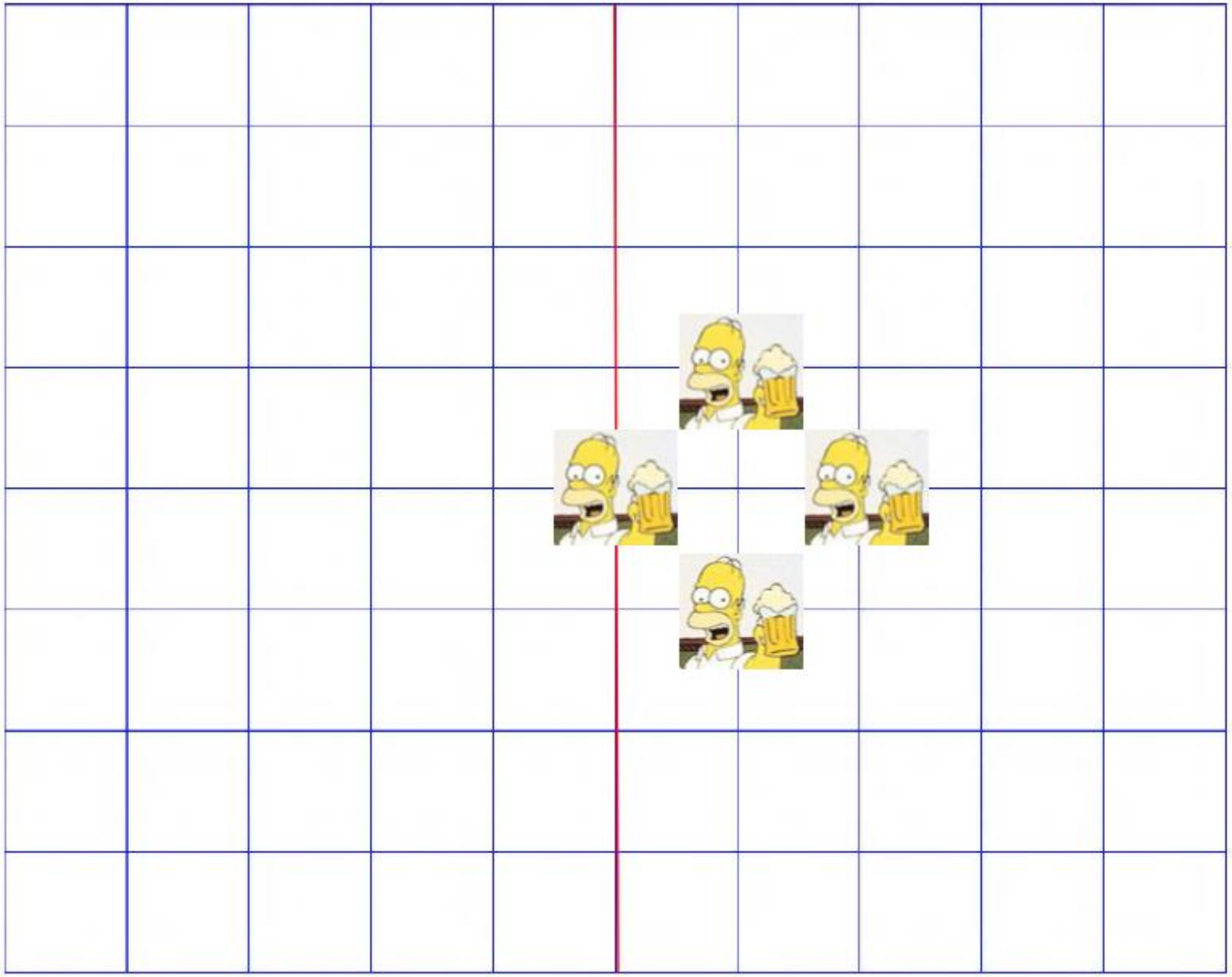
Yet Another Possible First Step



Last Possible First Step

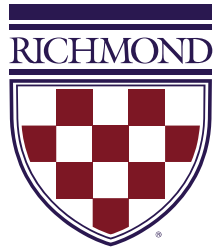


Possible Distances After Two Steps



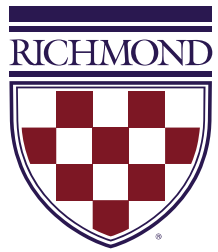
Expected Distance After 100,000 Steps?

- Need a different approach to problem
- Will use simulation



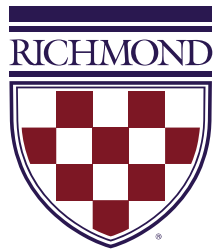
Structure of Simulation

- Simulate one walk of k steps
- Simulate n such walks
- Report average distance from origin



First, Some Useful Abstractions

- **Location** — a place
- **Field** — a collection of places and drunks
- **Drunk** — somebody who wanders from place to place in a field




Environment Setup
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In-Class Coding Exercise
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