



CSCI 1106

Lecture 21

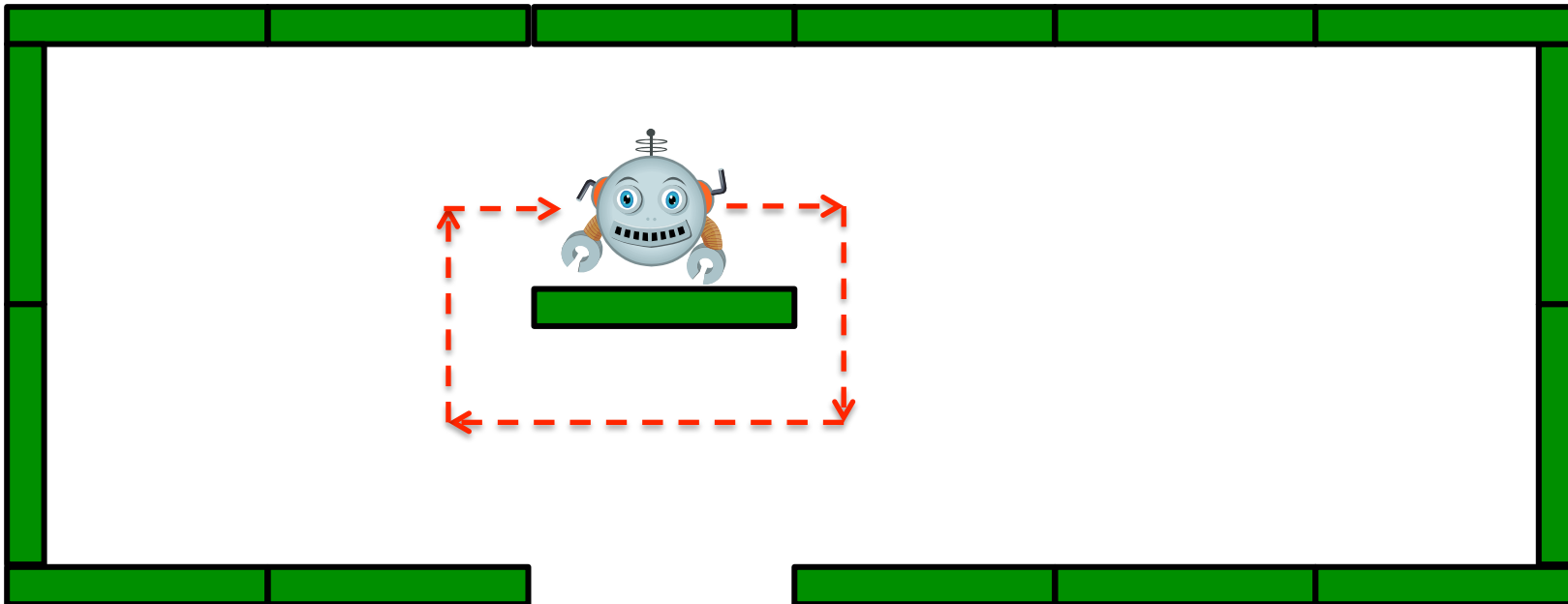
Search

Announcements

- Quiz #6 is on Friday, November 29, in class
- Today's Topics
 - Motivation
 - Introduction to Search
 - Random Search
 - Domain Representation
 - Fixed Pattern Search
 - Mark and Sweep

Introduction to Search

- One of the most common tasks in robotics is to map (explore) a given environment
 - Robot must know where it is and where it was
 - This includes searching (avoid searching same place twice)
- Example: Can the exit be found without location tracking?



Random Search

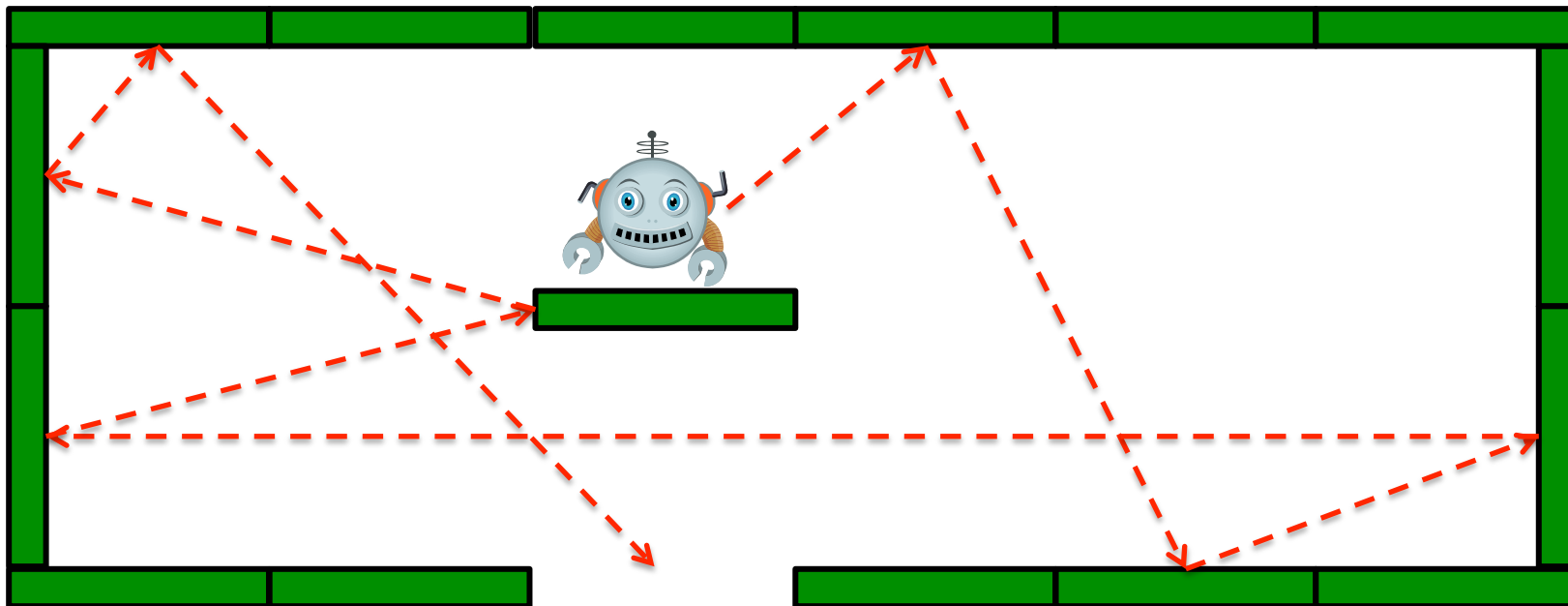
- Algorithm:

Loop:

- Move in a straight line
- Turn random amount when obstacle encountered

- Reasoning:

- Robot selects random direction regularly
- Robot is given sufficient time
- Robot should eventually visit every location in area



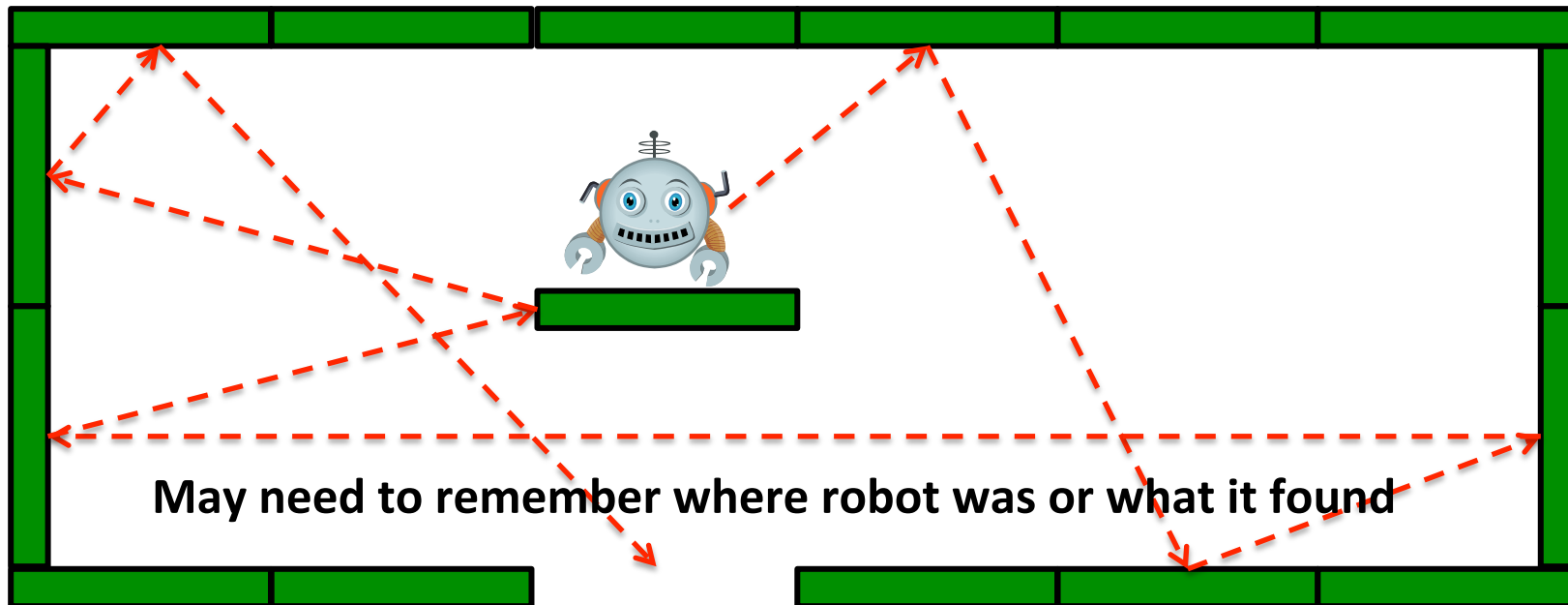
Random Search

Pros

- Easy to implement
- Almost guaranteed to work
- Odometry not needed

Cons

- Inefficient
- Some locations visited multiple times
- Can't reproduce search



Domain Representation

- Idea: To remember or reason about its environment, robot needs an internal representation of it
- Domain representations are either
 - Discrete: divided into small equal-sized sections
 - Continuous: one large section with points of interest
- Representation depends on application
 - Exploration vs Search
 - Granularity of objects in the environment
 - Range of sensors