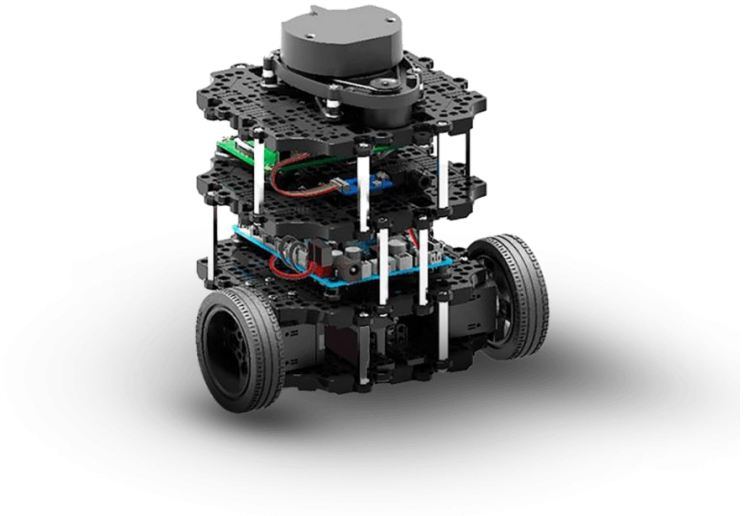
COEN 5830, Fall 2024
Introduction to Robotics

Lecture 9
Probabilistic Roadmap

Srikrishna Bangalore Raghu (srba2850@Colorado.edu)
Tuesday, 9/24/2024

Introduction

- Is it practical to use A* for this robot? What would the configuration space look like?



Introduction

- What about this robot?

Introduction

- What about this robot?

- The curse of dimensionality strikes!

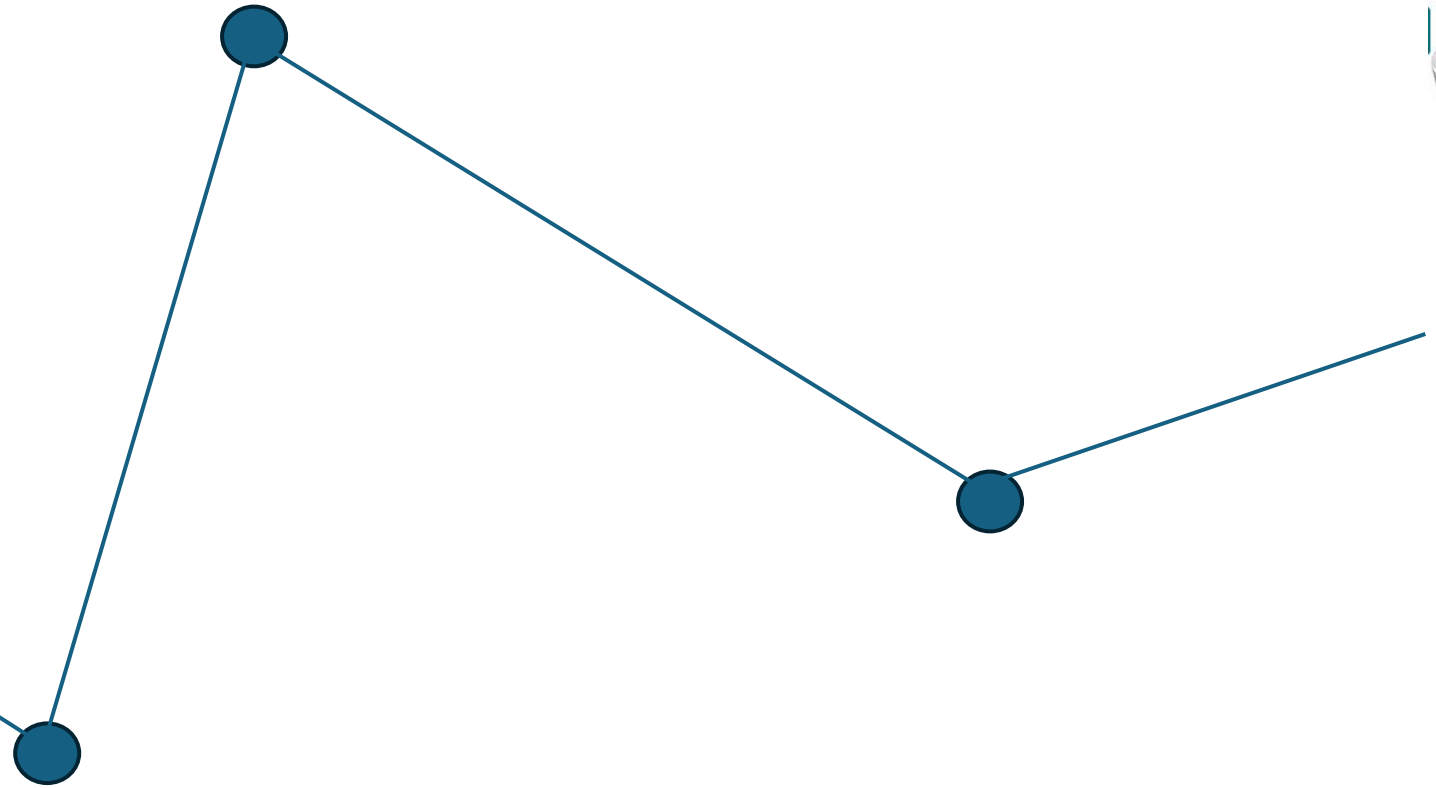
Sampling-Based Motion Planning

- Sampling-based planning is a popular graph-based approach used to generate robot motions by sampling discrete states and establishing connections between them via edges

- Their popularity is due to their simplicity and ability to rapidly explore high-dimensional spaces.

- Traditionally, these techniques employ a unidirectional tree that grows from the start state and expands towards the goal region

Sampling-Based Motion Planning

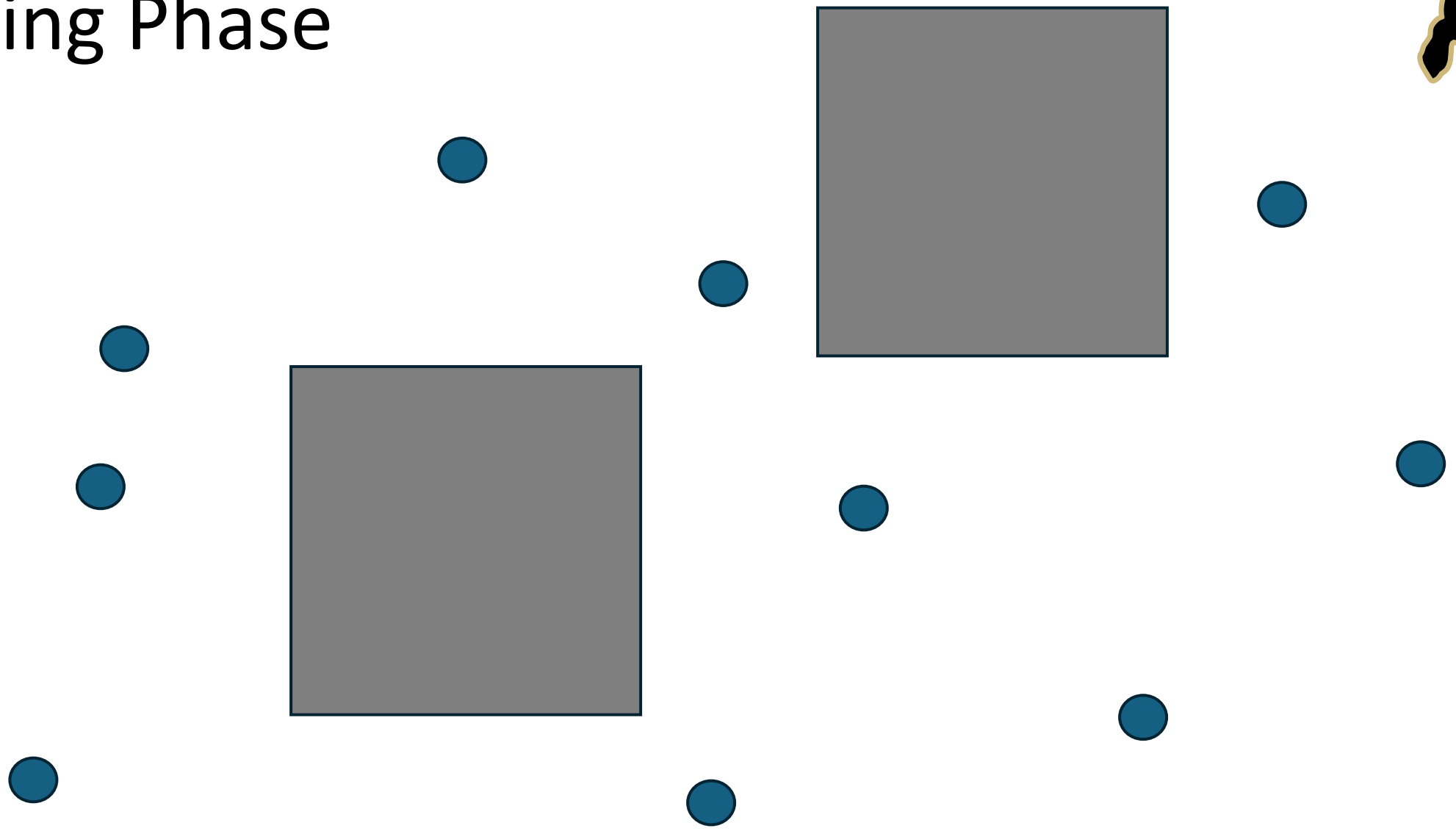


Probabilistic Roadmap

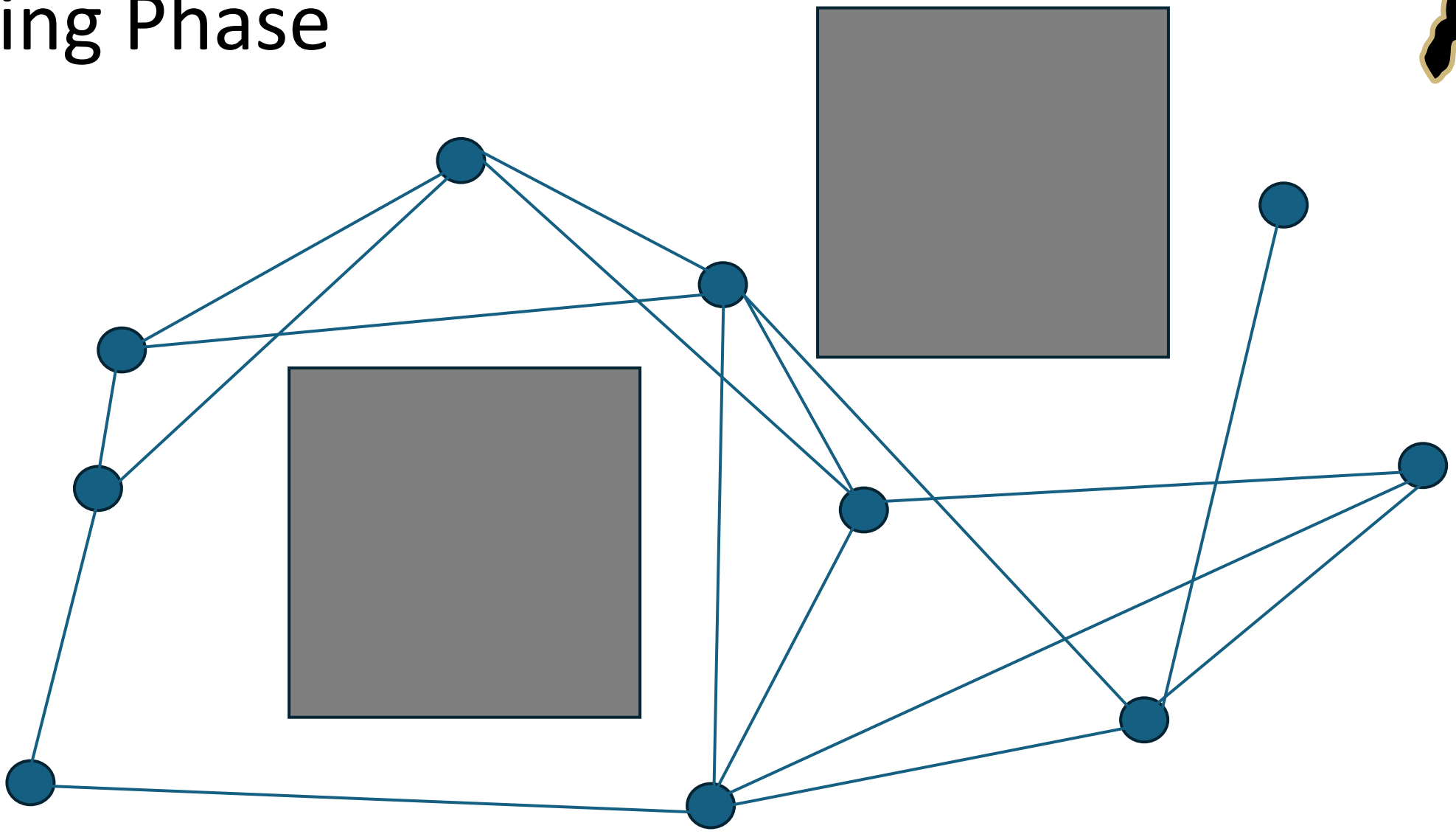
- Learning Phase: Construct a graph by sampling discrete states in the c-space

- Query Phase: Find a path between the start and goal by leveraging this graph

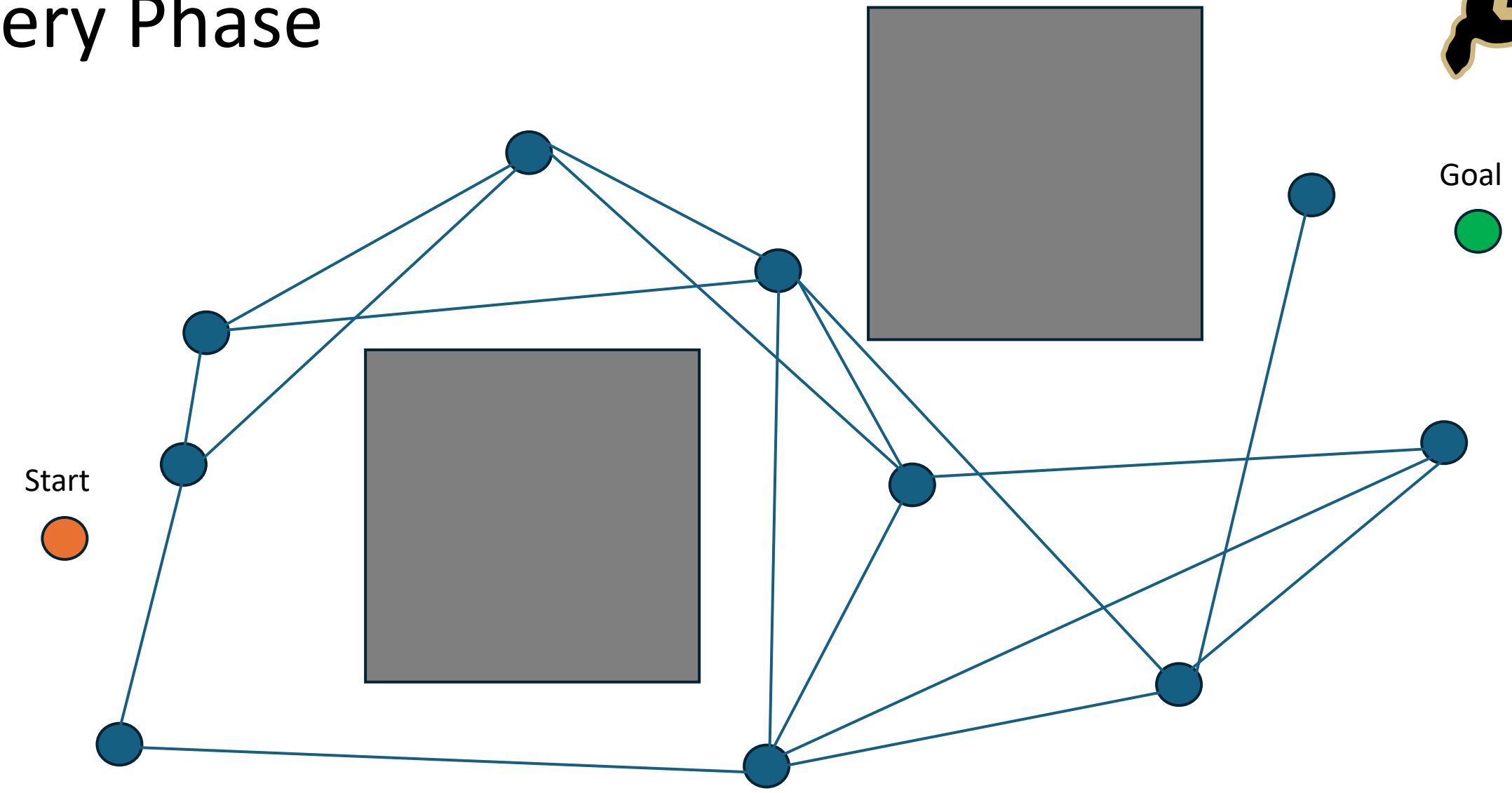
Learning Phase



Learning Phase



Query Phase



Query Phase