

IS 597PRO

Final Project Presentation

Twins City COVID-19 Monte Carlo
Simulation

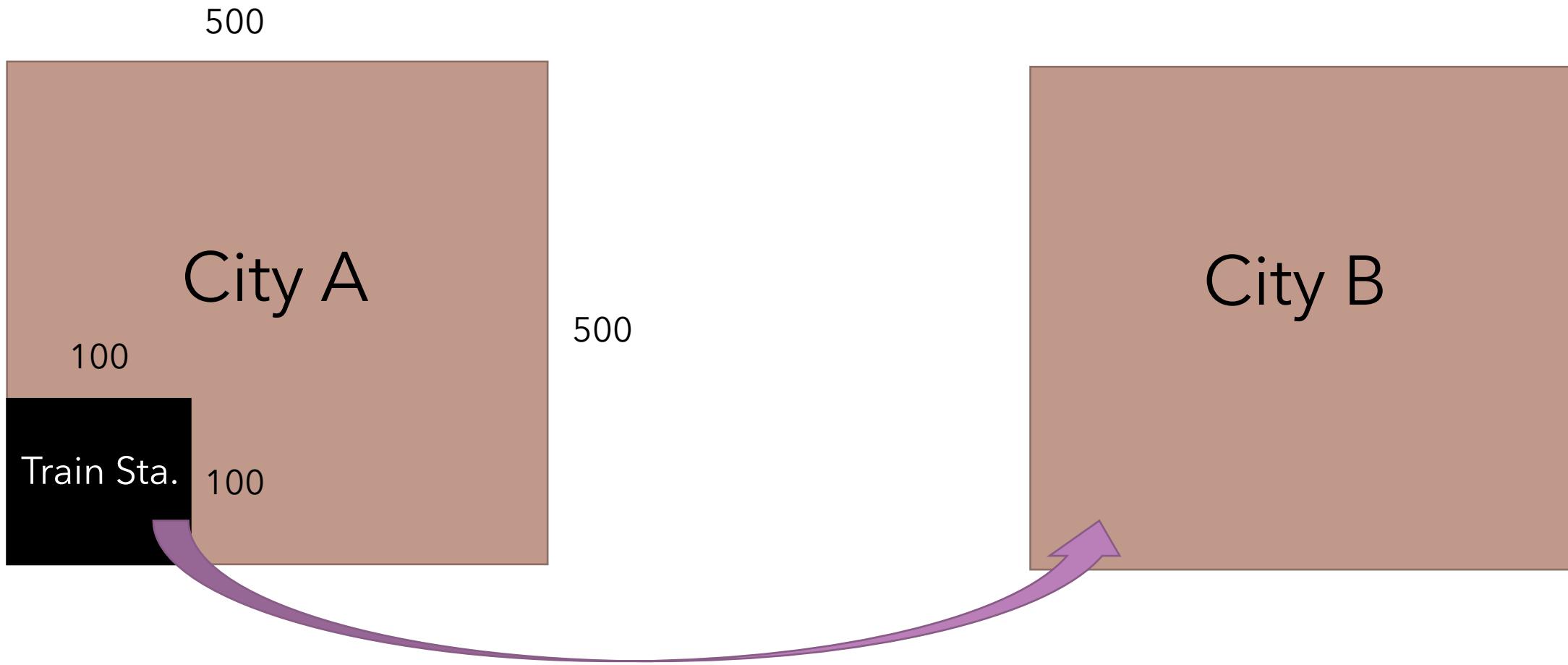
Erick Li



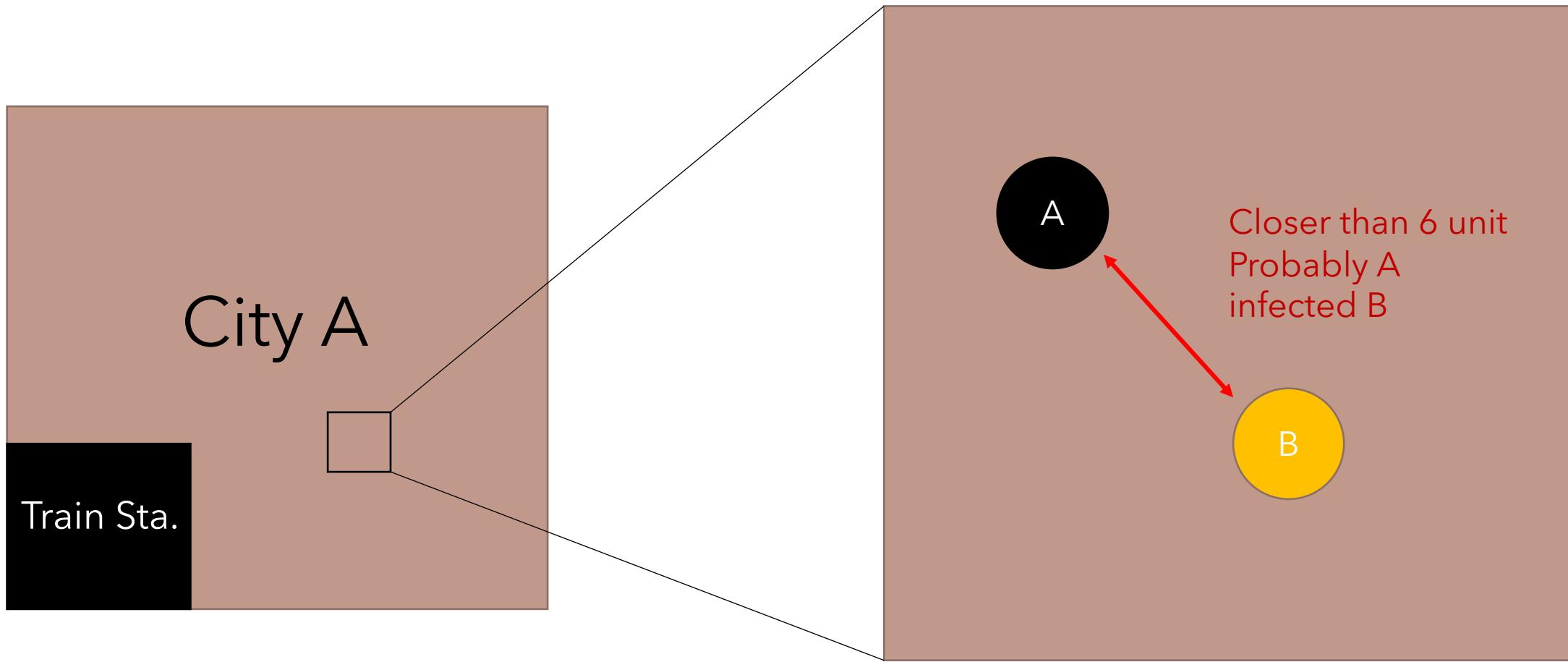
INTRODUCTION

- Simulates the spread of the Virus between cities
- Two cities in the model
- Hypothesis: Implementing quarantine in City B can help slow the spread of COVID from City A

MODEL



MODEL



Assumption

- One-way transit from A to B
- Ignore travel time
- Ignore infection during travel
- 50% population in A wear masks, while people in B don't
- Assumed infection rates
- If a person has been infected, they won't be infected again

Assumption (Cont.)

- 70% of infected people show symptoms
- Takes 360 time-units to show symptoms
- Takes 840 time-units to eliminate the Virus
- Quarantine period: 1200 time-unit
- People move 10 units per frame

Infection Probability (6 ft)

Infected Person	Target Person	Infection Rate
Masked	Masked	0.02
Masked	Unmasked	0.05
Unmasked	Masked	0.2
Unmasked	Unmasked	0.6
Quarantined	~	0.001

Can be modified in the config file

Script

- Written in Python
- Two classes:
 - Person: Store information of a person, including:
 - Person ID
 - Whether infected
 - Whether shows symptoms
 - Whether the virus is still active
 - Whether under quarantine

Script (Cont.)

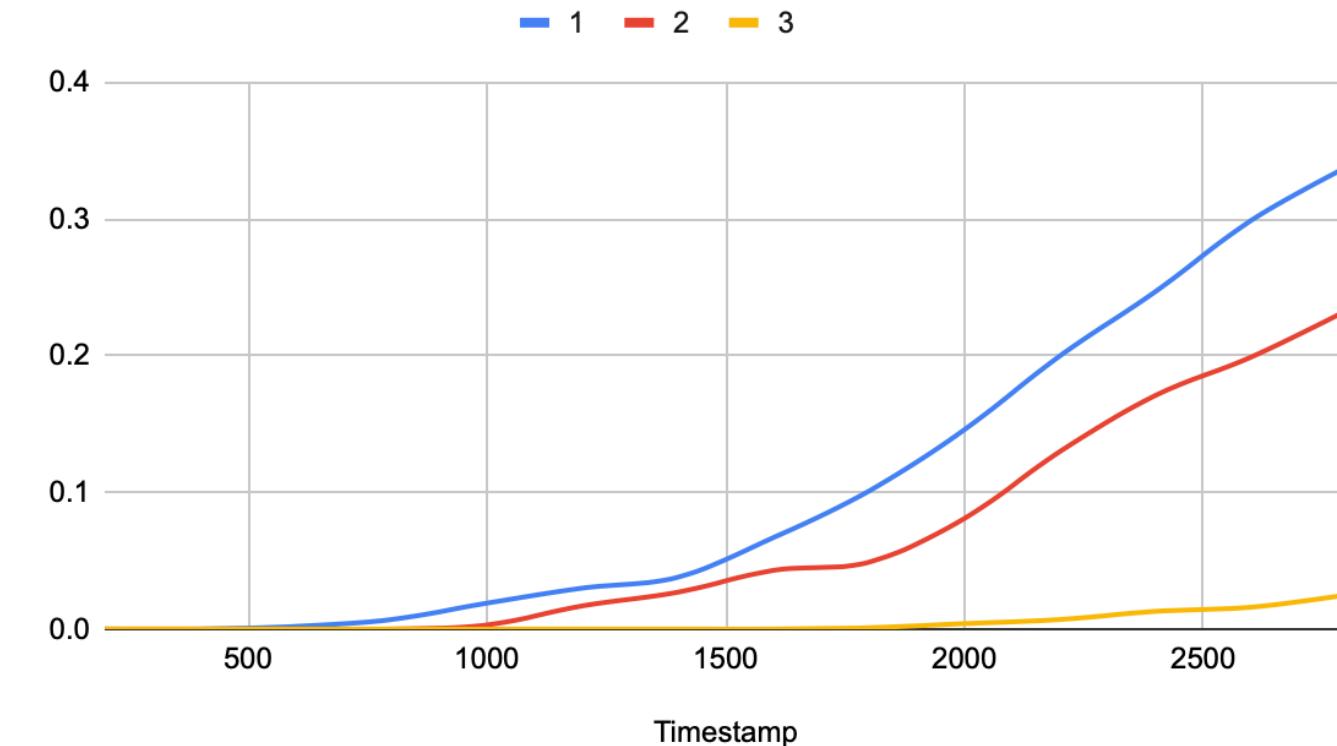
- City: Store information of a city, including:
 - City ID
 - List of Persons within the city limit
 - Infection rate
 - Detected infection rate
- Configfile.py
 - Store the configurations of the simulation
 - Infection probability
 - City size
 - Easy to modify the assumptions

Scenarios

- One: **Without any restrictions**
- Two: **City B quarantines people who shows symptoms**
- Three: **City B quarantines all travelers from Country A**

Results

Three Scenario Model



Future Improvement

- Two-way transit
- Increase number of people
- Consider the infection on trains
- Save the history as a CSV file



Thank You