Case Study: Rental Prices

CITS4403 - Computational Modelling Assignment

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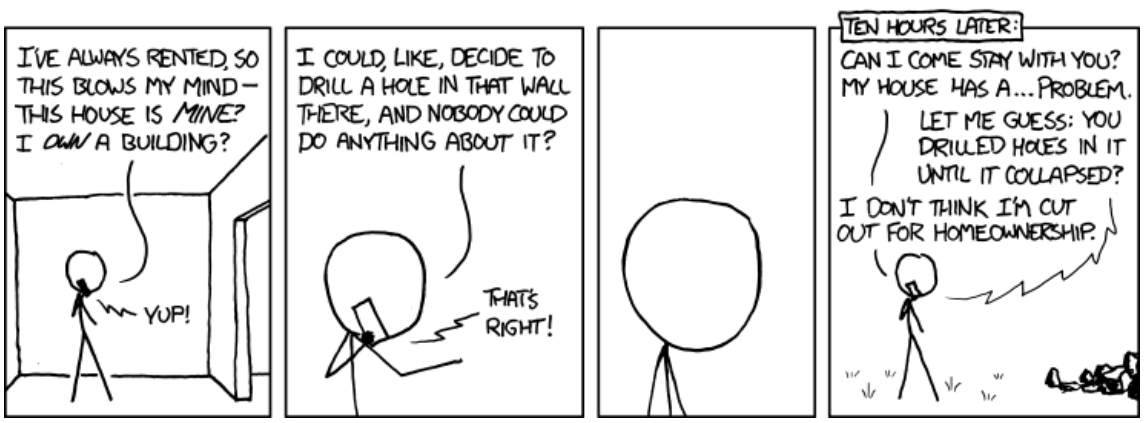

xkcd.com/905

1 Introduction

- Looking at rental prices
- By simulating people
- Seeing why expensive houses are close together

- Simulating population movements using agent based models is nothing new.
- Thomas C. Schelling published "Dynamic Models of Segregation" in 1971
- Two Agents, both acted the same way
- Moved around grid system preferring to not be outnumbered by other agent
- This model has two agents, People and the Houses they live in.
- Each agent has its own rules and interacts with each other

2 Implementation

- Agent based model
- Two agents that interact
- Houses and People
- Both act depending on the other

- Named Tuples
- Good for simple data structures that we want to pass around - Like Coordinates

```
1 import collections
2
3 Coordinates = collections.namedtuple('Coordinates', 'x y')
```

2.1 Agents

House

- Have a price and possibly an occupant
- Increase rent after certain amount of time
- Decrease rent to try and get people to rent it

People

- Similar to real people
- Have an income
- Have a bank balance
- Pay rent every month
- Can only move when rent agreement finishes
- Unlike real world

- No share houses
- No income increases
- Don't have sentience

2.2 Managing the Agents

City

- Manages all the houses
- Makes sure rent changes

Population

- Manages all the people
- Makes sure they are happy
- Make sure they move if they aren't
- Each step updates rent of old houses, moves people, then updates rent of occupied houses

3 Exercises

Exercise 1: *Randomly give people an income based off of Bureau of Statistic data.*

Exercise 2: *Modify the program to take city size and population size as arguments. See what happens when you increase and decrease the population.*

Exercise 3: *Modify the program so that there is a hole in the center of the City. Experiment with different City and population sizes and see how it changes.*