Nearest Neighbor Classification

with almost no background

Nate Derbinsky

+

Laney Strange

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Khoury College of Computer and Information Sciences

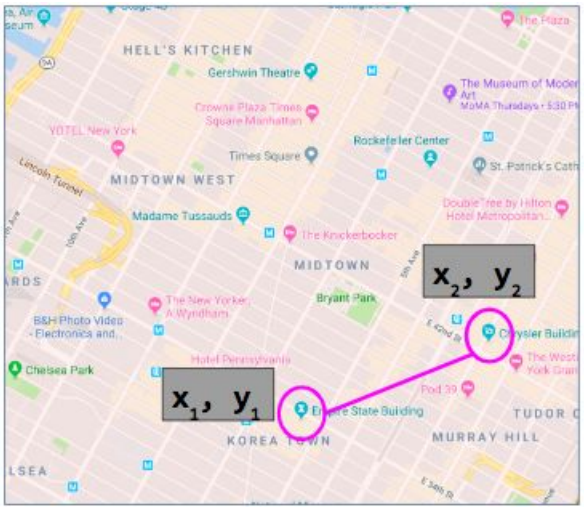
The Assignment

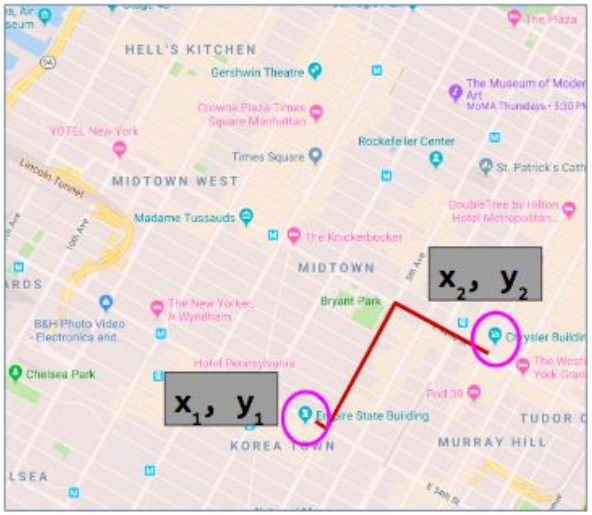
`Nearest Neighbors`

The Assignment

Why did Netflix tell me to watch Bodyguard?

The Assignment






```
Write distance functions
```

The Assignment

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Euclidean, Manhattan, Hamming

The Assignment

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Given a community of data points...

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```

[42.03, -71.99]?

...find the Nearest Neighbor of a new point

Materials

- Homework specification
- Unit tests
- Sample solution
- Introductory slides

Learners

- CS1 students
- Adults at a workshop

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Women's
community of
code

Goals of the Workshop

1. Exposure to Machine Learning

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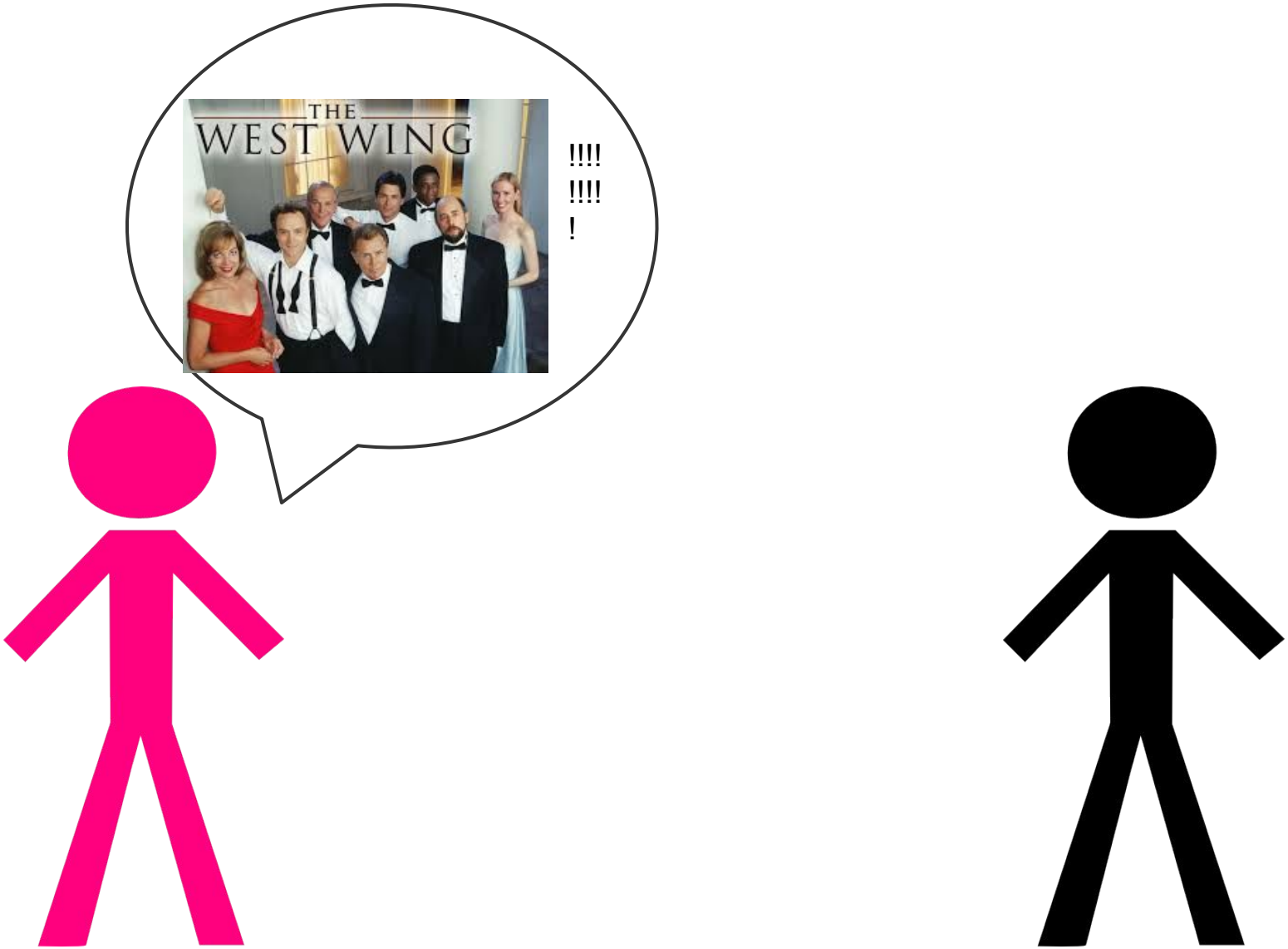
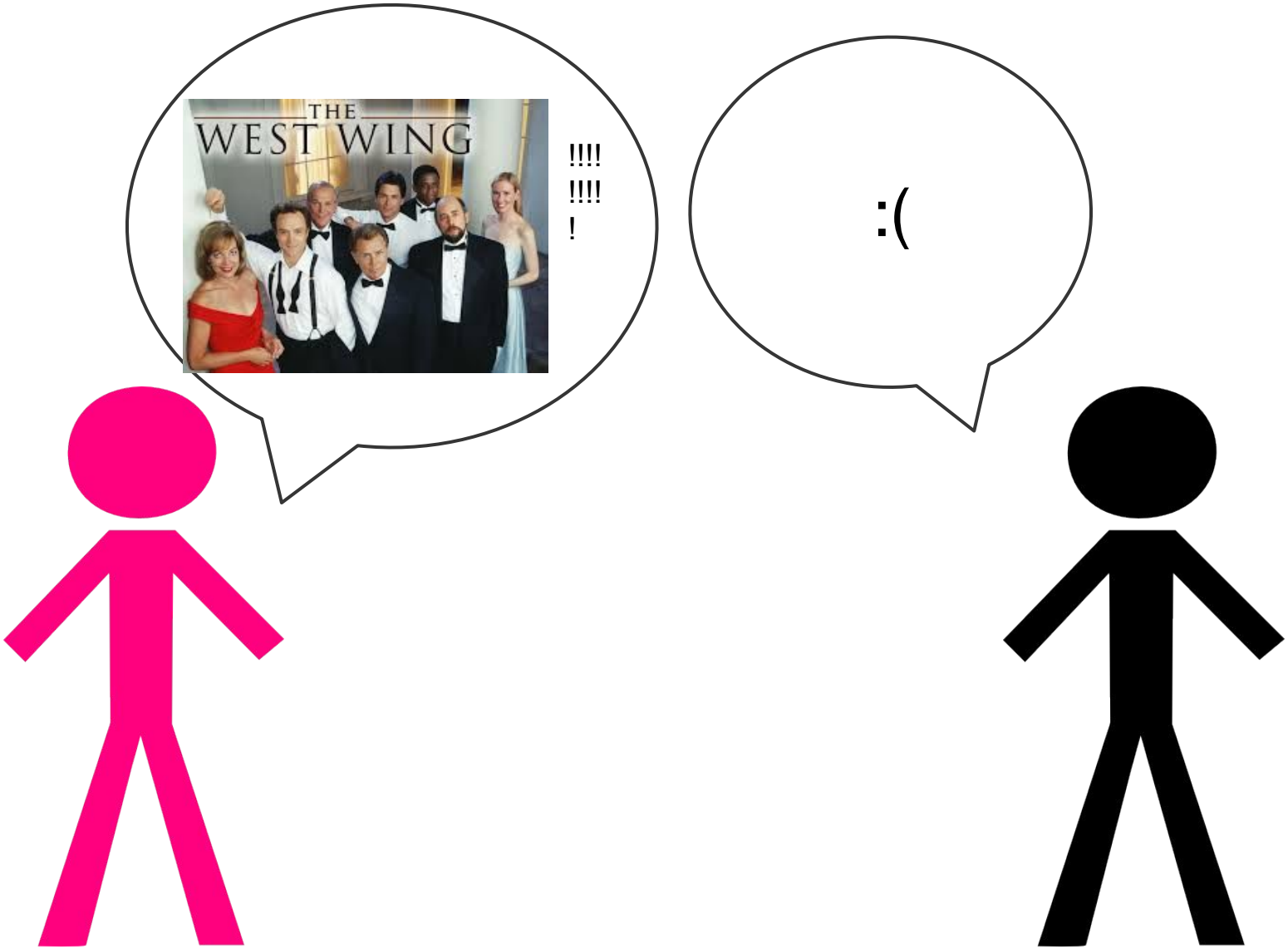
“Oh. That wasn’t so tough!”

1. Exposure to Machine Learning


THE
WEST WING
!!!!
!!!!
!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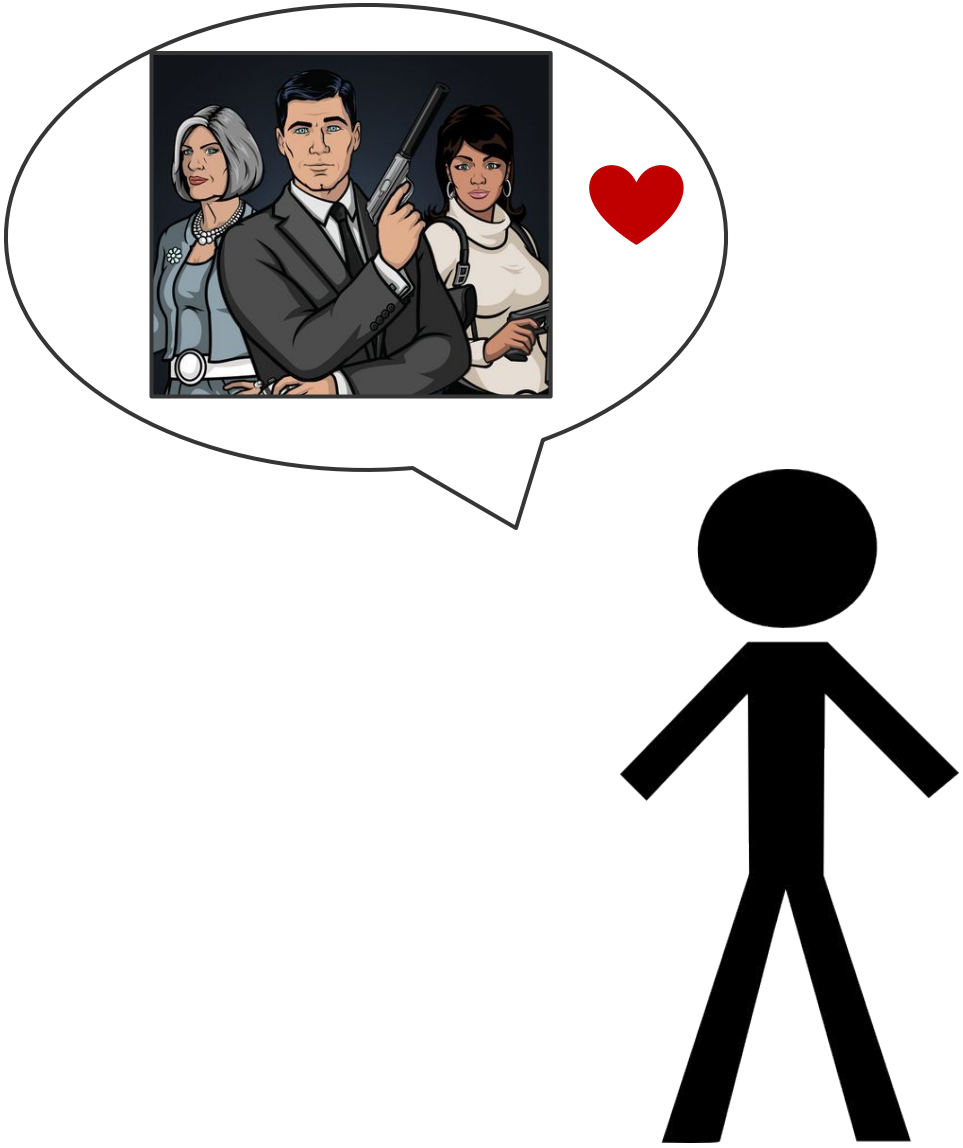
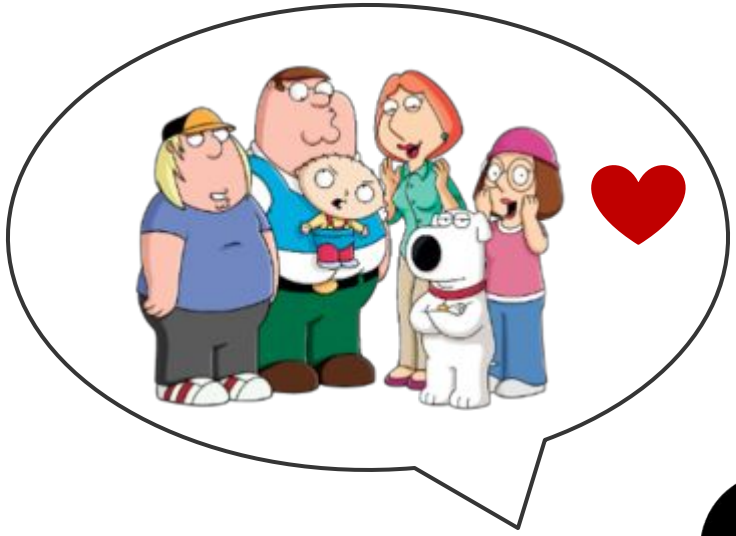
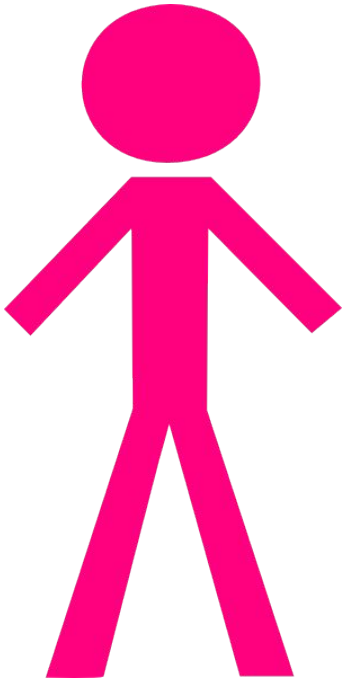
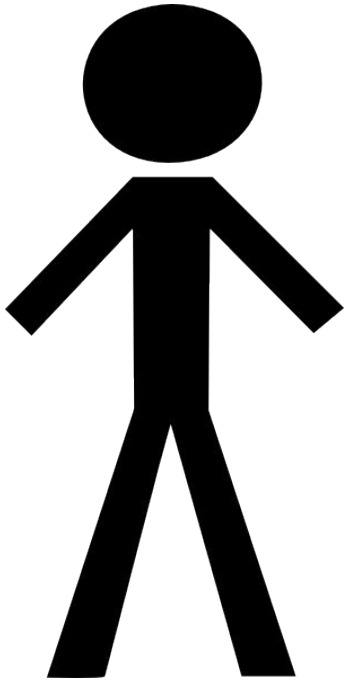
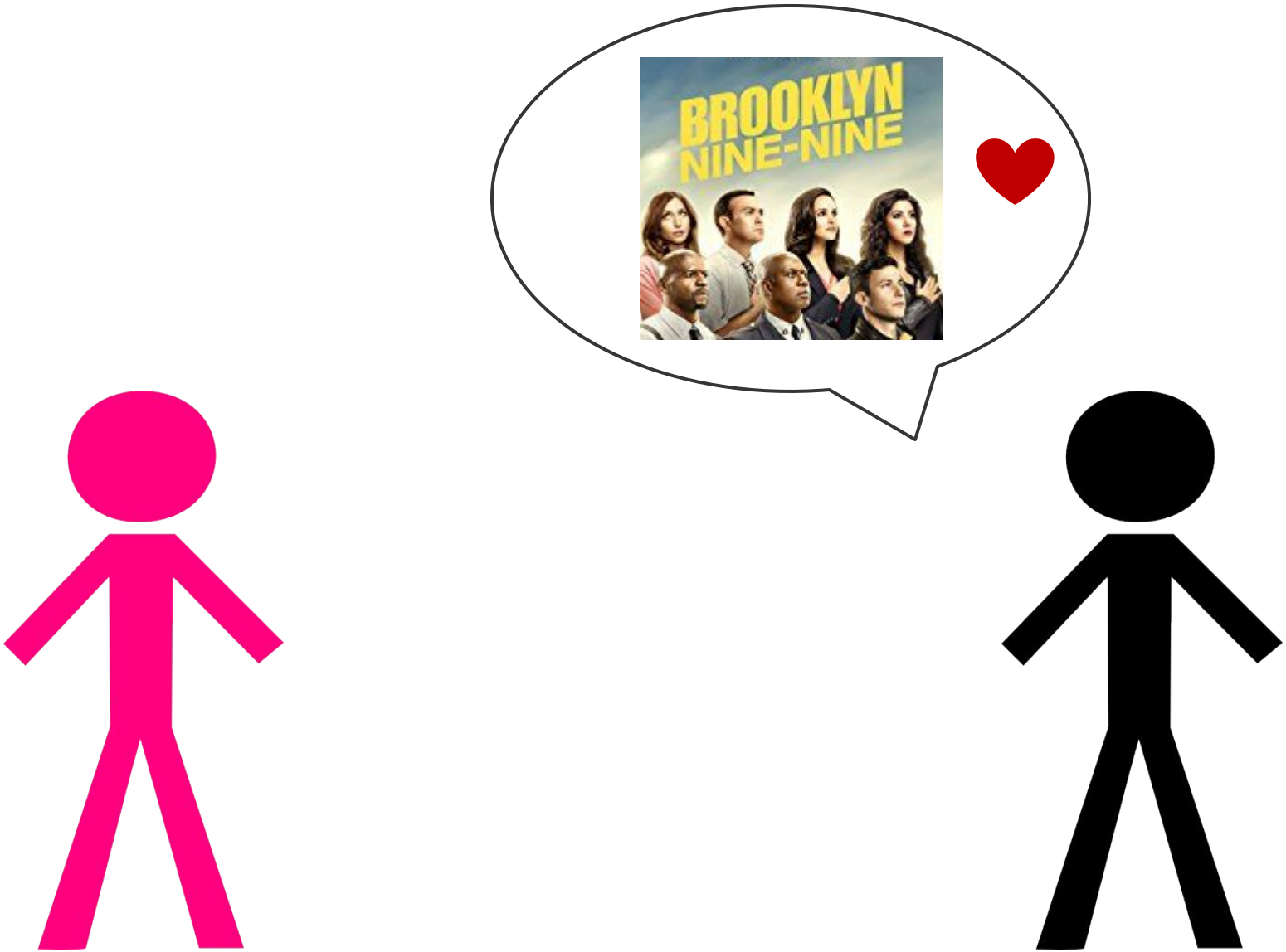
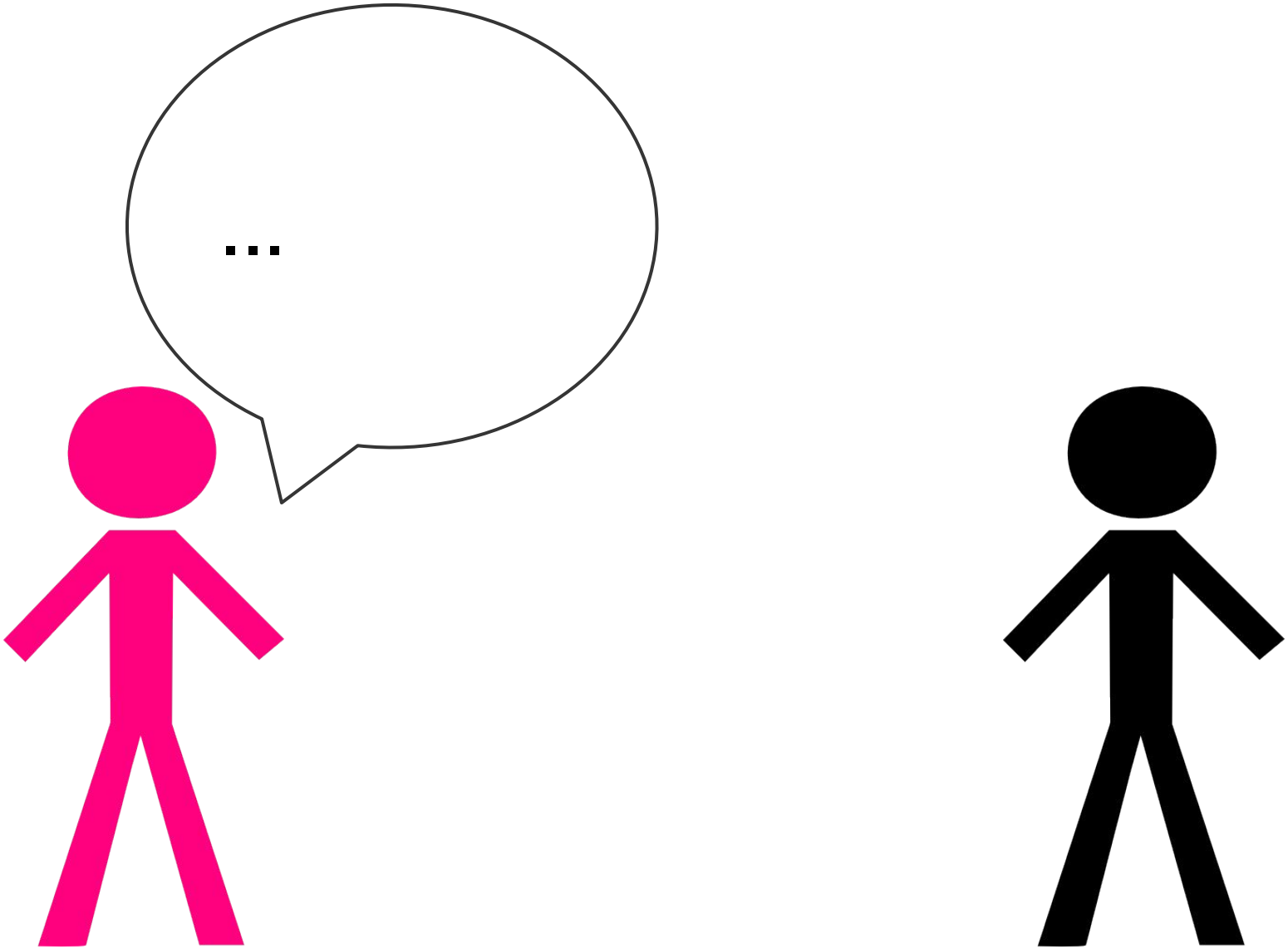


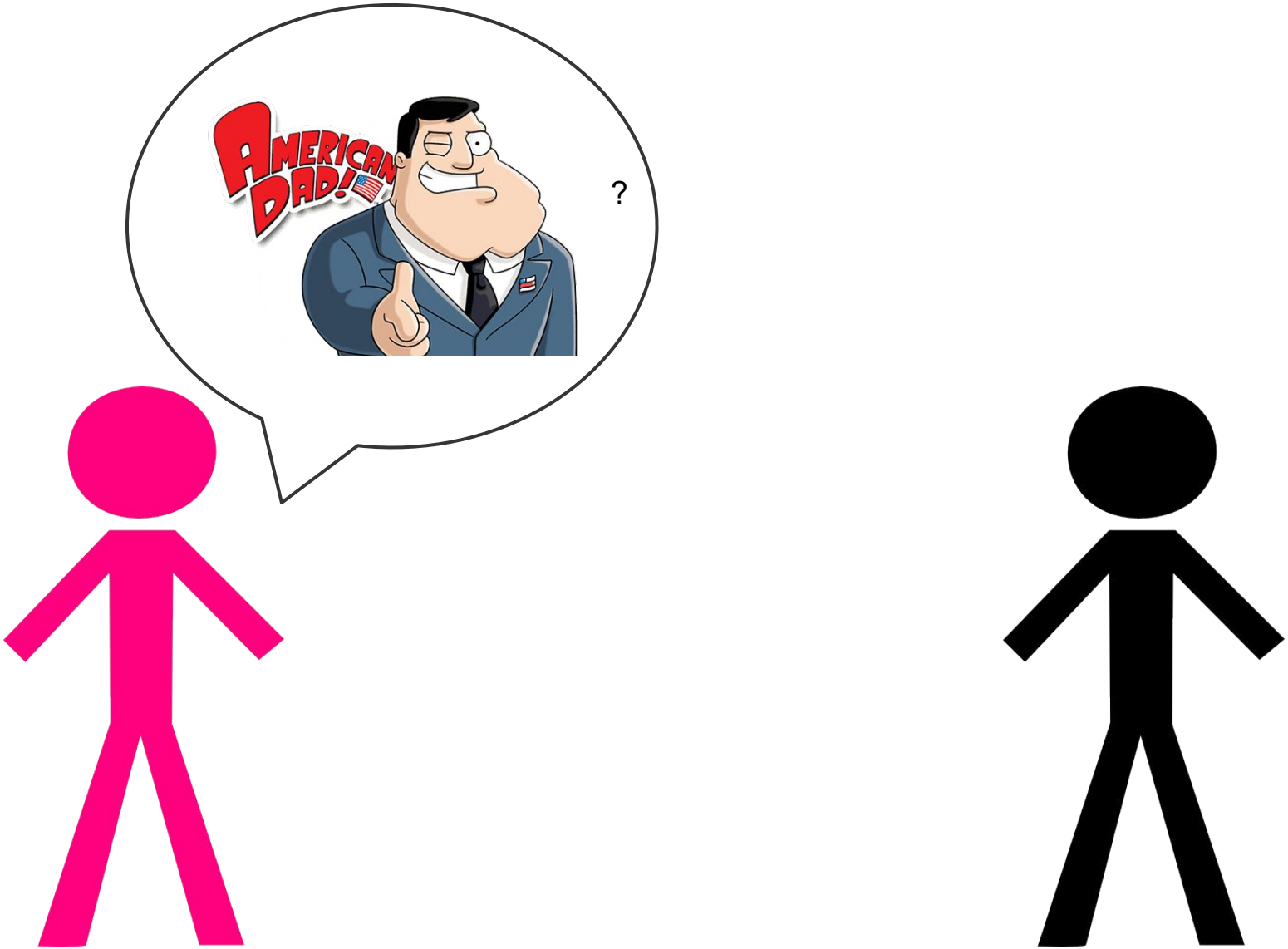


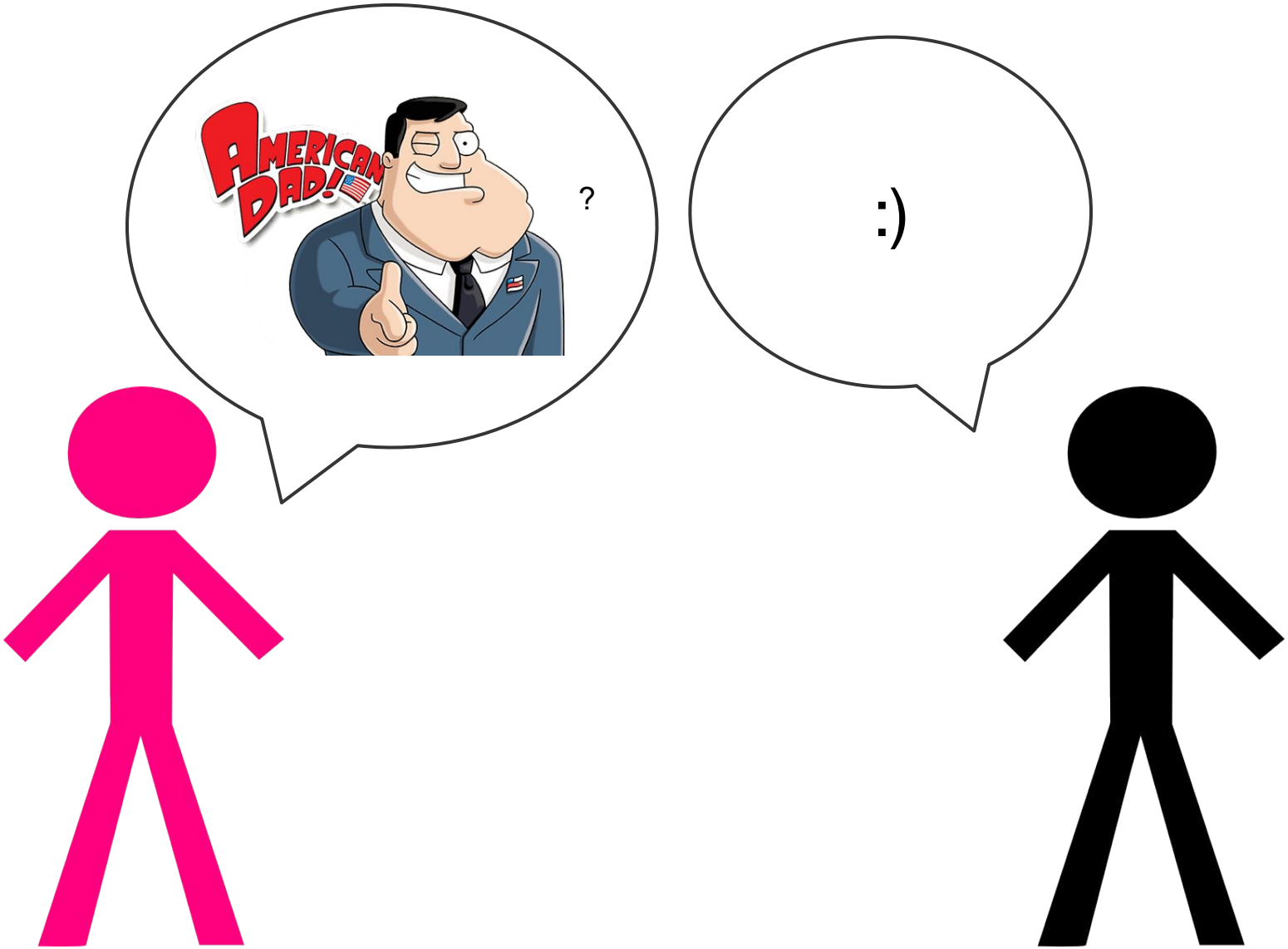





BROOKLYN
NINE-NINE




AMERICAN DAD!
?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:)

2. Write a program!

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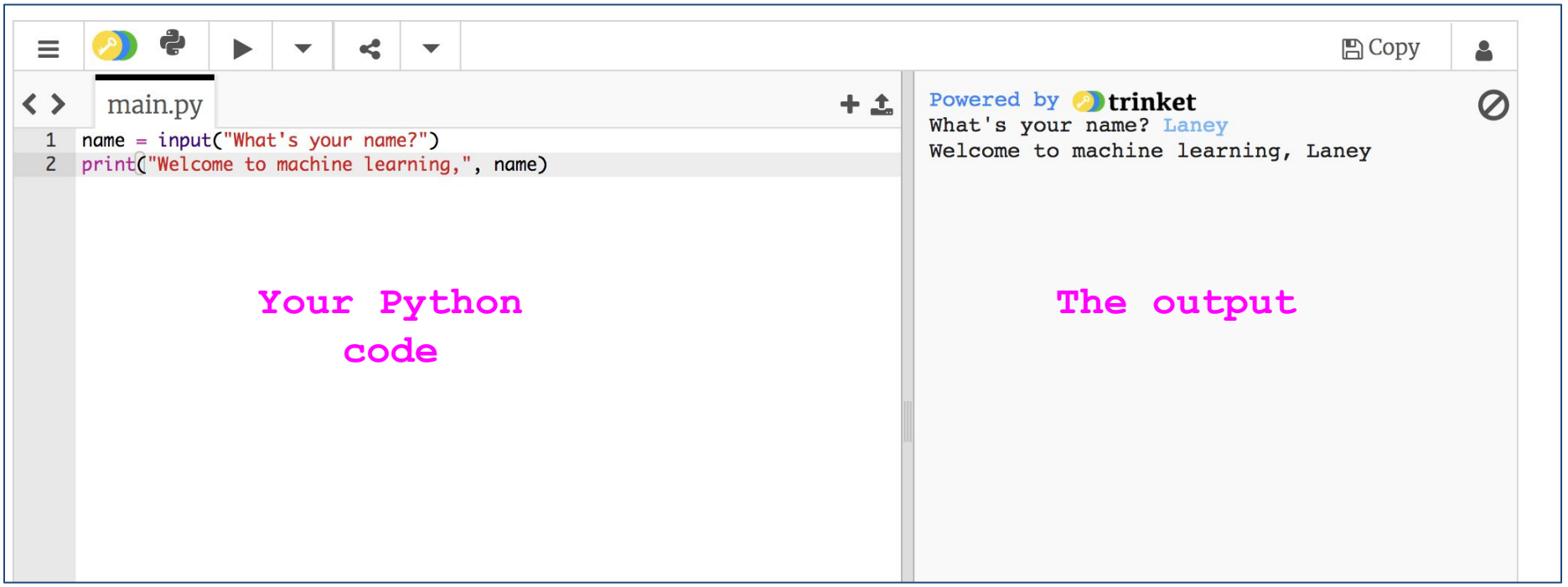
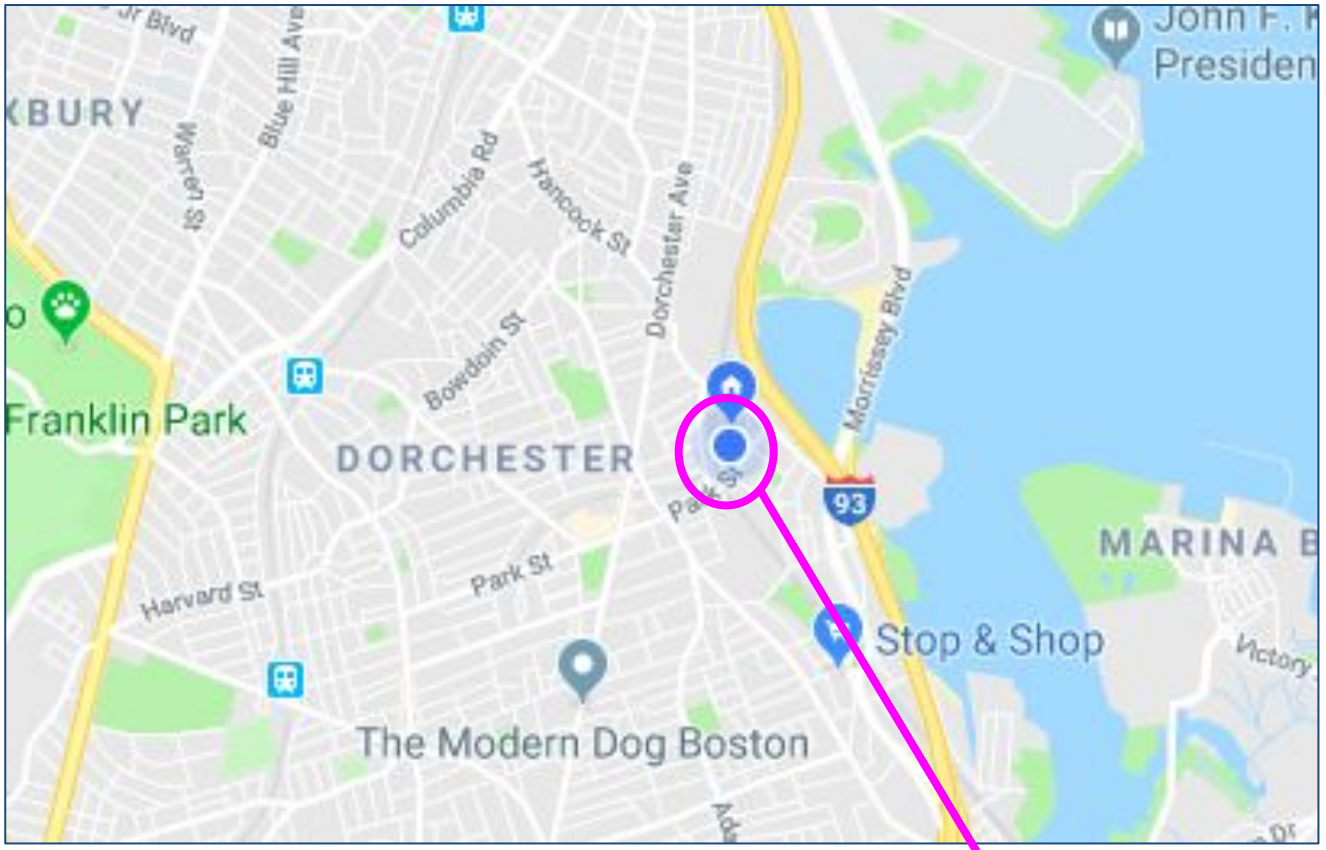
Often for the first time. It's exciting!

https://trinket.io/python3


Copy
main.py
1 name = input("What's your name?")
2 print("Welcome to machine learning,", name)
Your Python code
Powered by trinket
What's your name? Laney
Welcome to machine learning, Laney
The output

3. Recognize Nearest Neighbors from “real life”

Euclidean Distance



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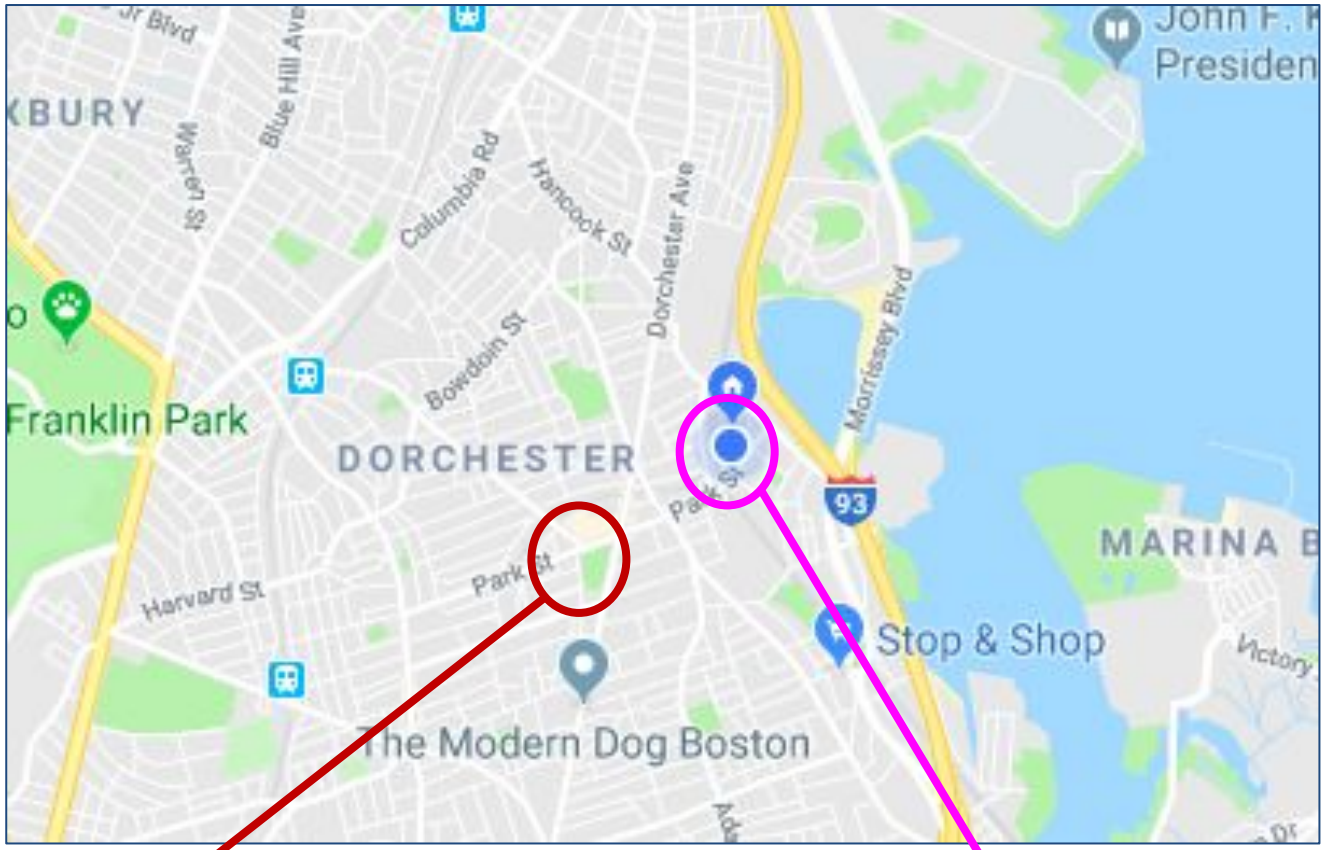

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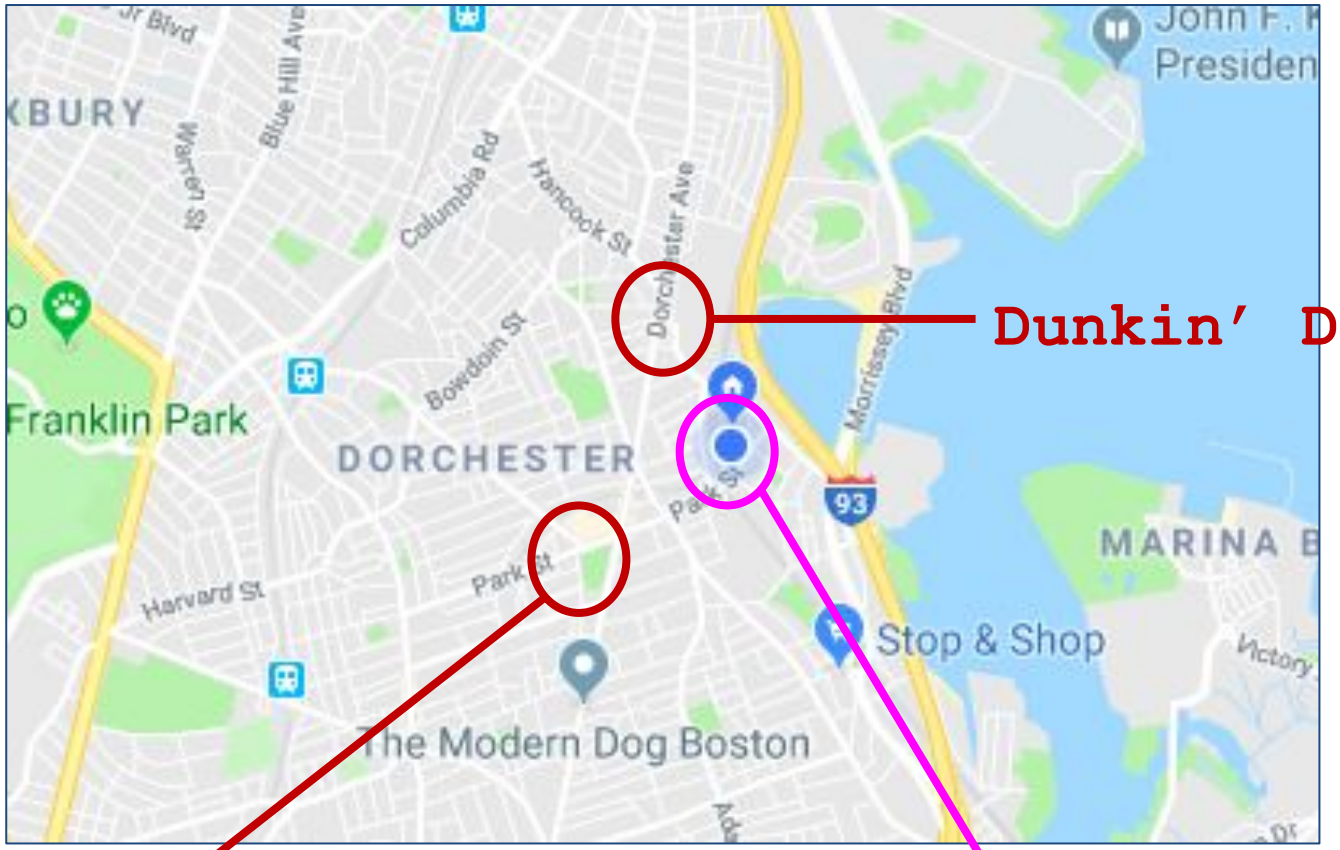

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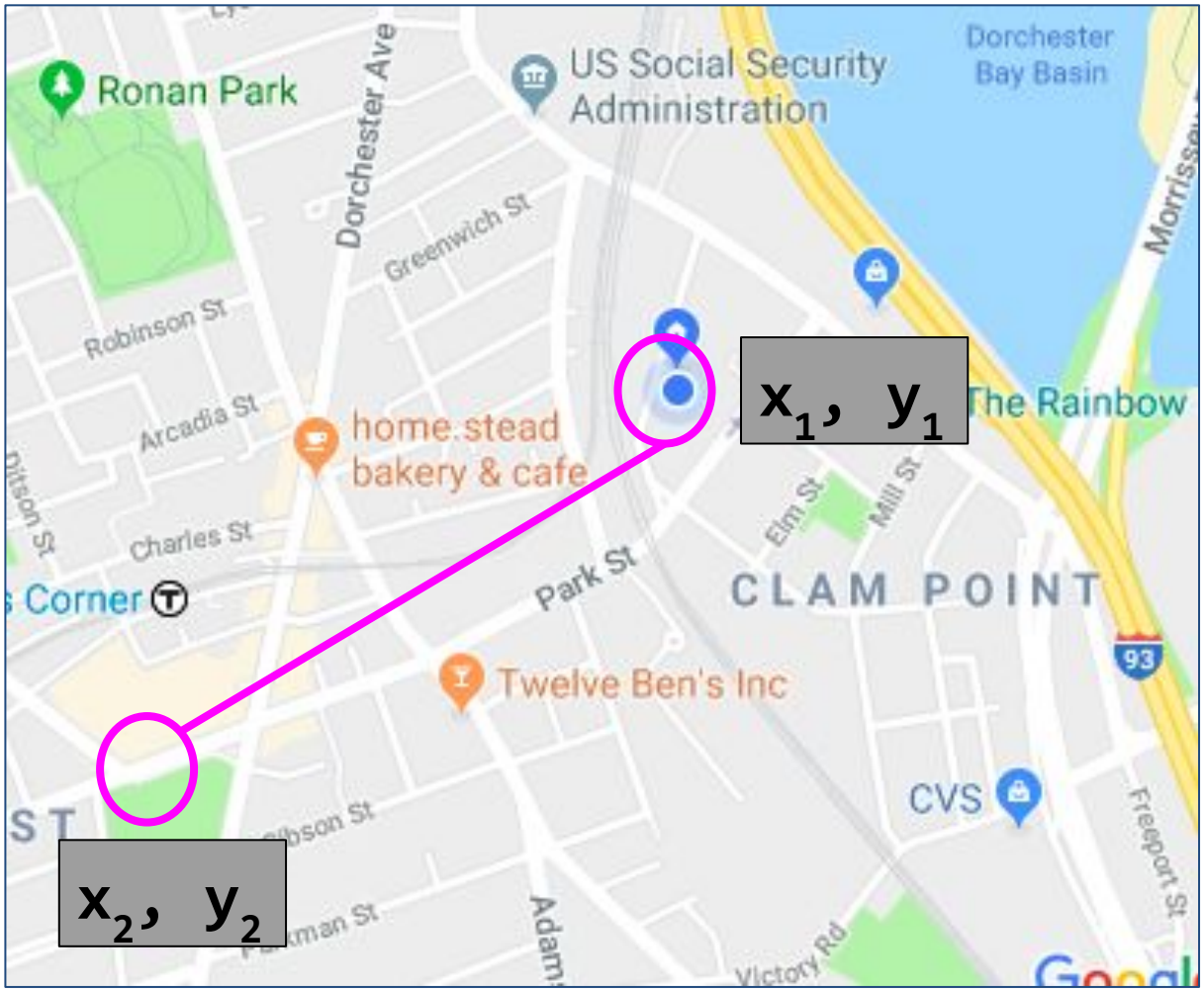

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Step by step

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Define the function in Python

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Did it work?

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“Keep Going!”

- How else are two cafes similar?
  - Price range
  - Do they have food
  - Sit-down or takeaway

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- Volunteers LOVED IT

Using the Assignment

- Host a workshop!

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- Assign in CS1
  - Functions
  - Arithmetic Operators
  - (Conditionals)
  - (Lists)
  - (Loops)

```
Scales up/down
nicely! (In our
experience. :)
```

The End :)

Questions?

The CS1 Version

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- They write:
  - Euclidean distance
  - Manhattan distance
  - Hamming distance
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- Then they find:
  - Nearest neighbor of a new data point

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Could ALSO include:

- Lists
  - Data points with > 2 coordinates
- Conditionals
  - Don't use `min` to find nearest neighbor