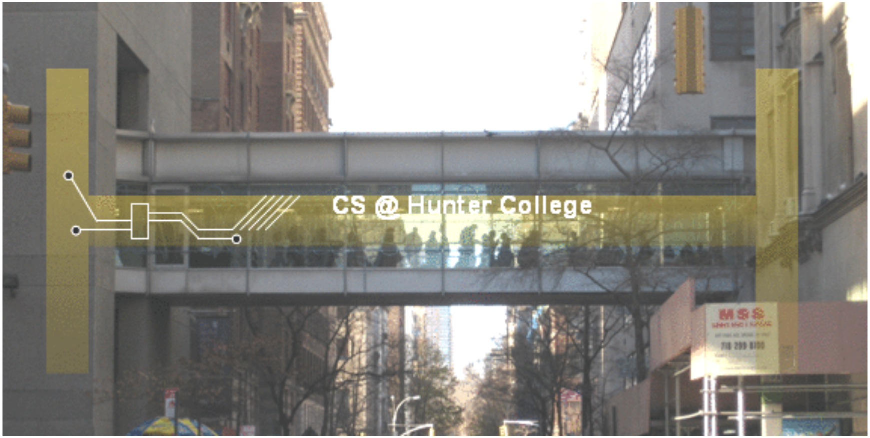
CSci 127: Introduction to Computer Science



hunter.cuny.edu/csci

Frequently Asked Questions

From email & past semesters.

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- **Do I have to take the final?**
  Yes, you must pass the final (60 out of 100 points) to the pass the class.

Today's Topics

- Recap: Folium
- Indefinite loops
- Design Patterns: Max (Min)
- Design Challenge

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Challenge:

What does this code do?

```
import folium
import pandas as pd

cuny = pd.read_csv('cunyLocations.csv')
mapCUNY = folium.Map(location=[40.75, -74.125])

for index,row in cuny.iterrows():
    lat = row["Latitude"]
    lon = row["Longitude"]
    name = row["Campus"]
    if row["College or Institution Type"] == "Senior Colleges":
        collegeIcon = folium.Icon(color="purple")
    else:
        collegeIcon = folium.Icon(color="blue")
    newMarker = folium.Marker([lat, lon], popup=name, icon=collegeIcon)
    newMarker.add_to(mapCUNY)

mapCUNY.save(outfile='cunyLocationsSenior.html')
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Folium example

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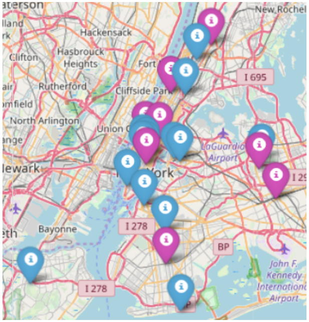

Folium

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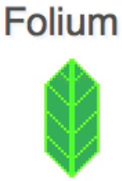

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- An extra step:

Write code. $\rightarrow$ *Run program.* $\rightarrow$ *Open .html in browser.*

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Challenge:

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def getYear():
    num = 0
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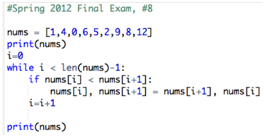
```
def getYear():
    num = 0
    while num <= 2000 or num >= 2018:
        num = int(input('Enter a number > 2000 & < 2018'))

    return(num)
```

Indefinite Loops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#Spring 2012 Final Exam, #8

nums = [1,4,0,6,5,2,9,8,12]
print(nums)
i=0
while i < len(nums)-1:
    if nums[i] < nums[i+1]:
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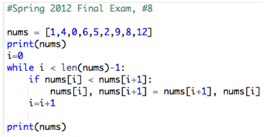

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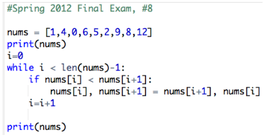
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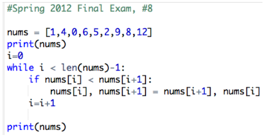

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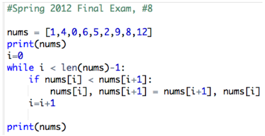

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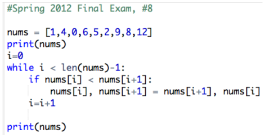
- Indefinite loops repeat as long as the condition is true.
- Could execute the body of the loop zero times, 10 times, infinite number of times.
- The condition determines how many times.
- Very useful for checking input, simulations, and games.

Indefinite Loops



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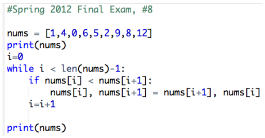

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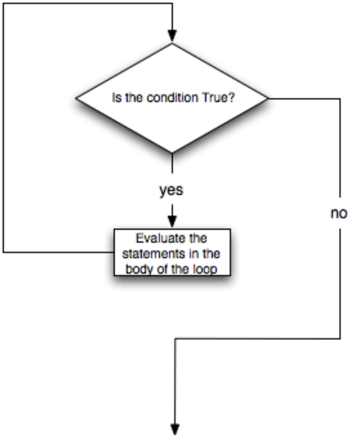
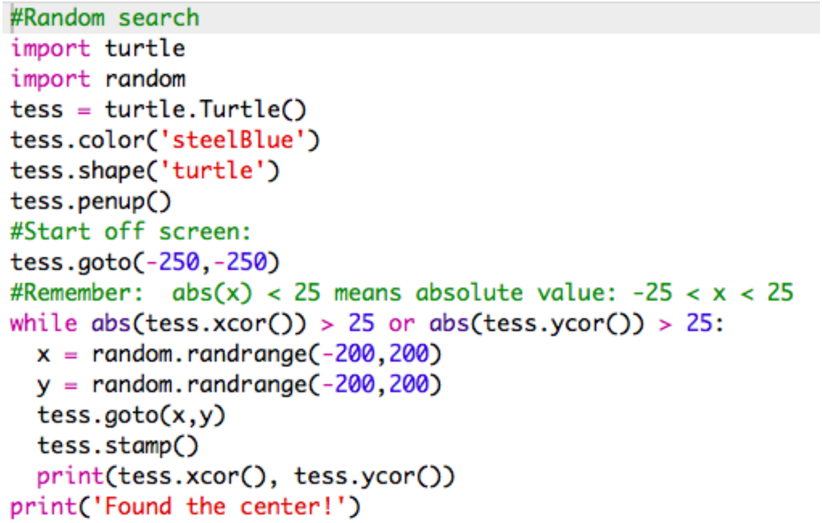


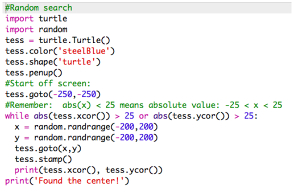
Challenge

Predict what this code does:



```
#Random search
import turtle
import random
tess = turtle.Turtle()
tess.color('steelBlue')
tess.shape('turtle')
tess.penup()
#Start off screen:
tess.goto(-250,-250)
#Remember:  abs(x) < 25 means absolute value: -25 < x < 25
while abs(tess.xcor()) > 25 or abs(tess.ycor()) > 25:
  x = random.randrange(-200,200)
  y = random.randrange(-200,200)
  tess.goto(x,y)
  tess.stamp()
  print(tess.xcor(), tess.ycor())
print('Found the center!')
```

Trinket Demo



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(Demo with `trinket`)

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- Design Challenge

Design Patterns

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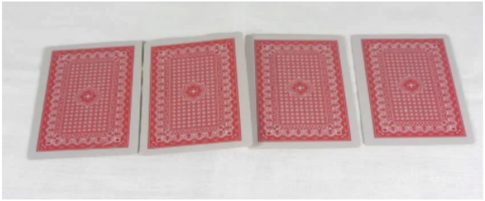
- The pattern is independent of the programming language.
- Can think of as a master recipe, with variations for different situations.

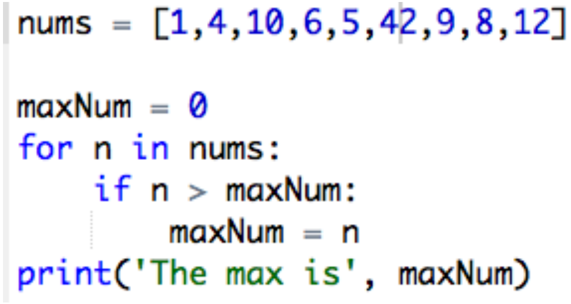
Design Question:



You can uncover one card at a time.
How would you go about finding the highest card?

Challenge:

Predict what the code will do:



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nums = [1,4,10,6,5,42,9,8,12]

maxNum = 0
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    if n > maxNum:
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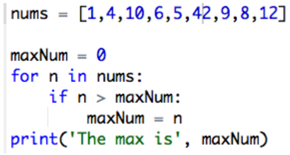
Python Tutor



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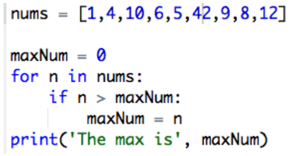
Max Design Pattern

- Set a variable to the smallest value.



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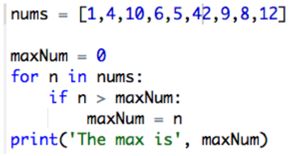

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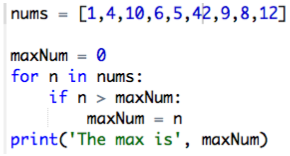

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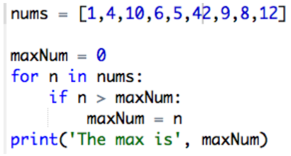
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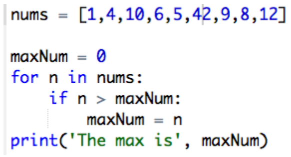

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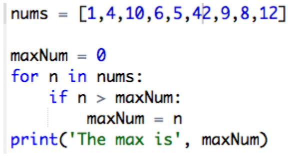

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- Similar idea works for finding the minimum value.

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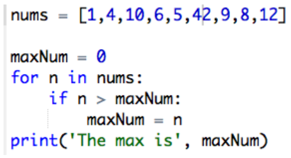

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- Must look at entire list to determine max is found
- Similar idea works for finding the minimum value.
- Different from **Linear Search**: can stop when value you are looking for is found.

Pandas: Minimum Values

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Pandas: Minimum Values

- In Pandas, lovely built-in functions:
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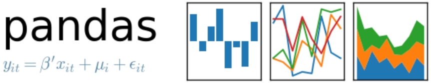
- What if you don't have a CSV and DataFrame, or data not ordered?

Design Question: Find first alphabetically



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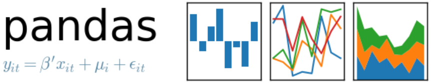

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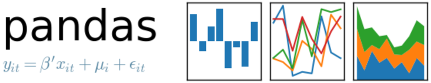

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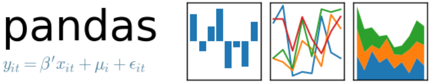

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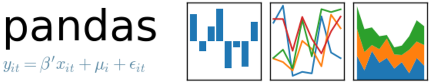

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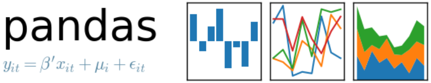
    - ★ Compare X to your variable.
    - ★ If better, update your variable to be X.

Design Question: Find first alphabetically



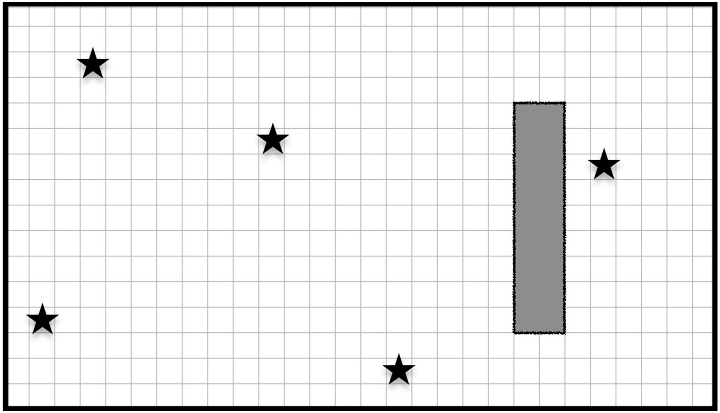
- What if you don't have a CSV and DataFrame, or data not ordered?
- Useful *Design Pattern*: min/max
  - Set a variable to worst value (i.e. `maxN = 0` or `first = "ZZ"`).
  - For each item, X, in the list:
    - ★ Compare X to your variable.
    - ★ If better, update your variable to be X.
  - Print/return X.

Today's Topics

- Recap: Folium
- Indefinite loops
- Design Patterns: Max (Min)
- **Design Challenge**

Design Challenge

Collect all five stars (locations randomly generated):



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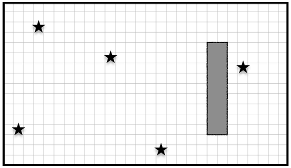
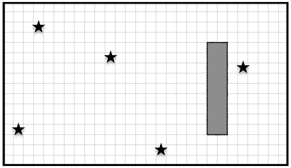


- Possible approaches:

Design Challenge



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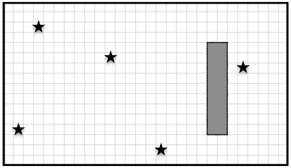

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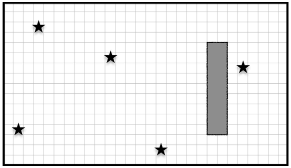

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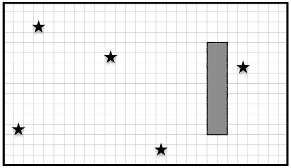

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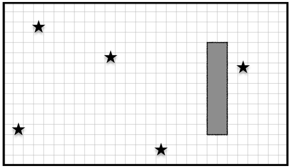

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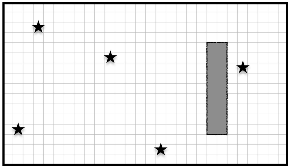

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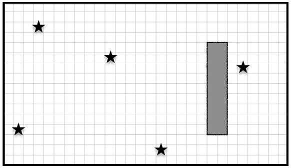

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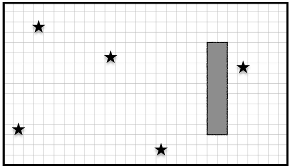

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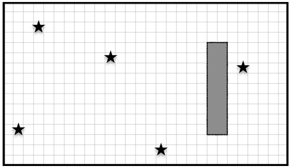

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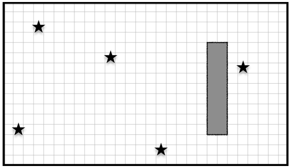

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  - Otherwise, mark 2 in map that it's an empty square.

Recap

- Quick recap of a Python library, `Folium` for creating interactive HTML maps.

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Recap

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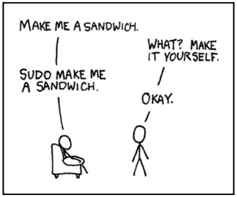
- Introduced the max/min and linear-search design pattern.

Final Exam Prep: UNIX



xkcd 149

- This course has three main themes:
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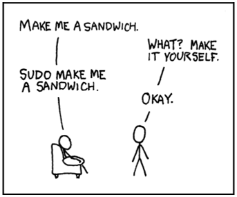
Final Exam Prep: UNIX



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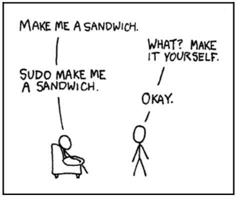
Final Exam Prep: UNIX



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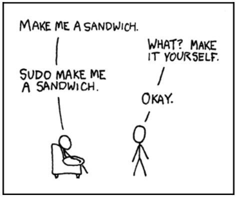

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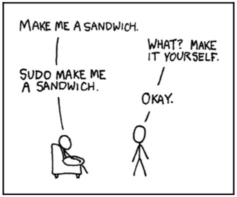
Final Exam Prep: UNIX



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- Unix commands in the weekly on-line labs

Final Exam Prep: UNIX

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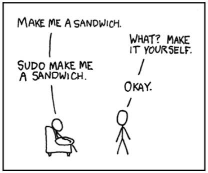

xkcd 149

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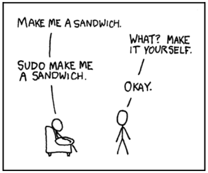

xkcd 149

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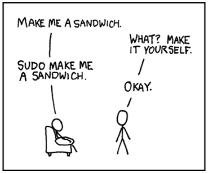

xkcd 149

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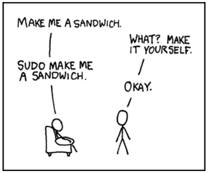

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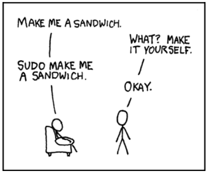

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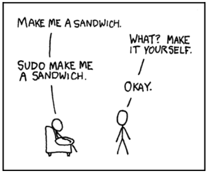

xkcd 149

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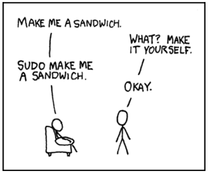

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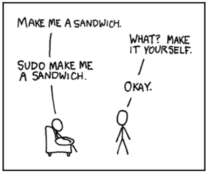

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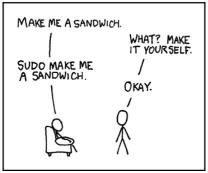

xkcd 149

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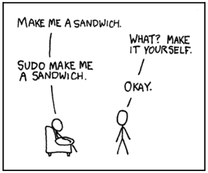

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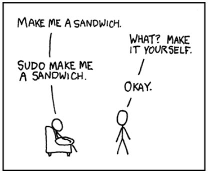

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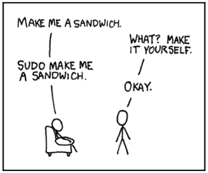

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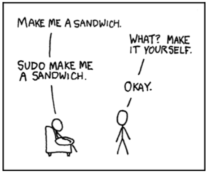
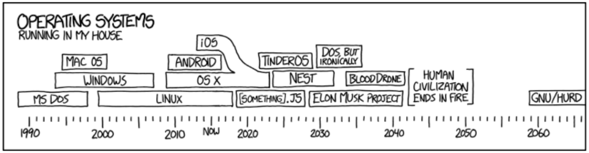


xkcd 149

Practice Quiz & Final Questions



xkcd #1508

- Since you must pass the final exam to pass the course, we end every lecture with final exam review.
- Pull out something to write on (not to be turned in).
- Lightning rounds:
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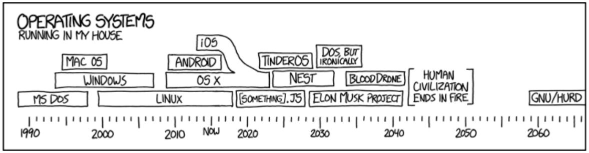

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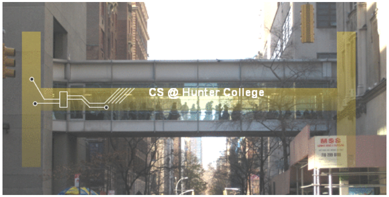
Class Reminders!



Before next class, don't forget to:

- Review this class's Lecture and Lab
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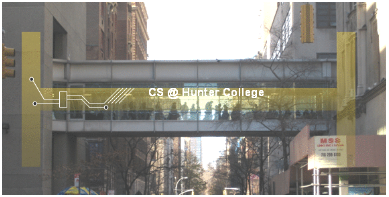

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