

Introduction to Plotting

Day 9 – PH 365

23 Oct 2024

Review of Day 8

Timing code snippets requires:

- One “start” time
- One “stop” time
- Print the difference

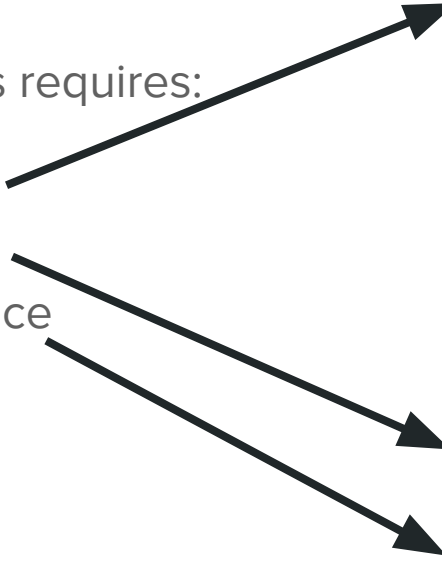
```
t0 = time.time()

t = 0
y_vals = []

for i in range(10000):
    y = y0 + vy0 * t - 0.5 * g * t ** 2
    y_vals.append(y)
    t += delta_t

t1 = time.time()

print(t1 - t0)
```



Review of Day 8

Coding the same calculation using **direct NumPy operations**

```
t0 = time.time()

t = 0
y_vals = []

for i in range(10000):
    y = y0 + vy0 * t - 0.5 * g * t ** 2
    y_vals.append(y)
    t += delta_t

t1 = time.time()

print(t1 - t0)
```



Need an array for time values to perform NumPy operations

```
t0 = time.time()

t_vals = np.arange(0, 50, 0.1)
y_vals = y0 + vy0 * t_vals - 0.5 * g * t_vals ** 2

t1 = time.time()

print(t1 - t0)
```

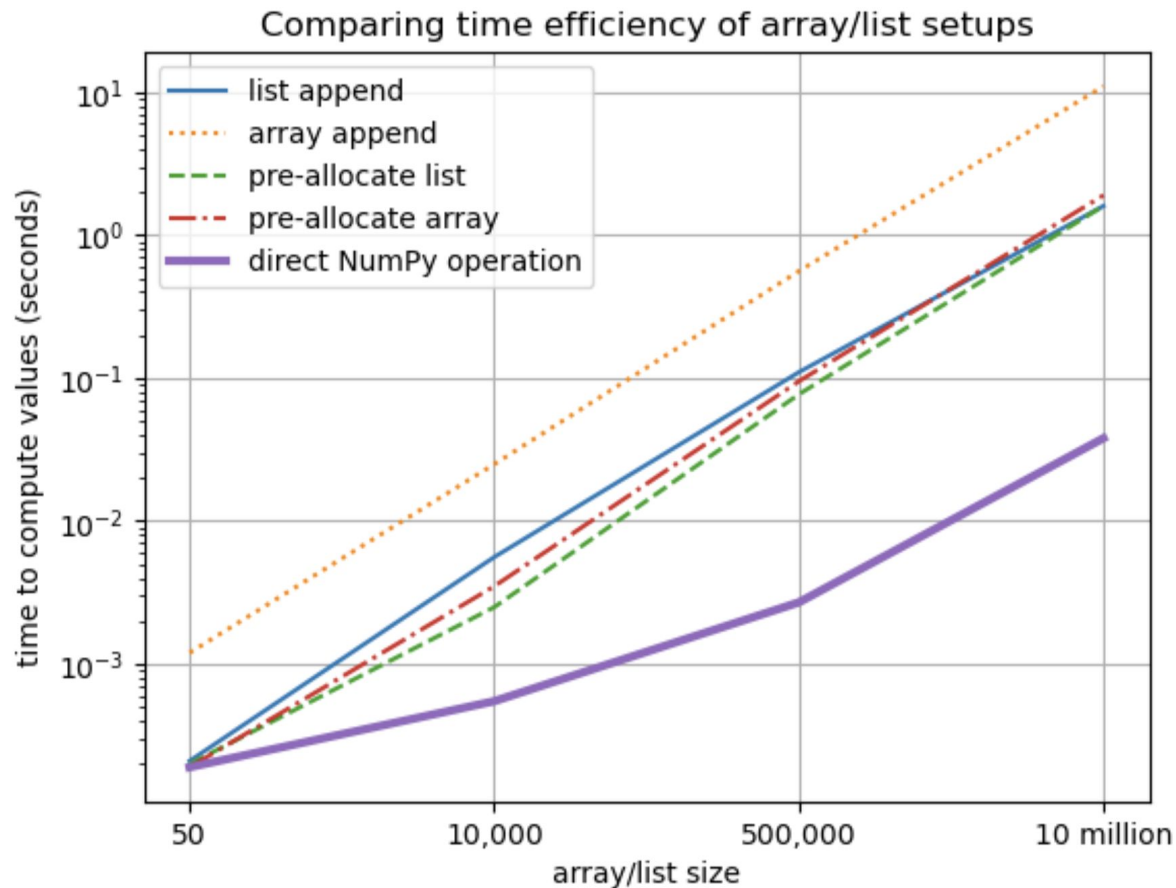
Computation of height values can look the exact same

Review of Day 8

Scale up to higher values by replacing “50” with other numbers, timing again

Solution Approach / Number of Values	50	10,000	500,000	10,000,000
Appending a list with a loop	0.00021	0.0056	0.11	1.6
Appending an array with a loop	0.0012	0.025	0.56	11
Filling a pre-allocated list with a loop	0.00020	0.0025	0.077	1.6
Filling a pre-allocated array with a loop	0.00019	0.0035	0.095	1.9
Using NumPy operations directly with no loop	0.00019	0.00055	0.0027	0.038

Review of Day 8



Mini-project next week

Worth **20%** of your grade

More open-ended assignment, takes 2 class periods

Expecting you to create code **and** explanations to address project prompt

Can collaborate with others, but your solution must be **your own** work

Description and rubric to be posted to Canvas

Other announcements

We will be using the Matplotlib library today

We will discuss Gen-AI today

Gen-AI Discussion

- How was Gen-AI **actually useful** today?
- How was Gen-AI **unhelpful or confusing**?
- What **level of usage** helped you feel like you understood plotting or approximations better?



tinyurl.com/365-gen-ai