Intro to Computer Science II

"Every program depends on algorithms and data structures, but few programs depend on the invention of them"

- Kernighan & Pike

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What will we do in class this semester?

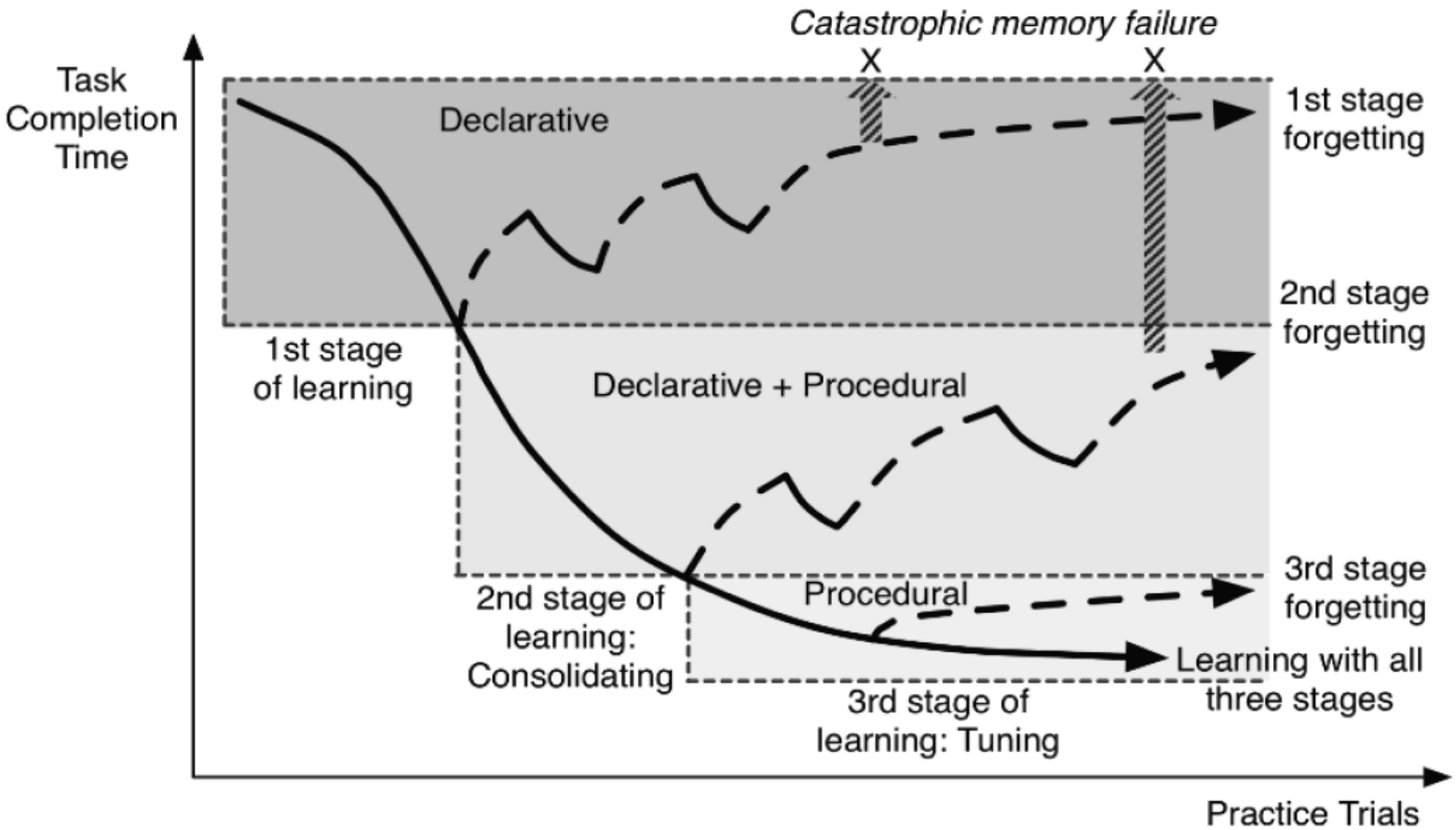
Lecture (but just to get the declarative knowledge down)

- PowerPoints

Active Learning

- Group activities
- Discussion and reflection

I may repeat things you may have seen before (e.g., in a lab)!



Syllabus

Course website

http://www.eg.bucknell.edu/~csci204/

Syllabus, schedule, lab, projects, …

Course Moodle site

http://moodle.bucknell.edu/course/view.php?id=26802

Submit work, check grades

Prof. Meng's Moodle site

http://moodle.bucknell.edu/course/view.php?id=25388

Online quizzes

Syllabus

Lectures

MWF: 11 am

Key skills, topics, and their motivation

I'd like to see you! Let me know if you'll be absent…

Lab

Th: 10-12 pm, 1-3 pm, 3-5 pm
Guided work on the material.
You are required to attend your section.
Let the lab instructor know if you'll be absent…

Office Hours

M: 2-3 PM**, WF:** 2-4 PM, **Th:** 2-3 PM; 212 Dana

Syllabus

Grading

Projects	16%
Professionalism	8%
Quiz/HW	10%
Labs	16%
Mid-term exams	30%
Final Exam	20%

What will we cover?

Data Structures

- Particular way to organize and manipulate data (e.g., **list**, stack, queue, trees, array

Data Abstraction

- Data type *properties* (independent of implementation)

Algorithms & Algorithm Analysis

- Common algorithms, searching, sorting

Advanced Python Programming

- OOP, classes, inheritance, exceptions, etc.

What will we cover?

Program design and style will be important!

- ***https://google.github.io/styleguide/pyguide.html***
- ***https://www.python.org/dev/peps/pep-0008/#function-names***

List Review

Python Lists are **Mutable**

- What does this mean?

```
test_list = [14, 2, 42, 3, 24]
```

List Review

Accessing and manipulating Python Lists

Some useful list operators

- + (concat), * (mult), : (slicing)

List methods

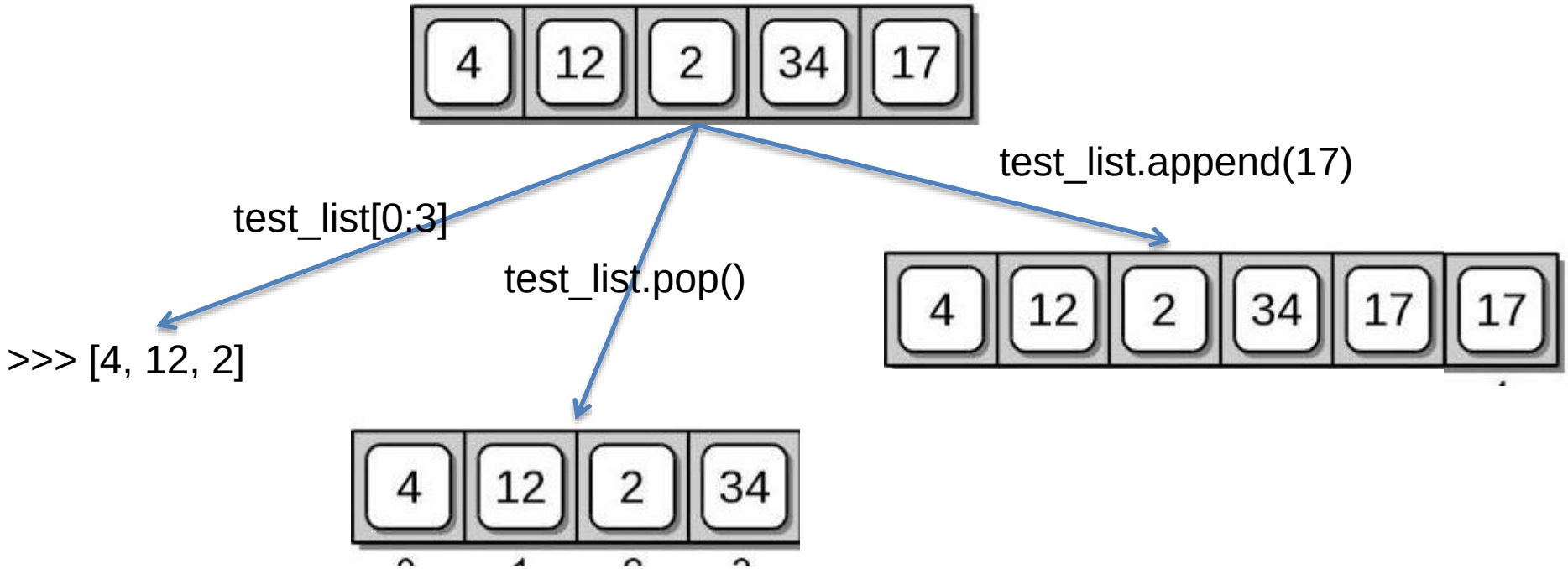
- append, extend, insert, pop

Comprehensions

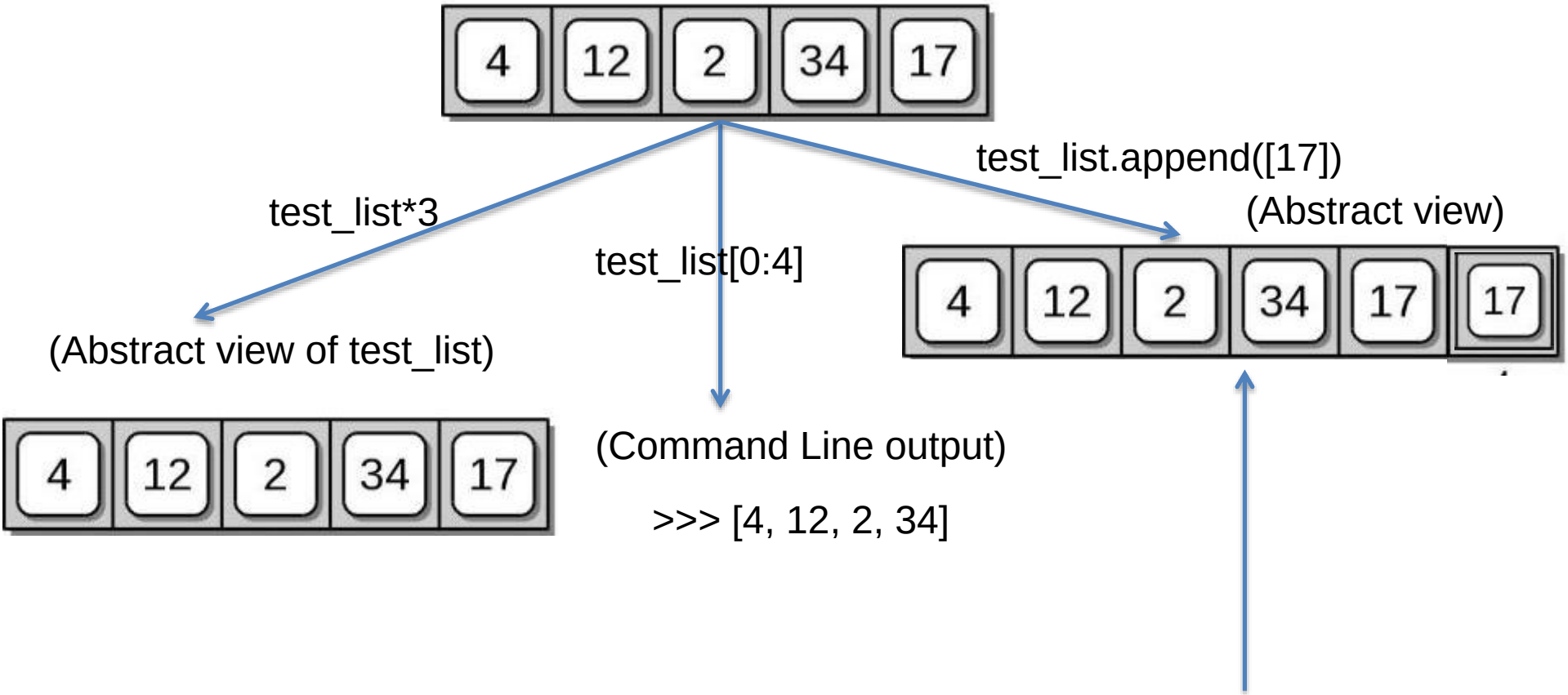
- Build lists from existing lists
- Ex:

```
my_list  = [x*2 for  x in range  (10) ]
```

List Review (Examples)



List Review (Examples)



What happens when we use * with this version of test_list?

Strings Review

Strings operate in a very similar way to lists, but they are **immutable**

- Lets say test_string = ‘team’
- What happens when I execute test_string[1] = ‘l’ ?

Several Methods

- split, upper, lower, count, find, …
  https://docs.python.org/3/library/stdtypes.html#textseq

Dictionaries Review

Dictionaries contain a *key* and a corresponding *value*

- ***Ex.*** B10FB = {‘PSU’ : ‘Penn State’, ‘OSU’ : ‘Ohio State’, ‘MSU’ : ‘Michigan State’, ‘Mary’ : ‘Maryland’, ‘Rut’ : ‘Rutgers’, ‘Ind’: ‘Indiana’}

- B10FB[‘PSU’] returns…..’Penn State’
- What if we didn’t know which B10 teams were in B10FB?
- B10FB[‘Umich’] throws an error, BUT B10FB.get(‘Umich’) simply returns *None*

Classroom exercise

Take as inputs from the user a sequence of nick names, and a sequence of full names, both groups separated by commas. Build a dictionary with the nick names as key and full names as value. Example:

```
Enter nicknames separated by commas:'bb, cc, dd'
Enter full names separated by commas:'bob barker,chris
christie, donny darko’

bob barker or bb for short.
chris christie or cc for short.
donny darko or dd for short.
```

Retrieve the starting source code from the course website www.eg.bucknell.edu/~csci204/