Computational Structures in Data Science

Wrap Up

(Starting Berkeley Time!)

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Announcements

- Seating assignments out next week (we'll be in 2-3 rooms)
- Remember to wrap up assignments
  - No extensions beyond 12/10

Final Exam Information

- Time: Thurs 8 AM ☹
  - We'll be split in 3 rooms; emails to be sent later week
  - Confirmations on accommodations, alt times sent soon.
- Similar to Midterm, but 3 hours
- 5 double-sided cheat sheets, **will be collected.**

Clobber Policy:

- If you improve upon your midterm score, your midterm score goes up
- Everything in class is in scope, but focus on post-midterm topics.

Grading Updates

- Everything is a straight sum, out of 400 points.
- Will release a grading report on gradescope later this week or next week.
- Lecture Self-Checks
  - Basically everyone *should get* 20/20 on the lecture self-checks. That's the point. ☺
  - Correctness *does* count! **Resubmit open ones, if you haven't gotten them right, but we will not reopen closed self-checks.**
  - There are 30 self-checks which means you could have skipped *a lot of* lectures

Is Your Brain Full Yet?

- Data: values, literals, operations,
- Functions, Variables
- List, Tuples, Dictionaries
- Conditionals, Loops
- Iteration: list comp, for, while
- Lambda function expr.
- Higher Order Functions
- Recursion
- Abstract Data Types
- Mutation
- Object-Oriented Programming
- Inheritance
- Linked Lists
- Trees
- Efficiency
- Iterators & Generators
- SQL / Declarative Programming

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CONGRATULATIONS!!

Computational Structures in Data Science

Final Review

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Michael Ball | UC Berkeley | https://c88c.org |

Approaching The Exam

- Skim the topics (~1 min)
- Handle the "easy"(est) questions first
- **Read the whole question first!**
- **Read the text**
- **Read the doctests!**
- What techniques might be applicable?
  - Pattern matching is OK
- Draft a solution on scratch paper!
- Write yourself notes

Spring 2022 – Question 5 - cascade

5. (6.0 points) Cascading Numbers

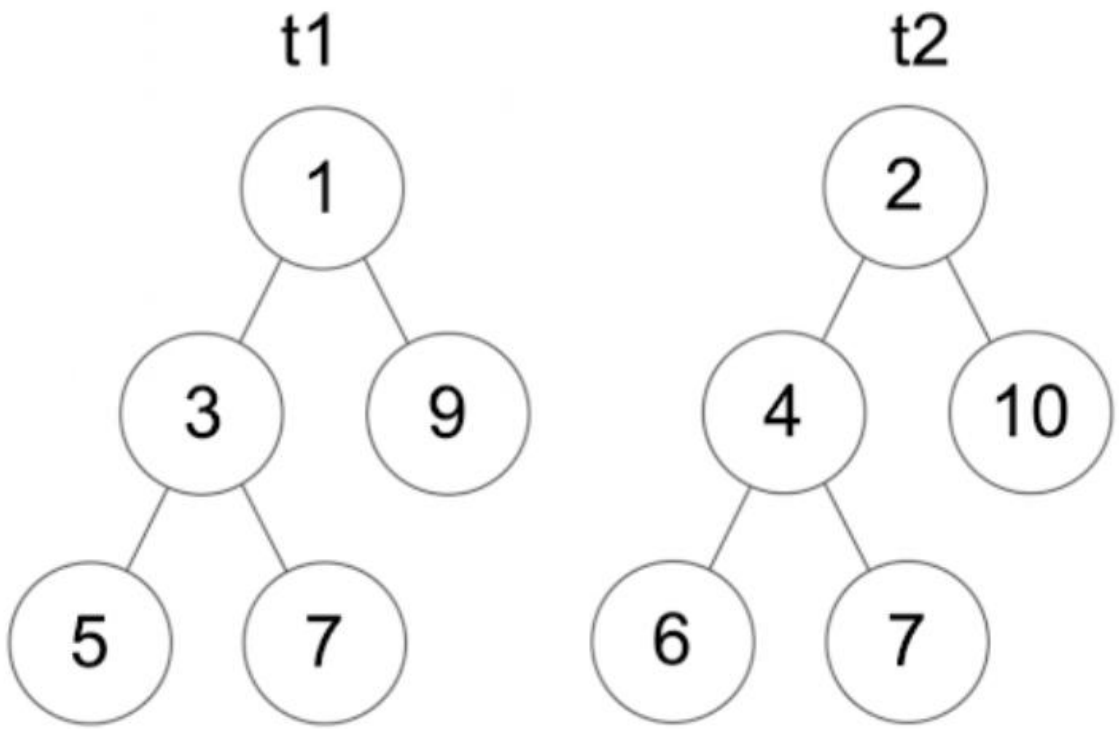
Complete the function cascade, which takes in an integer base, a function fn, and a non-negative integer count. cascade returns a sequence of numbers starting with base, fn(base), fn(fn(base)), . . . and so on, count number of times and then continues the sequence in reverse back to base.

```
if count == 0:
    return ______________________________
elif count == 1:
     return ______________________________
else:
    middle = cascade(____________________________)
    return ______________________________
```

Fall 2021 Q9 – Tree Farm

9. (12.0 points) Tree Farm

You've decided to get into the tree growing business! All the trees you grow have the same structure as each other but may have different values. You want to detect the nodes that are in the same position in two given trees but have different values. Write a function that takes in two trees, `t1` and `t2`, with the same structure and yields the mismatching node values as a tuple.



THANK YOU!

Isabelle Ng she/her/hers

@ DSP isabelle.ng@berkeley.edu

Hi there! I am a senior CS/DS/Music Major from San Jose, CA and this is my 4th semester being a TA for c88c/cs61a. I love writing songs and learning more about HCI and NLP. Excited to meet you all and have an awesome semester!

Rebecca Dang she/her/hers

@ DSP rdang@berkeley.edu

Hey there, I'm a 5th year MS EECS student and this is my fifth semester teaching C88C! Happy to chat about this course, classes and clubs at Berkeley, professional development, guitar, books, movies, TV, music, and more :D

Dhruv Syngol he/him/his

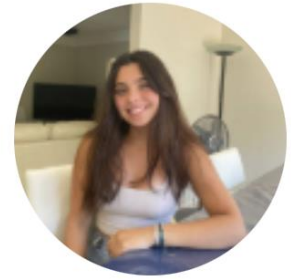
@ dhruvsyngol@berkeley.edu

Hey everyone, I'm a junior studying Data Science and Economics, originally from the Chicago Suburbs! I love to play pickleball, explore cafes and restaurants, and go on hikes! Super excited for this semester!

Grace Xie she/her/hers

gracexie@berkeley.edu

Hello! My name is Grace. I'm a third-year majoring in MCB and Data Science :0 I love reading sci-fi and baking in my free time.



Mira Wagner she/her/hers

@ DSP mirawagner@berkeley.edu

Hi! I am a junior majoring in data science and linguistics. I love reading, especially mysteries, swimming and baking! Excited for this semester :)

Alicia Wang she/her/hers

@ awwang629@berkeley.edu

Hi! I am a junior studying Data Science and Cognitive Science. I love playin badminton and traveling! Excited to meet everyone!

Grace Baek she/her/hers

gracebaek@berkeley.edu

Hi! I'm Grace, a senior majoring in Computer Science and Economics and t is my 2nd semester teaching C88C. In my free time, I like baking, trying ne cafes, and watching kdramas :) Super excited to meet everyone!

Cynthia Shao she/her/hers

cynthia_shao@berkeley.edu

Hey! I'm Cynthia, a sophomore in data science. You can find me dancing in The 510, jogging around campus, and finding/making/eating food at 1AM. See you in session :)

Maryam Akelyan she/her/hers

maryam.akelyan@berkeley.edu

Hi! I'm Maryam, a junior majoring in Data Science and MCB, and I'm from La Crescenta, CA! In my free time I like to watch sitcoms and sci-fi shows. Super excited to meet you all! :)

Orazaly Kabdrakhmanov he/him/his

kabdrakhmanov@berkeley.edu

Hi there! I'm Orazaly and I am a senior majoring in Data Science. I like playing tennis and video games(CS2). Hope you enjoy the class!

Reema Rafifar she/her/hers

reemarafifar@berkeley.edu

Hi everyone! I'm Reema, a junior majoring in Neuroscience & Data Science. I absolutely love movies so come talk to me about your favorite films! I can't wait to get through C88C with you!

Thompson Zhou he/him/his

chuanjunzhou@berkeley.edu

Hi! I'm Thompson, a third year double majoring in Applied Math and Data Science. During my free time, I like to read, play video games, and follow sports.

COME JOIN COURSE STAFF!

Keep on Programming

LOTS of Courses to Follow Up! [Courses]

- Explore all the DS connectors
  - Data 88E (Econ)
  - Stat 88 / DATA C88S
- Data 100: Principles of DS
- Data 101: Data Engineering
- Data 102: Data, Inference, and Decisions
- Data 104: Human Context and Ethics
- Data 140: Probability
- INFO – Course Schedule Varies!
  - INFO C103 in Spring: "History of Information"
  - Some Database courses, web development, etc.

CS Courses

- CS61B: (conventional) data structures, statically typed production languages.
- CS61C: computing architecture and hardware as programmers see it.
- CS70: Discrete Math and Probability Theory.
- CS170, CS171, CS172, CS174: “Theory”—analysis and construction of algorithms, cryptography, computability, complexity, combinatorics, use of probabilistic algorithms and analysis.
- CS161: Security
- CS162: Operating systems.
- CS164: Implementation of programming languages
- CS168: Introduction to the Internet
- CS160, CS169: User interfaces, software engineering
- CS176: Computational Biology

CS Courses Part 2

* CS182, CS188, CS189: Neural networks, Artificial intelligence, Machine Learning
- CS184: Graphics
- CS186: Databases
- CS191: Quantum Computing
- CS195: Social Implications of Computing
- EECS 16A, 16B: Designing Information Systems and Devices
- EECS 126: Probability and Random Processes
- EECS149: Embedded Systems
- EECS 151: Digital Design
- CS194: Special topics. (e.g.) computational photography and image manipulation, cryptography, cyberwar.
- Plus graduate courses on these subjects and more.

Personal Course Recommendations

- INFO C103
- Computational Photography – especially if you like photoshop
- HCE Courses
- History, Poli Sci, Psychology
- LS110 Brilliance of Berkeley (if offered)
  - https://curricularconnections.berkeley.edu/ls110/

What's next? (Otherwise)

- Programming contests
- Hackathons
- More paradigms and languages: the web
- The open-source world: Go out and build something!
- Above all: Have fun!

And there's lots more to Python!

What can you do with Python?

- Almost anything!
- Webapp backends
- Web scraping
- Natural Language Processing
- Data analysis
- Machine Learning
- Scientific computing
- Games

What can you do with Python?

- Almost anything! Thanks to libraries!
- Don't try to memorize libraries, learn how to learn how to use them!
- Webapp backends (Flask, Django)
- Web scraping (BeautifulSoup)
- Natural Language Processing (NLTK)
- Data analysis (Numpy, Pandas, Matplotlib)
- Machine Learning (FastAi, PyTorch, Keras)
- Scientific computing (SciPy)
- Games (Pygame)

(Reminder) Peer Resources: Join Ed!

- https://eecs.link/data001 - Data 001 Ed Group
- https://eecs.link/eecs101 - EECS 101 Ed Group

Ask Us Anything!

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THANK YOU!

(Again!)

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