Discussion 04

Sequences

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Slides available at `teaching.aditbala.com`

Announcements 📣

- Hog due TODAY for EXTRA CREDIT (7/5)
- No extensions for EC unless you have specific accomodations
- HW2 due Thursday (July 7th)
- Cats (Project 2!) begins Thursday
  - Checkpoint next Tuesday (July 12th)
  - Due following Tuesday (July 19th)
- Instructor OH - conceptual help; super useful!

Questions from last discussion

- What is in-scope for the exam
  - All lecture prior to the week of the exam
  - Practice exams until Summer 2019
  - Would personally reccomend doing more if you feel shaky (start soon)
- Video for `count_k(n, k)`
  - Delayed
  - Will try to get done today
  - Rough(ish) weekend

Lists

Lists

- An indexed collection of any data type
- Examples of valid lists:
  - `[1, 2, 3]`
  - `[True, False, 'boo']`
  - `[[4], [3, 6, 7], [8]]`
- Environment diagrams

Creation and Usage

- In order to access the values in our list, we have to use the index
- Python lists are zero indexed, so the first element is at index 0
- `n` element is at `n-1` index
- Can also access elements in reverse order through negative index
  - Last element is accessed through index `-1` or `len(list) - 1`

```
>>> a = [1, 2, [3, 4]]
>>> a[0]
1

>>> a[2]
[3, 4]

>>> a[2][0]
3
```

What questions do we have?

Q3: WWPD (Lists)

List Slicing

- How do you access a subset of the list?
- List slicing: creating a copy of part of the list
  - Syntax: `list[<start index>: <non inclusive end index>: <step size>]`
  - step size by default is 1
  - negative step size means list is reversed

List Slicing Examples

```
>>> a = [7, 89, True, ['cat']]

>>> a[1:3]
[89, True]

>>> a[:3:2]
[7, True]

>>> a[::-1]
[['cat'], True, 89, 7]

>>> a[:3:-1]
[]
```

What questions do we have?

List Comprehension

- How do you create a list that fits some criteria?
  e.g. How would you create a list with numbers 1 - 4, but squared
  `[1, 4, 9, 16]`
- List Comprehension: creating a list based on expressions filtering other lists
- Syntax: `[<expression> for <value> in <sequence> [if <filter>]]`
- `if` condition is optional

List Comprehension Examples

```
>>> a = [x**2 for x in range(1, 5)]

>>> a
[1, 2, 9, 16]

>>> [x/2 for x in [x for x in a if x % 2 == 0]]
[1, 8]
```

What questions do we have?

Q4: Even weighted

Q5: Max Product

Sequences 1️⃣ 2️⃣ 3️⃣

Sequences

- Many languages provide `map`, `filter`, `reduce` functions for sequences (lists in Python)
- Help manipulate lists with built-in functions

Q1: Map, Filter, Reduce

Q2: Count Palindromes

Dictionaries 📖

- Maps `keys` to `values`
- Doesn't really have an order
- Access elements using `keys` rather than indices

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- Maps `keys` to `values`
- Doesn't really have an order
- Access elements using `keys` rather than indices
- Defined with curly braces (`{}`)
  - `{key: value}`

Demo:

```
pokemon = {'pikachu': 25, 'dragonair': 148, 25: 'hello'}
pokemon['pikachu'] # 25
pokemon['hello'] = 'hi'
pokemon # {'pikachu': 25, 'dragonair': 148, 25: 'hello', 'hello': 'hi'}
```

Q6: WWPD (Dictionaries)

Thank you

Attendance Form -> https://tinyurl.com/adit-disc04

Anon Feedback -> https://tinyurl.com/adit-anon