CS417 Lab 8

Exercises on Dictionaries

Getting Started

Create a folder for your work. Then, go to `mycourses.unh.edu`, find CS417, click the `unh.box.com` link, find `Lab08`, and download this file:

- `dicts.py`

Exercises

1. Implement `get_frequencies(data)`. It counts how often each item occurs in `data`, and returns a dictionary of counts.

   Method:

   - first, create a dict called `counts`.
   - make a `for`-loop that visits each `x` in `data`
   - in the loop, do `counts[x] += 1`

   The statement `counts[x] += 1` will fail with `KeyError` if `x` is not yet in the dictionary. So, check `if x not in counts` before incrementing. If it's not, initialize `counts[x]` to `0` or `1`, depending on how you wrote your code.

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2. Implement `has_duplicates(data)`. It returns `True`/`False` if `data` has/hasn't repeated items.

   Method:

   - First, call `get_frequencies` to get the counts
   - Write a `for`-loop that visits all the keys: `for x in counts:`
   - The `for` loop will iterate through the *keys* of `counts`. You need to get the corresponding `counts[x]`.
   - Any key with a `count > 1` means there are duplicates.

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3. Implement `get_mode(data)`. It returns the item that occurs MOST frequently in `data`. If there are multiple modes, return the first one found.

   Method: You are basically finding the largest count, and saving the corresponding item. You can do this in several ways, but the simplest is:

   - Find the largest count: `max(counts.values()`.
   - Write a `for`-loop that visits each `key, value` pair:

```
for key, value in counts.items():
```

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4. Implement `is_invertible(dictionary)`. Returns `True`/`False` if the dictionary can/can't be inverted. A dictionary is invertible if every key maps to a different value. So, if you get all the values in the dictionary, and there are duplicates, it can't be inverted.

   Method:

   - `dictionary.values()` is a list of values.
   - Call `has_duplicates()` on it.

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5. Implement `inverted(dictionary)`. It returns a new `dict`, which is the inverse: if key, value is an item in `dictionary`, then `value, key` is an item in the inverse.

   Method:

   - Create an empty dict(), the `inverse`.
   - Loop through all the `items()` in `dictionary`, and add each value,pair to the `inverse`.

Test Your Code

The module `dicts.py` has a `main()` program that tests all the functions. It should produce this output:

```
counts   : {1: 2, 2: 3, 3: 2, 4: 3, 5: 2, 6: 1}
has dupes: True
mode     : 2
num_names is not invertible
unique_names is invertible
inverted(num): {1: 'a', 2: 'two', 5: 'five', 3: 'three', 4: 'four'}
inverted(uniq): {1: 'one', 2: 'two', 5: 'five', 3: 'three', 4: 'four'}
```

Turn in Your Work

When you are done, go to `mycourses`, and find the lab. Click the `Submit` button, and upload `dicts.py`.