QuickLook: Datastructures

CS 196 – 25 DotStar [Lecture M2]

Review:

Data Structure: *noun.* A structure that holds data…. Lol.

You're familiar with:

- Variables
- Arrays

Last week we talked about **lists** and **dictionaries**. You can find last week's handout at akmodi.com/docs/intro_to_algos.pdf

Lists

A data structure that organizes stuff in a list. The data is stored linearly, kind of like in an array.

Lists are cool because you can store an arbitrary amount of data in them.

Here's what dictionaries can normally do:

- Add(data)
- Remove(data)
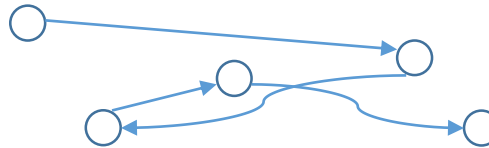- Find() discuss this with your neighbor

Remember objects from class yesterday? We're about to do something cool with them.

Remember that objects can hold data. Think about how you could program a list with this in mind.

What a list looks like in memory

Think of a scavenger hunt. You know where to start. But you don't know where to go next until you find the next clue.

Similarly, in a **linked list**, you know where the first unit of data is. And that unit then tells you where the next unit is.

This is what allows you to just keep adding an arbitrary amount of data to the structure.

Queues

This is just like a queue IRL. The most recent thing to join the queue is the last thing that will leave the queue.

Stacks

These are also like stacks IRL. Think of a stack of plates. The most recent plate to be put on top is the next plate to be washed.

Dictionaries

Dictionaries manage (key, value) pairs. All the data in a dictionary is organized as a **key** associated with a **value**.

With a dictionary, you pass in a **key** and it returns a **value**. Dictionaries are cool because they let you look up associations really quickly. Think of your netID. Information like your name, and class standing can be queried really easily in a database, which is really just a complicated dictionary.

We're going to have a class discussion on how dictionaries can be implemented. Takes NOTES!

Find this handout online at www.akmodi.com/docs/datastructures.pdf
Feel free to contact the lecturers: Abhishek Modi [akmodi2@illinois.edu] and Mark Miller [mrmillr3@illinois.edu]