

# CSE 12 – Basic Data Structures and Object-Oriented Design

## Lecture 21

Greg Miranda, Fall 2020

# Announcements

- Quiz 21 due next Monday, November 30<sup>th</sup> @ 9am
- Survey 8 due Friday @ 11:59pm
- PA7 due Tuesday, December 1<sup>st</sup> @ 11:59pm (Week 9)
- Exam 2 Review during discussion on Tuesday
  - 9am – 9:50am, 10am – 10:50am
- Exam 2 – Released Tuesday @ 6pm, due Wednesday @ 11:59pm
  - 60 minutes once you start - see Piazza post for more details

*No class Wed. No class Friday.*

# Topics

- Heaps Applications
- Questions on Lecture 21?

# MedianTracker (draw the picture and arrays)

- Draw the picture and the arrays for the following:
  - Add the following elements to the MedianTracker (in this order):
    - 5, 10, 15, 20, 25, 30, 35
  - What is the result of the call to `get()` after adding all the elements?

```

class Tracker {
    PriorityQueue<Integer> pq1 = new PriorityQueue<>(Collections.reverseOrder(Integer::compare));
    PriorityQueue<Integer> pq2 = new PriorityQueue<>(Integer::compare);
    void add(int n) {
        if(pq2.size() == 0 && pq1.size() == 0) {
            pq2.add(n);
            return;
        }
        int current = get();
        if(n >= current) {
            pq2.add(n);
        }
        else {
            pq1.add(n);
        }
        int sizeDifference = pq2.size() - pq1.size();
        if(sizeDifference > 1) { pq1.add(pq2.poll()); }
        else if(sizeDifference < -1) { pq2.add(pq1.poll()); }
    }

    int get() {
        if(pq2.size() == pq1.size()) { return (pq2.peek() + pq1.peek()) / 2; }
        if(pq2.size() > pq1.size()) { return pq2.peek(); }
        else { return pq1.peek(); }
    }

    public String toString() {
        return "" + pq1 + " " + this.get() + " " + pq2;
    }
}

```

Questions on Lecture 21?