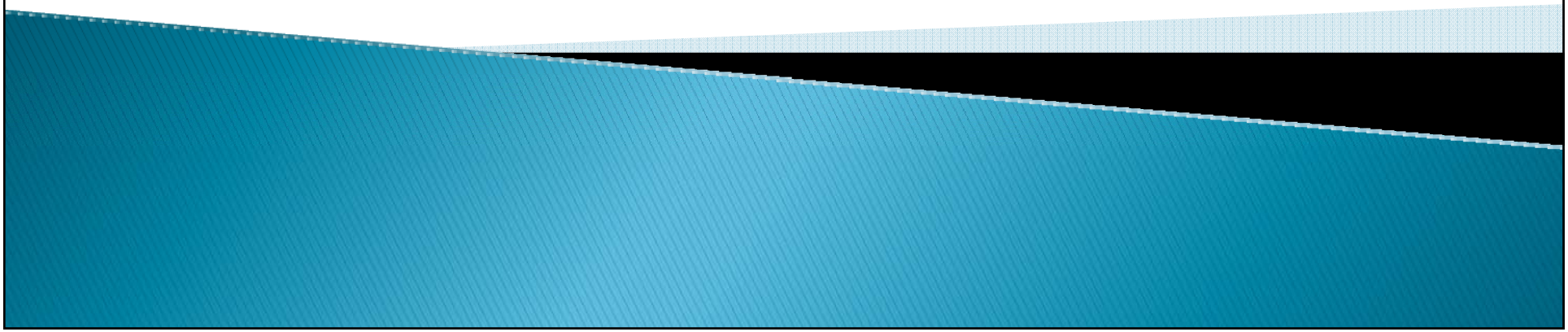
CSSE 220 Day 15

Key Concepts Quiz

Recap of Function Objects and BigOh

Work on Paint



CSSE 220 Day 15

- Note that Paint is due next class. Are you almost done?
  - Student assistants are available in the lab this afternoon Sunday evening, Monday afternoon, and Monday evening.
- Exams:
  - Exam 2 is Friday, May 2, as originally announced in the syllabus
  - Final is Monday, May 19, at 6 PM.

- Today:
  - Key Concepts Quiz
  - Recap of big-Oh and function objects
  - Paint time
- Questions?

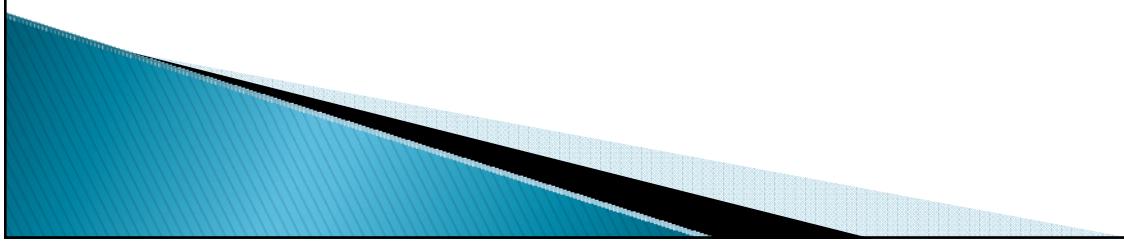
Quiz

- Angel > Lessons > Assignments > Reading Quizzes > Key Concepts quiz

Recap: Efficiency

```
for (int i = 0; i < n; i++) {
    a = 3*i
}
b = 17
```

- How many assignments are made?



Recap: Efficiency

```
for (int i = 0; i < n; i++) {
    do something
}
do something else
```

- Key: we know that whatever happens in the loop happens n times. Unless the "something" depends on i (like StringCopy), then the runtime is _____
- Note: we just care what happens when n gets large.

Recap: big-Oh

- We say that $5n^2 + 4n + 3$ is O(_____)
- What does this mean?
- Is $5n^2 + 4n + 3$ $O(n^3)$?
- Is $5n^2 + 4n + 3$ $O(n)$?
- We introduce new notation to discriminate further.

Recap: O, Ω, Θ

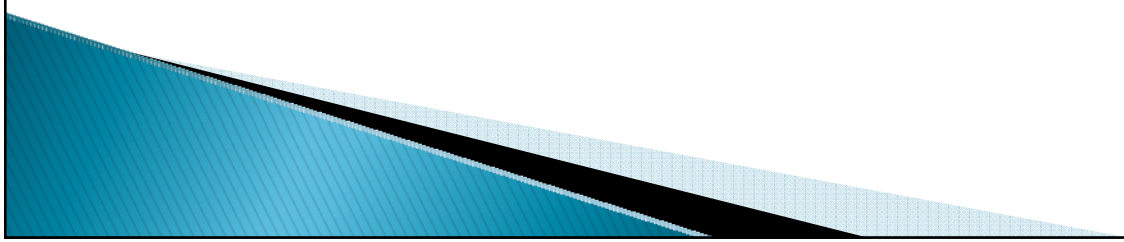
- f(N) is O(g(N) if there is a constant c such that for sufficiently large N, $f(N) \leq cg(N)$
  - Informally, the growth rate of f is bounded above by the growth rate of g
- f(N) is Ω(g(N) if there is a constant c such that for sufficiently large N, $f(N) \geq cg(N)$
  - Informally, the growth rate of f is bounded below by the growth rate of g
- f(N) is Θ(g(N) if f(N) is O(g(n)) and f(N) is Ω(g(N))
  - Informally, the growth rate of f is the same as the growth rate of g

Big-Oh Style

- **Give tightest bound you can**
  - Saying that $3N+2$ is $O(N^3)$ is true, but not as useful as saying it's $O(N)$ [What about $\Theta(N^3)$?]
- **Simplify:**
  - You *could* say:
  - $3n+2$ is $O(5n-3\log(n) + 17)$
  - and it would be technically correct…
  - It would also be poor taste … and put me in a bad mood.
- **But… if I ask "true or false: $3n+2$ is $O(n^3)$", what's the answer?**
  - True!
  - There may be "trick" questions like this on assignments and exams.
  - But they aren't really tricks, just following the big-Oh definition!

Function objects review

- Go over solution to EqualsZero and EqualsK.
- Note how beautiful countMatches() is.



A “map” functor

- In this assignment, you’ll write a functor to do an operation to each element in an array, and return an array containing the results.

- Examples:
  - int[] ar = [6,7,8,9]
  - When map is called with ar and a Square functor, it would return [36, 49, 64, 81]
  - When map is called with ar and an isPrime functor, it would return [false, true, false, false]

Work on Paint

- Don't forget to commit your progress report to the repository before the end of class.