CS 314: Data Structures

First Discussion Section! - Spring 2022

Sam's Section

Slides I make this semester will be available on my website: cs.utexas.edu/~slaberge

Zoom Logistics
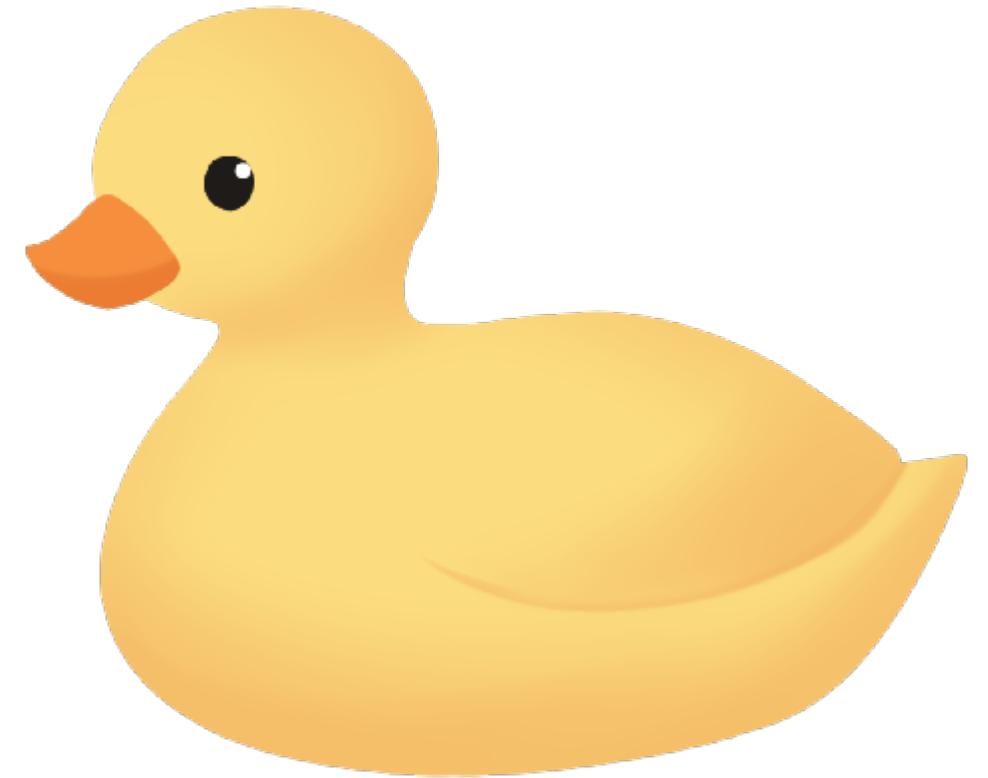
- Please turn your cameras on if possible

- Enter & leave breakout rooms quickly!

- If you have a question, just unmute yourself and ask or type it in chat

  - If this becomes too chaotic, we can switch to raising hands

Help Hours
(formerly *Lab Hours*)

- You can go to any TA's (or Mike's) help hours

  - Mine are Monday 6-8pm, Tuesday 4-5pm (Zoom), Thursday 4-6pm

  - If you have questions you think only I can answer (e.g. my style preferences) and can't make my help hours, contact me!

- The line will get **quite** long later in the semester, so start assignments early!

- Sign up link for Zoom help hours: cs314.utcshelphours.com

- In-person help hours are in the 3rd floor lab in GDC

If you have no idea why we seem obsessed with ducks, see: Rubber Duck Debugging (but also cuz they're cute)
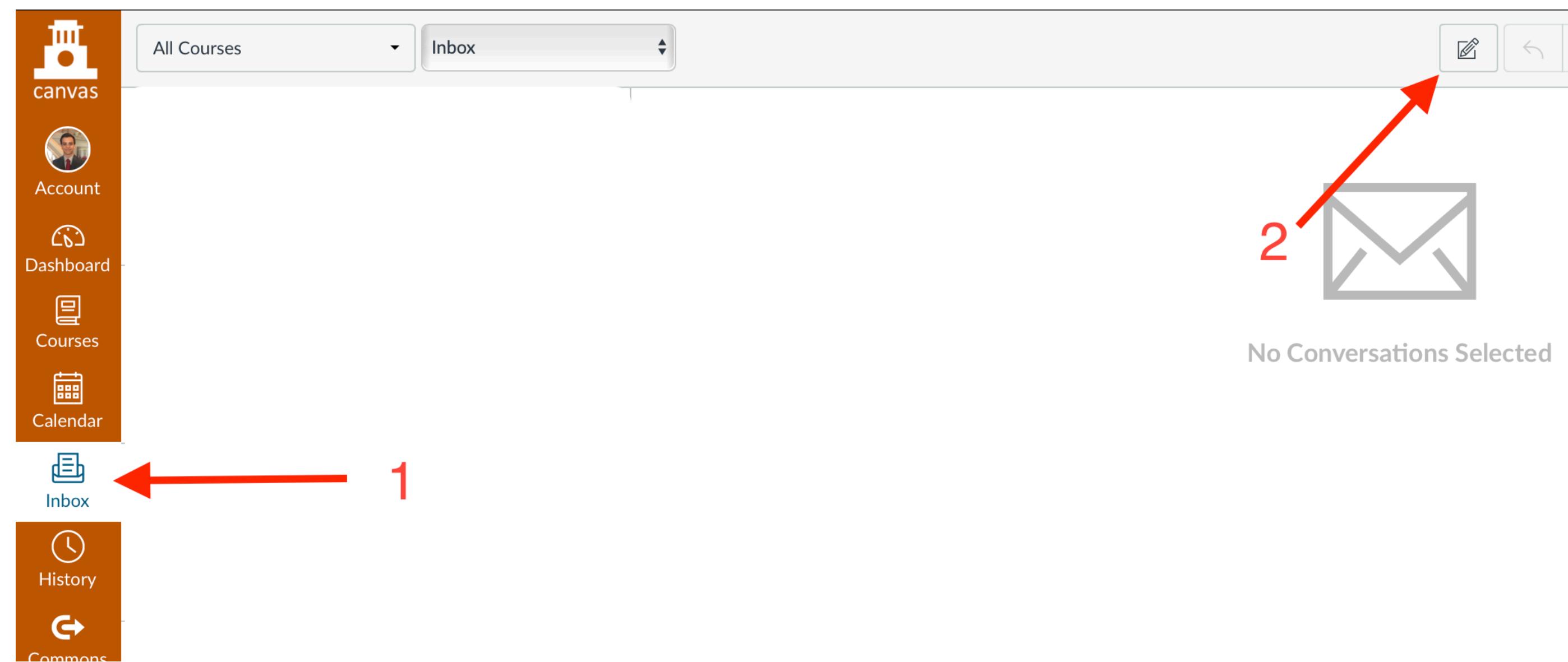
About Me
Samuel Laberge

- Senior in CS at UT

- Took CS312 in Fall '18 and CS314 in Spring '19

- TA'd for 314 Fall '19, Spring '20, Fall '20, Spring '21, Fall '21

- Interned at WP Engine (2020) and Stripe (2021)

- Currently in the five-year MS program

- Feel free to ask about anything UT, CS, or internship related!

How to Contact Me

- For questions about assignments, exams, and class logistics, please use <u>Piazza</u>.

- For more personal questions, like grades, please message me through Canvas.

  - I should respond within 24 hours, if I don't follow-up with me

Time to choose a Section Name!

https://tinyurl.com/ykzufrkw

Code Camp Common Mistakes

Assignment Discussion

- Be wary of repeated/redundant code!

  - If you ever notice that you're writing very similar code more than once, it may be redundant. Try to find a way to generalize it (TAs can help with this in Help Hours)

- Formatting:

  - Every method should have a comment above it describing what it does, any preconditions, and ideally a description of parameters it expects

  - Keep lines under ~100 columns wide

  - Methods should be under ~25 lines

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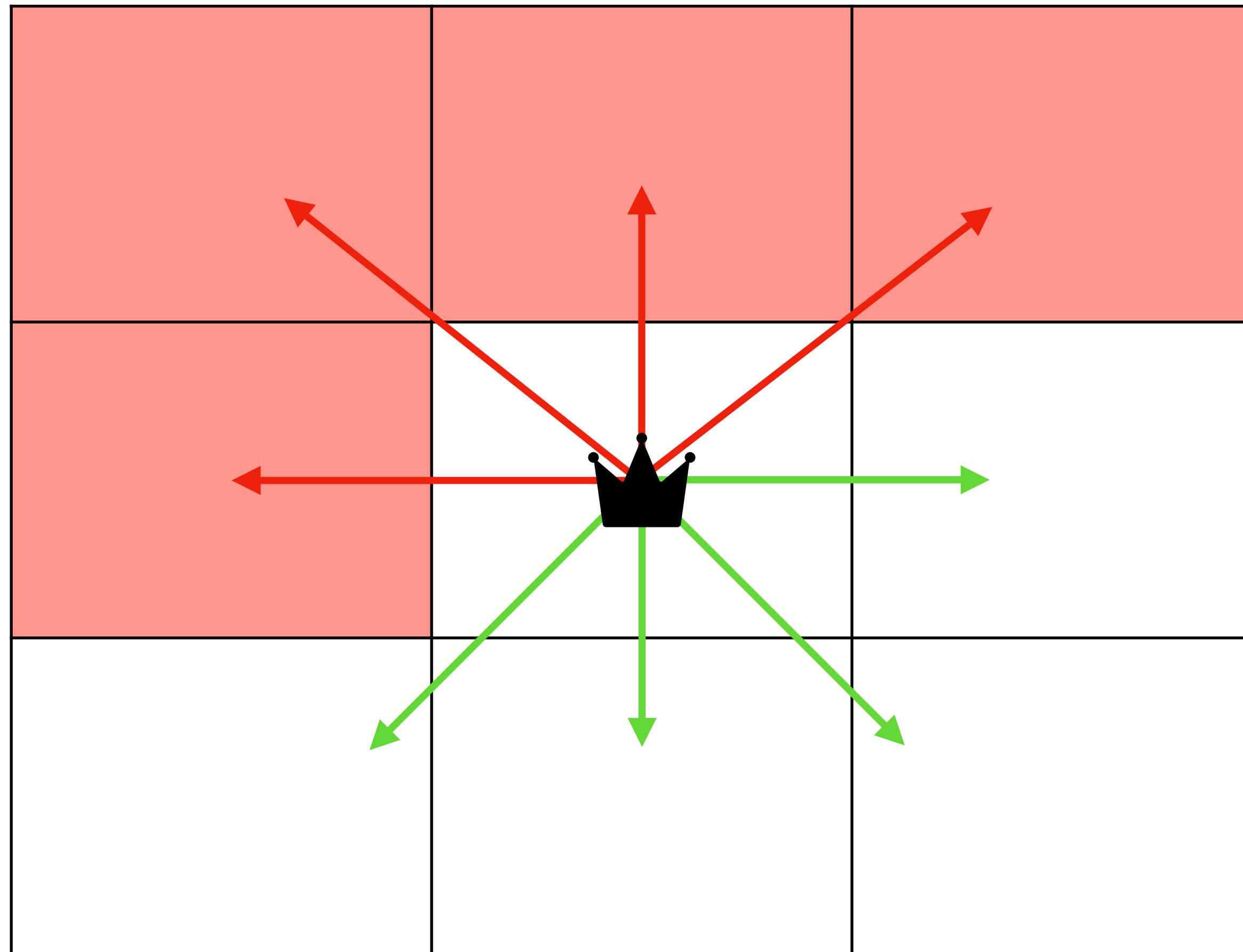
queensAreSafe()
All Eight Directions?
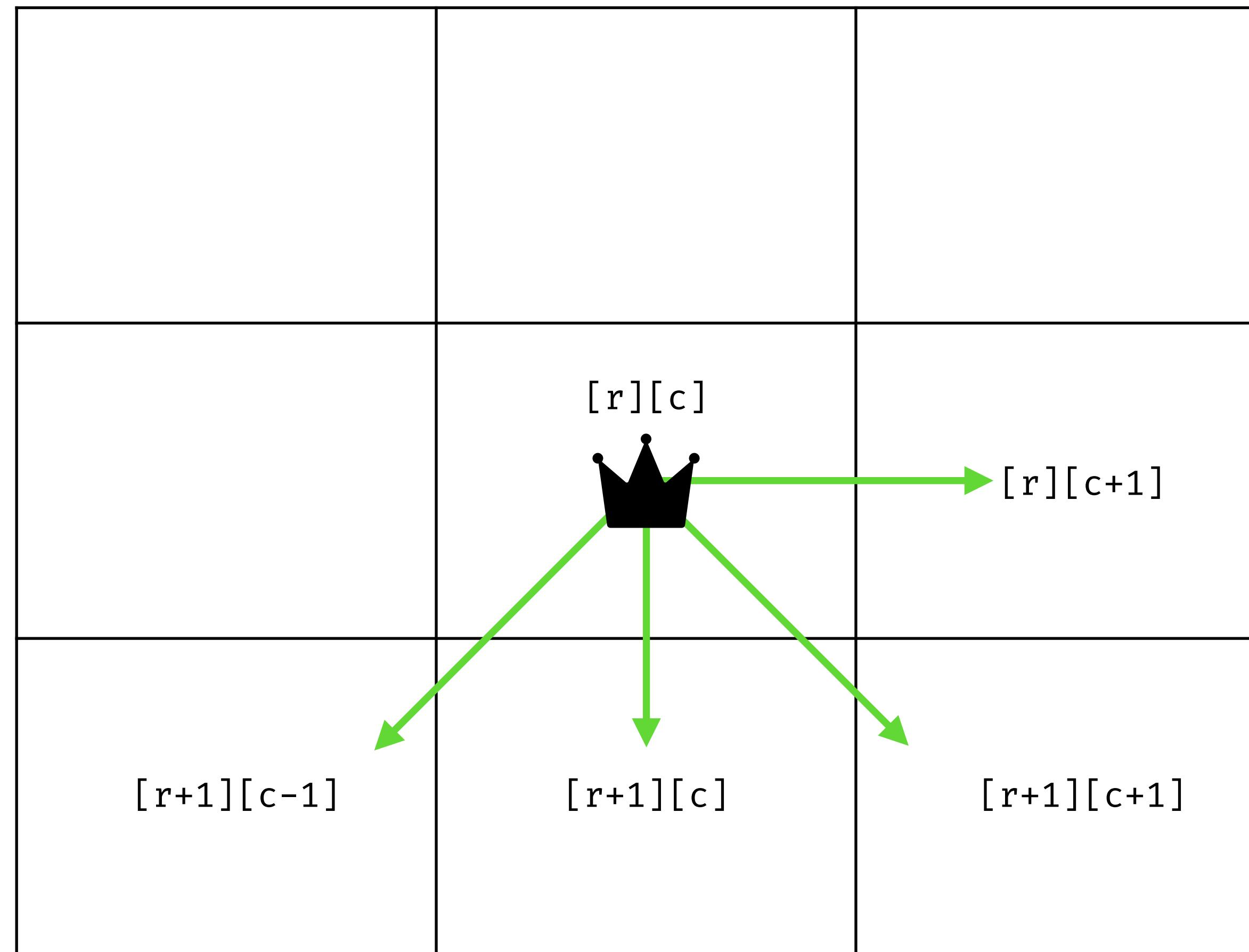
queensAreSafe()
All Eight Directions?

We've already checked the red tiles for queens!

queensAreSafe()
Generalized Direction Checks

queensAreSafe()

- Redundant code for checking the different directions

- We can generalize checking a direction into a helper method

Assignment 2: MathMatrix

MathMatrix

- W.r.t. Style:

  - Make instance variables private

  - Use an auto-formatter!

  - Watch out for unnecessary repeated computations inside of loops

- W.r.t Experiments:

  - Answer all the questions!

  - It's **ok** if your timing data doesn't support your Big O analysis of a method! Remember, Big O is a big simplification!

MathMatrix
Matrix Multiplication "Review"

a	b	c
d	e	f
g	h	i

X

j	k
m	n
p	q

3 x 3   3 x 2

These two need to be the same! (precondition)

These two are your resulting matrix size:

3 x 2

MathMatrix
Matrix Multiplication "Review"

<table>
<tr><td style="background:#4db8ff">a</td><td style="background:#4db8ff">b</td><td style="background:#4db8ff">c</td></tr>
<tr><td>d</td><td>e</td><td>f</td></tr>
<tr><td>g</td><td>h</td><td>i</td></tr>
</table>

X

<table>
<tr><td style="background:#4db8ff">j</td><td>k</td></tr>
<tr><td style="background:#4db8ff">m</td><td>n</td></tr>
<tr><td style="background:#4db8ff">p</td><td>q</td></tr>
</table>

=

<table>
<tr><td style="background:#4db8ff">aj + bm + cp</td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>

MathMatrix
Matrix Multiplication "Review"

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \times \begin{bmatrix} j & k \\ m & n \\ p & q \end{bmatrix}$$

$$= \begin{bmatrix} aj + bm + cp & ak + bn + cq \\ & \\ & \end{bmatrix}$$

MathMatrix
Matrix Multiplication "Review"

a	b	c
d	e	f
g	h	i

X

j	k
m	n
p	q

=

aj + bm + cp	ak + bn + cq
dj + em + fp	

MathMatrix
Matrix Multiplication "Review"

a	b	c
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X

j	k
m	n
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=

aj + bm + cp	ak + bn + cq
dj + em + fp	dk + en + fq

MathMatrix
Matrix Multiplication "Review"

a	b	c
d	e	f
g	h	i

X

j	k
m	n
p	q

And so on…   =

aj + bm + cp	ak + bn + cq
dj + em + fp	dk + en + fq
gj + hm + ip	gk + hn + iq