CS 1112: Introduction To Programming

Python Turtles

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Friendly Reminders

- Your ***safety*** and ***comfort*** is important!
  - If you choose to wear a mask you are welcome to do so
  - *We will interpret wearing a mask as being considerate and caring of others in the classroom (not that you are sick), and realize that some may choose to mask to remain distanced*
- Remember to always be **kind, respectful, supportive, compassionate and mindful of others!** ☺
- Be an ***active*** participant in your learning!
  You're welcome and ***encouraged*** to ask questions during class!
- If you feel ***unwell***, or think you are, please stay home
  - *Contact us!* *We will work with you!*
  - Get some rest ☺
  - View the recorded lectures – *please allow 24-48 hours to post*

Announcements

- **Quiz 1** is due by 11:00pm on Monday (***tonight***)!
  - No late quizzes accepted
  - No make-up quizzes allowed
  - If you believe your computer is glitching, it's a good idea to *copy down your answers* to each of the questions in a word document (even a couple of screen shots will be great). In the event something happens, you can send me your solutions
  - **Take quiz on:** Sherlock.cs.virginia.edu (or use Sherlock link on Canvas)
- **Programming Assignment 00 (PA00)** is due by 11:00pm on Wednesday (***Jan. 29***)!
- **Add deadline**: January 27, 2025 (***today***)!
- **Syllabus Quiz**: If you wish to remain in the course, you must earn 12/12 on the Syllabus Quiz. Most of you should have **completed** the quiz by now.
  Deadline: by 11:00pm on Wednesday (***Jan. 29***)!

TA Office Hours

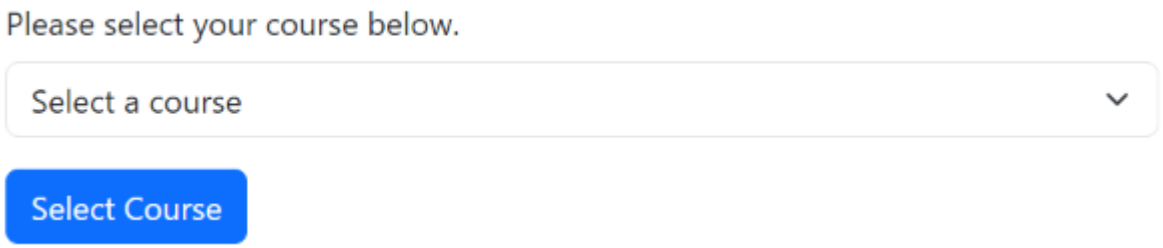
- *Check out the **Office Hour Calendar** to know when TAs are holding their Office Hours (Linked on our Canvas page)*
- In-person in **Thornton Stacks** (Thornton A, 2nd floor)
- Join the **queue** using the **link** on the left navigation bar of Canvas
  - "**TA Office Hour Queue Tool**"

Reminder: If attending Professor Office Hours – there is no need to use the Office Hour Queue Tool!

TA Office Hour Queue Tool

1. Click on "TA Office Hour Queue Tool" link on Canvas. You will be logged in via your UVa NetBadge credentials

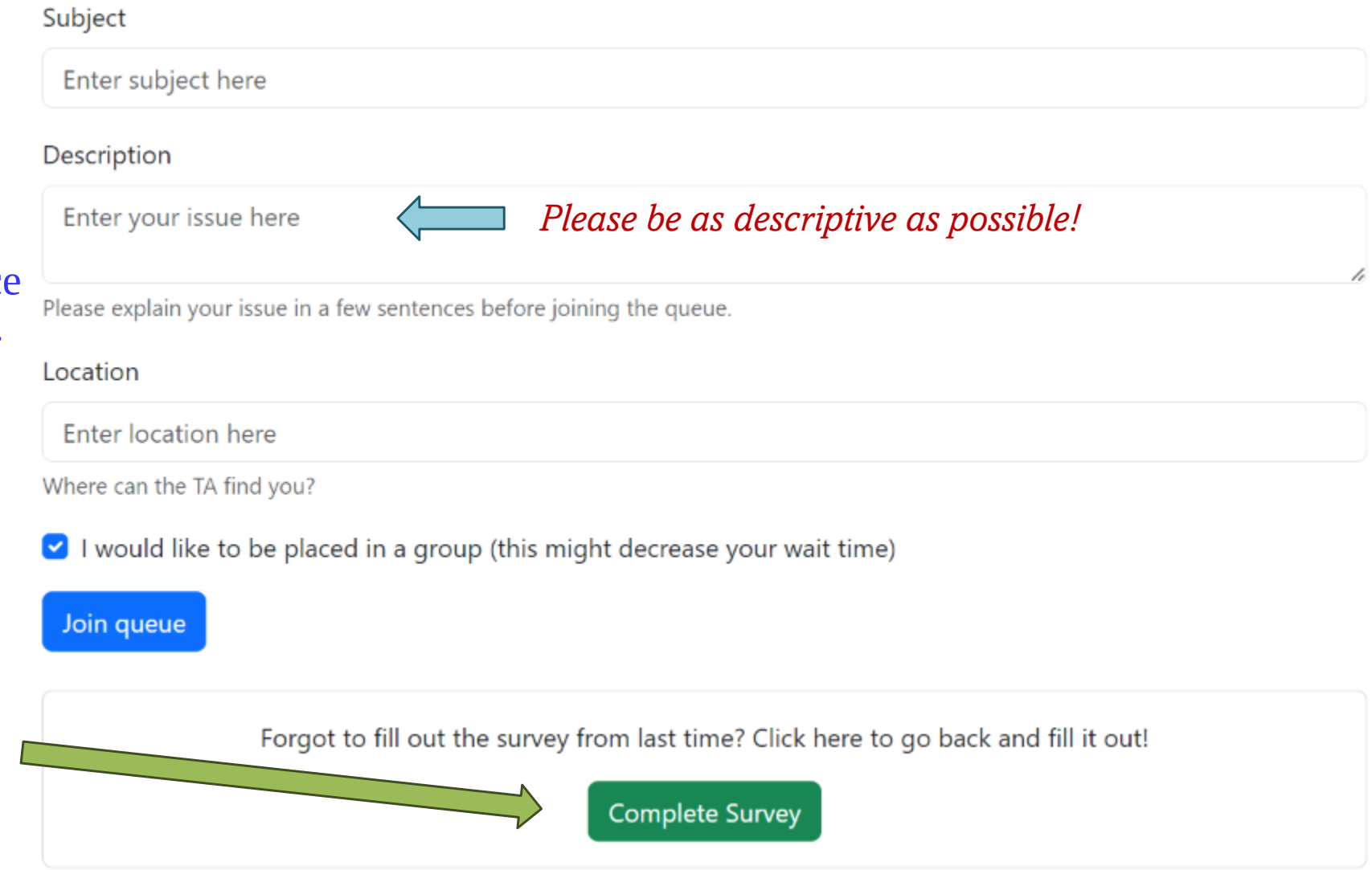
2. Select your **course (CS 1112)** *(if you see other courses listed there, be sure you don't click there!)*



Reminder: Even though TA Office Hours are in-person, you must first join the electronic (online) queue!

TA Office Hour Queue Tool

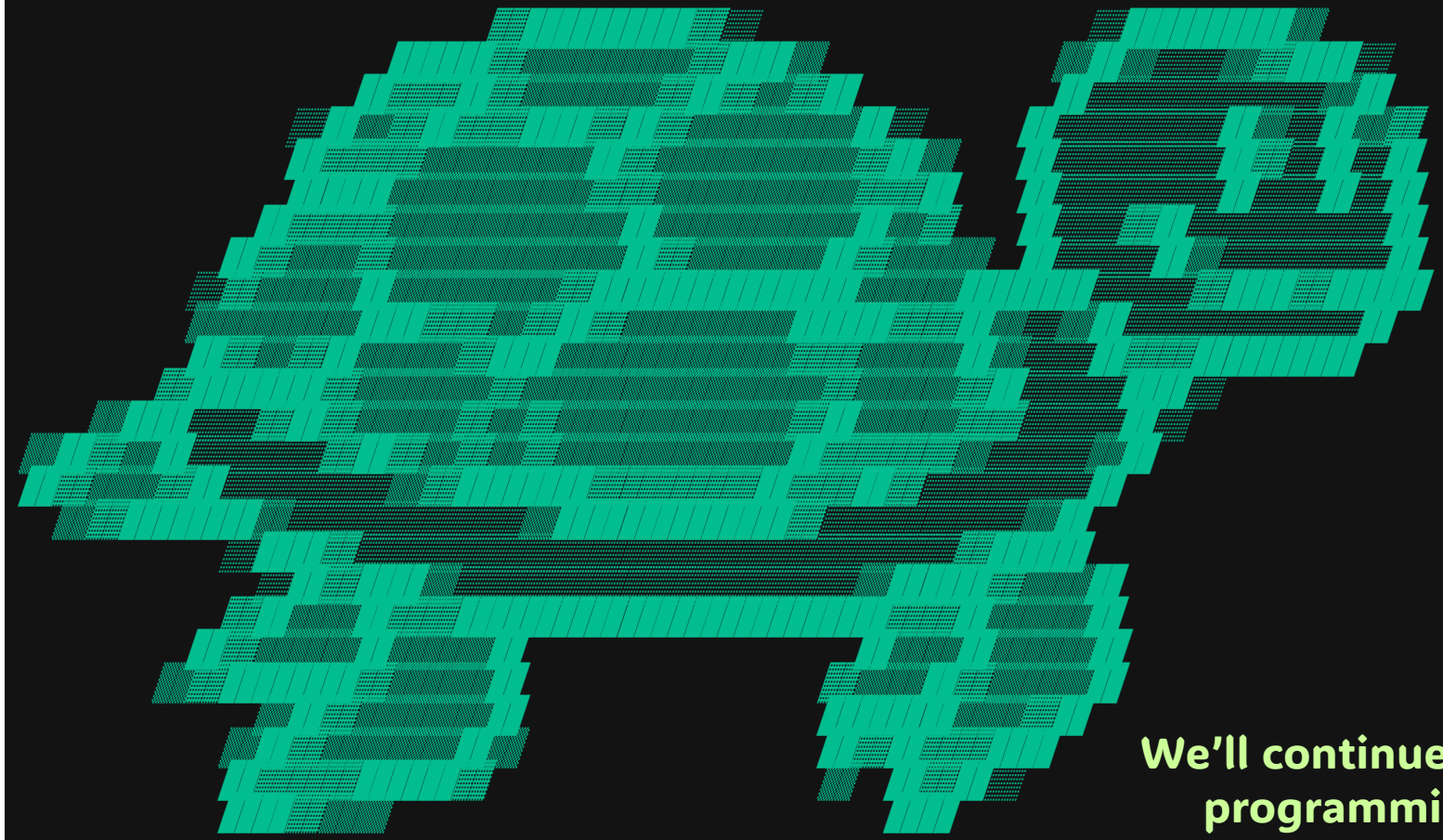
3. Fill in the **details** before joining the queue
   - We strive to find ways to make the office hour experience better. To help, kindly fill out a short survey after each of your office hour sessions with a TA, by clicking on the "Complete Survey" button.
     Thanks for helping us improve office hours!



Don't be shy to ask for additional directions if you are not sure how to find Thornton Stacks! (e.g., Ask on Piazza or ask in class)

TA Office Hours: Thornton Stacks

Python Library: “turtle”



Hi, I’m Tabitha the turtle!

Believe it or not, Python has a pre-installed Python library called “turtle” that enables users to create pictures and shapes by providing them with a virtual canvas.

We’ll continue to learn about basic Python programming concepts through turtles!

Learning the "**turtle**" Library

Need to import the turtle library first! *(First line of code)*

```
import turtle
```

Next, you need to create a turtle to work with. *(Create a new turtle on the canvas.)*

Need to call the *constructor* method of the class Turtle. We're building a turtle and associating that *instance* with a variable (**toni**, in this case).

```
toni = turtle.Turtle()
```

Learning the "**turtle**" Library

As default, the cursor/turtle faces to the **RIGHT**

We can choose the **shape** of the cursor to look like one of several different shapes.

We'll use the "`shape`" method

"square"
"turtle" 
"arrow"
"circle"
"triangle"
"classic" 

We apply the shape function on the turtle instance, toni, to make the cursor look like a little turtle. We can use the "`color`" function to change the color of the **cursor** AND the color of the **line** that is drawn.

```
toni.shape("turtle")
toni.color("green")
```

Learning the "**turtle**" Library

Now we have our cute turtle cursor, how do we draw and move around?
We can change the **speed** at which we draw:

```
toni.speed("slow")
```

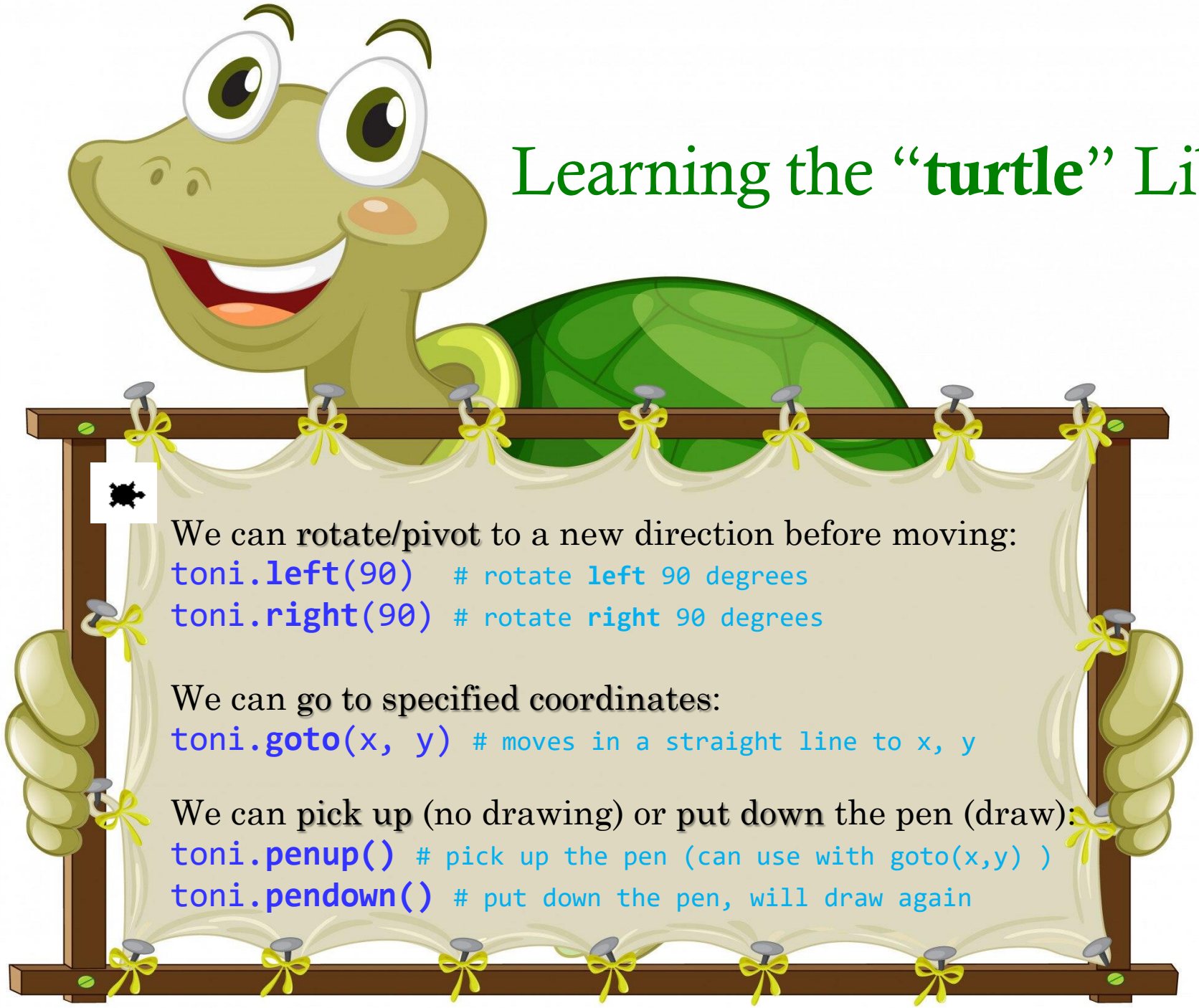
We can **move forward** by a certain number of pixels:

```
toni.forward(300)
```

We can **move backward** by a certain number of pixels:

```
toni.backward(300)
```

Learning the "**turtle**" Library



We can rotate/pivot to a new direction before moving:

```
toni.left(90)   # rotate left 90 degrees
toni.right(90)  # rotate right 90 degrees
```

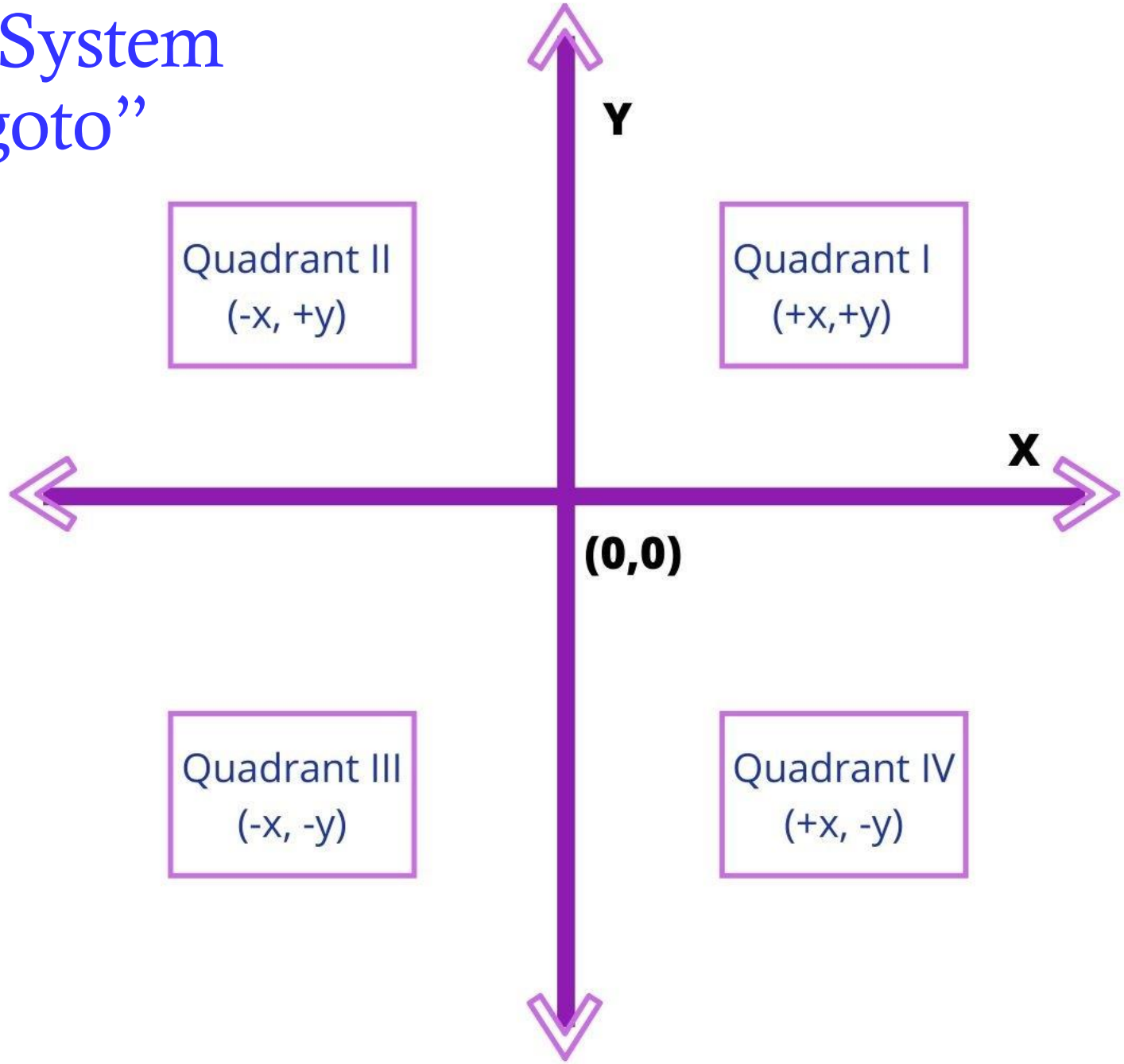
We can go to specified coordinates:

```
toni.goto(x, y)  # moves in a straight line to x, y
```

We can pick up (no drawing) or put down the pen (draw):

```
toni.penup()  # pick up the pen (can use with goto(x,y) )
toni.pendown()  # put down the pen, will draw again
```

Coordinate System
For turtle “goto”



Learning the "**turtle**" Library

```
turtle.done()
```

When you are done, you must include this as the **last line** of your code!

It signals that drawing onto the turtle canvas is complete, and the window is ready to close. Not associated with your turtle reference (**not**: **toni.done()**)

Turtles can now rest :-)

Python Demonstration

Let's jump on PyCharm!

intro_turtles.py

turtle_polygons.py

Activity on Turtles!

- In pairs or groups up to three work on the following turtles and pseudocode in-class "lab" activity
- **turtle_with_pseudocode_ica.py**
- *Convert the instructions (pseudocode) into Python code, using the turtle library!*

Remember to check-in with a TA before leaving class today!

In-Class "lab" Activity!

Notes/Reminders…

Reminder: CS Laptop Loaner Program

- This course requires students to have a **laptop**
- I realize that not everybody might have one (nor necessarily need one for their desired major / path…)
- If you do not have a laptop for any reason… ***not to worry!***
- The CS department's Systems staff has a notebook / laptop loaner program and will be able to loan you a notebook / laptop computer for the duration of the semester if you don't have one or if you cannot afford one.
  - Also available if your laptop is broken and under repair, we can arrange for you to receive a loaner laptop for a week or two until your own laptop is fixed

Interested? Link: https://www.cs.virginia.edu/wiki/doku.php?id=cs_laptop_loaner

I am happy to be your sponsor. Please let me know.

Tools: Piazza

- We will use **Piazza** in the following way:
  - Website: https://piazza.com/ [Linked through Canvas]
  - Piazza is a great tool for asking questions about **course content**, **policies**, or getting help on **homework** assignments
  - While you are waiting for an answer, see if there's an answer you can provide to someone else's question. We're all in this together! CS is a team sport! ☺
  - TAs will monitor and answer questions throughout the semester
  - Not a means to help you debug your code! (See more below)

It is very important to remember the following:

- **Do not post** complete or partial code solutions (for Homework) on Piazza when seeking answers to your question unless it is in a **PRIVATE** post
- **Do not post** complete or partial quiz solutions (code or short-answer) when seeking answers to your question unless it is in a **PRIVATE** post

Tools: Gradescope

- We will use **Gradescope** in the following way:
  - Website: https://www.gradescope.com/
  - Linked through Canvas
  - Homework assignments will be **submitted**
    - Most programming assignments are autograded (some are manually graded)
    - Some aspects of programming assignments may be manually graded