COMP1021
Introduction to Computer Science

The Coordinate System

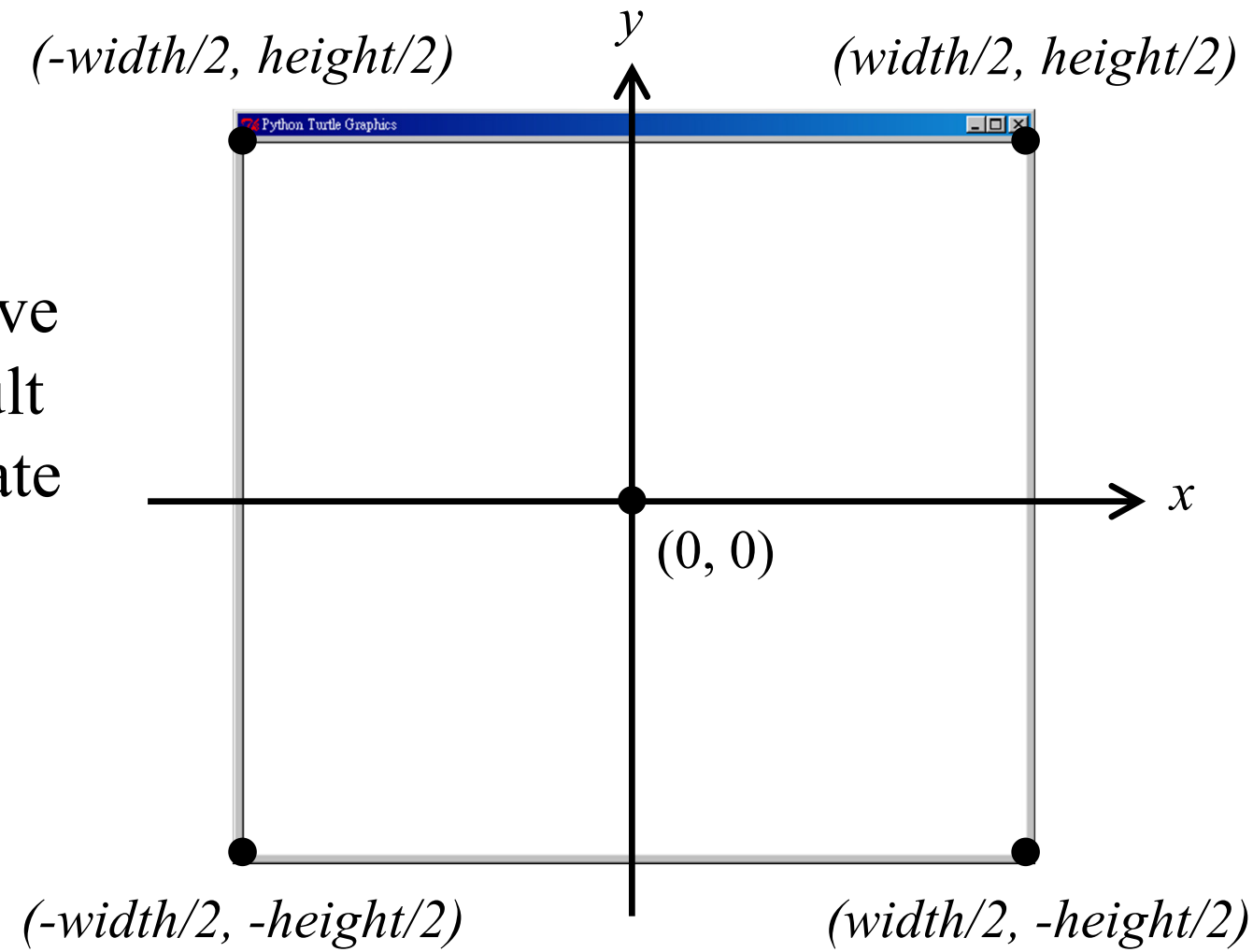
David Rossiter

Outcomes

- After completing this presentation, you are expected to be able to:
  1. Change the turtle coordinate system
  2. Design an appropriate coordinate system to help with a specific task

The Turtle Coordinate System

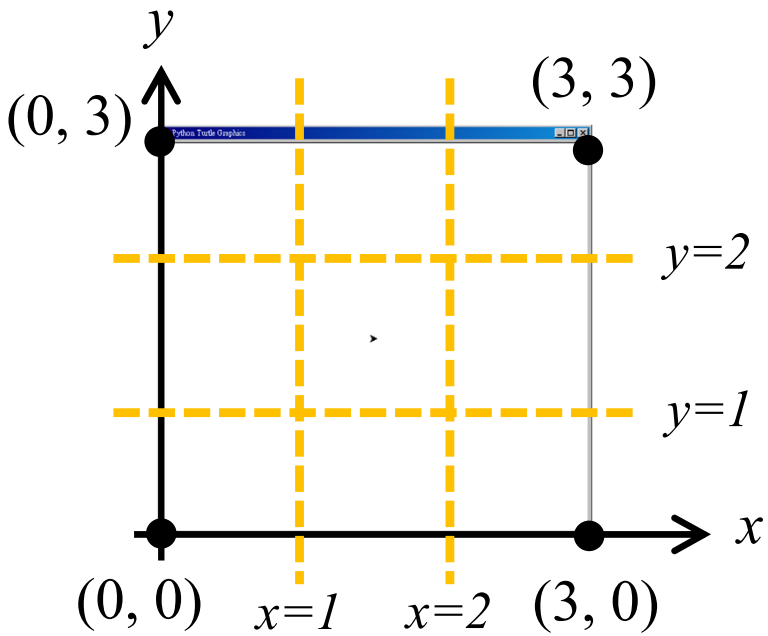
- So far, you have used the default turtle coordinate system:



Suitable Axis Ranges

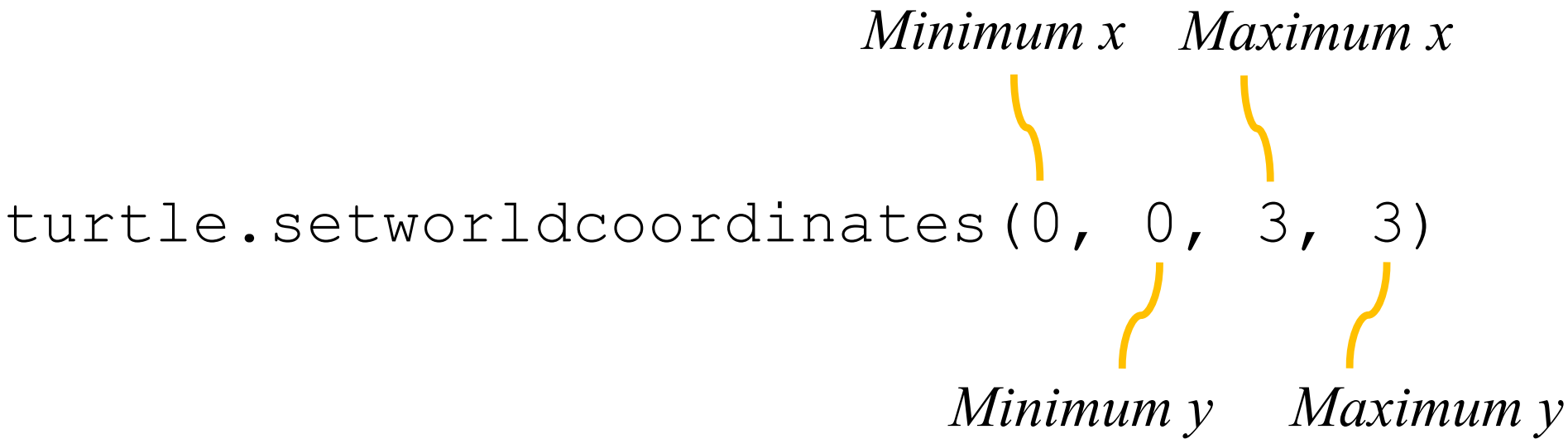
Tic-tac-toe

- However, you can change the coordinate system to anything you like
- For example, if you are making a tic-tac-toe game, it would be suitable to have (0, 0) in the bottom left corner and (3, 3) in the top right corner:
- The ability to change the coordinate system makes it easier to do some programming tasks



Changing The Coordinate System

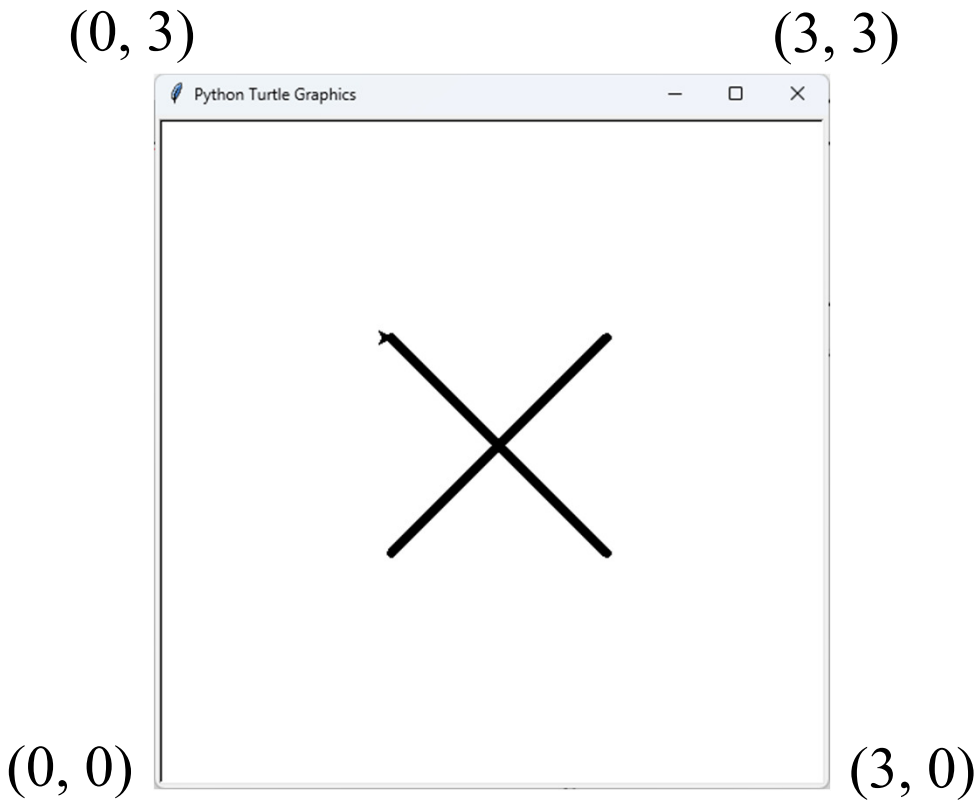
- You set up the coordinates like this:



- Usually this is one of the first commands that gets executed in a program, before you start doing things with the turtle system

Example – Tic-Tac-Toe

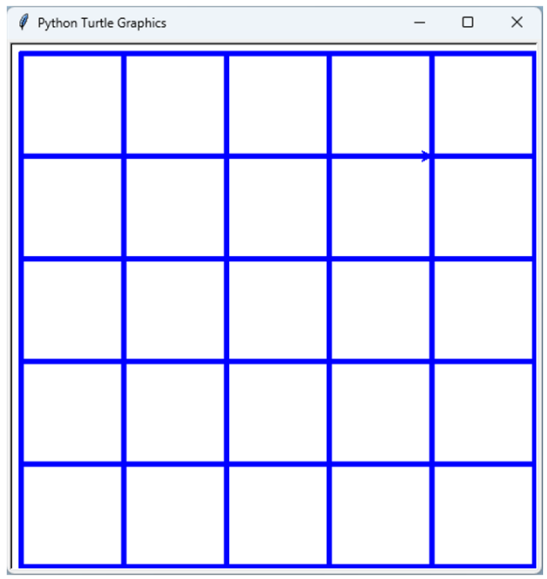
```
import turtle

turtle.setworldcoordinates(0, 0, 3, 3)

turtle.width(7)
turtle.up()
turtle.goto(1, 1)
turtle.down()
turtle.goto(2, 2)
turtle.up()
turtle.goto(2, 1)
turtle.down()
turtle.goto(1, 2)

turtle.done()
```



An X is drawn in the middle

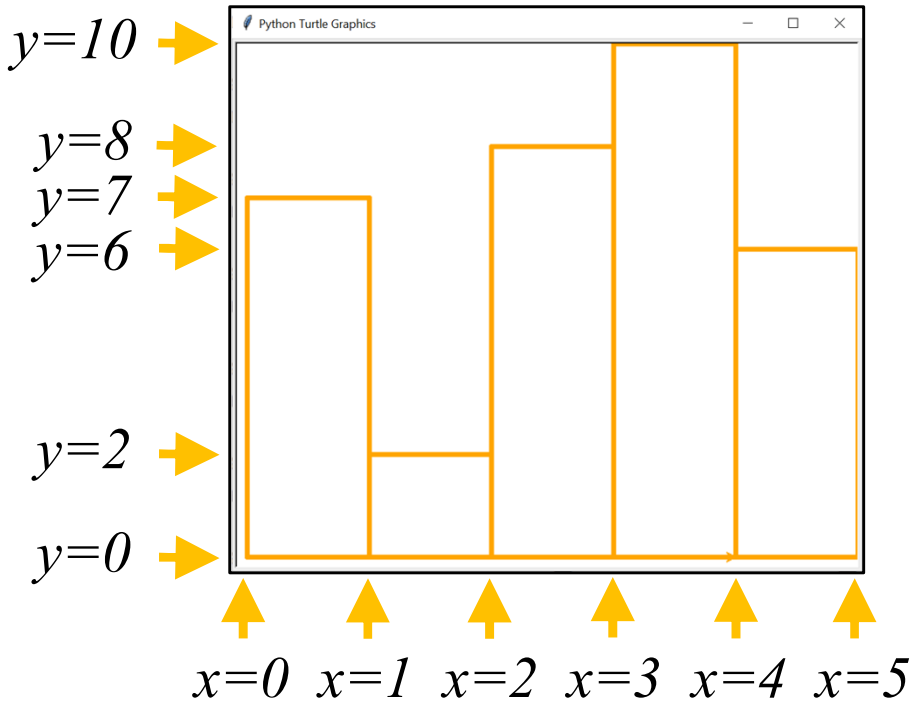
Example – Drawing Boxes

```
import turtle

def draw_square(y, x):
    turtle.up()
    turtle.goto(x, y)
    turtle.down()
    for _ in range(4):
        turtle.forward(1)
        turtle.left(90)

total_rows=5
total_cols=5

turtle.setworldcoordinates(0, 0, total_cols, total_rows)

turtle.color("blue")
turtle.speed(0)
turtle.width(5)

for row in range(total_rows):
    for col in range(total_cols):
        draw_square(row, col)
turtle.done()
```



Example – Drawing a Chart

```
import turtle

def draw_rectangle(height):
    for _ in range(2):
        turtle.forward(1)
        turtle.left(90)
        turtle.forward(height)
        turtle.left(90)

values=[7, 2, 8, 10, 6]
turtle.setworldcoordinates( \
    0, 0, 5, 10)
turtle.color("orange")
turtle.speed(0)
turtle.width(5)

for x in range(len(values)):
    turtle.goto(x, 0)
    draw_rectangle(values[x])

turtle.done()
```



A series of rectangles is drawn