

Python for Beginner

Lesson 1

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Why Python?

- Python is a programming language
- Easy to learn, a lot of top universities (MIT, UC Berkeley) use Python to teach “Programming 101”
- Not a toy, quite powerful. From basic tools to web development, data analytics, etc, Python can handle all of them. Giant company love it too, like Google and NASA
- Write once, run everywhere. Windows, Mac OS, Unix/Linux

Say Hello

- **print** "hello python"

Print Number

- `print 5`
- `print "5"`
- `print 5 + 3`
- `print "5 + 3"`

Calculator

- Addition: **+** , e.g. $1 + 1$
- Subtraction: **-** , e.g. $2 - 1$
- Multiplication: ***** , e.g. $2 * 3$
- Division: **/** , e.g. $6 / 3$
- **print** $1 + 1$
- **print** $1235 * 5678$
- **print** $1 + 2 * 3$
- **print** $(1 + 2) * 3$

Concatenate String

```
print "I love" + " pizza"
```

```
print "I love"
```

```
print "pizza " * 20
```

```
print "Yummy, I am full : P"
```

Quiz

- Is “4” the same as 4 to Python?
- Is “10” a number or a string?
- You have seen we use 5+3, and “5+3”, how about “5” + 3, what will you get ?

Challenge

- ☆ Use Python to calculate the number of seconds in a hour
- ☆ Use Python to calculate the number of minutes in a week
- ☆ Write a short program to print three lines:
 - your name
 - your birthday
 - your favorite color
- ☆☆ Three people ate dinner at a restaurant and want to split the bill. The total is \$36, and they want to leave a 15% tip, how much should each person pay? Use Python to calculate the answer.

Python Turtle

Import Turtle from library

from turtle **import** Turtle

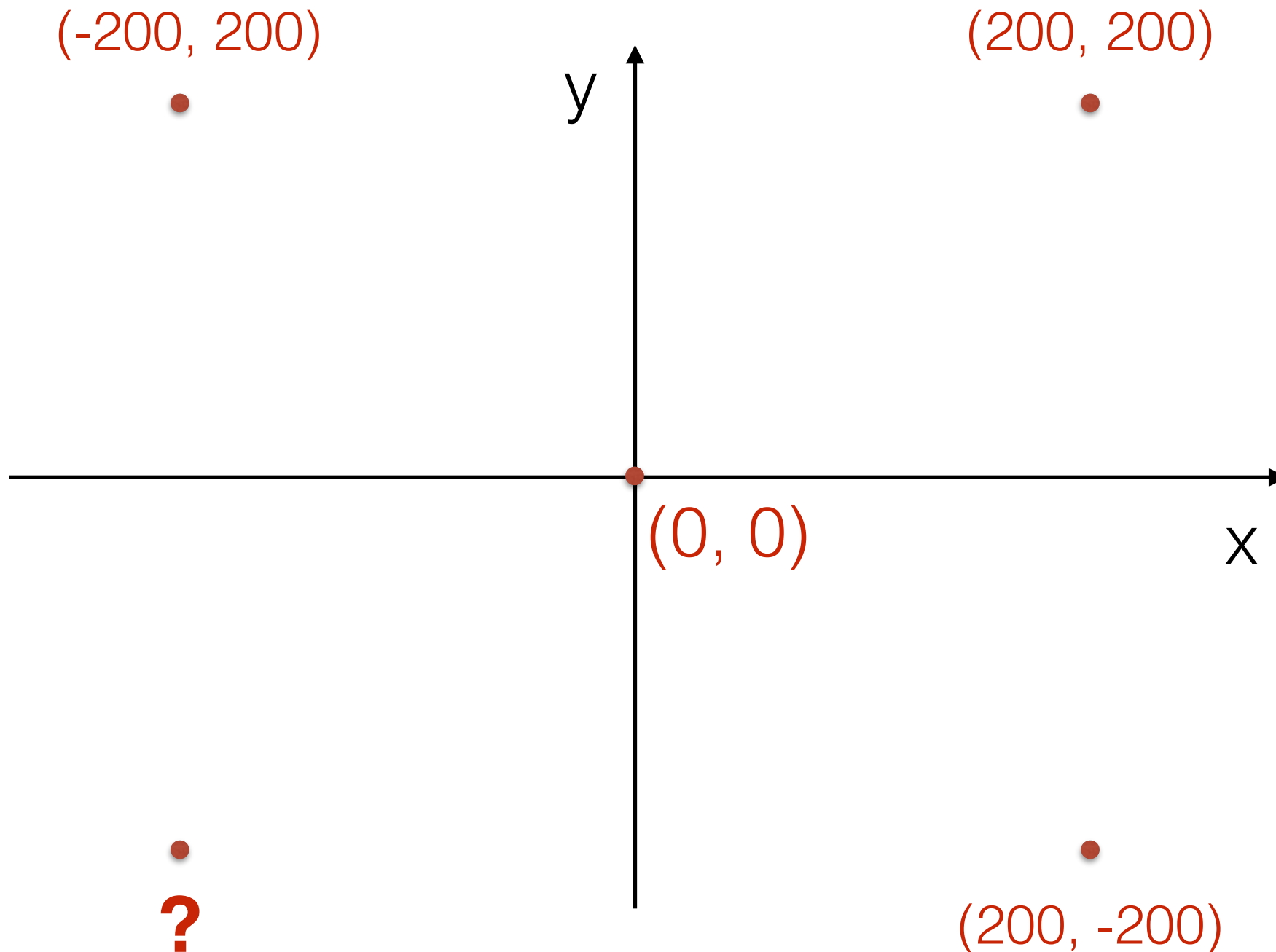
Generate your own turtle, give it a name

nick = Turtle()

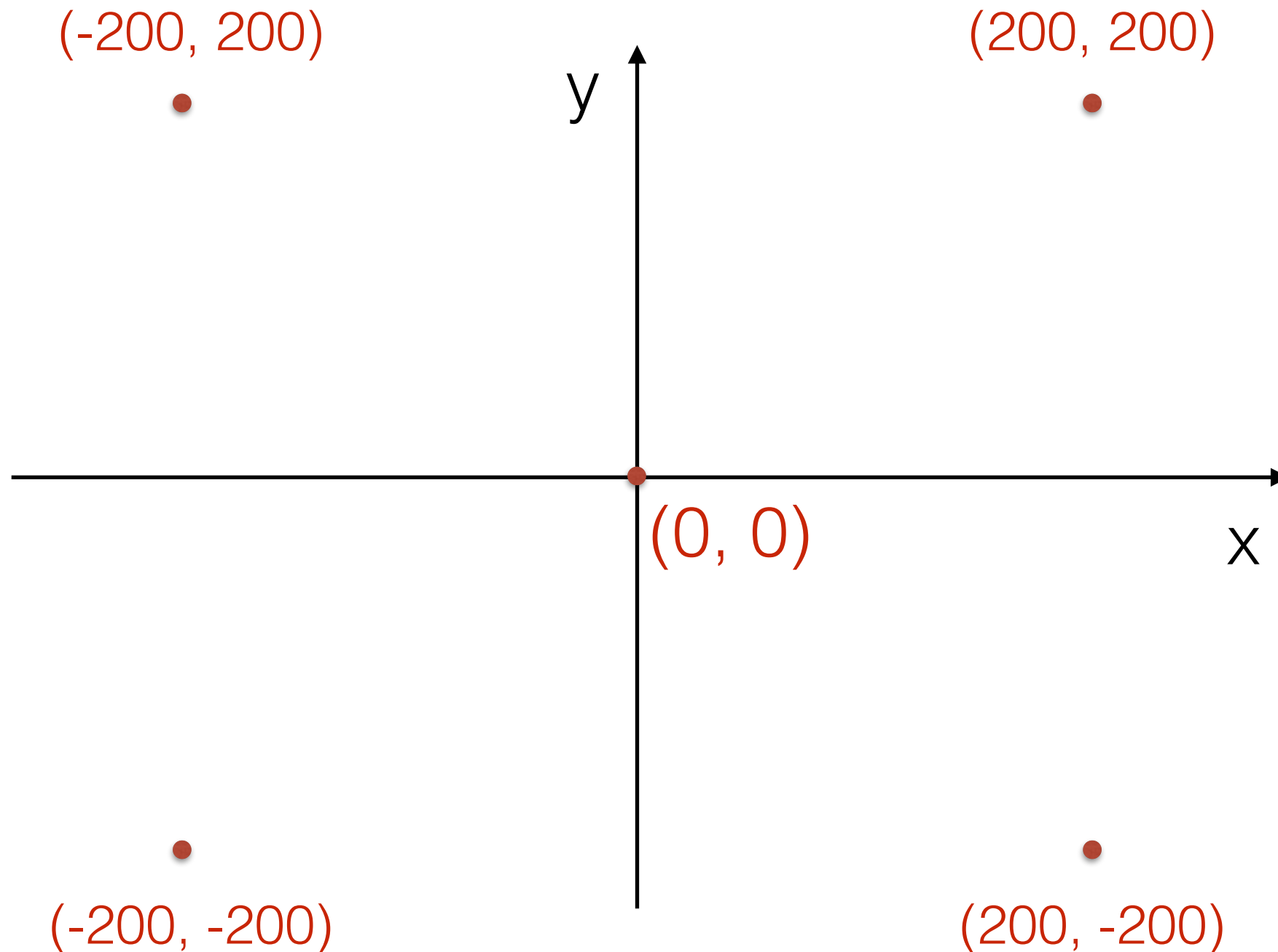
Control your turtle to move

nick.forward(50)

Turtle Position



Turtle Position



Turtle motion

move forward, e.g. nick.forward(50)

yourTurtleName.**forward**(*distance*)

move backward, e.g. nick.backward(50)

yourTurtleName.**backward**(*distance*)

turn right with certain degree, e.g. nick.right(90)

yourTurtleName.**right**(*angle*)

turn left with certain degree, e.g. nick.left(90)

yourTurtleName.**left**(*angle*)

ask turtle to go to coordinate with drawing a line

yourTurtleName.**goto**(*x*, *y*)

set turtle's coordinate, e.g. nick.setposition(10, 10)

yourTurtleName.**setposition**(*x*, *y*)

draw a circle with certain radius, e.g. nick.circle(20)

yourTurtleName.**circle**(*radius*)

Turtle Appearance

change shape to a real turtle

yourTurtleName.**shape**("turtle")

stamp a copy of the turtle shape

yourTurtleName.**stamp**()

change draw color, e.g. nick.color("red")

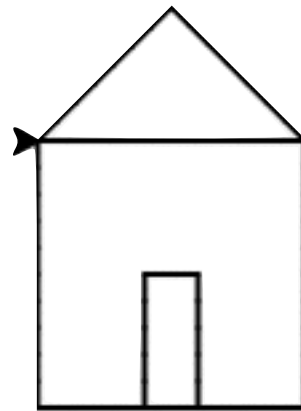
yourTurtleName.**color**(*color*)

change line width, e.g. nick.width(5)

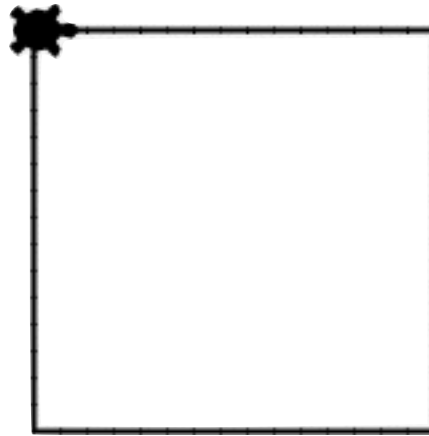
yourTurtleName.**width**(*width*)

Draw a house

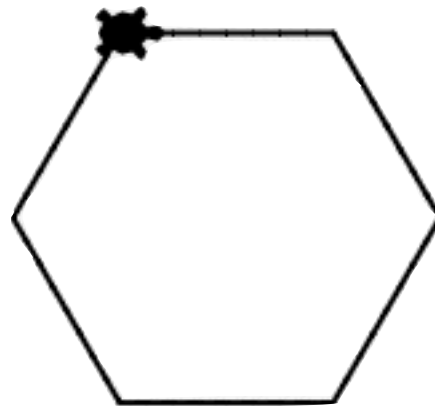
1. Design your house in a paper, set points coordinate
2. Use `goto` / `setposition` to control your turtle to draw the line



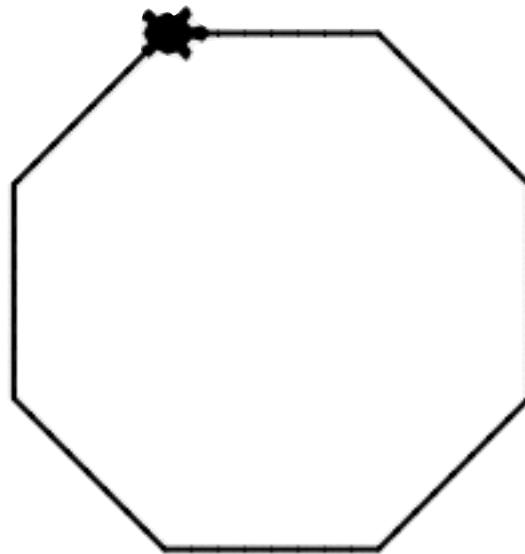
Draw a Square



Challenge: draw a hexagon



How about Octagon



```
nick.forward(80)
nick.right(60)
nick.forward(80)
nick.right(60)
nick.forward(80)
nick.right(60)
nick.forward(80)
nick.right(60)
nick.forward(80)
nick.right(60)
nick.forward(80)
nick.right(60)
```

[illegible]

Repeat / Loop:

let computer do the dirty work

```
for counter in [0, 1, 2, 3, 4]:  
    print counter  
    print "hello"
```

```
for counter in [0, 1, 2, 3, 4]:
```

```
    print counter  
    print "hello"
```



Indent



Code Block

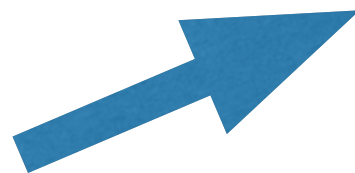
Repeat / Loop:

ask computer to do the dirty work

```
for counter in [0, 1, 2, 3, 4]:
```

```
    print counter
```

```
    print "hello"
```



Repeat "hello" 5 times

0	hello
1	hello
2	hello
3	hello
4	hello

Repeat / Loop: Draw a square

```
for counter in [0, 1, 2, 3]:  
    yourTurtle.forward(80)  
    yourTurtle.right(90)
```

Repeat 4 times do:

moving forward 80
turn right 90 degree

Repeat / Loop:

Challenge: Draw a hexagon

```
for counter in [0, 1, 2, 3, 4, 5]:
```

```
    # your code here
```

Repeat / Loop:

Challenge: Draw a hexagon

```
for counter in [0, 1, 2, 3, 4, 5]:
```

```
    # your code here
```

```
for counter in range(6):
```

```
    # your code here
```



Repeat 6 times

Repeat / Loop:

Challenge: Draw a octagon

```
for counter in range(8):  
    # your code here
```

Free Style

```
for counter in range(?):  
    yourTurtleName.forward(?)  
    yourTurtleName.right(?)
```

Draw a dashed line

Requirement:

1. Must contain at least 10 short lines
2. Your code should be within 10 lines

Hint:

1. Use `penup()` and `pendown()` function
2. Use loop



Recap

- **print**
- Calculator
- Coordinate system
- Draw line / circle / square with Turtle
- Use **for** loop