

Python for Beginners

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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** $(1 + 2) * 3$

Python Turtle

Import Turtle from library

from turtle **import** Turtle

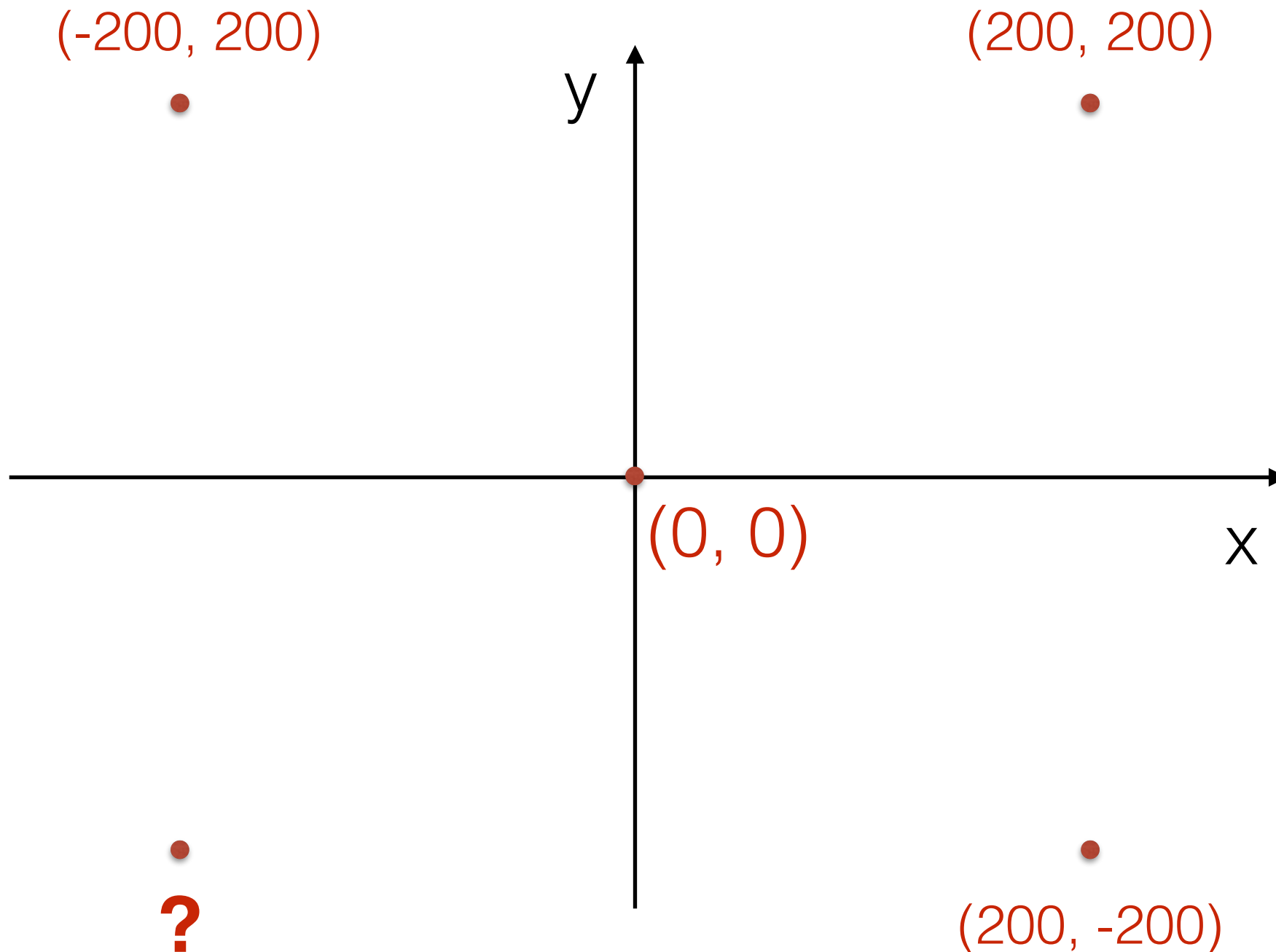
Generate your own turtle, give it a name

nick = Turtle()

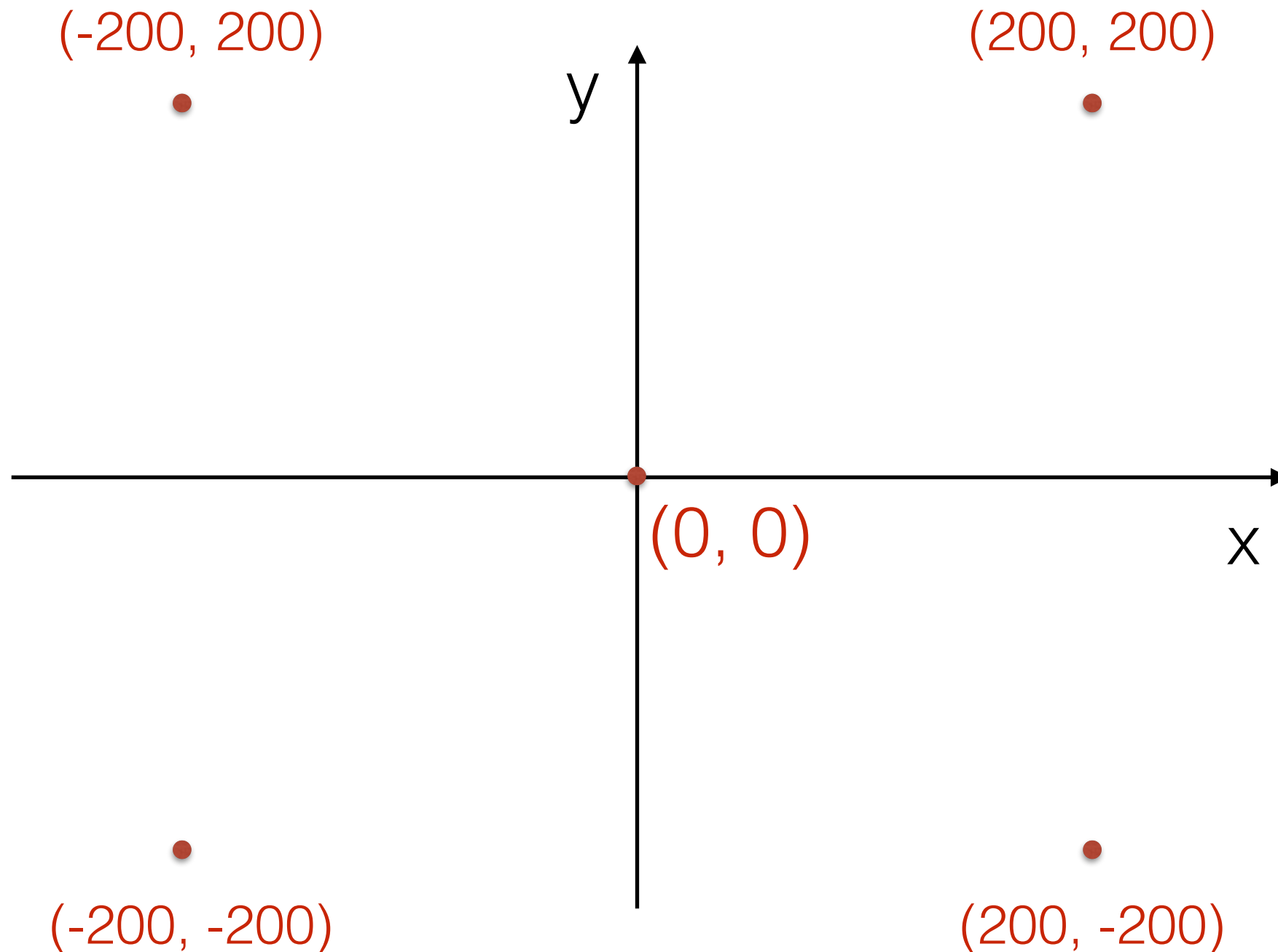
Control your turtle to move

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*)

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**()

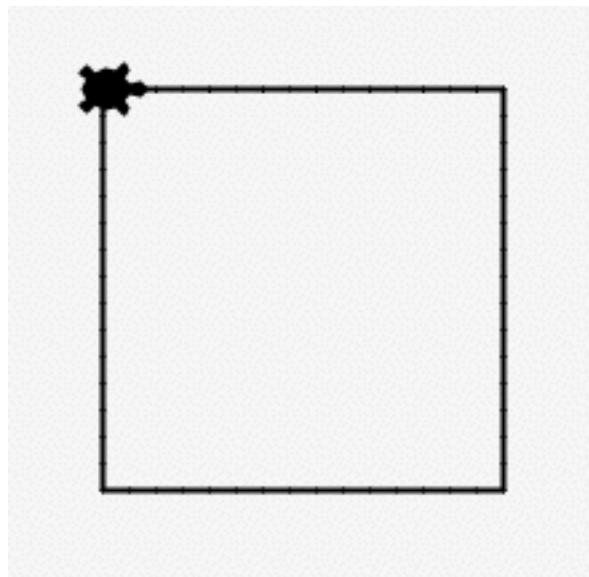
change draw color, e.g. nick.color("red")

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

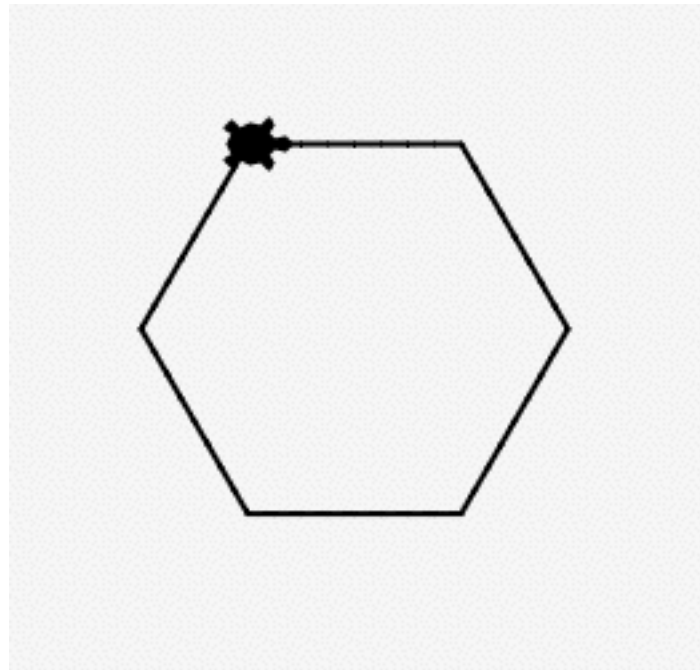
change line width, e.g. nick.width(5)

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

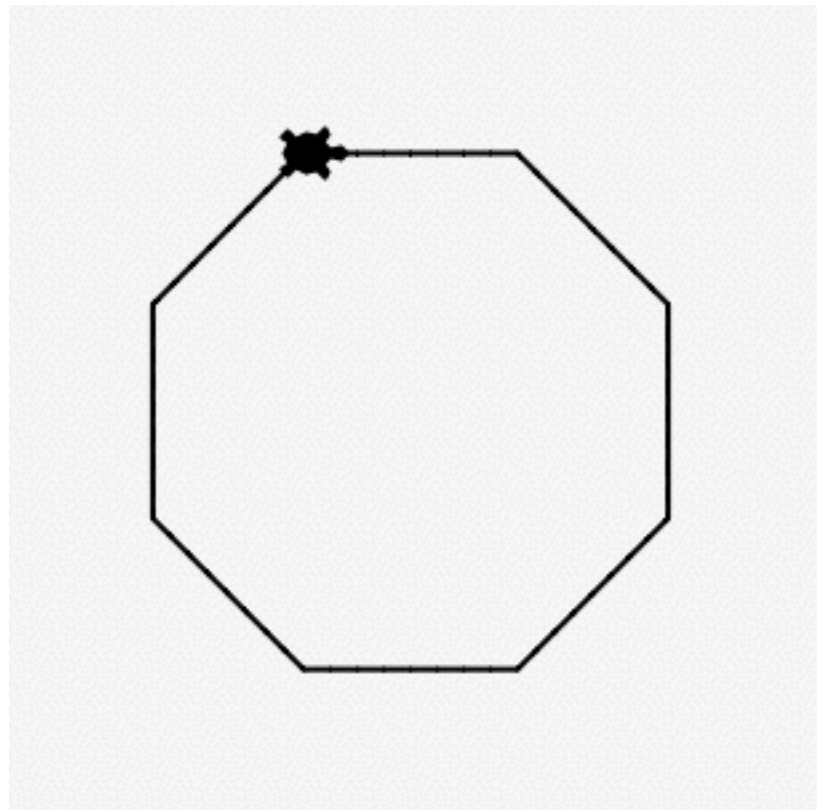
Draw a Square



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"
```

0

hello

1

hello

2

hello

3

hello

4

hello

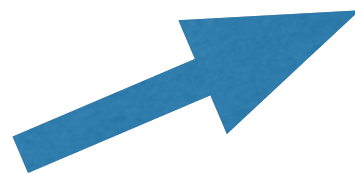
Repeat / Loop:

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

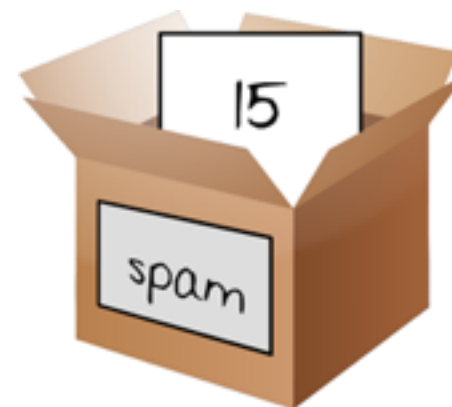
```
for counter in range(8):  
    # your code here
```

Variables

- `nick = Turtle()`
- Storing Values in Variables
- Variable like a box that can hold values, you can store values inside variable with the `=` sign
- e.g. Store value 15 in a variable names spam:

```
spam = 15  
print spam
```

?



raw_input: get input from user

```
name = raw_input("What's your name?")
age = raw_input("What's your age?")
game = raw_input("What's your favorite game?")
print "Here is your short bio:"
print "My name is " + name
print "I am " + age
print "My favorite game is " + game
```


Condition: if - else

if *a condition is evaluated to be True:*

do this

else:

do that

e.g.

grade = 61

if grade > 60:

print "You passed the final exam"

else:

print "You failed"

Comparison Operator

== : equal

> : greater than

< : less than

>= : greater or equal

<= : less or equal

!= : not equal

Condition: if - else cont'd

Get user's input by using raw_input function

```
age = raw_input("What's your age?")
```

age now is a string, convert it to integer

```
age = int(age)
```

Check whether it is greater or equal than 5

```
if age >= 5:
```

```
    print "You can play this game"
```

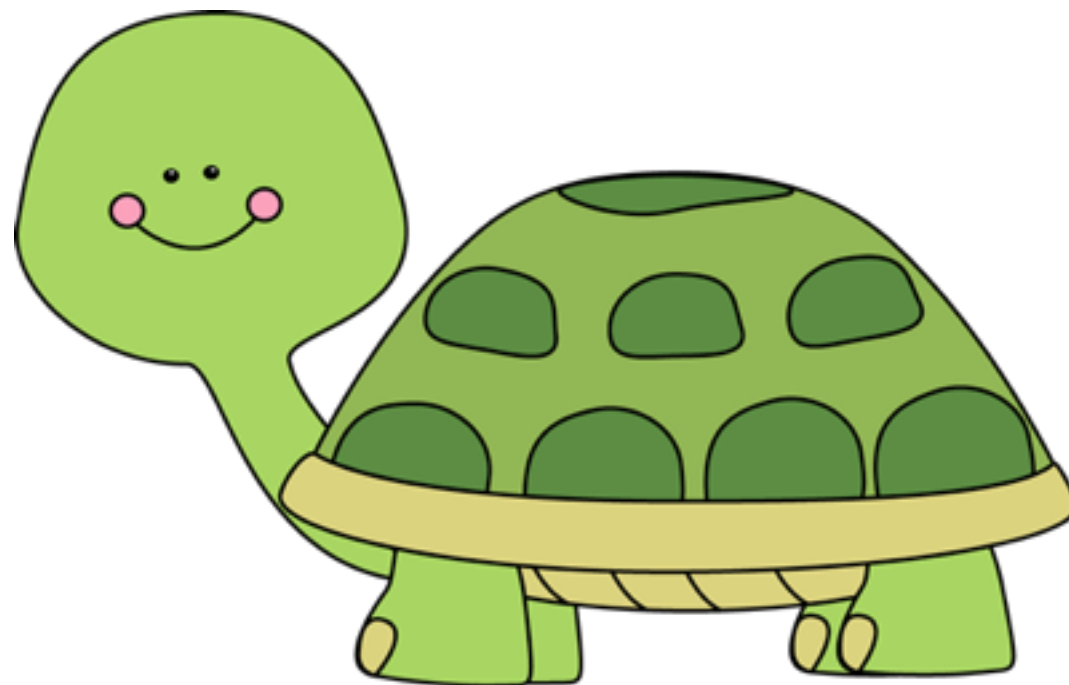
```
else:
```

```
    print "You can't play this game"
```

Game Time

Help your turtle find food !

<http://bit.ly/find-food>



<http://content.mycutegraphics.com/graphics/turtle/cute-turtle.png>

Game Time

Guess the right Number !



Recap

- **print** “hello python”
- calculator: **print** 2 * 3 + 4
- control turtle: forward / backward, right / left
- loop: **for** number **in** range(6)
- condition: **if** / **else**
- Games you made: turtle’s food, guess number

The End

Extra - Dictionary

Dictionary (key: value) pair

e.g. Check our restaurant menu:

```
menu = {  
    "bacon": 4.5,  
    "sandwich": 4,  
    "waffles": 3,  
    ...  
}  
  
print "Price for bacon is:", menu["bacon"]
```

Dictionary

A waiter / waitress app



Challenge : Fizz Buzz

A real interview question for CS student

- Problem: from 1 to 20,
 - if the number is multiple of 3, print “fizz”;
 - if the number is multiple of 5, print “buzz”;
 - if the number is both multiple of 3 and 5, print “fizz buzz”;
 - otherwise, print out the number

The Real End

Q & A