# [301] Conditions

Tyler Caraza-Harter

## Learning Objectives Today

### Reason about conditions

- Conditional execution
- Alternate execution
- Chained execution
- Nested conditions

Please continue reading Chapter 3 of Think Python

### Understand code blocks

Be able to identify the lines of code in the same block

### Sanity checking

- Recognize errors
- Sanitize bad data automatically

## Today's Outline



**Control Flow Diagrams** 

Basic syntax for "if"

Identifying code blocks

Demos

```
print("A")
print("B")
def print_letters():
    print("C")
    print("D")
print("E")
print("F")
print letters()
```

what does it print?

```
print("A")
print("B")
def print_letters():
    print("C")
    print("D")
print("E")
print("F")
print letters()
```

### what does it print?

A B E F C D

```
print("A")
print("B")
def print_letters():
                     indented, so "inside"
                      print_letters function
print("E")
print("F")
print letters()
```

### what does it print?

A B E F C D

```
print("A")
print("B")
def print_letters():
                        indented, so "inside"
                        print_letters function
print("E")
                         printed last because
print("F")
                       print_letters is called last
print letters()
```

### what does it print?

A B E C D

```
print("A")
print("B")
def print_letters():
                     indented, so "inside"
                      print_letters function
print("E")
print("F")
print letters()
```

### what does it print?

A B E F C D

```
not indented, so
print("A")
                  "outside" any function
print("B")
def print letters():
                       indented, so "inside"
                       print_letters function
print("E")
print("F")
print letters()
```

### what does it print?

A B F C

```
not indented, so
print("A")
                   "outside" any function
print("B")
def print letters():
     print("C")
                        indented, so "inside"
     print("D")
                        print_letters function
                   also not indented, so
print("E")
                   "outside" any function.
print("F")
                      Runs BEFORE
                   print_letters is called
print letters()
```

### what does it print?

A B E F

```
what does it print?
                       not indented, so
                     "outside" any function
def print letters():
                        indented, so "inside"
                           print_letters function
                     also not indented, so
                    "outside" any function.
                        Runs BEFORE
                     print_letters is called
print letters()
```

We use **indenting** to tell Python which code is **inside** or **outside** of a function (or other things we'll learn about soon).

```
what does it print?
                       not indented, so
print("A")
                     "outside" any function
def print letters():
                          indented, so "inside"
                           print_letters function
                                    blank lines are irrelevant
                     also not indented, so
print("E")
                    "outside" any function.
                        Runs BEFORE
                     print_letters is called
print letters()
```

We use **indenting** to tell Python which code is **inside** or **outside** of a function (or other things we'll learn about soon).

```
print("A")
print("B")
def print letters():
                       we'll often call the lines
                      of code inside something
                         a "block" of code
print("E")
print("F")
print letters()
```

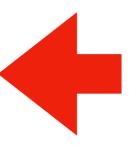
what does it print?

A B E F C D

## Today's Outline

Review

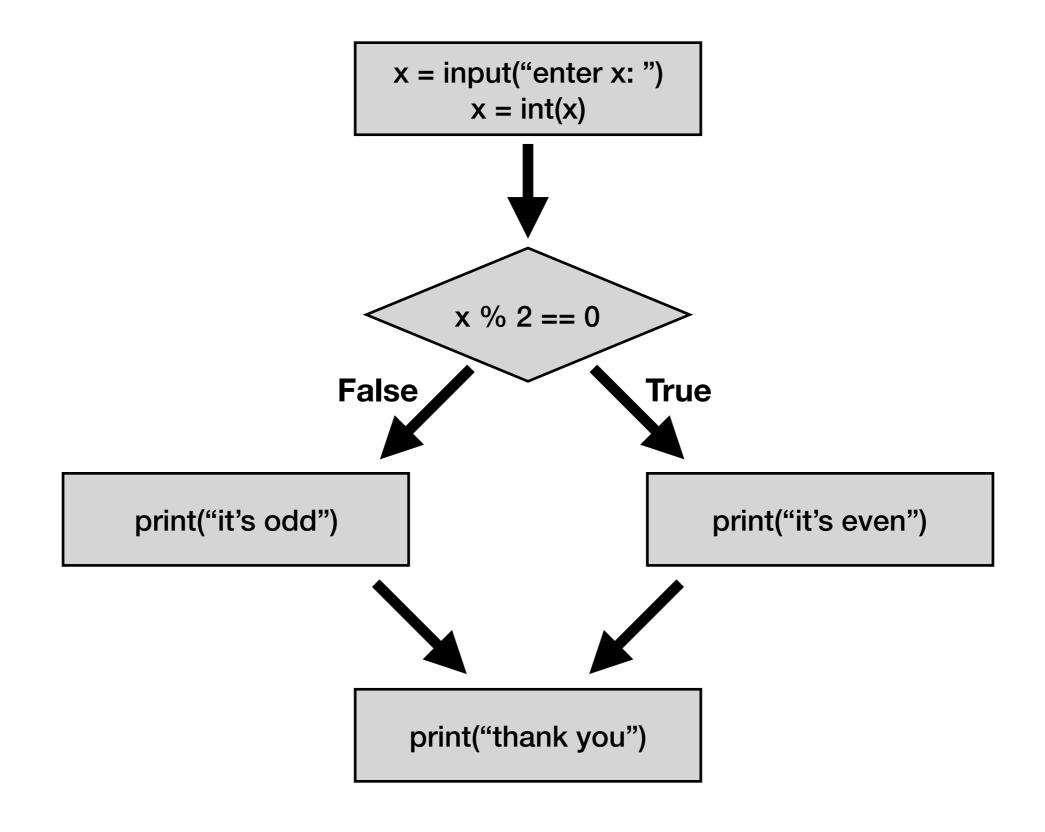
### **Control Flow Diagrams**

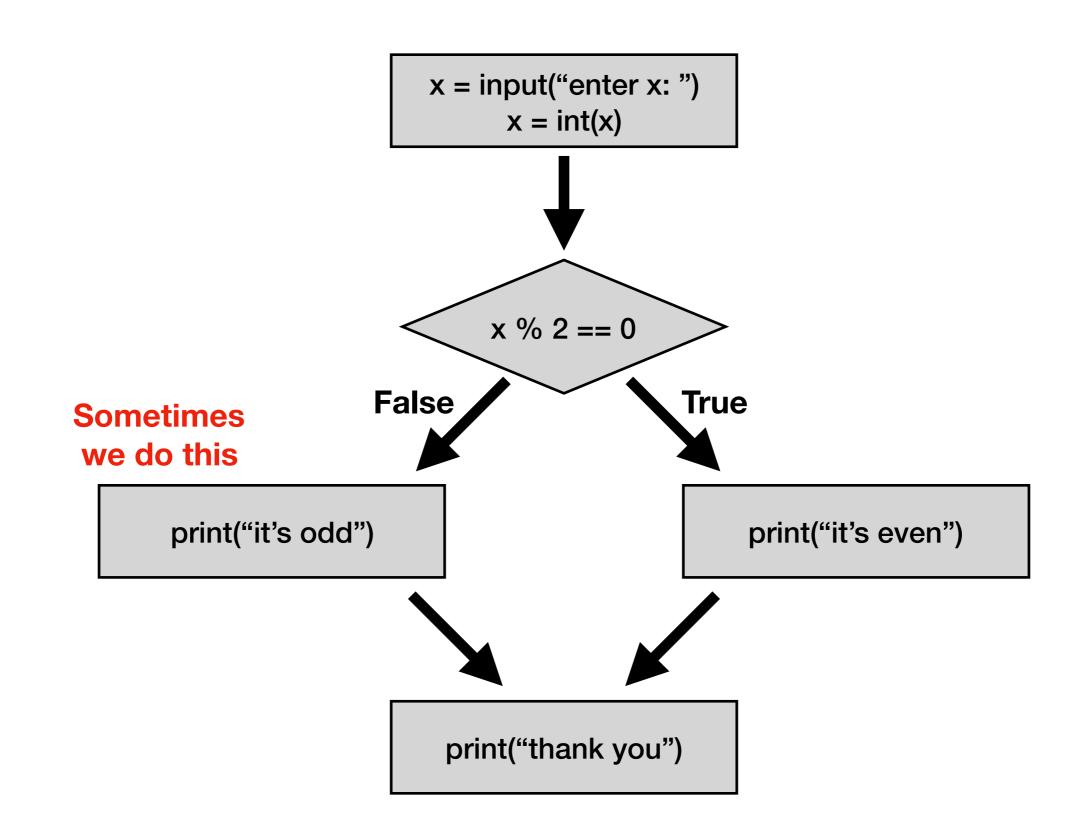


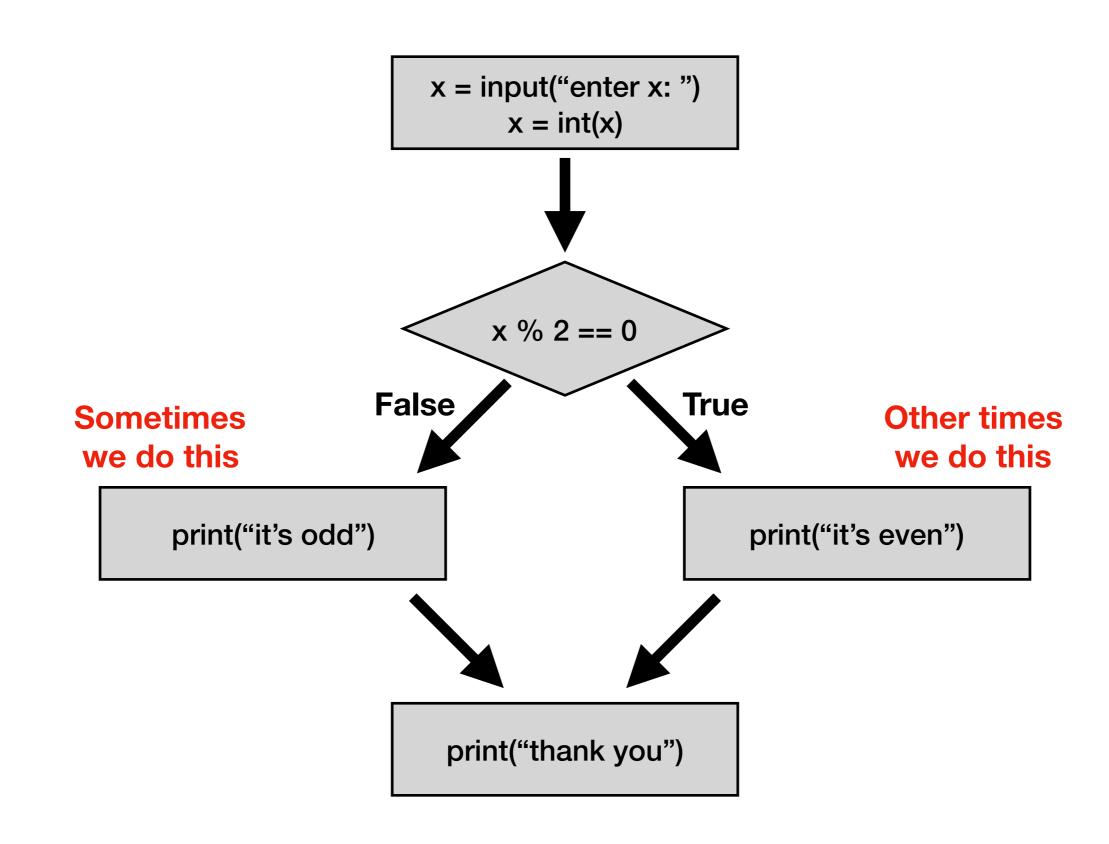
Basic syntax for "if"

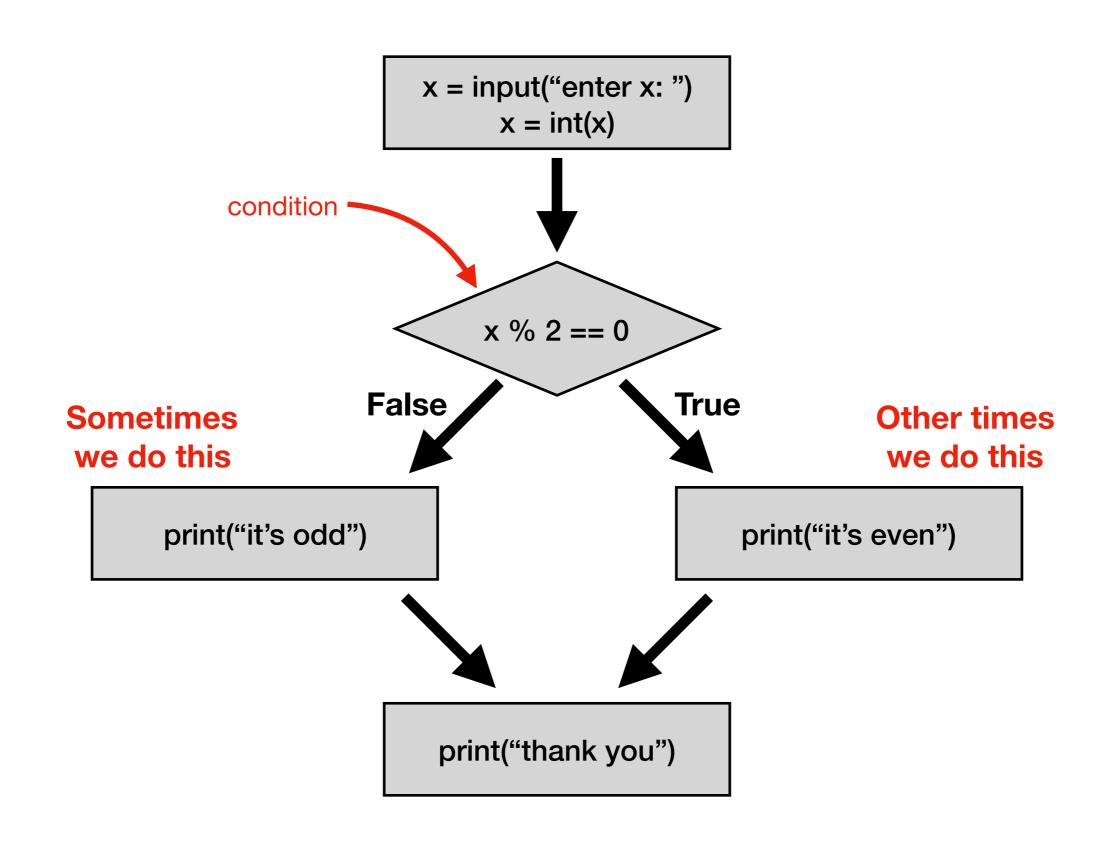
Identifying code blocks

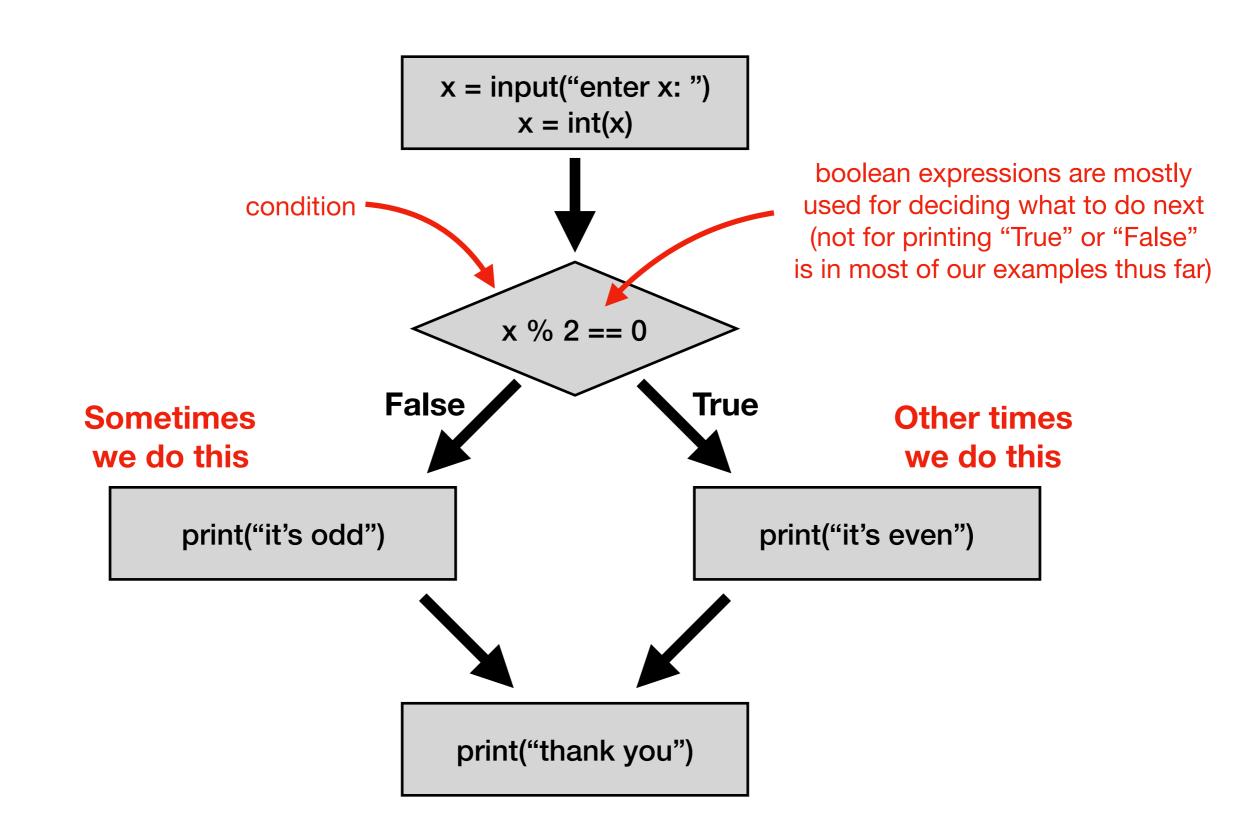
Demos







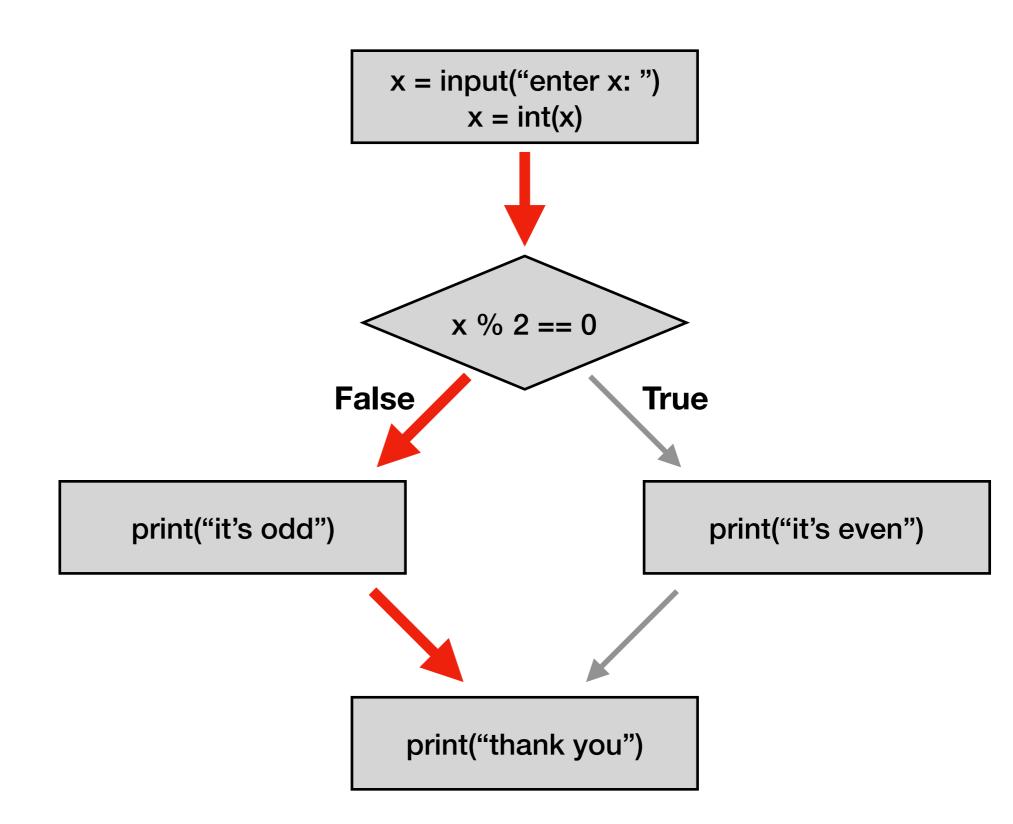




### "Paths of Execution"

### **Input/Output:**

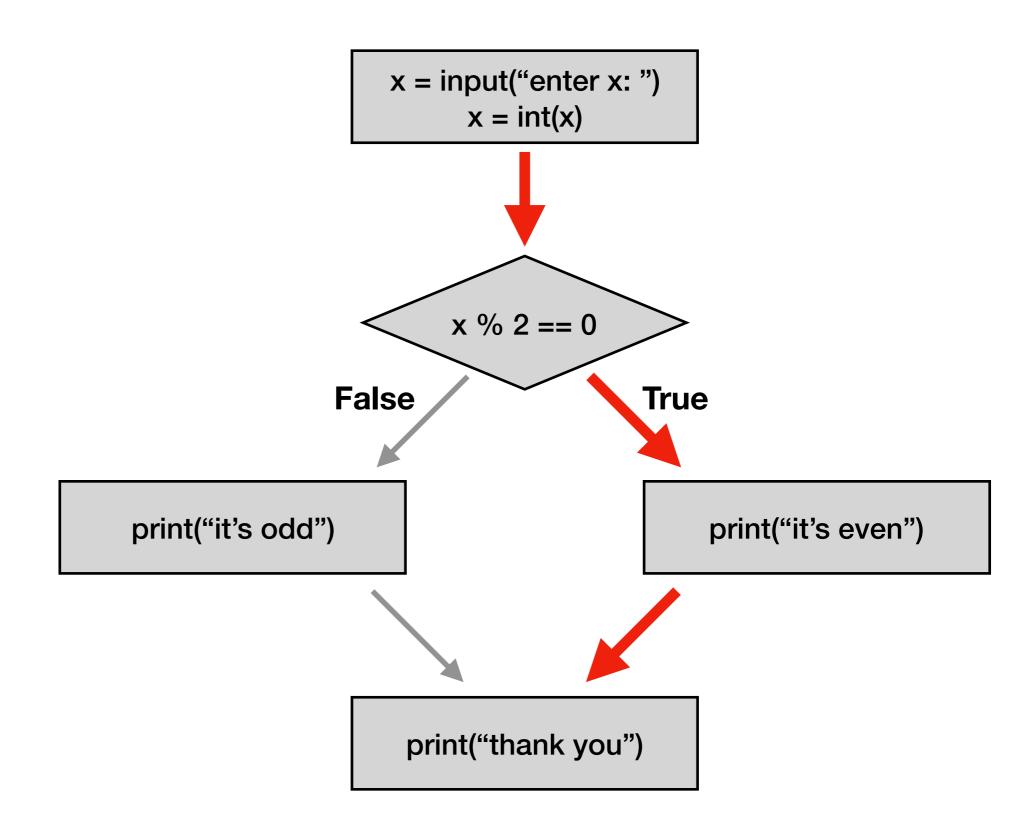
enter x: 7
it's odd
thank you



### "Paths of Execution"

### **Input/Output:**

enter x: 8
it's even
thank you



## Today's Outline

Review

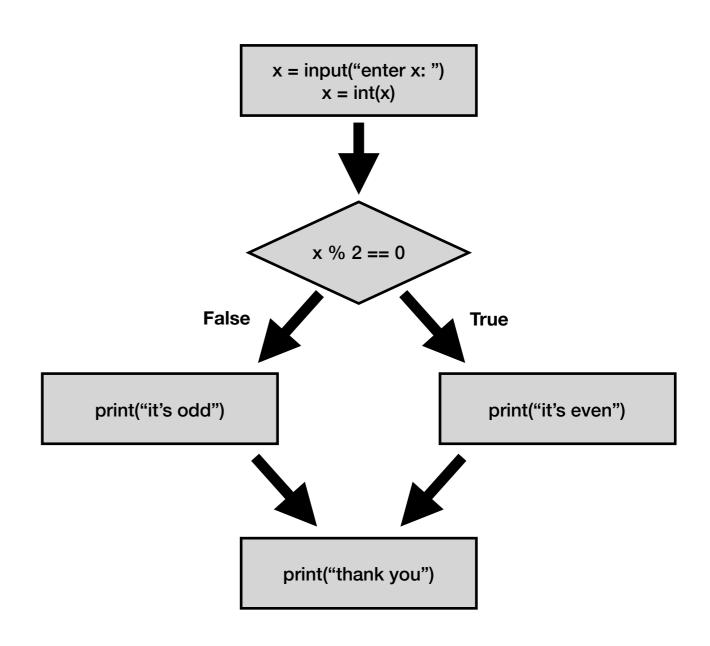
**Control Flow Diagrams** 

Basic syntax for "if"

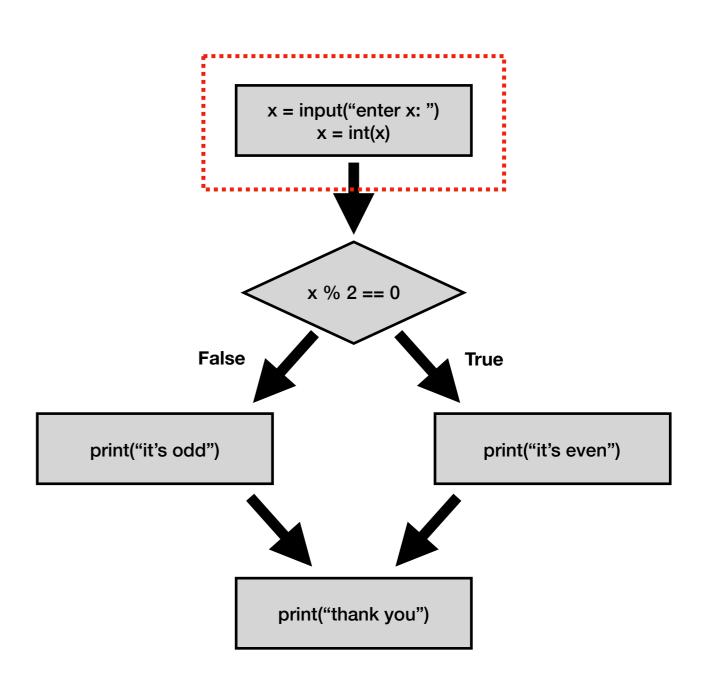


Identifying code blocks

Demos

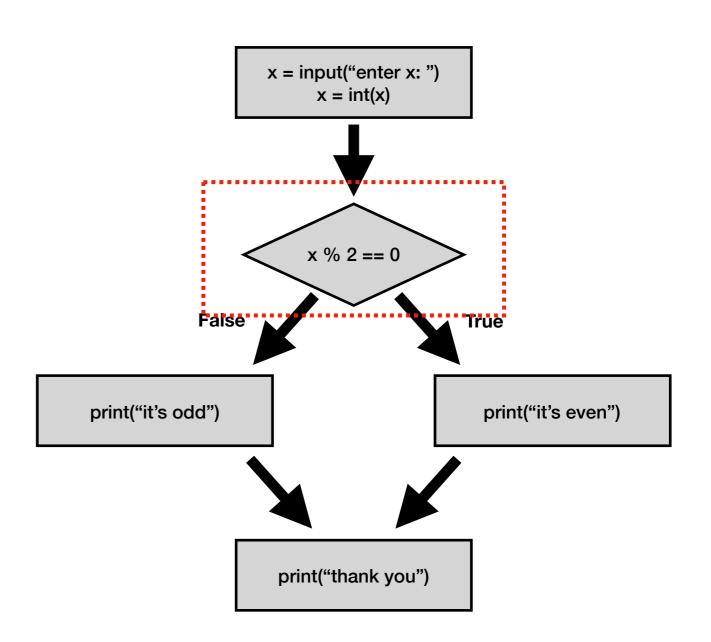


```
x = input("enter x: ")
x = int(x)
```



```
x = input("enter x: ")
x = int(x)

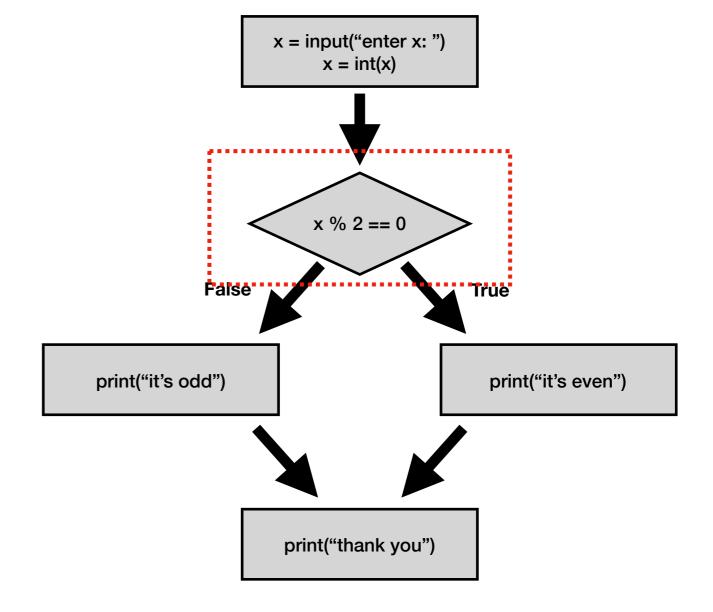
if x % 2 == 0:
```



```
x = input("enter x: ")
x = int(x)

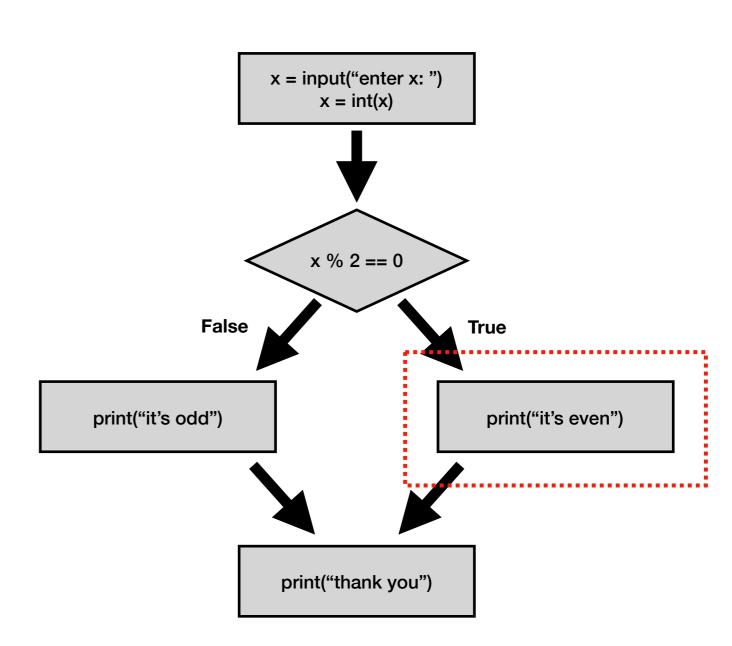
if x % 2 == 0:
```





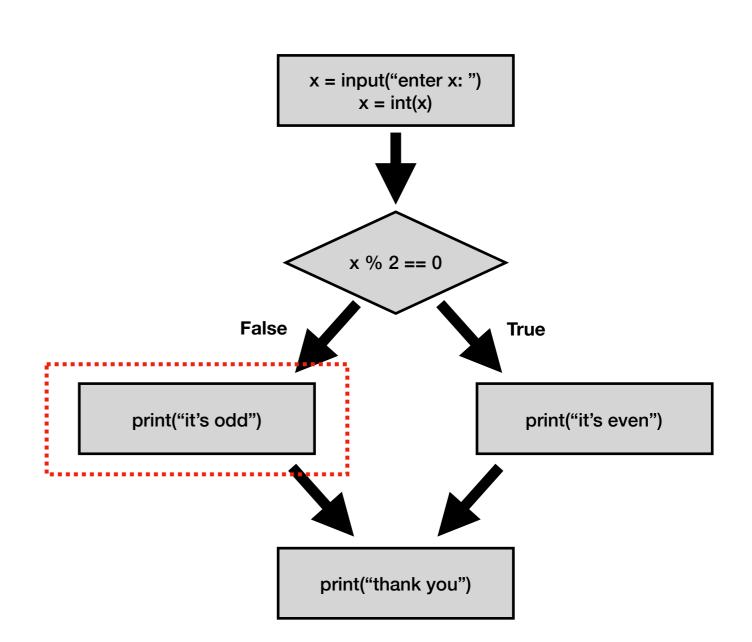
```
x = input("enter x: ")
x = int(x)

if x % 2 == 0:
    print("it's even")
```



```
x = input("enter x: ")
x = int(x)

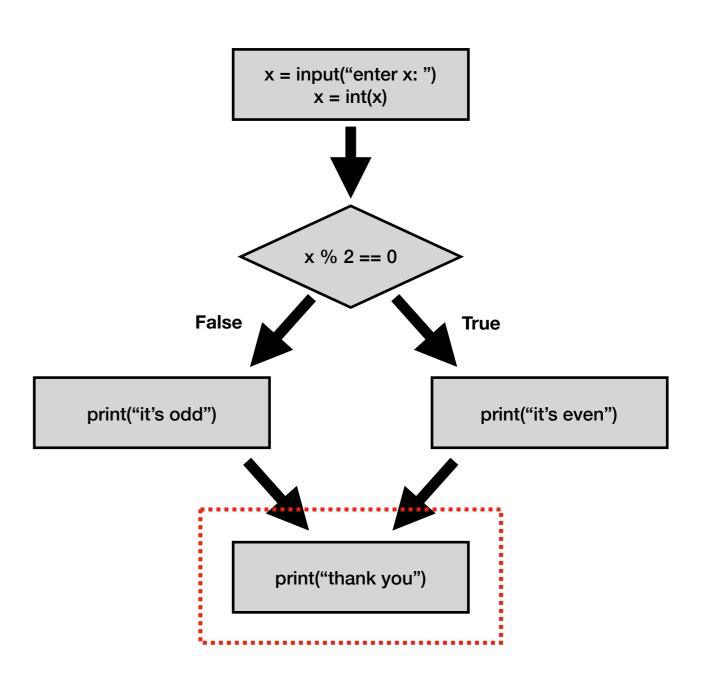
if x % 2 == 0:
   print("it's even")
else:
   print("it's odd")
```



```
Code:
x = input("enter x: ")
x = int(x)

if x % 2 == 0:
   print("it's even")
else:
   print("it's odd")
```

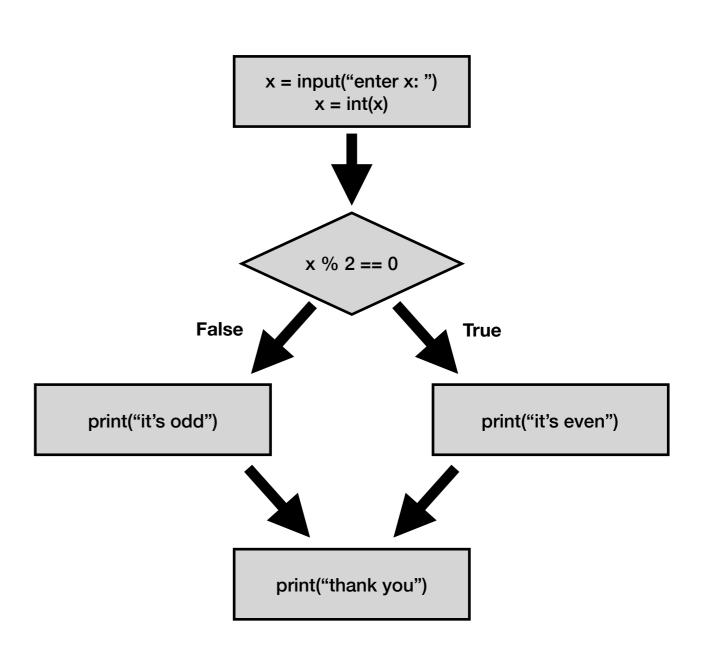
print("thank you")



```
x = input("enter x: ")
x = int(x)

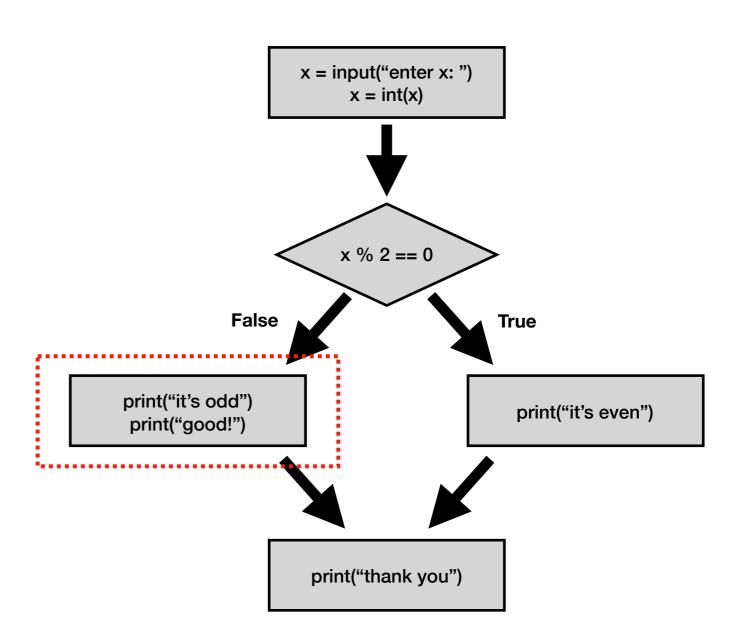
if x % 2 == 0:
    print("it's even")
else:
    print("it's odd")

print("thank you")
```



```
Code:
x = input("enter x: ")
x = int(x)

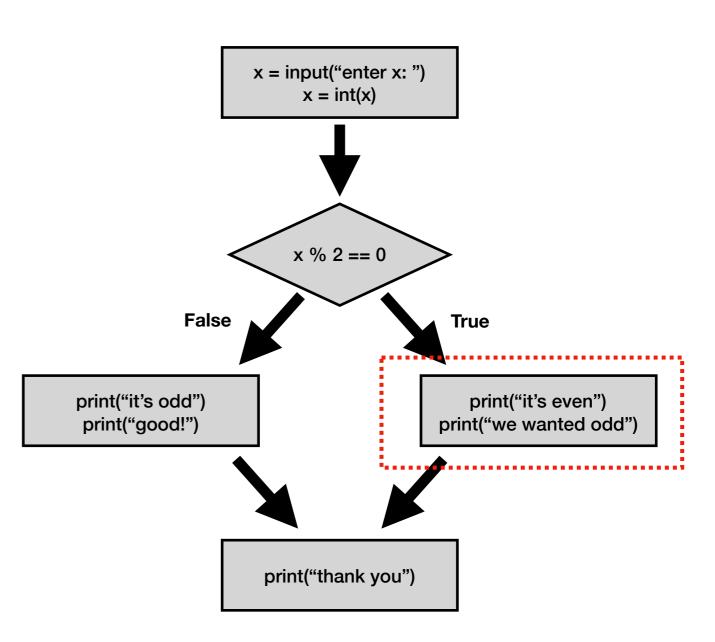
if x % 2 == 0:
    print("it's even")
else:
    print("it's odd")
    print("good!")
```



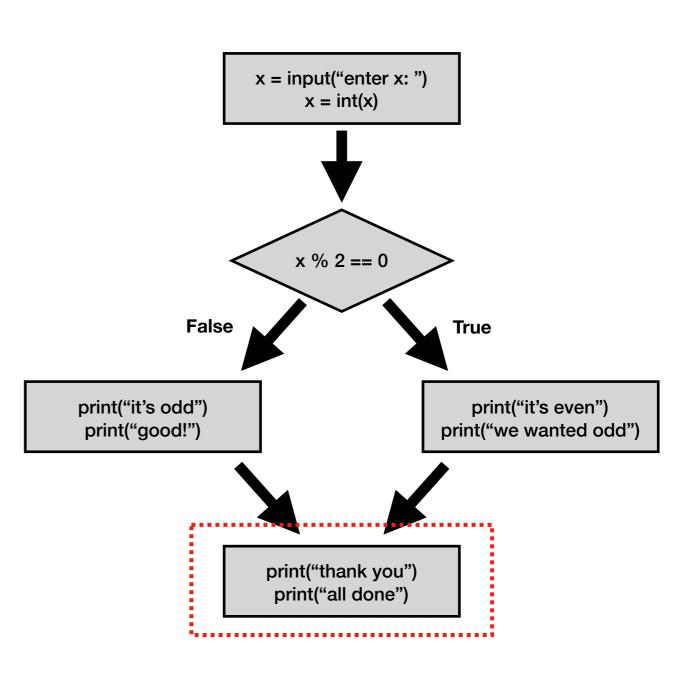
```
Code:
x = input("enter x: ")
x = int(x)

if x % 2 == 0:
    print("it's even")
    print("we wanted odd")

else:
    print("it's odd")
    print("good!")
```



```
Code:
x = input("enter x: ")
x = int(x)
if x % 2 == 0:
    print("it's even")
    print("we wanted odd")
else:
    print("it's odd")
    print("good!")
print("thank you")
print("all done")
```



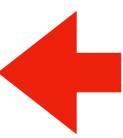
## Today's Outline

Review

**Control Flow Diagrams** 

Basic syntax for "if"

Identifying code blocks •



Demos

### **Code Blocks**

```
Code:
x = input("enter x: ")
x = int(x)
if x % 2 == 0:
    print("it's even")
    print("we wanted odd")
else:
    print("it's odd")
    print("good!")
print("thank you")
print("all done")
```

### **Code Blocks**

```
Code:
x = input("enter x: ")
x = int(x)
if x % 2 == 0:
                                block of code
    print("it's even")
                                  inside "if"
    print("we wanted odd")
else:
    print("it's odd")
    print("good!")
print("thank you")
print("all done")
```

```
Code:
x = input("enter x: ")
x = int(x)
if x % 2 == 0:
                                 block of code
    print("it's even")
                                   inside "if"
    print("we wanted odd")
else:
    print("it's odd")
                           block of code
    print("good!")
                            inside "else"
print("thank you")
print("all done")
```

```
Code:
x = input("enter x: ")
x = int(x)
if x % 2 == 0:
                                 block of code
    print("it's even")
    print("we wanted odd")
                                   inside "if"
else:
    print("it's odd")
                           block of code
    print("good!")
                            inside "else"
print("thank you")
print("all done")
```

What if all this were inside a function?

```
Code:
def check_oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
                                     block of code
        print("we wanted odd")
                                       inside "if"
    else:
        print("it's odd")
                               block of code
        print("good!")
                                inside "else"
    print("thank you")
    print("all done")
check_oddness()
```

#### Code:

```
def check oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
                                      block of code
        print("we wanted odd")
                                       inside "if"
    else:
        print("it's odd")
                                block of code
        print("good!")
                                inside "else"
                                                      block of code in
    print("thank you")
                                                      check_oddness
    print("all done")
```

check\_oddness()

check\_oddness()

You need to get good at "seeing" code blocks in Python code.

#### Code:

```
def check oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
                                      block of code
        print("we wanted odd")
                                       inside "if"
    else:
        print("it's odd")
                                block of code
        print("good!")
                                inside "else"
                                                      block of code in
    print("thank you")
                                                      check_oddness
    print("all done")
```

You need to get good at "seeing" code blocks in Python code.

Even blocks inside blocks inside blocks...

Code:

```
def check oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
                                      block of code
        print("we wanted odd")
                                       inside "if"
    else:
        print("it's odd")
                                block of code
        print("good!")
                                inside "else"
                                                      block of code in
    print("thank you")
                                                      check_oddness
    print("all done")
```

check\_oddness()

```
Code:
def check_oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
check_oddness()
```

```
Code:
def check_oddness()(:)
    x = input("enter x: ")
    x = int(x)
    if x \% 2 == 0:
        print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
check_oddness()
```

Step 1: look for a colon at end of a line

```
Code:
def check_oddness():
    x = input("enter x: ")
    x = int(x)
        print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
check_oddness()
```

Step 2: start drawing a line on next code line, indented in

```
Code:
def check_oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
       print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
check_oddness()
```

Step 3: continue down until you hit code that is less indented

```
Code:
def check_oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
       print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
check_oddness()
```

Step 4: box off the code

### Code: def check oddness(): x = input("enter x: ") x = int(x)if x % 2 == 0: print("it's even") print("we wanted odd") else: print("it's odd") print("good!") print("thank you") print("all done")

check\_oddness()

Step 4: box off the code

```
Code:
def check oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
```

to find more boxes, look for the next colon and repeat

check\_oddness()

```
Code:
def check oddness():
    x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
```

check\_oddness()

### Code: def check oddness(): x = input("enter x: ") x = int(x)if x % 2 == 0: print("it's even") print("we wanted odd") else: print("it's odd") print("good!") print("thank you") print("all done")

check\_oddness()

### Code: def check oddness(): x = input("enter x: ") x = int(x)if x % 2 == 0: print("it's even") print("we wanted odd") else: print("it's odd") print("good!") print("thank you") print("all done")

check\_oddness()

#### Code:

#### Do practice problems on worksheet

```
def check oddness():
   x = input("enter x: ")
    x = int(x)
    if x % 2 == 0:
        print("it's even")
        print("we wanted odd")
    else:
        print("it's odd")
        print("good!")
    print("thank you")
    print("all done")
```

check oddness()

# Today's Outline

Review

Control Flow Diagrams

Basic syntax for "if"

Identifying code blocks

