# CS101: Intro to Computing
# Fall 2015

## Lecture 7

# Administrivia

- Homework 5 is due **_tonight_**
- Homework 6 assigned (due on Mon)
- Midterm 1 is October 5$^{th}$
- DO NOT GIVE OUT HOMEWORK ANSWERS ON PIAZZA
  - This is academic dishonesty
  - There WILL BE CONSEQUENCES

# REVIEW

```
x=10
if ((x/2)<5) or ((x%3)==1):
  x=x+2
if (x!=10) or ((x**2)<=144):
  x=x*2
```

What is the value of x?

a) 10
b) 12
c) 20
d) 24

```
def fun(x):
  if x and x:
    return not x
  else:
    return x or x
```

x=fun(True) or fun(False)

What is the value of x?

a) True

b) False

```
def fun(a,b):
    if len(a)+len(b)>5:
        return (a+b)[0:5]
    else:
        return (b+a)+str(len(a))

x=fun("abc","def")+fun("gh","ij")
```

What is the value of x?
a) "abcdefijgh4
b) "defabcghij4"
c) "abcdeijgh4"
d) None of the above.

```
def fun(x):
  if x<100 or ???:
    return x+1
  else:
    return x
```

Increment x if the 100's place is 0:

a) x.string(3)=='0'

b) str(x)[-3]=='0'

c) ((x/100)%10)==0

d) None of the above.

# CONDITIONAL EXECUTION

# Conditional Execution

- Make decisions in our program

- Change program behavior

  - Based on a Boolean value
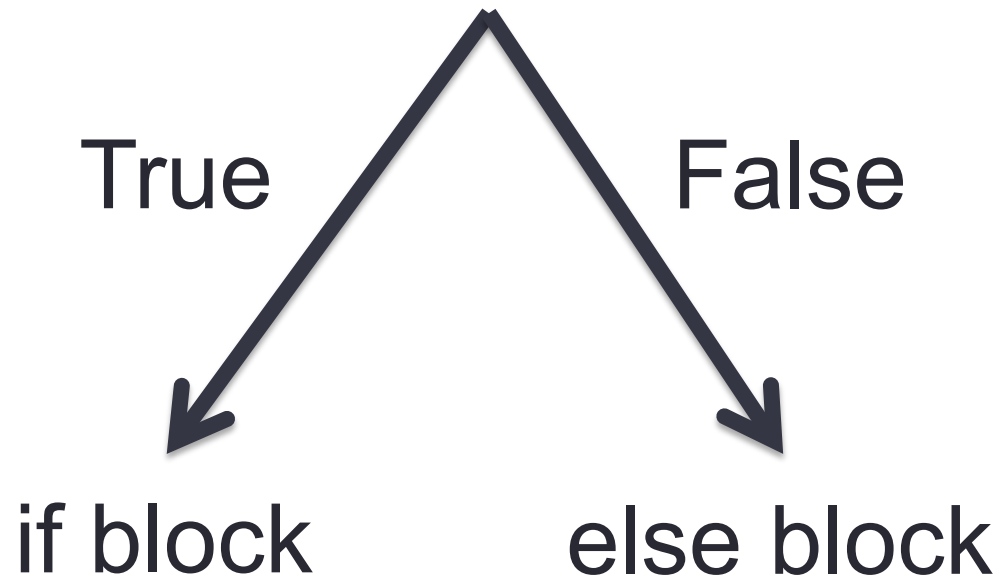
- Change the **control flow**

# If statement

- We create an **if statement** by typing:

1. the keyword **if**

2. a Boolean expression

3. a **block** of code

```
print "Welcome to my program."
input=raw_input("Are you nice?")
if input=="Yes":
  print "Hello, friend!"
```

# Alternative Execution

- Make decisions in our program

- Change program behavior

- Change the **control flow**

- Execute one block **or** another

# Alternative Execution

True                         False

if block               else block

# If… else statement

- We create an *if… else statement* with:
1. the keyword *if*
2. a Boolean expression
3. a *block* of code
4. the keyword *else*
5. another *block* of code

```
print "Welcome to my program."
input=raw_input("Are you nice?")
if input=="Yes":
  print "Hello, friend!"
else:
  print "HEY! BE NICE!"
```

```python
def absolute(x):
  if x>=0:
    return x
  else:
    return -x
```

# BOOLEANS AND STRINGS

# Boolean string methods

- isdigit() - "Is the string all digits?"
- isalpha() - "Is the string all letters?"
- islower() - "Is the string all lower case?"
- isupper() - "Is the string all upper case?"

```python
input=raw_input("Are you nice?")
if not input.isalpha():
  print "I don't understand."
else:
  print "I think I understand."
```

# Sequence operators

- in "Is this string inside the other?"
- not in "Is this string NOT inside the other?"

```
def fun(s):
    return s.isalpha() and "s" in s


x = fun("sam") and fun("AS")
```

What is the value of x?

a) True

b) False

# Nesting

- Sometimes, we need to make *more than one decision*

- We can *nest* blocks
  - One block inside the other
  - We've already been nesting conditionals and functions

```python
input=raw_input("Hello!")
if not input.isalpha():
  print "I don't understand."
else:
  if input.isupper():
    print "Don't shout!"
  else:
    print "Thanks!"
```

not alphabetical?

True                                    False
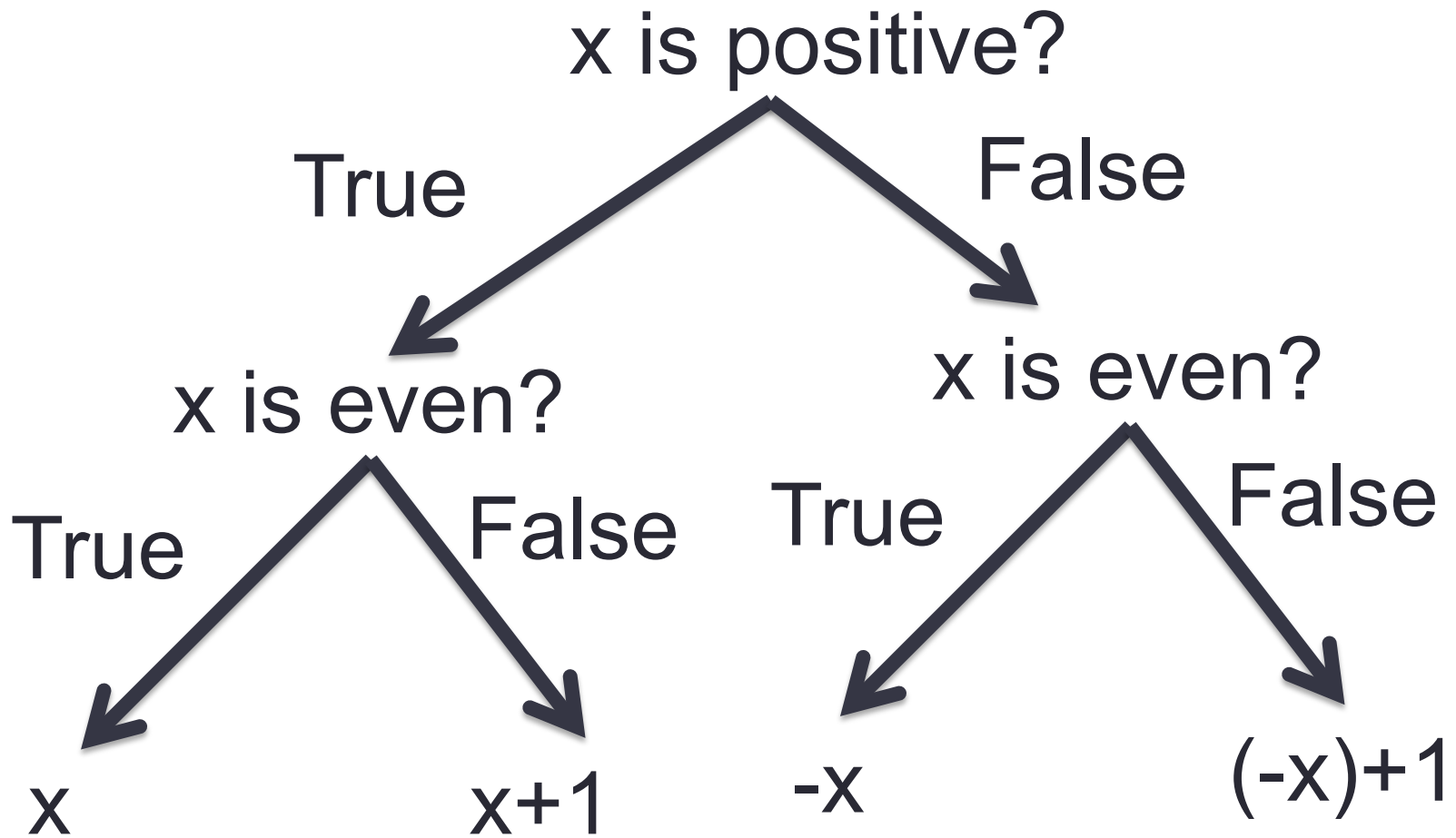
"I don't understand."          all upper case?

                              True                    False

"Don't shout!"                              "Thanks!"

x is positive?

True — x is even?

False — x is even?

x is even? (left): True → x; False → x+1

x is even? (right): True → -x; False → (-x)+1
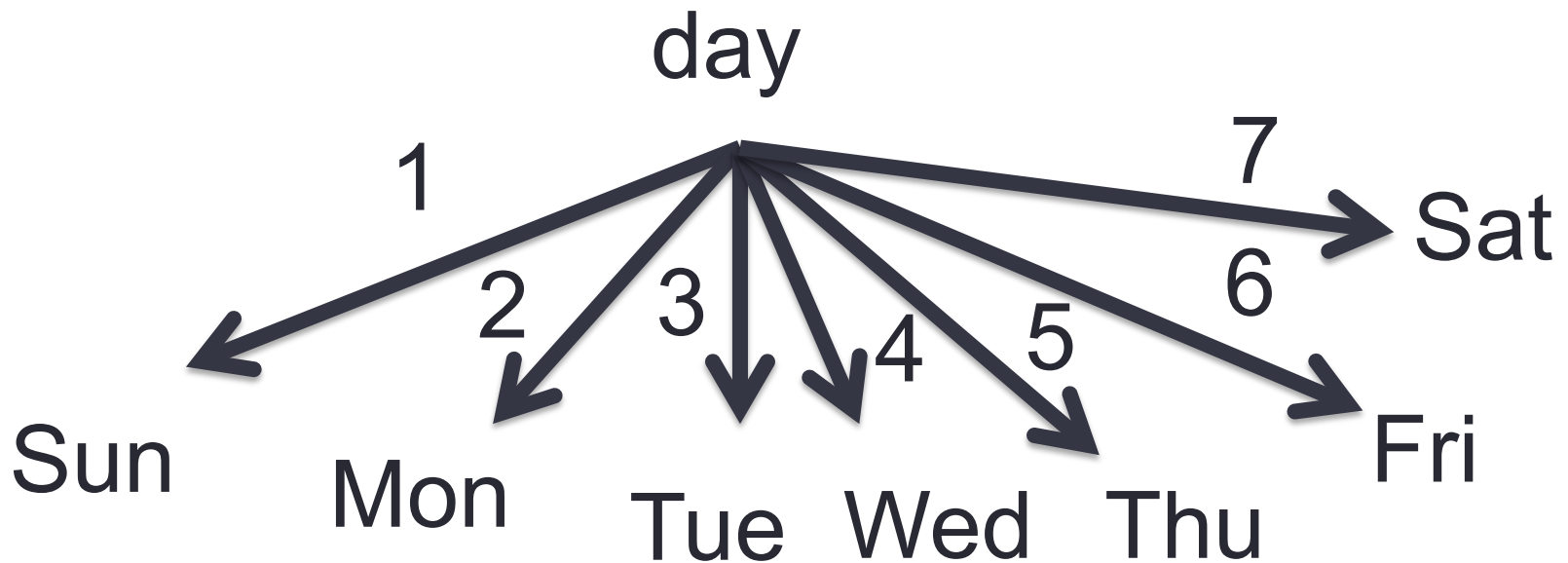
```python
def evenpos(x):
  if x>=0:
    if (x%2)==0:
      return x
    else:
      return x+1
  else:
    if (x%2)==0:
      return -x
    else:
      return (-x)+1
```

# Multi-way branch

- Sometimes, we want to choose between multiple choices
- Example: day of week => string

```
if day==1:
   print "Sunday"
else:
      if day==2:
         print "Monday"
      else:
         if day==3:
            print "Tuesday"
         else:
            if day==4:
               print "Wednesday"
            else:
               if day==5:
                  print "Thursday"
               else:
                  if day==6:
                     print "Friday"
                  else:
                     if day==7:
                        print "Saturday"
```

This
sucks!
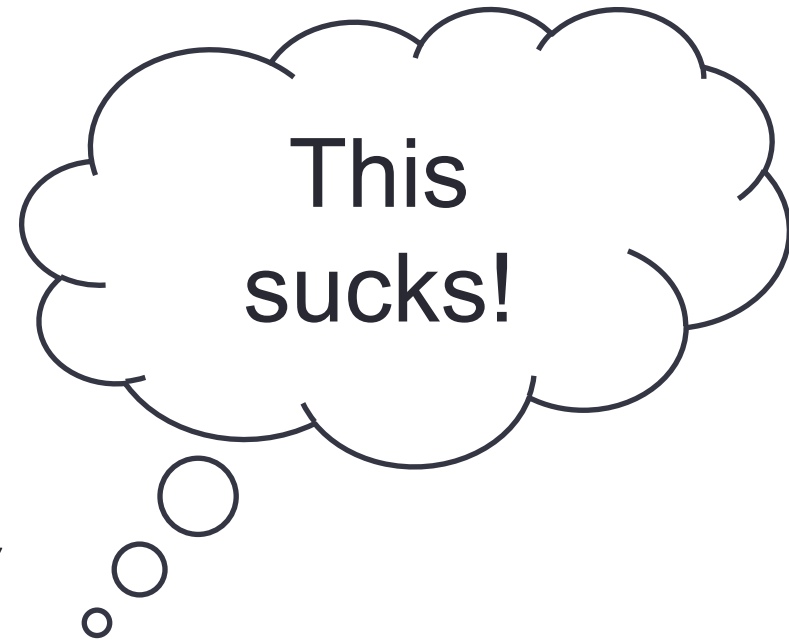
# elif

- Shorthand for ***else if***
- We don't need to indent again!

```
if day==1:
    print "Sunday"
elif day==2:
    print "Monday"
elif day==3:
    print "Tuesday"
elif day==4:
    print "Wednesday"
elif day==5:
    print "Thursday"
elif day==6:
    print "Friday"
elif day==7:
    print "Saturday"
else:
    print "That is not a valid day."
```