# Nested Loops

CS303E: Elements of Computers
and Programming
July 11, 2012

# Cloud Computing and
# Stem Cell Research

# Nested Loops

- *Nested loops* occur when a loop has one or more other loops in its body
- Outside loop variable is constant while the inside loop executes to completion
  - The outside loop variable is incremented and inside loop begins again

# Example

```
for i in range(5)
  for j in range(3)
      print "i="+str(i)+
             " j="+str(j)
```

Output:
i=0 j=0
i=0 j=1
i=0 j=2
i=1 j=0
i=1 j=1
i=1 j=2
i=2 j=0
i=2 j=1
i=2 j=2
i=3 j=0
i=3 j=1
i=3 j=2
i=4 j=0
i=4 j=1
i=4 j=2

## Example

Write a program that reads 10 strings from the user and prints the number of times the letter "a" appears in each string.

## iClicker Question

What is the value of sum after the following code is evaluated?

```
sum=0
for i in range(3)
    for j in range(6)
        sum=sum+1
```

A. 3      C. 18
B. 9      D. 729

## Exercise

Write a program that prints the following triangle, in which the first row contains 1 *, row 2 contains 2 *'s, … and row 10 contains 10 *'s

```
*
**
***
****
*****
******
*******
********
*********
**********
```

## Print:
## Eliminating Extra Space

- `print` always adds a blank space at the end:
  - A space after a comma OR
  - A newline when there is no comma
- To avoid this, use `sys.stdout.write()`
  - `sys` indicates the sys library
  - `stdout` indicates *standard output* or where the output usually goes---in this case, the interpreter

## sys.stdout.write(): Example

```
import sys
sys.stdout.write("hello")
sys.stdout.write("world")

Output:
    helloworld
```

## iClicker Question

What does `stdout` represent?

A. standard error
B. standard output
C. standard deviation

## Exercise

Write a program that reads in a string from the user and then:
- Capitalizes all the words
- Uses a loop to print every other character in the string starting with the first character without spaces between the letters

## Reminder

- Assignment 4 due SATURDAY
- Exam NEXT week (Friday)