Objectives

- Advanced problem solving with for loops

for loop review

```python
for i in xrange(5):
    # like assigning i values(0,1,2,3,4)
    # rest of loop body ...
```

- Note: when have xrange(5)
  - i gets values (0, 1, 2, 3, 4)
  - Which means that loop executes 5 times
- Optional: start and step parameters

Practicing for Loops

- Print the following:
  - A) 1 2 3 4 5
  - B) 2 5 8 11
  - C) **** **** ****

Fence Post Problem

- Given some posts and some beams to connect the posts, build a fence that is X fenceposts long

```
Posts: | Beams: -
```

Nested for Loops

- Use when need to repeat a loop
  - Good programming practice: use different variables for inner and outer loop variable

```
for x in xrange(N):
    statementa
    for y in xrange(M):
        statementb
```

- Analysis: how many times are statementa and statementb repeated?

fence_post.py
Practice: Draw a Tic-Tac-Toe Board

\[
\begin{array}{|c|c|}
\hline
| & | \\
\hline
- - - - & \\
\hline
| & | \\
\hline
\end{array}
\]

Practice: Assign Students to Groups

• Using a `for` loop and the modulo (%) operator, assign students to groups
  ➢ How would you “model” students (given the above problem specification)?

• Output for five students in 3 groups:

  Student 0 is in group 1
  Student 1 is in group 2
  Student 2 is in group 3
  Student 3 is in group 1
  Student 4 is in group 2

numStudents = 12
numGroups = 4
for student in xrange(numStudents):
    print student, “is in group”,
    print (student%numGroups)+1

random module

• Python provides the `random` module to generate pseudo-random numbers
• Why “pseudo-random”?  
  ➢ Actually generates a list of numbers and grabs the next one off the list
  ➢ A “seed” is used to initialize the random number generator
    • By default, the current time is used as the seed

Some random Functions

• `random()`
  ➢ Returns the next random floating point number in the range [0.0, 1.0)
• `randint(a, b)`
  ➢ Return a random integer N such that a<= N<= b

```python
import random
#random.seed(1)     # module.function()
for x in xrange(10):
    print random.random()
```
VA Lottery: Pick 4

- To play: you pick 4 numbers between 0 and 9
- To win: select the numbers that are selected by the magic ping-pong ball machine
- Your job: Simulate the magic ping-pong ball machines
  - Display the number on one line

VA Lottery: Pick 4

- To play: you pick 4 numbers between 0 and 9
- To win: select the numbers that are selected by the magic ping-pong ball machine
- Your job: Simulate the magic ping-pong ball machines
  - Revision: display number as #-#-#-#

For Friday

- Lab 2 is due
- Read rest of Four Puzzles from Cyberspace and write summary on Sakai